Tungaloy
Member IMC Group

Tungaloy Report No. 323-E

# TURNLINE Stainless steel turning series

# T6100 SERIES CVD coated grade

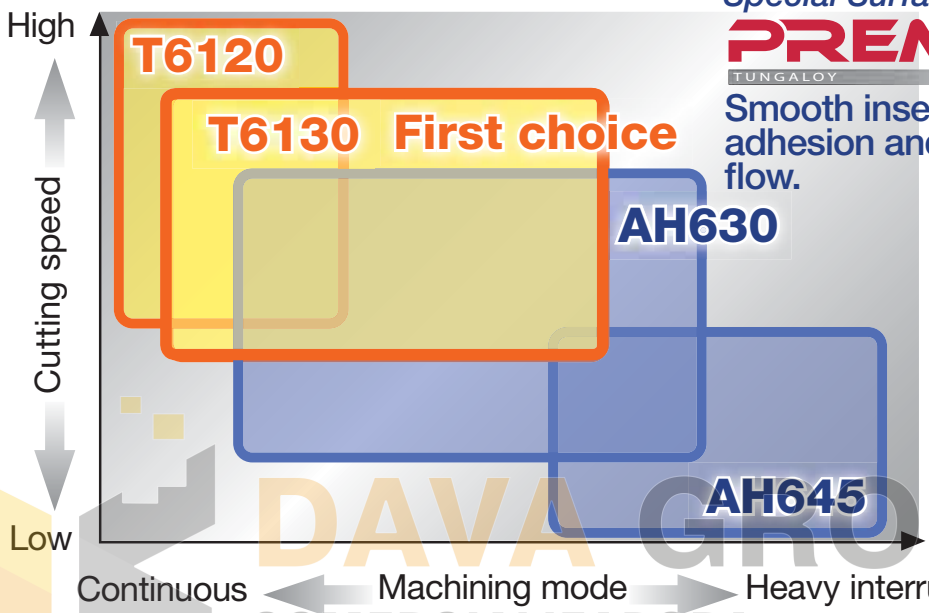
# AH600 SERIES PVD coated grade

PREMIUMTEC
TUNGALOY

## Most efficient grades for stainless steel turning

# Incredible reliability in stainless steel turning !

■ Application range of T6100 & AH600




*Special Surface Technology*

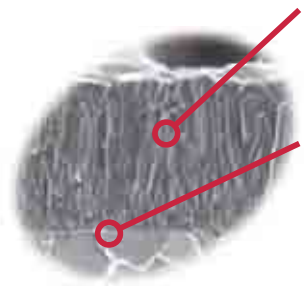
PREMIUMTEC
TUNGALOY

Smooth insert surface prevents chip adhesion and provides smooth chip flow.



## T6100 SERIES
TUNGALOY

New CVD coated grade



### Columnar Stabilization Technology

Excellent fracture and chipping resistance for extended tool life.

### Unique substrate with improved adhesion strength

High adhesion strength significantly improves chipping and fracture resistance.

**T6120**

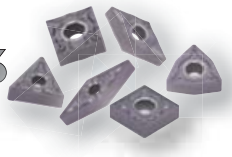
- Suitable for high speed cutting.
- Delivers excellent plastic deformation resistance.
- Especially suitable for austenite and precipitation hardened stainless steel machining.

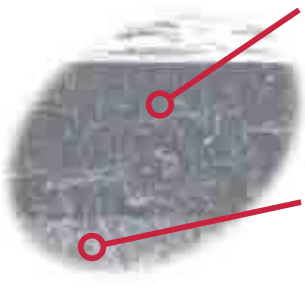
**T6130**

- Provides excellent wear resistance in medium to high speed machining.
- Ideal grade especially for ferrite and martensite stainless steel machining.
- Thicker layer than PVD leads to outstanding wear resistance.

## AH600 SERIES
TUNGALOY

New PVD coated grade





### Advanced wear and fracture resistance

This innovative coating layer reduces cracks while keeping a high level of wear resistance that enhances fracture resistance.

### Extremely high reliability !

Newly developed substrate with high adhesion strength on the coating layer.

**AH630**

- Recommended grade for general machining with its perfect balance of fracture and wear resistance
- High chipping resistance with excellent adhesion strength

**AH645**

- Excellent fracture resistance when machining at low to medium cutting speed
- Suitable grade for interrupted and heavy machining of stainless steel

# M Stainless

Stainless

## Negative type

### Finishing

Continuous to light interrupted

Recommended

SF T6130

Wear → SF T6120

### Medium cutting

Continuous to light interrupted

Recommended

SM T6130

Impact → SM AH630

Wear → SM T6120

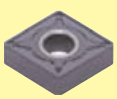
### Medium to heavy cutting

Continuous to light interrupted

Recommended

SH T6130

Impact → SH AH630



Wear → SH T6120

## Positive type

### Finishing

Continuous to light interrupted

Recommended

PSS T6130

Impact → PSS AH630

Wear → PSS T6120

### Medium cutting

Continuous to light interrupted

Recommended

PS T6130

Impact → PS AH630

Wear → PS T6120

### Medium to heavy cutting

Continuous to light interrupted

Recommended

PM T6130

Impact → PM AH630

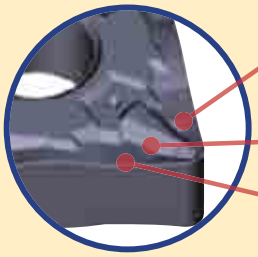
Wear → PM T6120

# Chipbreaker

## Negative type

### For finishing operations
### SF type

- Excellent chip control for finish machining
- Outstanding chip control when high feed turning at small depths of cut.
- Sharp edge reduces cutting forces and burrs



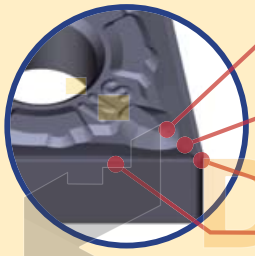
**Low cutting force**
➡ Large rake angle

**Reduces chip adhesion**
➡ Dimples around protrusion reduces contact with chips

**Excellent chip evacuation**
➡ Large inclination

### For medium cutting
### SM type

- Versatile chipbreaker applicable to a wide range of cutting conditions.
- Sharp cutting edge leads the excellent chip control



**Outstanding control of chips**
➡ Well-designed protrusion curls chips smoothly

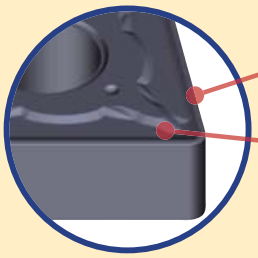
**Low cutting force**
➡ Created by the large rake angle and deep chipbreaker

**Tough cutting edge with excellent sharpness offers stable machining**
➡ Sharp positive-land on the corner
➡ Toughness with wide land at the main cutting edge



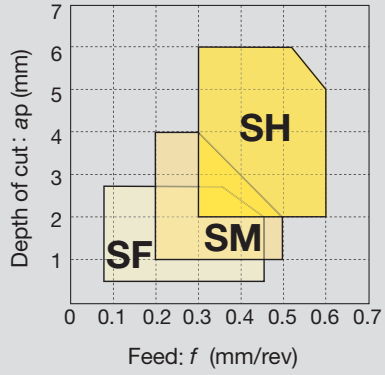
### For medium to heavy cutting
### SH type

- Suitable for roughing operations and interrupted machining with tough cutting edges
- Applicable for a wide range of cutting conditions and ideal for machining with a fluctuating depth of cut
- Newly designed cutting edges increase the fracture resistance



**Incredible fracture resistance**
➡ Provided from advanced cutting edges

**Low cutting forces and excellent chip control**
➡ Credit to a unique chipbreaker geometry



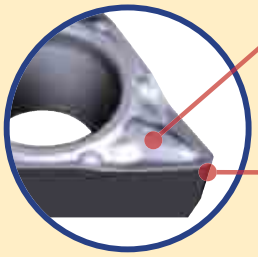

| Operation | Machining mode | Chip-breaker | Grades | Depth of cut ap (mm) | Feed f (mm/rev) |
|---|---|---|---|---|---|
| Finishing | Continuous | SF | T6120 | 0.5 ~ 2.5 | 0.08 ~ 0.45 |
| | Continuous to Light interrupted | | T6130 | | |
| | Heavy interrupted | | AH630 | | |
| Medium cutting | Continuous | SM | T6120 | 1.0 ~ 4.0 | 0.2 ~ 0.5 |
| | Continuous to Light interrupted | | T6130 | | |
| | Light interrupted | | AH630 | | |
| | Heavy interrupted | | AH645 | | |
| Medium to heavy cutting | Continuous | SH | T6130 | 2.0 ~ 6.0 | 0.3 ~ 0.6 |
| | Continuous to Light interrupted | | AH630 | | |
| | Heavy interrupted | | AH645 | | |

Note: Conditions in above table are for regular sized inserts.

# Positive type

Finishing to light cutting

## PSS type



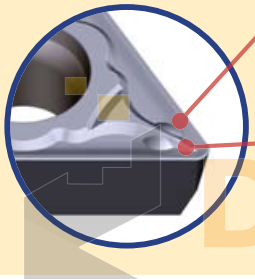
- Optimum chipbreaker for finish cutting of stainless steel
- Provides excellent chip control at small depths of cut

**Remarkable chip breaking**
➡ Arc shaped protrusion allows stable chip control even at small depths of cut

**Stable machining with low cutting force**
➡ Optimized inclination and rake angle reduces cutting forces and controls the chip flow when finish cutting

Finishing to medium cutting

## PS type



- Recommended chipbreaker for finish to medium cutting of stainless steel

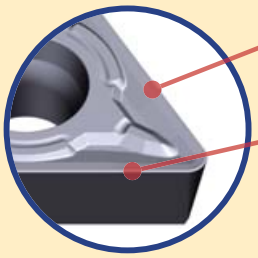
**Provides high reliability with low cutting force**
➡ Ideal combination of optimum rake angle and tough cutting edge

**Stable chip control in a wide range of cutting conditions**
➡ Uniquely designed protrusion creates smooth chip curling



Heavy cutting

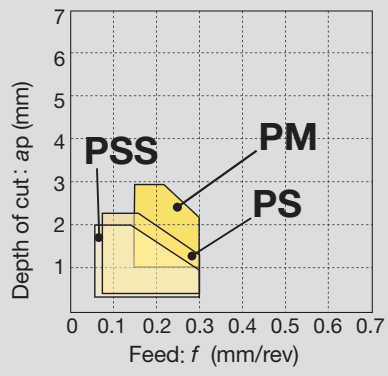
## PM type



- Sharp and tough cutting edge provides high reliability for stainless steel machining

**Allows exceptional chip control with low cutting force**
➡ Sharp cutting edges with optimum rake angle

**Reduces chipping and notch wear**
➡ Flexible land width along the cutting edge prevents chipping



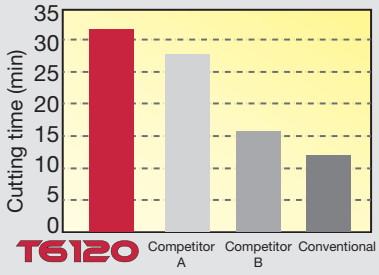

| Operation | Chipbreaker | Grades | Depth of cut *ap* (mm) | Feed *f* (mm/rev) |
|---|---|---|---|---|
| Finishing to Light cutting | PSS | T6120<br>T6130<br>AH630<br>AH645 | 0.3 ~ 2.0 | 0.08 ~ 0.3 |
| Finishing to Medium cutting | PS | T6120<br>T6130<br>AH630<br>AH645 | 0.5 ~ 2.5 | 0.08 ~ 0.3 |
| Heavy cutting | PM | T6120<br>T6130<br>AH630<br>AH645 | 1.0 ~ 3.0 | 0.15 ~ 0.3 |

Note: Conditions in above table are for regular sized inserts.

# Cutting performance

## T6120

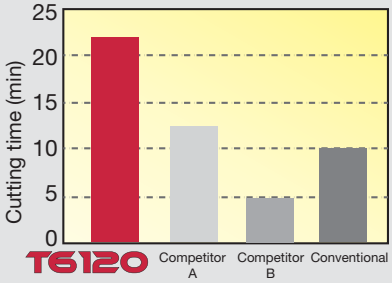
### Wear resistance test




■ Continuous cutting
Work material:
SUS304 / X5CrNi18-9
*Vc* = 200 m/min
*ap* = 2 mm
*f* = 0.2 mm/rev

**T6120 has higher wear resistance than competitor products when high speed cutting.**

### Fracture resistance test

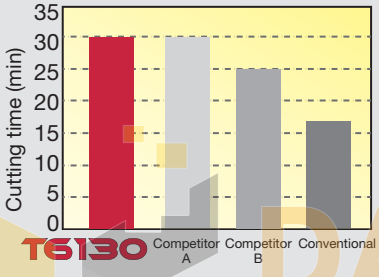



■ Interrupted cutting
Work material:
SUS304 / X5CrNi18-9
*Vc* = 150 m/min
*ap* = 2 mm
*f* = 0.2 mm/rev

**T6120 has higher fracture resistance than competitors products.**

## T6130

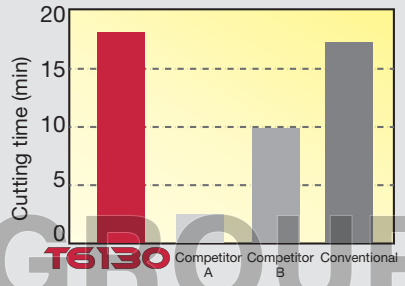
### Wear resistance test




■ Continuous cutting
Work material:
SUS304 / X5CrNi18-9
*Vc* = 150 m/min
*ap* = 2 mm
*f* = 0.3 mm/rev

**T6130 has higher wear resistance than both conventional and competitor grades.**

### Fracture resistance test



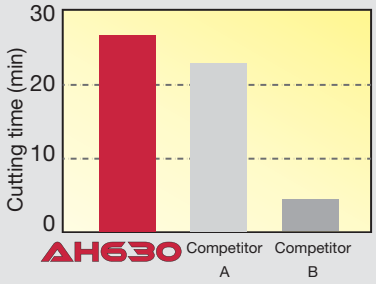

■ Interrupted cutting
Work material:
SUS304 / X5CrNi18-9
*Vc* = 120 m/min
*ap* = 2 mm
*f* = 0.1 mm/rev

**T6130 has higher fracture resistance than competitor products when medium cutting to provide longer tool life.**



## AH630

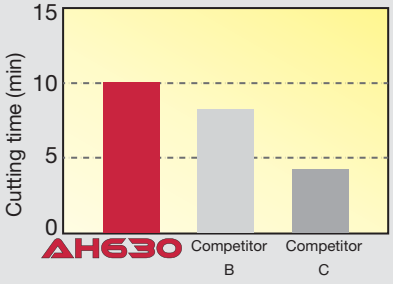
### Wear resistance test




■ Continuous cutting
Work material:
SUS304 / X5CrNi18-9
*Vc* = 150 m/min
*ap* = 2 mm
*f* = 0.3 mm/rev

**AH630 has higher wear resistance than competitor products.**

### Fracture resistance test

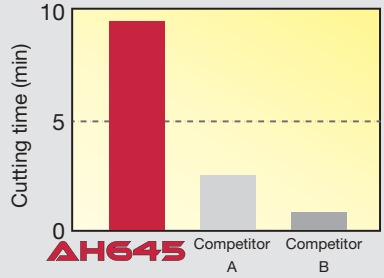



■ Interrupted cutting
Work material:
SUS304 / X5CrNi18-9
*Vc* = 120 m/min
*ap* = 1 mm
*f* = 0.25 mm/rev

**AH630 has higher fracture resistance than competitor products at medium cutting speed.**

## AH645

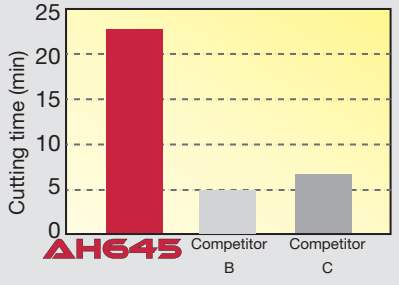
### Wear resistance test




■ Continuous cutting
Work material:
SUS304 / X5CrNi18-9
*Vc* = 150 m/min
*ap* = 2 mm
*f* = 0.3 mm/rev

**AH645 has higher wear resistance than competitors.**

### Fracture resistance test



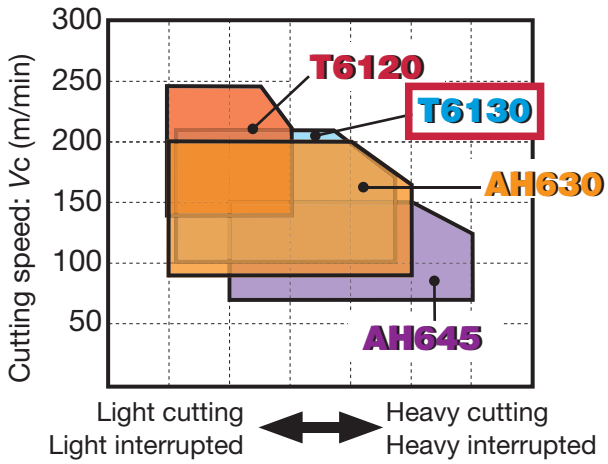

■ Interrupted cutting
Work material:
SUS304 / X5CrNi18-9
*Vc* = 120 m/min
*ap* = 1 mm
*f* = 0.25 mm/rev

**AH645 has higher fracture resistance than competitors in medium speed cutting.**

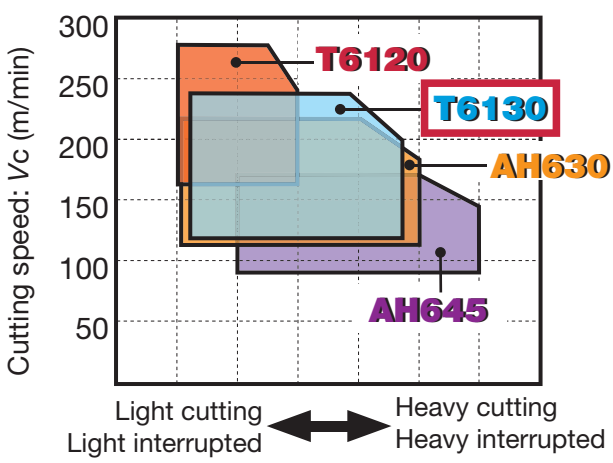
# Standard cutting conditions

## Standard cutting condition depending on work material

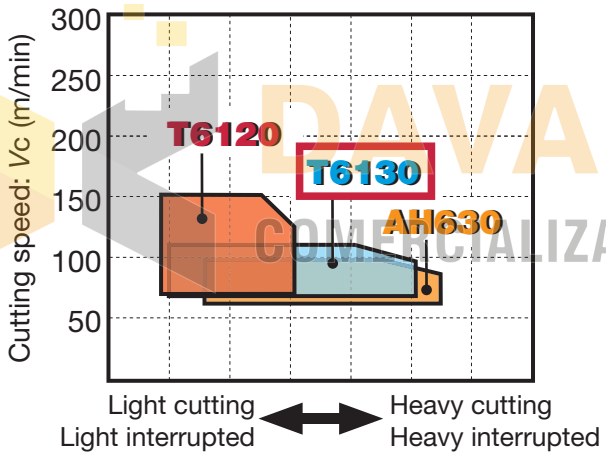
### Austenitic stainless steel




### Ferritic / martensite stainless steel




### Precipitation hardened stainless steel



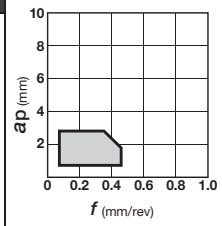
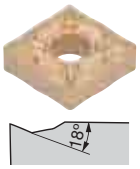
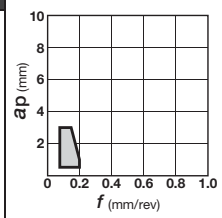
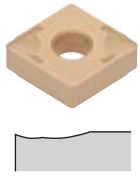
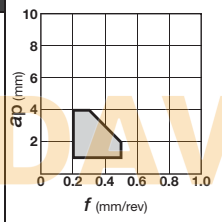
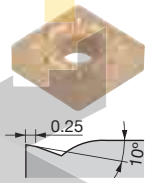
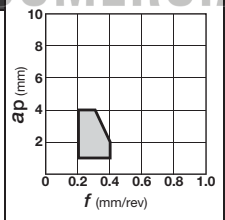
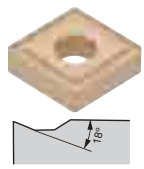
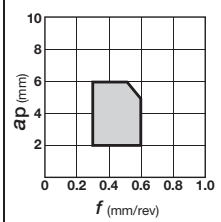
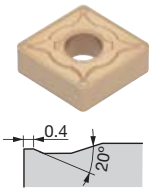
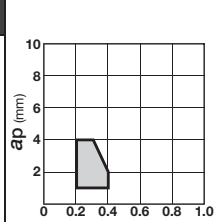
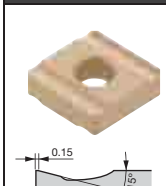



| Work materials | Grades | Cutting speed: *Vc* (m/min) |
|---|---|---|
| Austenitic<br>SUS304, SUS316 etc.<br>(X5CrNi18-9, X5CrNiMo17-12-2 etc.)<br>*AH630: First choice | T6120 | 140 - 240 |
| | **T6130** | **100 - 200** |
| | AH630 | 90 - 190 |
| | AH645 | 70 - 150 |
| Ferrite / Martensite<br>SUS430 / SUS410 etc.<br>(X6Cr17, X12Cr13 etc.) | T6120 | 160 - 280 |
| | **T6130** | **120 - 240** |
| | AH630 | 110 - 210 |
| | AH645 | 90 - 170 |
| Precipitation hardened<br>SUS631 etc.<br>(X7CrNiAl17-7 etc.) | T6120 | 80 - 150 |
| | **T6130** | **70 - 110** |
| | AH630 | 60 - 90 |

▭ :1st choice

# Inserts Negative type

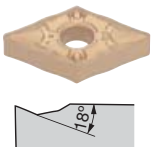
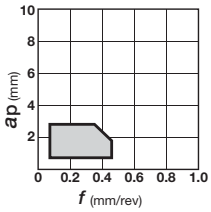
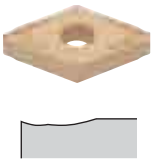
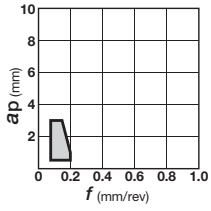
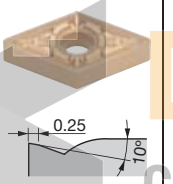
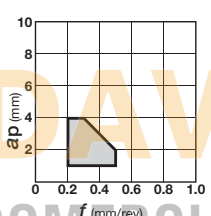
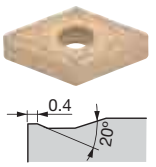
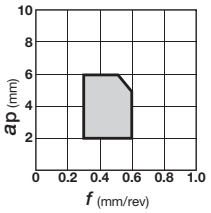
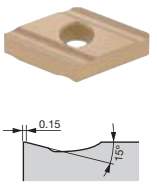
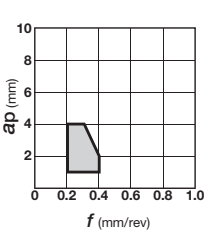
## Rhombic, 80°

| Appli-cation | Chipbreaker Appearance (Cross section) | f - ap | Cat. No. | Stocked grades Coated T6120 | T6130 | AH630 | AH645 | Dimensions (mm) I.C.dia ød | Thick-ness s | Hole dia ød1 | Corner radius rε |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Finishing | SF |  | CNMG090304-SF | ● | ● | ● | | 9.525 | 3.18 | 3.81 | 0.4 |
| |  | | CNMG090308-SF | ● | ● | ● | | | | | 0.8 |
| | | | CNMG120404-SF | ● | ● | ● | | 12.7 | 4.76 | 5.16 | 0.4 |
| | | | * CNMG120408-SF | ● | ● | ● | | | | | 0.8 |
| | | | CNMG120412-SF | ● | ● | ● | | | | | 1.2 |
| | SS |  | CNMG120404-SS | ● | ● | ● | ● | 12.7 | 4.76 | 5.16 | 0.4 |
| |  | | * CNMG120408-SS | ● | ● | ● | ● | | | | 0.8 |
| | | | CNMG120412-SS | ● | ● | ● | ● | | | | 1.2 |
| Medium cutting | SM |  | CNMG120404-SM | ● | ● | ● | ● | 12.7 | 4.76 | 5.16 | 0.4 |
| |  | | * CNMG120408-SM | ● | ● | ● | ● | | | | 0.8 |
| | | | CNMG120412-SM | ● | ● | ● | ● | | | | 1.2 |
| | SA |  | CNMG120404-SA | ● | ● | ● | ● | 12.7 | 4.76 | 5.16 | 0.4 |
| |  | | * CNMG120408-SA | ● | ● | ● | ● | | | | 0.8 |
| | | | CNMG120412-SA | ● | ● | ● | ● | | | | 1.2 |
| Medium to heavy cutting | SH |  | CNMG120408-SH | | ● | ● | ● | 12.7 | 4.76 | 5.16 | 0.8 |
| |  | | CNMG120412-SH | | ● | ● | ● | | | | 1.2 |
| | | | CNMG120416-SH | | ● | ● | ● | | | | 1.6 |
| | | | * CNMG160612-SH | | ● | ● | ● | 15.875 | 6.35 | 6.35 | 1.2 |
| | | | CNMG160616-SH | | ● | ● | ● | | | | 1.6 |
| | | | CNMG190612-SH | | ● | ● | ● | 19.05 | 6.35 | 7.93 | 1.2 |
| | | | CNMG190616-SH | | ● | ● | ● | | | | 1.6 |
| | S |  | CNMG120404R-S | | ● | ● | ● | 12.7 | 4.76 | 5.16 | 0.4 |
| |  | | CNMG120404L-S | | ● | ● | ● | | | | 0.4 |
| | | | * CNMG120408R-S | | ● | ● | ● | | | | 0.8 |
| | | | CNMG120408L-S | | ● | ● | ● | | | | 0.8 |

*Note: Chipbreaker cross sections are of the inserts marked *

● : Stocked items

## Rhombic, 55°

| Appli-cation | Chipbreaker Appearance (Cross section) | f - ap | Cat. No. | Stocked grades Coated T6120 | T6130 | AH630 | AH645 | Dimensions (mm) I.C.dia ød | Thick-ness s | Hole dia ød1 | Corner radius rε |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Finishing | **SF**   |   | DNMG150404-SF | ● | ● | ● | | 12.7 | 4.76 | 5.16 | 0.4 |
| | | | * DNMG150408-SF | ● | ● | ● | | | | | 0.8 |
| | | | DNMG150604-SF | ● | ● | ● | | 12.7 | 6.35 | 5.16 | 0.4 |
| | | | DNMG150608-SF | ● | ● | ● | | | | | 0.8 |
| | **SS**  |   | DNMG150404-SS | ● | ● | ● | ● | 12.7 | 4.76 | 5.16 | 0.4 |
| | | | DNMG150408-SS | ● | ● | ● | ● | | | | 0.8 |
| | | | * DNMG150412-SS | ● | ● | ● | ● | | | | 1.2 |
| | | | DNMG150604-SS | ● | ● | ● | ● | 12.7 | 6.35 | 5.16 | 0.4 |
| | | | DNMG150608-SS | ● | ● | ● | ● | | | | 0.8 |
| | | | DNMG150612-SS | ● | ● | ● | ● | | | | 1.2 |
| Medium cutting | **SM**   |   | DNMG150404-SM | ● | ● | ● | ● | 12.7 | 4.76 | 5.16 | 0.4 |
| | | | * DNMG150408-SM | ● | ● | ● | ● | | | | 0.8 |
| | | | DNMG150412-SM | ● | ● | ● | ● | | | | 1.2 |
| | | | DNMG150604-SM | ● | ● | ● | ● | 12.7 | 6.35 | 5.16 | 0.4 |
| | | | DNMG150608-SM | ● | ● | ● | ● | | | | 0.8 |
| | | | DNMG150612-SM | ● | ● | ● | ● | | | | 1.2 |
| Medium to heavy cutting | **SH**   |   | DNMG150408-SH | | ● | ● | ● | 12.7 | 4.76 | 5.16 | 0.8 |
| | | | * DNMG150412-SH | | ● | ● | ● | | | | 1.2 |
| | | | DNMG150416-SH | | ● | ● | ● | | | | 1.6 |
| | | | DNMG150608-SH | | ● | ● | ● | 12.7 | 6.35 | 5.16 | 0.8 |
| | | | DNMG150612-SH | | ● | ● | ● | | | | 1.2 |
| | **S**   |   | DNMG150404R-S | | ● | ● | ● | 12.7 | 4.76 | 5.16 | 0.4 |
| | | | DNMG150404L-S | | ● | ● | ● | | | | 0.4 |
| | | | * DNMG150408R-S | | ● | ● | ● | | | | 0.8 |
| | | | DNMG150408L-S | | ● | ● | ● | | | | 0.8 |
| | | | DNMG150604R-S | | ● | ● | ● | 12.7 | 6.35 | 5.16 | 0.4 |
| | | | DNMG150604L-S | | ● | ● | ● | | | | 0.4 |
| | | | DNMG150608R-S | | ● | ● | ● | | | | 0.8 |
| | | | DNMG150608L-S | | ● | ● | ● | | | | 0.8 |

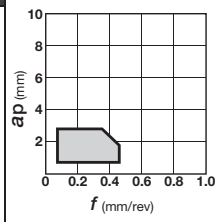
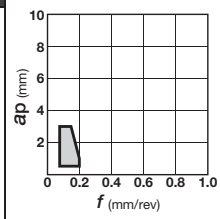
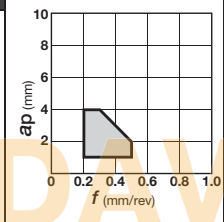
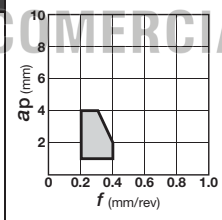
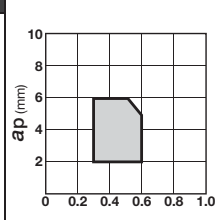
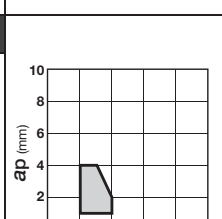


*Note: Chipbreaker cross sections are of the inserts marked *

● : Stocked items

## Negative type

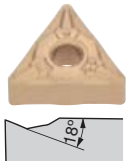
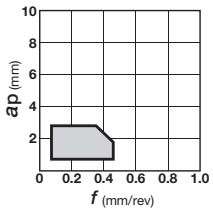
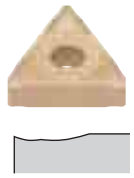
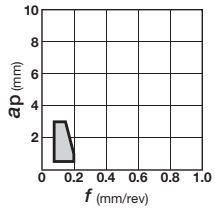
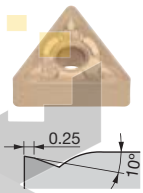
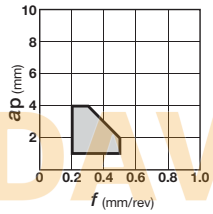
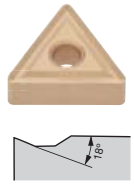
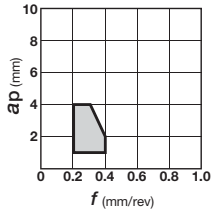
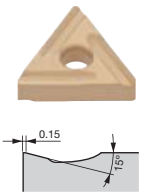
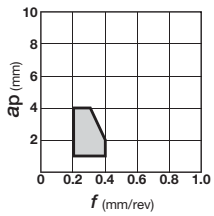
### Square, 90°

| Appli-cation | Chipbreaker<br>Appearance (Cross section) | f - ap | Cat. No. | Stocked grades<br>Coated<br>T6120 | T6130 | AH630 | AH645 | Dimensions (mm)<br>I.C.dia ød | Thick-ness s | Hole dia ød1 | Corner radius rε |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Finishing | SF |  | SNMG120404-SF | ● | ● | ● | | 12.7 | 4.76 | 5.16 | 0.4 |
| | | | * SNMG120408-SF | ● | ● | ● | | | | | 0.8 |
| | SS |  | SNMG120404-SS | ● | ● | ● | ● | 12.7 | 4.76 | 5.16 | 0.4 |
| | | | * SNMG120408-SS | ● | ● | ● | ● | | | | 0.8 |
| | | | SNMG120412-SS | ● | ● | ● | ● | | | | 1.2 |
| Medium cutting | SM |  | * SNMG120408-SM | ● | ● | ● | ● | 12.7 | 4.76 | 5.16 | 0.8 |
| | | | SNMG120412-SM | ● | ● | ● | ● | | | | 1.2 |
| | SA |  | * SNMG120404-SA | ● | ● | ● | ● | 12.7 | 4.76 | 5.16 | 0.4 |
| | | | SNMG120408-SA | ● | ● | ● | ● | | | | 0.8 |
| | | | SNMG120412-SA | ● | ● | ● | ● | | | | 1.2 |
| Medium to heavy cutting | SH |  | SNMG120408-SH | | ● | ● | ● | 12.7 | 4.76 | 5.16 | 0.8 |
| | | | SNMG120412-SH | | ● | ● | ● | | | | 1.2 |
| | | | * SNMG150612-SH | | ● | ● | ● | 15.875 | 6.35 | 6.35 | 1.2 |
| | | | SNMG150616-SH | | ● | ● | ● | | | | 1.6 |
| | | | SNMG190612-SH | | ● | ● | ● | 19.05 | 6.35 | 7.93 | 1.2 |
| | | | SNMG190616-SH | | ● | ● | ● | | | | 1.6 |
| | S |  | SNMG120404R-S | | ● | ● | ● | 12.7 | 4.76 | 5.16 | 0.4 |
| | | | SNMG120404L-S | | ● | ● | ● | | | | 0.4 |
| | | | * SNMG120408R-S | | ● | ● | ● | | | | 0.8 |
| | | | SNMG120408L-S | | ● | ● | ● | | | | 0.8 |

*Note: Chipbreaker cross sections are of the inserts marked *

● : Stocked items

## Triangular, 60°

| Appli-cation | Chipbreaker Appearance (Cross section) | f - ap | Cat. No. | Stocked grades Coated T6120 | T6130 | AH630 | AH645 | Dimensions (mm) I.C.dia ød | Thick-ness s | Hole dia ød1 | Corner radius rε |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Finishing | SF  |  | TNMG160404-SF | ● | ● | ● | | 9.525 | 4.76 | 3.81 | 0.4 |
| | | | *TNMG160408-SF | ● | ● | ● | | | | | 0.8 |
| | | | TNMG160412-SF | ● | ● | ● | | | | | 1.2 |
| | SS  |  | TNMG160404-SS | ● | ● | ● | ● | 9.525 | 4.76 | 3.81 | 0.4 |
| | | | TNMG160408-SS | ● | ● | ● | ● | | | | 0.8 |
| | | | TNMG160412-SS | ● | ● | ● | ● | | | | 1.2 |
| | | | * TNMG220404-SS | ● | ● | ● | ● | 12.7 | 4.76 | 5.16 | 0.4 |
| | | | TNMG220408-SS | ● | ● | ● | ● | | | | 0.8 |
| | | | TNMG220412-SS | ● | ● | ● | ● | | | | 1.2 |
| Medium cutting | SM  |  | TNMG160404-SM | ● | ● | ● | ● | 9.525 | 4.76 | 3.81 | 0.4 |
| | | | *TNMG160408-SM | ● | ● | ● | ● | | | | 0.8 |
| | | | TNMG160412-SM | ● | ● | ● | ● | | | | 1.2 |
| | | | TNMG220408-SM | ● | ● | ● | ● | 12.7 | | 5.16 | 0.8 |
| | | | TNMG220412-SM | ● | ● | ● | ● | | | | 1.2 |
| | SA  |  | TNMG160404-SA | ● | ● | ● | ● | 9.525 | 4.76 | 3.81 | 0.4 |
| | | | * TNMG160408-SA | ● | ● | ● | ● | | | | 0.8 |
| | | | TNMG160412-SA | ● | ● | ● | ● | | | | 1.2 |
| | | | TNMG220408-SA | ● | ● | ● | ● | 12.7 | 4.76 | 5.16 | 0.8 |
| | | | TNMG220412-SA | ● | ● | ● | ● | | | | 1.2 |
| | S  |  | TNMG160404R-S | | ● | ● | ● | 9.525 | 4.76 | 3.81 | 0.4 |
| | | | TNMG160404L-S | | ● | ● | ● | | | | 0.4 |
| | | | * TNMG160408R-S | | ● | ● | ● | | | | 0.8 |
| | | | TNMG160408L-S | | ● | ● | ● | | | | 0.8 |
| | | | TNMG220404R-S | | ● | ● | ● | 12.7 | 4.76 | 5.16 | 0.4 |
| | | | TNMG220404L-S | | ● | ● | ● | | | | 0.4 |
| | | | TNMG220408R-S | | ● | ● | ● | | | | 0.8 |
| | | | TNMG220408L-S | | ● | ● | ● | | | | 0.8 |

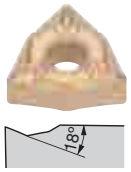
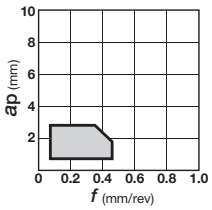
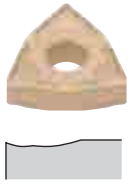
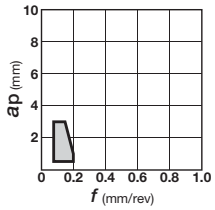
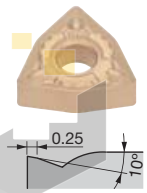
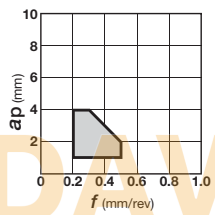
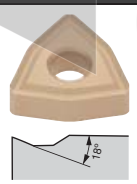
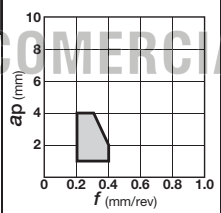
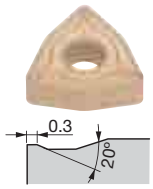
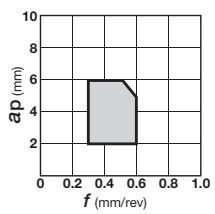


*Note: Chipbreaker cross sections are of the inserts marked *

● : Stocked items

## Negative type

### Trigon, 80°

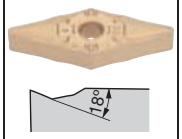
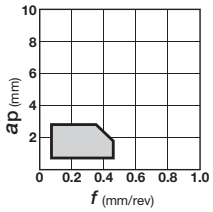
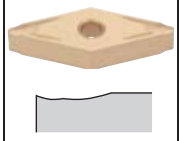
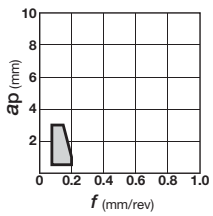
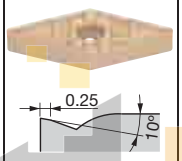
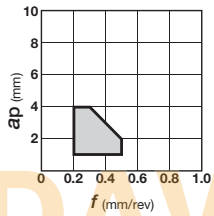
| Appli-cation | Chipbreaker Appearance (Cross section) | f - ap | Cat. No. | Stocked grades Coated T6120 | T6130 | AH630 | AH645 | Dimensions (mm) I.C.dia ød | Thick-ness s | Hole dia ød1 | Corner radius rε |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Finishing | SF   |   | WNMG060404-SF | ● | ● | ● | | 9.525 | 4.76 | 3.81 | 0.4 |
| | | | WNMG060408-SF | ● | ● | ● | | | | | 0.8 |
| | | | WNMG080404-SF | ● | ● | ● | | 12.7 | 4.76 | 5.16 | 0.4 |
| | | | * WNMG080408-SF | ● | ● | ● | | | | | 0.8 |
| Medium cutting | SS  |   | WNMG080404-SS | ● | ● | ● | ● | 12.7 | 4.76 | 5.16 | 0.4 |
| | | | * WNMG080408-SS | ● | ● | ● | ● | | | | 0.8 |
| | | | WNMG080412-SS | ● | ● | ● | ● | | | | 1.2 |
| | SM   |   | WNMG080404-SM | ● | ● | ● | ● | 12.7 | 4.76 | 5.16 | 0.4 |
| | | | * WNMG080408-SM | ● | ● | ● | ● | | | | 0.8 |
| | | | WNMG080412-SM | ● | ● | ● | ● | | | | 1.2 |
| Medium to heavy cutting | SA   |   | * WNMG080408-SA | ● | ● | ● | ● | 12.7 | 4.76 | 5.16 | 0.8 |
| | | | WNMG080412-SA | ● | ● | ● | ● | | | | 1.2 |
| | SH   |   | WNMG080408-SH | | ● | ● | ● | 12.7 | 4.76 | 5.16 | 0.8 |
| | | | * WNMG080412-SH | | ● | ● | ● | | | | 1.2 |



*Note: Chipbreaker cross sections are of the inserts marked *

● : Stocked items

## Rhombic, 35°

| Appli-cation | Chipbreaker Appearance (Cross section) | f - ap | Cat. No. | Stocked grades Coated T6120 | T6130 | AH630 | AH645 | Dimensions (mm) I.C.dia ød | Thick-ness s | Hole dia ød1 | Corner radius rε |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Finishing | **SF**   |   | **VNMG160404-SF** | ● | ● | ● | | 9.525 | 4.76 | 3.81 | 0.4 |
| | | | * **VNMG160408-SF** | ● | ● | ● | | | | | 0.8 |
| | **SS**  |   | * **VNMG160404-SS** | ● | ● | ● | ● | 9.525 | 4.76 | 3.81 | 0.4 |
| | | | **VNMG160408-SS** | ● | ● | ● | ● | | | | 0.8 |
| | | | **VNMG160412-SS** | ● | ● | ● | ● | | | | 1.2 |
| Medium cutting | **SM**   |   | **VNMG160404-SM** | ● | ● | ● | ● | 9.525 | 4.76 | 3.81 | 0.4 |
| | | | * **VNMG160408-SM** | ● | ● | ● | ● | | | | 0.8 |
| | | | **VNMG160412-SM** | ● | ● | ● | ● | | | | 1.2 |

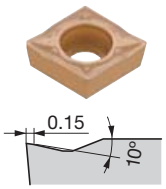
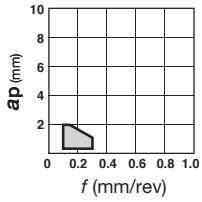
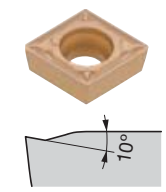
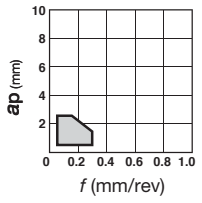
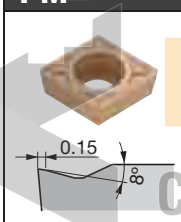
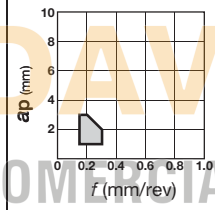


*Note: Chipbreaker cross sections are of the inserts marked *

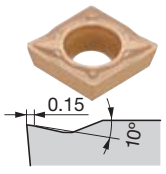
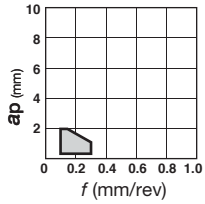
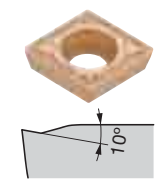
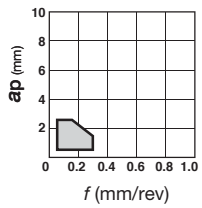
● : Stocked items

# Inserts Positive type

## Rhombic, 80° (7°)

| Application | Chipbreaker Appearance (Cross section) | f - ap | Cat. No | Stocked grades Coated T6120 | T6130 | AH630 | AH645 | Dimensions (mm) I.C.dia ød | Thick-ness s | Hole dia ød1 | Corner radius rε |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Finishing to light cutting | PSS   |   | CCMT060204-PSS | ● | ● | ● | ● | 6.35 | 2.38 | 2.8 | 0.4 |
| | | | CCMT060208-PSS | ● | ● | ● | ● | | | | 0.8 |
| | | | *CCMT09T304-PSS | ● | ● | ● | ● | 9.525 | 3.97 | 4.4 | 0.4 |
| | | | CCMT09T308-PSS | ● | ● | ● | ● | | | | 0.8 |
| | | | CCMT120404-PSS | ● | ● | ● | ● | 12.7 | 4.76 | 5.5 | 0.4 |
| | | | CCMT120408-PSS | ● | ● | ● | ● | | | | 0.8 |
| | | | CCMT120412-PSS | ● | ● | ● | ● | | | | 1.2 |
| Finishing to medium cutting | PS   |   | CCMT060202-PS | ● | ● | ● | ● | 6.35 | 2.38 | 2.8 | 0.2 |
| | | | CCMT060204-PS | ● | ● | ● | ● | | | | 0.4 |
| | | | *CCMT060208-PS | ● | ● | ● | ● | | | | 0.8 |
| | | | CCMT09T302-PS | ● | ● | ● | ● | 9.525 | 3.97 | 4.4 | 0.2 |
| | | | CCMT09T304-PS | ● | ● | ● | ● | | | | 0.4 |
| | | | CCMT09T308-PS | ● | ● | ● | ● | | | | 0.8 |
| | | | CCMT120404-PS | ● | ● | ● | ● | 12.7 | 4.76 | 5.5 | 0.4 |
| | | | CCMT120408-PS | ● | ● | ● | ● | | | | 0.8 |
| | | | CCMT120412-PS | ● | ● | ● | ● | | | | 1.2 |
| Medium cutting | PM   |   | CCMT060204-PM | ● | ● | ● | ● | 6.35 | 2.38 | 2.8 | 0.4 |
| | | | CCMT060208-PM | ● | ● | ● | ● | | | | 0.8 |
| | | | CCMT09T304-PM | ● | ● | ● | ● | 9.525 | 3.97 | 4.4 | 0.4 |
| | | | *CCMT09T308-PM | ● | ● | ● | ● | | | | 0.8 |
| | | | CCMT09T312-PM | ● | ● | ● | ● | | | | 1.2 |
| | | | CCMT120408-PM | ● | ● | ● | ● | 12.7 | 4.76 | 5.5 | 0.8 |
| | | | CCMT120412-PM | ● | ● | ● | ● | | | | 1.2 |

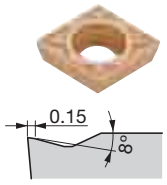
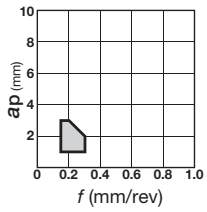
## Rhombic, 80° (11°)

| Application | Chipbreaker Appearance (Cross section) | f - ap | Cat. No | Stocked grades Coated T6120 | T6130 | AH630 | AH645 | Dimensions (mm) I.C.dia ød | Thick-ness s | Hole dia ød1 | Corner radius rε |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Finishing to light cutting | PSS   |   | CPMT080204-PSS | ● | ● | ● | ● | 7.94 | 2.38 | 3.4 | 0.4 |
| | | | CPMT080208-PSS | ● | ● | ● | ● | | | | 0.8 |
| | | | *CPMT090304-PSS | ● | ● | ● | ● | 9.525 | 3.18 | 4.4 | 0.4 |
| | | | CPMT090308-PSS | ● | ● | ● | ● | | | | 0.8 |
| Finishing to medium cutting | PS   |   | CPMT080202-PS | ● | ● | ● | ● | 7.94 | 2.38 | 3.4 | 0.2 |
| | | | CPMT080204-PS | ● | ● | ● | ● | | | | 0.4 |
| | | | CPMT080208-PS | ● | ● | ● | ● | | | | 0.8 |
| | | | *CPMT090304-PS | ● | ● | ● | ● | 9.525 | 3.18 | 4.4 | 0.4 |
| | | | CPMT090308-PS | ● | ● | ● | ● | | | | 0.8 |

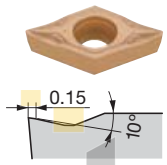
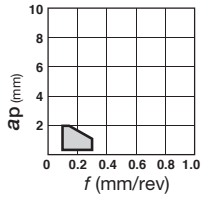
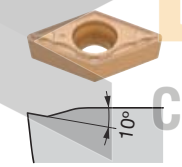
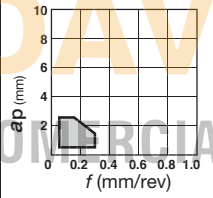
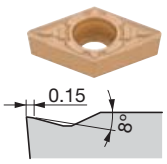
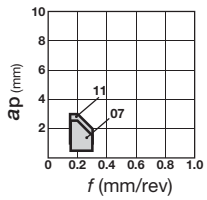
*Note: Chipbreaker cross sections are of the inserts marked *

● : Stocked items

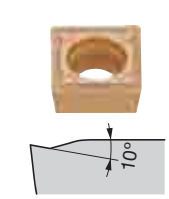
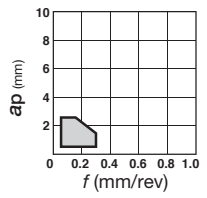
## Rhombic, 80° (11°)

| Application | Chipbreaker Appearance (Cross section) | f - ap | Cat. No | Stocked grades Coated T6120 | T6130 | AH630 | AH645 | Dimensions (mm) I.C.dia ød | Thick-ness s | Hole dia ød1 | Corner radius rε |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Medium cutting | **PM**   |   | **CPMT060204-PM** | ● | ● | ● | ● | 6.35 | 2.38 | 2.8 | 0.4 |
| | | | **CPMT060208-PM** | ● | ● | ● | ● | | | | 0.8 |
| | | | ***CPMT090304-PM** | ● | ● | ● | ● | 9.525 | 3.18 | 4.4 | 0.4 |
| | | | **CPMT090308-PM** | ● | ● | ● | ● | | | | 0.8 |

## Rhombic, 55° (7°)

| Application | Chipbreaker Appearance (Cross section) | f - ap | Cat. No | Stocked grades Coated T6120 | T6130 | AH630 | AH645 | Dimensions (mm) I.C.dia ød | Thick-ness s | Hole dia ød1 | Corner radius rε |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Finishing to light cutting | **PSS**   |   | **DCMT070204-PSS** | ● | ● | ● | ● | 6.35 | 2.38 | 2.8 | 0.4 |
| | | | **DCMT070208-PSS** | ● | ● | ● | ● | | | | 0.8 |
| | | | ***DCMT11T304-PSS** | ● | ● | ● | ● | 9.525 | 3.97 | 4.4 | 0.4 |
| | | | **DCMT11T308-PSS** | ● | ● | ● | ● | | | | 0.8 |
| | | | **DCMT11T312-PSS** | ● | ● | ● | ● | | | | 1.2 |
| Finishing to medium cutting | **PS**   |   | **DCMT070202-PS** | ● | ● | ● | ● | 6.35 | 2.38 | 2.8 | 0.2 |
| | | | ***DCMT070204-PS** | ● | ● | ● | ● | | | | 0.4 |
| | | | **DCMT11T302-PS** | ● | ● | ● | ● | 9.525 | 3.97 | 4.4 | 0.2 |
| | | | ***DCMT11T304-PS** | ● | ● | ● | ● | | | | 0.4 |
| | | | **DCMT11T308-PS** | ● | ● | ● | ● | | | | 0.8 |
| | | | **DCMT11T312-PS** | ● | ● | ● | ● | | | | 1.2 |
| Medium cutting | **PM**   |   | **DCMT070204-PM** | ● | ● | ● | ● | 6.35 | 2.38 | 2.8 | 0.4 |
| | | | **DCMT070208-PM** | ● | ● | ● | ● | | | | 0.8 |
| | | | **DCMT11T304-PM** | ● | ● | ● | ● | 9.525 | 3.97 | 4.4 | 0.4 |
| | | | ***DCMT11T308-PM** | ● | ● | ● | ● | | | | 0.8 |
| | | | **DCMT11T312-PM** | ● | ● | ● | ● | | | | 1.2 |

## Square, 90° (7°)

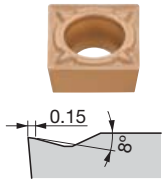
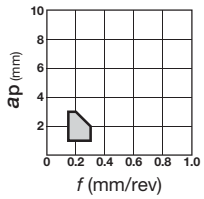
| Application | Chipbreaker Appearance (Cross section) | f - ap | Cat. No | Stocked grades Coated T6120 | T6130 | AH630 | AH645 | Dimensions (mm) I.C.dia ød | Thick-ness s | Hole dia ød1 | Corner radius rε |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Finishing to medium cutting | **PS**   |   | ***SCMT09T304-PS** | ● | ● | ● | ● | 9.525 | 3.97 | 4.4 | 0.4 |
| | | | **SCMT09T308-PS** | ● | ● | ● | ● | | | | 0.8 |
| | | | **SCMT120404-PS** | ● | ● | ● | ● | 12.7 | 4.76 | 5.5 | 0.4 |
| | | | **SCMT120408-PS** | ● | ● | ● | ● | | | | 0.8 |

*Note: Chipbreaker cross sections are of the inserts marked *

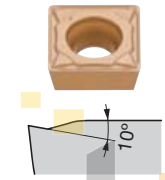
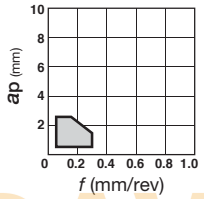
● : Stocked items

Positive type

## Square, 90° (7°)

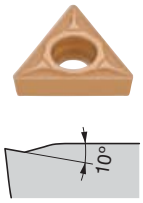
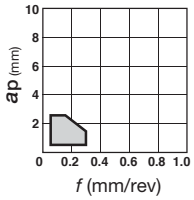
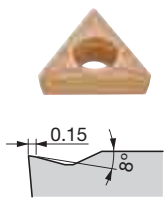
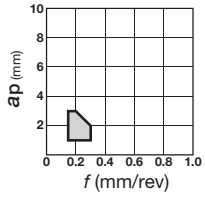
| Application | Chipbreaker Appearance (Cross section) | f - ap | Cat. No | Stocked grades Coated T6120 | T6130 | AH630 | AH645 | Dimensions (mm) I.C.dia ød | Thick-ness s | Hole dia ød1 | Corner radius rε |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Medium cutting | **PM**   |   | *SCMT09T304-PM | ● | ● | ● | ● | 9.525 | 3.97 | 4.4 | 0.4 |
| | | | SCMT09T308-PM | ● | ● | ● | ● | | | | 0.8 |
| | | | SCMT120408-PM | ● | ● | ● | ● | 12.7 | 4.76 | 5.5 | 0.8 |
| | | | SCMT120412-PM | ● | ● | ● | ● | | | | 1.2 |

## Square, 90° (11°)

| Application | Chipbreaker Appearance (Cross section) | f - ap | Cat. No | Stocked grades Coated T6120 | T6130 | AH630 | AH645 | Dimensions (mm) I.C.dia ød | Thick-ness s | Hole dia ød1 | Corner radius rε |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Finishing to medium cutting | **PS**   |   | SPMT090304-PS | ● | ● | ● | ● | 9.525 | 3.97 | 4.4 | 0.4 |
| | | | SPMT090308-PS | ● | ● | ● | ● | | | | 0.8 |
| | | | SPMT120404-PS | ● | ● | ● | ● | 12.7 | 4.76 | 5.5 | 0.4 |
| | | | *SPMT120408-PS | ● | ● | ● | ● | | | | 0.8 |



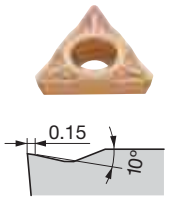
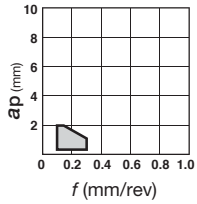
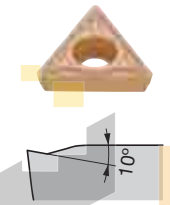
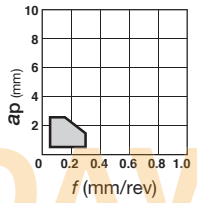
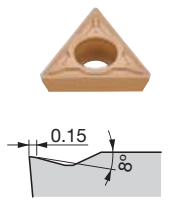
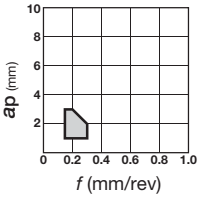
## Triangular, 60° (7°)

| Application | Chipbreaker Appearance (Cross section) | f - ap | Cat. No | Stocked grades Coated T6120 | T6130 | AH630 | AH645 | Dimensions (mm) I.C.dia ød | Thick-ness s | Hole dia ød1 | Corner radius rε |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Finishing to medium cutting | **PS**   |   | TCMT110202-PS | ● | ● | ● | ● | 6.35 | 2.38 | 2.8 | 0.2 |
| | | | *TCMT110204-PS | ● | ● | ● | ● | | | | 0.4 |
| | | | TCMT110208-PS | ● | ● | ● | ● | | | | 0.8 |
| | | | TCMT110302-PS | ● | ● | ● | ● | 6.35 | 3.18 | 2.8 | 0.2 |
| | | | TCMT110304-PS | ● | ● | ● | ● | | | | 0.4 |
| | | | TCMT110308-PS | ● | ● | ● | ● | | | | 0.8 |
| | | | TCMT16T302-PS | ● | ● | ● | ● | 9.525 | 3.97 | 4.4 | 0.2 |
| | | | TCMT16T304-PS | ● | ● | ● | ● | | | | 0.4 |
| | | | TCMT16T308-PS | ● | ● | ● | ● | | | | 0.8 |
| Medium cutting | **PM**   |   | TCMT110202-PM | ● | ● | ● | ● | 6.35 | 2.38 | 2.8 | 0.2 |
| | | | TCMT110204-PM | ● | ● | ● | ● | | | | 0.4 |
| | | | TCMT110208-PM | ● | ● | ● | ● | | | | 0.8 |
| | | | TCMT110302-PM | ● | ● | ● | ● | 6.35 | 3.18 | 2.8 | 0.2 |
| | | | TCMT110304-PM | ● | ● | ● | ● | | | | 0.4 |
| | | | TCMT110308-PM | ● | ● | ● | ● | | | | 0.8 |
| | | | *TCMT16T304-PM | ● | ● | ● | ● | 9.525 | 3.97 | 4.4 | 0.4 |
| | | | TCMT16T308-PM | ● | ● | ● | ● | | | | 0.8 |
| | | | TCMT16T312-PM | ● | ● | ● | ● | | | | 1.2 |

*Note: Chipbreaker cross sections are of the inserts marked *

● : Stocked items

## Triangular, 60° (11°)

| Application | Chipbreaker Appearance (Cross section) | f - ap | Cat. No | Stocked grades Coated T6120 | T6130 | AH630 | AH645 | Dimensions (mm) I.C.dia ød | Thick-ness s | Hole dia ød1 | Corner radius rε |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Finishing to light cutting | **PSS**   |   | TPMT090204-PSS | ● | ● | ● | ● | 5.56 | 2.38 | 2.5 | 0.4 |
| | | | TPMT090208-PSS | ● | ● | ● | ● | | | | 0.8 |
| | | | *TPMT110204-PSS | ● | ● | ● | ● | 6.35 | 2.38 | 2.8 | 0.4 |
| | | | TPMT110208-PSS | ● | ● | ● | ● | | | | 0.8 |
| | | | TPMT110304-PSS | ● | ● | ● | ● | 6.35 | 3.18 | 3.4 | 0.4 |
| | | | TPMT110308-PSS | ● | ● | ● | ● | | | | 0.8 |
| | | | TPMT130304-PSS | ● | ● | ● | ● | 7.94 | 3.18 | 3.4 | 0.4 |
| | | | TPMT130308-PSS | ● | ● | ● | ● | | | | 0.8 |
| | | | TPMT16T304-PSS | ● | ● | ● | ● | 9.525 | 3.97 | 4.4 | 0.4 |
| | | | TPMT16T308-PSS | ● | ● | ● | ● | | | | 0.8 |
| Finishing to medium cutting | **PS**   |   | TPMT090202-PS | ● | ● | ● | ● | 5.56 | 2.38 | 2.5 | 0.2 |
| | | | TPMT090204-PS | ● | ● | ● | ● | | | | 0.4 |
| | | | TPMT090208-PS | ● | ● | ● | ● | | | | 0.8 |
| | | | TPMT110202-PS | ● | ● | ● | ● | 6.35 | 2.38 | 2.8 | 0.2 |
| | | | *TPMT110204-PS | ● | ● | ● | ● | | | | 0.4 |
| | | | TPMT110208-PS | ● | ● | ● | ● | | | | 0.8 |
| | | | TPMT110304-PS | ● | ● | ● | ● | 6.35 | 3.18 | 3.4 | 0.4 |
| | | | TPMT110308-PS | ● | ● | ● | ● | | | | 0.8 |
| | | | TPMT130304-PS | ● | ● | ● | ● | 7.94 | 3.18 | 3.4 | 0.4 |
| | | | TPMT130308-PS | ● | ● | ● | ● | | | | 0.8 |
| | | | TPMT16T304-PS | ● | ● | ● | ● | 9.525 | 3.97 | 4.4 | 0.4 |
| | | | TPMT16T308-PS | ● | ● | ● | ● | | | | 0.8 |
| Medium cutting | **PM**   |   | TPMT090204-PM | ● | ● | ● | ● | 5.56 | 2.38 | 2.5 | 0.4 |
| | | | TPMT090208-PM | ● | ● | ● | ● | | | | 0.8 |
| | | | TPMT110204-PM | ● | ● | ● | ● | 6.35 | 2.38 | 2.8 | 0.4 |
| | | | TPMT110208-PM | ● | ● | ● | ● | | | | 0.8 |
| | | | TPMT110304-PM | ● | ● | ● | ● | 6.35 | 3.18 | 3.4 | 0.4 |
| | | | TPMT110308-PM | ● | ● | ● | ● | | | | 0.8 |
| | | | TPMT130304-PM | ● | ● | ● | ● | 7.94 | 3.18 | 3.4 | 0.4 |
| | | | TPMT130308-PM | ● | ● | ● | ● | | | | 0.8 |
| | | | *TPMT16T304-PM | ● | ● | ● | ● | 9.525 | 3.97 | 4.4 | 0.4 |
| | | | TPMT16T308-PM | ● | ● | ● | ● | | | | 0.8 |
| | | | TPMT16T312-PM | ● | ● | ● | ● | | | | 1.2 |

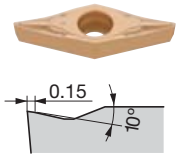
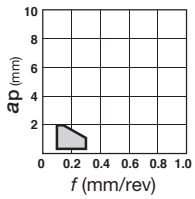
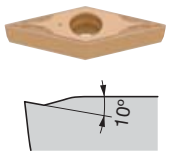
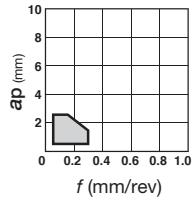


*Note: Chipbreaker cross sections are of the inserts marked *

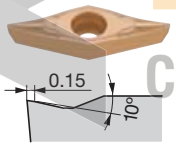
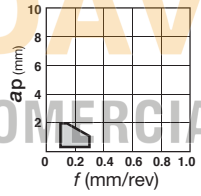
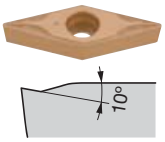
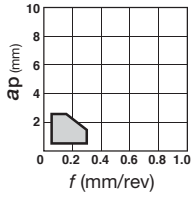
● : Stocked items

## Positive type

### Rhombic, 35° (5°)

| Application | Chipbreaker Appearance (Cross section) | f - ap | Cat. No | Stocked grades: Coated T6120 | T6130 | AH630 | AH645 | Dimensions (mm): I.C.dia ød | Thick-ness s | Hole dia ød1 | Corner radius rε |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Finishing to light cutting | PSS   |   | VBMT110304-PSS | ● | ● | ● | ● | 6.35 | 3.18 | 2.8 | 0.4 |
| | | | VBMT110308-PSS | ● | ● | ● | ● | | | | 0.8 |
| | | | *VBMT160404-PSS | ● | ● | ● | ● | 9.525 | 4.76 | 4.4 | 0.4 |
| | | | VBMT160408-PSS | ● | ● | ● | ● | | | | 0.8 |
| Finishing to medium cutting | PS   |   | *VBMT110302-PS | ● | ● | ● | ● | 6.35 | 3.18 | 2.8 | 0.2 |
| | | | VBMT110304-PS | ● | ● | ● | ● | | | | 0.4 |
| | | | VBMT110308-PS | ● | ● | ● | ● | | | | 0.8 |
| | | | VBMT160402-PS | ● | ● | ● | ● | 9.525 | 4.76 | 4.4 | 0.2 |
| | | | VBMT160404-PS | ● | ● | ● | ● | | | | 0.4 |
| | | | VBMT160408-PS | ● | ● | ● | ● | | | | 0.8 |

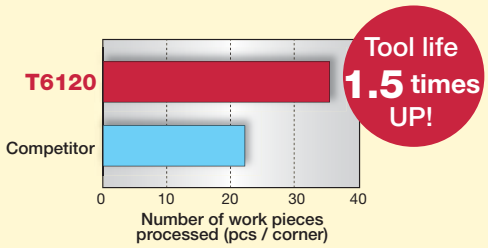
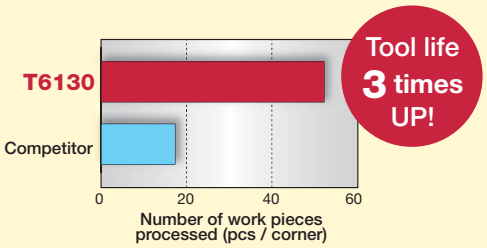
### Rhombic, 35° (7°)

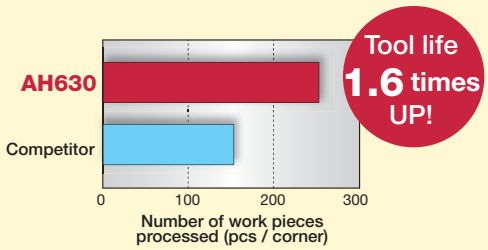
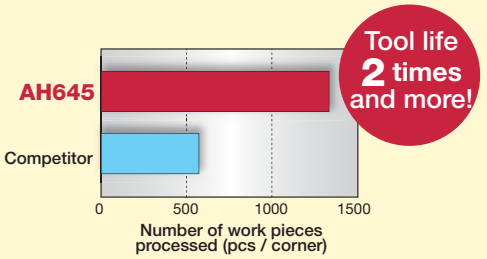
| Application | Chipbreaker Appearance (Cross section) | f - ap | Cat. No | Stocked grades: Coated T6120 | T6130 | AH630 | AH645 | Dimensions (mm): I.C.dia ød | Thick-ness s | Hole dia ød1 | Corner radius rε |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Finishing to light cutting | PSS   |   | VCMT110304-PSS | ● | ● | ● | ● | 6.35 | 3.18 | 2.8 | 0.4 |
| | | | VCMT110308-PSS | ● | ● | ● | ● | | | | 0.8 |
| | | | *VCMT160404-PSS | ● | ● | ● | ● | 9.525 | 4.76 | 4.4 | 0.4 |
| | | | VCMT160408-PSS | ● | ● | ● | ● | | | | 0.8 |
| Finishing to medium cutting | PS   |   | VCMT110302-PS | ● | ● | ● | ● | 6.35 | 3.18 | 2.8 | 0.2 |
| | | | VCMT110304-PS | ● | ● | ● | ● | | | | 0.4 |
| | | | *VCMT110308-PS | ● | ● | ● | ● | | | | 0.8 |
| | | | VCMT160404-PS | ● | ● | ● | ● | 9.525 | 4.76 | 4.4 | 0.4 |
| | | | VCMT160408-PS | ● | ● | ● | ● | | | | 0.8 |

*Note: Chipbreaker cross sections are of the inserts marked *

● : Stocked items

# Practical examples

| Workpiece type | | Shaft | Machine parts |
|---|---|---|---|
| Insert | | CNMG120408-SM | WNMG080412-SM |
| Grade | | T6120 | T6130 |
| Work material | | SUS304 / X5CrNi18-9 | SUS303 / X10CrNiS18-9 |
| Cutting conditions | Cutting speed: *Vc* (m/min) | 120 | 125 |
| | Feed: *f* (mm/rev) | 0.5 | 0.3 |
| | Depth of cut: *ap* (mm) | 1.5 | 1.3 |
| | Machining | Continuous | Continuous |
| | Coolant | Wet | Wet |
| Results | |  T6120 has excellent wear resistance, achieving 1.5 times longer tool life than ccompetitor CVD grades. |  T6130 allows better surface finish and 3 times longer tool life than competitor inserts due to its high wear and chipping resistance. |

| Workpiece type | | Shaft | Machine parts |
|---|---|---|---|
| Insert | | CNMG120408-SM | CNMG120404-SM |
| Grade | | AH630 | AH645 |
| Work material | | SUS304 / X5CrNi18-9 | SUS304 / X5CrNi18-9 |
| Cutting conditions | Cutting speed: *Vc* (m/min) | 150 | 100 |
| | Feed: *f* (mm/rev) | 0.3 | 0.15 |
| | Depth of cut: *ap* (mm) | 2 | 1 ~ 2.5 |
| | Machining | Continuous | Interrupted |
| | Coolant | Wet | Wet |
| Results | |  AH630 has a good balance of wear and chipping resistance, achieving 1.6 times longer tool life than competitor grades. |  AH645 has excellent fracture resistance, achieving 2 times longer tool life than competitor grades. |

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Feb. 2013 (TJ)