

ACHTECK














































































www.achtecktool.com/en

THE EXPERTS OF DIFFICULT MACHINING

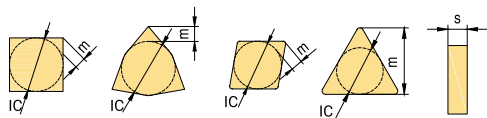
CUTTING TOOL CATALOG

| | | | |
|--------------------------------------------|------------|------------------------------------------------------------------|------------|
| ISO Turning Inserts | 22 | For CC..Insert | 122 |
| ISO Turning Insert Denomination System | 24 | For DC..Insert | 123 |
| Overview of Turning Grades | 27 | For VB/VP..Insert | 124 |
| Overview of Turning Insert Geometries | 28 | ABF Backturning Tool Hoder | 125 |
| Turning Grade Description | 44 | ASW Multifunctional Tool Hoder | 126 |
| Cutting Parameter Recommendations Table | 46 | ASWP Parting off Series Inserts | 127 |
| Negative 80° C Shape Insert | 50 | ASWB Backturning Series Inserts | 129 |
| Negative 55° D Shape Insert | 54 | ASWT Threading Series Inserts | 129 |
| Negative 90° S Shape Insert | 57 | Solid Sarbide Boring Tool Hoder | 130 |
| Negative 60° T Shape Insert | 60 | ASIB Solid Boring Tool | 131 |
| Negative 35° V Shape Insert | 63 | ASIG Solid Internal Grooving Tool | 135 |
| Negative 80° W Shape Insert | 65 | ASIF Solid Face Grooving Tool | 140 |
| Negative 90° L Shape Insert | 68 | ASIT Solid Threading Tool | 141 |
| Train Wheel Re-turning Insert | 69 | | |
| Positive 80° C Shape Insert | 70 | Grooving | 144 |
| Positive 55° D Shape Insert | 74 | Overview of Grooving Holders | 144 |
| Positive 90° S Shape Insert | 78 | ASGHR/L External shallow Grooving Holder for Swiss Lathe | 147 |
| Positive 60° T Shape Insert | 79 | S..ASGHL External Shallow Grooving Sleeve Holder for Swiss Lathe | 148 |
| Positive 35° V Shape Insert | 84 | ATGHR/L External Shallow Grooving Holder | 149 |
| Positive 80° W Shape Insert | 89 | Holder Denomination System | 150 |
| Positive Round Insert | 90 | ATSER/L External Turning and Grooving Holder | 151 |
| | | ATSER/L-D Reonforced External Turning and Grooving Holder | 153 |
| PCBN Inserts | 91 | ATSER/L-SW External Turning and Grooving Holder for Swiss Lathe | 154 |
| PCBN Insert Denomination System | 92 | AGUER/L External Undercutting Holder | 155 |
| Overview of Grades | 93 | ATSFR/L Face Turning and Grooving Holder | 156 |
| Negative 80° C Shape Insert | 94 | ATSFR/L-OB Face Grooving and Turning Holder (Outside Bluge Type) | 157 |
| Negative 55° D Shape Insert | 95 | AGSFR/L External & Face Grooving and Turning Holder | 159 |
| Negative 90° S Shape Insert | 96 | AGPFR/L Face Grooving and Turning Holder | 160 |
| Negative 60° T Shape Insert | 96 | ATPFR/L Face Grooving and Turning Holder | 161 |
| Negative 35° V Shape Insert | 97 | ATPIR/L Internal Turning, Grooving and Profiling Holder | 162 |
| Negative 80° W Shape Insert | 97 | ATGIR/L Internal Grooving Holder | 163 |
| Positive 80° C Shape Insert | 98 | ATSIR/L Internal & Face Grooving and Turning Holder | 164 |
| Positive 55° D Shape Insert | 99 | AGSIR/L Internal & Face Grooving and Turning Holder | 165 |
| Positive 60° T Shape Insert | 100 | AGUIR/L Internal Undercutting holder | 166 |
| Positive 35° V Shape Insert | 101 | Grooving Grade Description | 167 |
| | | Insert Geometry Introduction | 169 |
| PCD Inserts | 102 | Grade Application Guide | 170 |
| PCD Insert Denomination System | 102 | Triangular Shallow Grooving Insert Denomination System | 171 |
| Overview of Grades | 103 | Swiss Grooving-ASG Series | 172 |
| Positive 80° C Shape Insert | 104 | Profiling Grooving-ATG Series | 173 |
| Positive 55° D Shape Insert | 105 | Insert Denomination System (Pressing Insert) | 175 |
| Positive 60° T Shape Insert | 106 | Parting off-Grooving CS Geometry Series | 175 |
| Positive 35° V Shape Insert | 107 | Parting off-Grooving CM Geometry Series | 176 |
| | | Parting off-Grooving CH Geometry Series | 177 |
| Small Tools | 109 | Grooving-Turning GS Geometry Series | 178 |
| Turning Shank Denomination System | 110 | Grooving-Turning TS Geometry Series | 179 |
| For CC..Insert | 112 | Grooving-Turning TM Geometry Series | 179 |
| For DC..Insert | 113 | Grooving-Profiling RM Geometry Series | 180 |
| For TC..Insert | 115 | Grooving-Profiling RA Geometry Series | 180 |
| For VB..Insert | 116 | Insert Denomination System (Ground Insert) | 181 |
| For VC..Insert | 118 | Grooving-Turning Ground Geometry Series | 182 |
| For VP..Insert | 119 | Blank Insert of ATBD | 184 |
| External Sleeve Holder Denomination System | 120 | Cutting Parameter Recommendation Table | 185 |

ISO Turning Insert Denomination System

| C | N | M | G | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|---|---|---|---|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|---|---|---|---|---|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|---|---|---|---|---|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|---|---|--------|--|--|-----------------------------------------------------------------------------------|--|--|--|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|---|---|---|---|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---|---|---|---|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---|---|-----------------------|--|-----------------------------------------------------------------------------------|--|--|--|
| 1 | 2 | 3 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <div>1- Shape/code</div> <table><tr><td>A</td><td>B</td><td>C</td><td>D</td><td>E</td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td>H</td><td>K</td><td>L</td><td>M</td><td>O</td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td>P</td><td>R</td><td>S</td><td>T</td><td>V</td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td>W</td><td>Z</td><td colspan="3">Others</td></tr><tr><td></td><td></td><td colspan="3"></td></tr></table> | | | | A | B | C | D | E |  |  |  |  |  | H | K | L | M | O |  |  |  |  |  | P | R | S | T | V |  |  |  |  |  | W | Z | Others | | |  | | | | | <div>2- Clearance angle</div> <table><tr><td>A</td><td>B</td><td>C</td><td>D</td></tr><tr><td></td><td></td><td></td><td></td></tr><tr><td>E</td><td>F</td><td>G</td><td>N</td></tr><tr><td></td><td></td><td></td><td></td></tr><tr><td>P</td><td>O</td><td colspan="2">Other clearance angle</td></tr><tr><td></td><td></td><td colspan="2"></td></tr></table> | | | A | B | C | D |  |  |  |  | E | F | G | N |  |  |  |  | P | O | Other clearance angle | |  | | | |
| A | B | C | D | E | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|  |  |  |  |  | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| H | K | L | M | O | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|  |  |  |  |  | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| P | R | S | T | V | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|  |  |  |  |  | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| W | Z | Others | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|  | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| A | B | C | D | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|  |  |  |  | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| E | F | G | N | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|  |  |  |  | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| P | O | Other clearance angle | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|  | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

3- Tolerance



| Class | Unit | In.Circle dimension IC | Nose height m | Thickness s |
|-------|------|------------------------|---------------|-------------|
| A | in | ± 0.0010 | ± 0.0002 | ± 0.0010 |
| C | in | ± 0.0010 | ± 0.0005 | ± 0.0010 |
| E | in | ± 0.0010 | ± 0.0010 | ± 0.0010 |
| F | in | ± 0.0005 | ± 0.0002 | ± 0.0010 |
| G | in | ± 0.0010 | ± 0.0010 | ± 0.0005 |
| H | in | ± 0.0005 | ± 0.0005 | ± 0.0010 |
| J | in | * | ± 0.0002 | ± 0.0010 |
| K | in | * | ± 0.0005 | ± 0.0010 |
| L | in | * | ± 0.0010 | ± 0.0010 |
| M | in | * | * | ± 0.0005 |
| U | in | * | * | ± 0.0005 |
| N | in | * | * | ± 0.0010 |

* For details refer to right and below tables

| Shape: C, E, H, M, O, P, S, T, R, W | | | | |
|-------------------------------------|-----------|---------|--------|--------|
| IC | d | | m | |
| | J,K,L,M,N | U | M,N | U |
| 3/16 | ±0.002 | ±0.003 | ±0.003 | ±0.005 |
| 7/32 | ±0.002 | ±0.003 | ±0.003 | ±0.005 |
| 0.236 | ±0.002 | ±0.003 | ±0.003 | ±0.005 |
| 1/4 | ±0.002 | ±0.003 | ±0.003 | ±0.005 |
| 5/16 | ±0.002 | ±0.003 | ±0.003 | ±0.005 |
| 0.315 | ±0.002 | ±0.003 | ±0.003 | ±0.005 |
| 3/8 | ±0.002 | ±0.003 | ±0.003 | ±0.005 |
| 0.394 | ±0.002 | ±0.003 | ±0.003 | ±0.005 |
| 0.472 | ±0.003 | ±0.005 | ±0.005 | ±0.007 |
| 1/2 | ±0.003 | ±0.005 | ±0.005 | ±0.008 |
| 5/8 | ±0.004 | ±0.007 | ±0.005 | ±0.011 |
| 0.630 | ±0.003 | ± 0.007 | ±0.006 | ±0.011 |
| 3/4 | ±0.004 | ±0.007 | ±0.005 | ±0.011 |
| 0.787 | ±0.004 | ±0.007 | ±0.006 | ±0.011 |
| 0.984 | ±0.005 | ±0.010 | ±0.007 | ±0.015 |
| 1 | ±0.005 | ±0.010 | ±0.007 | ±0.015 |
| 1¼ | ±0.006 | ±0.010 | ±0.008 | ±0.015 |
| 1.260 | ±0.006 | ±0.010 | ±0.200 | ±0.015 |

| M&N shape | D shape | | V shape | |
|-----------|---------|--------|---------|--------|
| IC | d | m | d | m |
| 7/32 | ±0.002 | ±0.004 | | |
| 1/4 | ±0.002 | ±0.004 | ±0.002 | ±0.006 |
| 5/16 | ±0.002 | ±0.004 | ±0.002 | ±0.006 |
| 3/8 | ±0.002 | ±0.004 | ±0.002 | ±0.006 |
| 1/2 | ±0.003 | ±0.006 | ±0.003 | ±0.008 |
| 5/8 | ±0.004 | ±0.007 | ±0.004 | ±0.011 |
| 3/4 | ±0.004 | ±0.007 | ±0.004 | ±0.011 |

| 4 - Type of insert | | | | |
|--------------------|---|---|---|---------|
| A | B | C | F | G |
| H | J | M | N | Q |
| R | T | U | W | Z |
| | | | | Special |

4

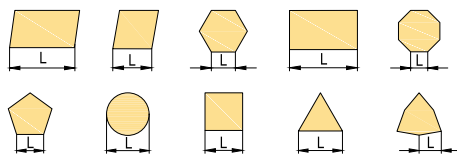
5

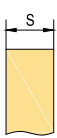
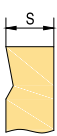
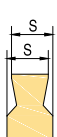
3

6

5- Cutting edge length

| in | In.Circle Dimension (in) | insert shape | | | | | | |
|---------|--------------------------------|--------------|----|----|----|----|----|----|
| | | C | D | R | S | T | V | W |
| 1.2 (5) | 5/32 | | | | | 06 | | 02 |
| 1.5 (6) | 5 | | | 05 | | | | |
| 1.8 (7) | 7/32 | | | 09 | | | | |
| | 0.236 | | 06 | | | | | |
| 2 | 1/4 | 06 | 07 | | | 11 | 11 | 04 |
| | 0.315 | | | 08 | | | | |
| 3 | 3/8 | 09 | 11 | 09 | 09 | 16 | 16 | 06 |
| | 0.394 | | | 10 | | | | |
| | 0.472 | | | 12 | | | | |
| 4 | 1/2 | 12 | 15 | 12 | 12 | 22 | 22 | 08 |
| 5 | 5/8 | 16 | | 15 | 15 | 27 | | |
| | 0.630 | | | 16 | | | | |
| 6 | 3/4 | 19 | | 19 | 19 | 33 | | |
| | 0.787 | | | 20 | | | | |
| | 0.984 | | | 25 | | | | |
| 8 | 1 | 25 | | 25 | 25 | | | |
| 10 | 1 1/4 | | | 31 | | | | |
| | 1.260 | | | 32 | | | | |

**6- Thickness**

| | | |
|-------------------------|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| A, B, C, N, O, W, |  | Example: 0.5(1) = 1/32 0.6 = 0.040 1(2) = 0.625 1.2 = 0.075 1.5(3) = 3/32 2 = 1/8 2.5 = 5/32 3 = 3/16 3.5 = 7/32 4 = 1/4 5 = 5/16 6 = 3/8 7 = 7/16 8 = 1/2 |
| H, M, R, T, |  | |
| F, G, J, U, |  | |

2

7

F

8

-

-

R

9

7- Nose radius

Corner radius

Example:

M0 = round insert (metric)

00 = Sharp

0 = 0.004

0.5 = 0.008

1 = 1/64

2 = 1/32

3 = 3/64

4 = 1/16

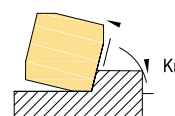
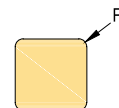
5 = 5/64

6 = 3/32

7 = 7/64

8 = 1/8

X = Others



Wiper

Approaching angle (Kr)

A = 45°

D = 60°

E = 75°

F = 85°

G = 87°

P = 90°

Z = Others

Wiper clearance angle (an)

A = 3°

B = 5°

C = 7°

D = 15°

E = 20°

F = 25°

G = 30°

N = 0°

P = 11°

Z = Others

8- Edge preparation

| | |
|----|--------------------|
| F | Sharp cutting edge |
| NO | Edge processing |

9-Direction of the blade

| | |
|---|-------|
| L | Left |
| R | Right |

10- Chip Breaker Illustration

Refer to page : 28-43

Ground positive insert sample

CCET 3 2.5 03 F P R -- F

F: Sharp cutting edge
NO: Edge processingP: Insert
polishingL: Left
R: Right

Chip breaker

ACHTECK

www.achtecktool.com/en

THE EXPERTS OF DIFFICULT MACHINING




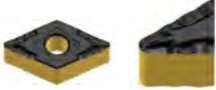
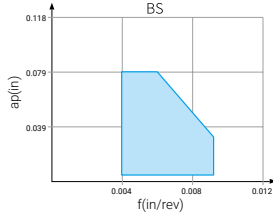
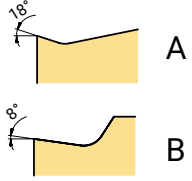
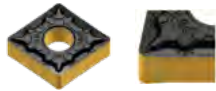
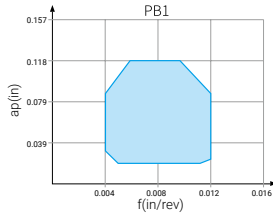
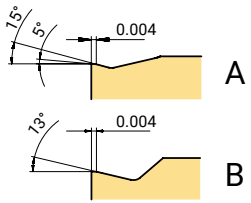
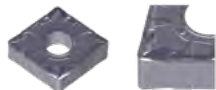
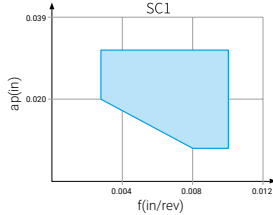
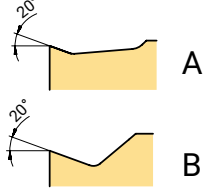

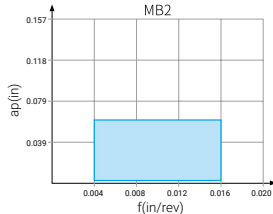
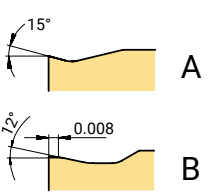

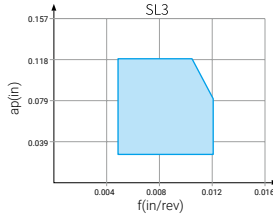
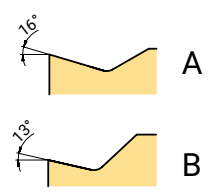
Turning Inserts











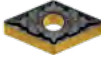





















Turning and Grooving Grade Application Guide


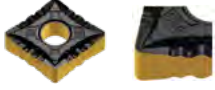
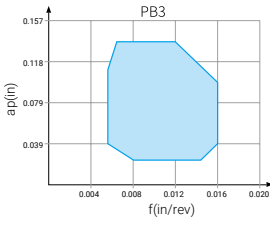
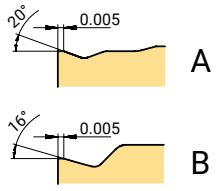
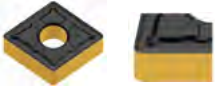
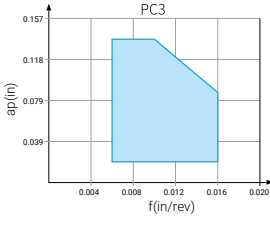
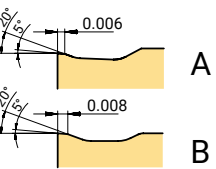
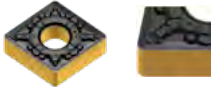
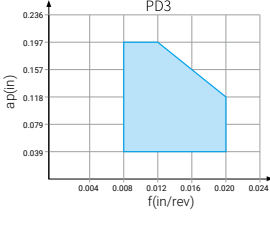
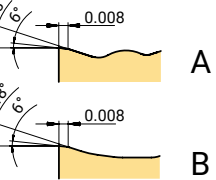
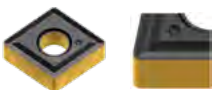
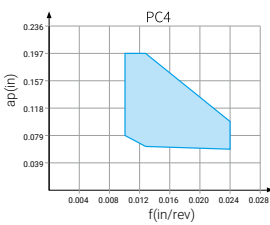
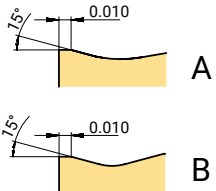

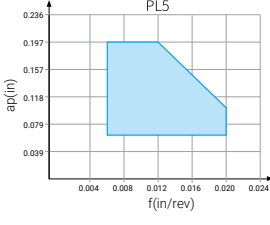
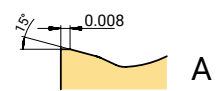
| Material Group | | ISO | Turning | | | | | | | Grooving/ Parting off | | ISO |
|----------------|---------------------------------------|-----|---------|--------|--------|----------|------|------|--------|--------------------------|----------|-----|
| | | | Coated | | Cermet | Uncoated | PCBN | PCD | Coated | | Uncoated | |
| | | | CVD | PVD | | | | | CVD | PVD | | |
| <div>P</div> | Non-alloy steels/ Alloyed steels | P01 | AC052P | | | | | | | | | P01 |
| | | P10 | AC150P | | | | | | AC230P | AP301U | | P10 |
| | | P20 | AC250P | | AP200U | | | | | AP301U | AP330M | P20 |
| | | P30 | AC350P | | | AT202 | | | | | | P30 |
| | | P40 | | | | | | | | | | P40 |
| | | P50 | | | | | | | | | | P50 |
| <div>M</div> | Stainless steels | M01 | | | | | | | | | | M01 |
| | | M10 | AC100M | | AP100S | | | | | AP301U | | M10 |
| | | M20 | AC200M | | AP301M | AP200U | | | | AP301U | AP330M | M20 |
| | | M30 | | | | | | | | | | M30 |
| | | M40 | | | | | | | | | | M40 |
| | | M50 | | | | | | | | | | M50 |
| <div>K</div> | Cast iron | K01 | AC100K | AC102K | | | | PB90 | | | | K01 |
| | | K10 | AC202K | | AT202 | | | | AC230P | AP301U | | K10 |
| | | K20 | | | | | | | | | | K20 |
| | | K30 | | | | | | | | | | K30 |
| | | K40 | | | | | | | | | | K40 |
| | | K50 | | | | | | | | | | K50 |
| <div>N</div> | Aluminum/Aluminum alloys | N01 | | | | AW100K | | PD20 | | | AW100K | N01 |
| | | N10 | | | | | | | | | | N10 |
| | | N20 | | | | | | | | | | N20 |
| | | N30 | | | | | | | | | | N30 |
| <div>S</div> | Heat resistant alloys | S01 | | | AP100S | | | | | | | S01 |
| | | S10 | AC100M | | AP301M | AP200U | | | | | | S10 |
| | | S20 | AC200M | | | | | | | | | S20 |
| | | S30 | | | | | | | | | | S30 |
| | | S40 | | | | | | | | | | S40 |
| <div>H</div> | Hardened steels/ Chilled cast iron | H01 | | | | | PB30 | | | | | H01 |
| | | H10 | | | | | PB60 | | | | | H10 |
| | | H20 | | | | | | | | | | H20 |
| | | H30 | | | | | | | | | | H30 |








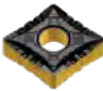
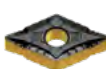



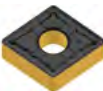
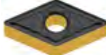





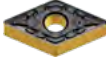




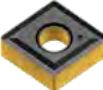
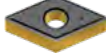




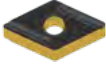


Overview of Turning Insert Geometries



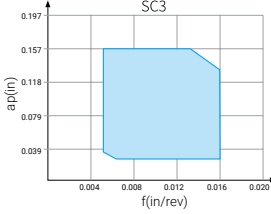
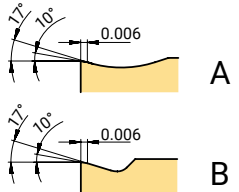
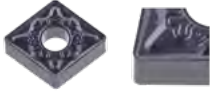
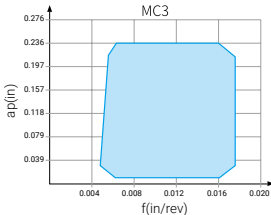
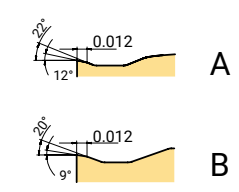
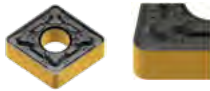
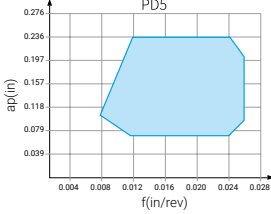
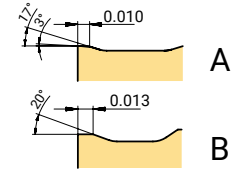
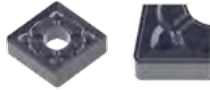
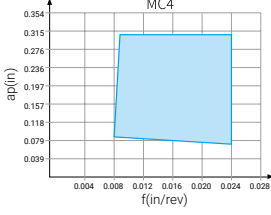
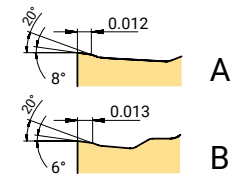
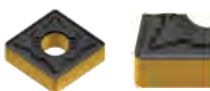
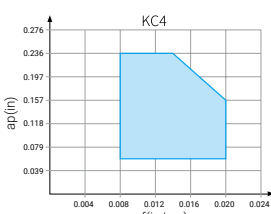
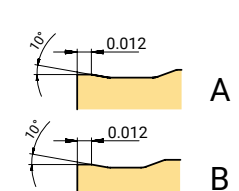

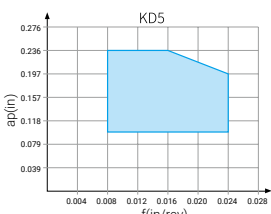
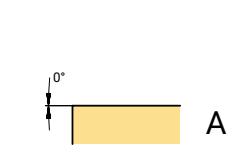
Negative Inserts




















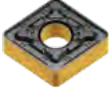









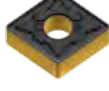





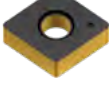




| Application | Chip breaker | Features | Chip breaking range | Cross section geometry  | |
|---------------|-----------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|--|
| Profiling | BS  | Finishing and semi-finishing profile turning Suitable for turning with changing depth of cut. Smooth chip evacuation |  |  | |
| Finishing | PB1  | First choice for steel finish turning Light cutting chip breaker, low cutting force, suitable for machining slender shaft, thin wall and unstably clamped parts, good cutting performance |  |  | |
| | SC1  | First choice for heat resistant alloy finish turning Excellent performance at low depth of cut. |  |  | |
| | MB2  | First choice for stainless steel finish turning High positive rake angle reduced cutting force and built-up edge, can obtain much better surface quality. Very good chip breaking at low feed and cutting depth. |  |  | |
| Light cutting | SL3  | Recommended for heat resistant alloy light turning. Suitable for heat resistant alloy, Ti-alloy. Sharp and wavy cutting edge can get good surface finish and good chip breaking results. |  |  | |


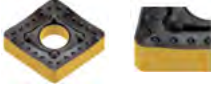
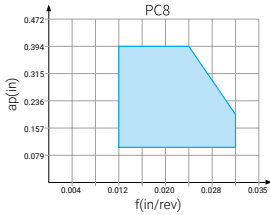
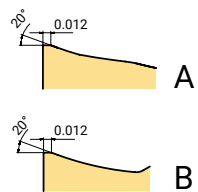

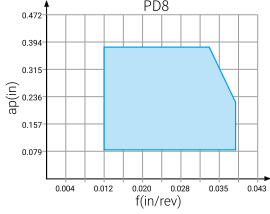
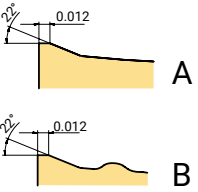
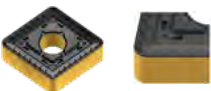
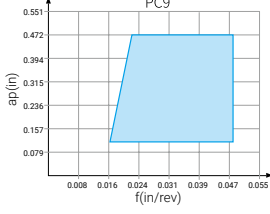
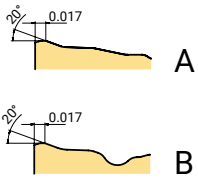
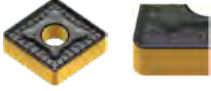
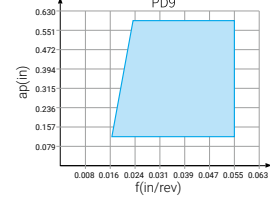
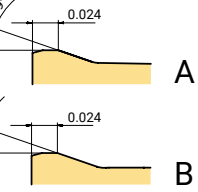
| | 80° Rhombus  | 55° Rhombus  | 90° Square  | 60° Triangle  | 35° Rhombus  | 80° Trigon  | Round  |
|--|--------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|
| | | DNMG-BS  P54 | | | VNMG-BS  P63 | | |
| | CNMG-PB1  P50 | DNMG-PB1  P54 | SNMG-PB1  P57 | TNMG-PB1  P60 | VNMG-PB1  P63 | WNMG-PB1  P65 | |
| | CNMG-SC1  P50 | DNMG-SC1  P54 | | TNMG-SC1  P60 | VNMG-SC1  P63 | WNMG-SC1  P65 | |
| | CNMG-MB2  P50 | DNMG-MB2  P54 | SNMG-MB2  P57 | TNMG-MB2  P60 | VNMG-MB2  P63 | WNMG-MB2  P65 | |
| | CNMG-SL3  P50 | DNMG-SL3  P54 | SNMG-SL3  P57 | TNMG-SL3  P60 | VNMG-SL3  P63 | WNMG-SL3  P65 | |









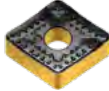


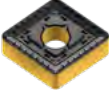

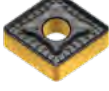

| Application | Chip breaker | Features | Chip breaking range | Cross section geometry  | |
|----------------|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|--|
| Semi-finishing | PB3  | First choice for steel semi finish turning The positive rake angle combined with small land guarantees edge strength and sharpness, reducing the cutting forces. The wavy side edge design has a good chip breaking results in out-copying turning on the shoulder, and in profile turning at different cutting depths. |  |  | |
| | PC3  | Alternative chipbreaker for steel semi-finish turning Unique geometry design offers wider chip breaking range. Double rake angle for smooth cutting. Enhanced insert tip reduced crater wear. |  |  | |
| Medium | PD3  | First choice for steel medium turning It has a strong chip control ability at low feed and cutting depth, and reduces crater wear. The chip breaking is also very good at high feed and cutting depth due to the geometry design. Double rake angle design makes sharp cutting edge and reduces cutting force. |  |  | |
| | PC4  | First choice for cast iron medium turning Alternative chipbreaker for carbon steel and alloy steel medium turning Flat T-land guarantees the strength of the cutting edge. This multi-purpose geometry can be used in universal applications. |  |  | |
| | PL5  | First choice for steel slender bar turning Open chip breaker leads to smooth cutting with low cutting force, which is suitable for slender shaft turning. |  |  | |

| | 80° Rhombus  | 55° Rhombus  | 90° Square  | 60° Triangle  | 35° Rhombus  | 80° Trigon  | Round  |
|--|--------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|
| | CNMG-PB3  P50 | DNMG-PB3  P54 | | TNMG-PB3  P60 | VNMG-PB3  P63 | WNMG-PB3  P65 | |
| | CNMG-PC3  P50 | DNMG-PC3  P55 | SNMG-PC3  P57 | TNMG-PC3  P60 | VNMG-PC3  P63 | WNMG-PC3  P65 | |
| | CNMG-PD3  P50 | DNMG-PD3  P55 | SNMG-PD3  P57 | TNMG-PD3  P60 | VNMG-PD3  P64 | WNMG-PD3  P66 | |
| | CNMG-PC4  P51 | DNMG-PC4  P56 | SNMG-PC4  P58 | TNMG-PC4  P61 | VNMG-PC4  P64 | WNMG-PC4  P66 | |
| | | DNMG-PL5  P55 | | TNMG-PL5  P60 | | WNMG-PL5  P66 | |



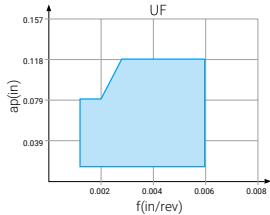
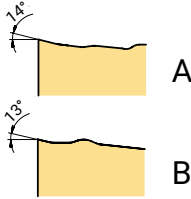
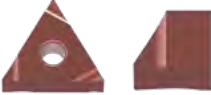
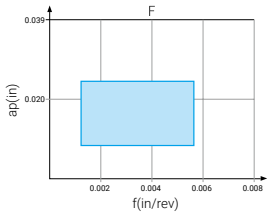


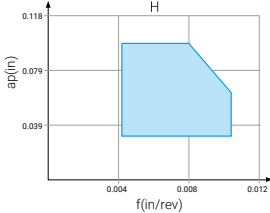
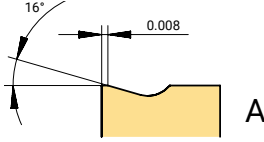
| Application | Chip breaker | Features | Chip breaking range | Cross section geometry  | |
|-------------|------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|--|
| Medium | <p>SC3</p>  | <p>First choice for heat resistant alloy medium turning</p> <p>Used in heat resistant alloy and titanium alloy medium turning. Large rake angle and small land width design allows for easy cutting and is suitable for soft steel turning.</p> |  |  | |
| | <p>MC3</p>  | <p>First choice for stainless steel medium turning</p> <p>Sharp cutting edge, low cutting force, wide chip breaking range and good chip removability.</p> |  |  | |
| Roughing | <p>PD5</p>  | <p>Alternative chipbreaker for steel rough turning</p> <p>A strong cutting edge. Double rake angle design effectively reduces the cutting force, can still have good chip breaking at small cutting depth.</p> |  |  | |
| | <p>MC4</p>  | <p>Alternative chipbreaker for stainless steel and heat resistant alloy rough turning</p> <p>Large chip breaker design, smooth chip evacuation, good chip breaking, with high metal removal rate.</p> |  |  | |
| | <p>KC4</p>  | <p>First choice for cast iron turning</p> <p>It has strong cutting edge, reliable and stable performance.</p> |  |  | |
| | <p>KD5</p>  | <p>First choice for cast iron rough turning</p> <p>High cutting edge strength, suitable for interrupt cutting and unstable cutting.</p> |  |  | |












| | 80° Rhombus  | 55° Rhombus  | 90° Square  | 60° Triangle  | 35° Rhombus  | 80° Trigon  | Round  |
|--|--------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|
| | CNMG-SC3  P51 | DNMG-SC3  P55 | SNMG-SC3  P57 | TNMG-SC3  P60 | VNMG-SC3  P64 | WNMG-SC3  P66 | |
| | CNMG-MC3  P51 | DNMG-MC3  P55 | SNMG-MC3  P57 | TNMG-MC3  P61 | VNMG-MC3  P64 | WNMG-MC3  P66 | |
| | CNMG-PD5  P52 | DNMG-PD5  P56 | SNMG-PD5  P58 | TNMG-PD5  P61 | | WNMG-PD5  P67 | |
| | CNMG-MC4  P51 | DNMG-MC4  P56 | SNMG-MC4  P58 | TNMG-MC4  P61 | | WNMG-MC4  P67 | |
| | CNMG-KC4  P52 | DNMG-KC4  P56 | SNMG-KC4  P58 | TNMG-KC4  P61 | VNMG-KC4  P64 | WNMG-KC4  P67 | |
| | CNMA-KD5  P52 | DNMA-KD5  P56 | SNMA-KD5  P59 | TNMA-KD5  P62 | | WNMA-KD5  P67 | |

| Application | Chip breaker | Features | Chip breaking range | Cross section geometry  | |
|----------------|------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|--|
| Heavy roughing | <p>PC8</p>  | <p>Light cutting geometry for heavy turning</p> <p>Positive rake angle and curved cutting edge design, low cutting force.</p> |  |  | |
| | <p>PD8</p>  | <p>Heavy turning geometry for soft steel and stainless steel</p> <p>The geometry design ensures low cutting force. Suitable for low power machine tools. Applied in steel, stainless steel and cast iron heavy turning.</p> |  |  | |
| | <p>PC9</p>  | <p>First choice for steel heavy rough turning</p> <p>Wavy geometry is good for chip breaking. The geometry has a big space for chips, which is suitable for high metal removal rate.</p> |  |  | |
| | <p>PD9</p>  | <p>Alternative chipbreaker for steel heavy rough turning</p> <p>High edge strength is suitable for big cutting depth and high feed turning. High machining reliability.</p> |  |  | |

| | 80° Rhombus  | 55° Rhombus  | 90° Square  | 60° Triangle  | 35° Rhombus  | 80° Trigon  | Round  |
|--|--------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|
| | CNMM-PC8  P53 | | | | | | |
| | CNMM-PD8  P53 | | SNMM-PD8  P59 | TNMM-PD8  P62 | | | |
| | CNMM-PC9  P53 | | SNMM-PC9  P59 | | | | |
| | CNMM-PD9  P53 | | SNMM-PD9  P59 | | | | |



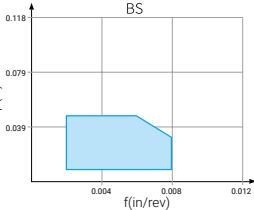
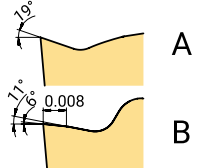

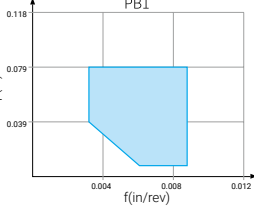
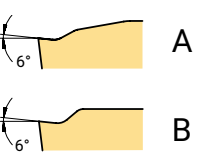

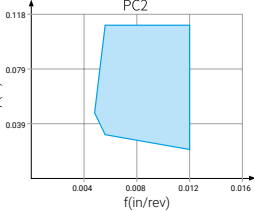
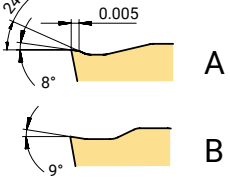
Negative Ground Insert









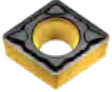
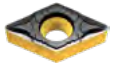








| Application | Chip breaker | Features | Chip breaking range | Cross section geometry  | |
|--------------------------------|----------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|--|
| Finishing | <p>UF</p>  | <p>Suitable for precision turning Low cutting forces, good chip breaking, suitable for finish turning.</p> |  |  | |
| | <p>F</p>  | <p>Finish turning Low cutting force, good chip control. The sharp edge produces a good surface finish.</p> |  |  | |
| Semi-finishing-Rough machining | <p>H</p>  | <p>Light turning Excellent chip control at low to medium feed rates. Strong edge strength.</p> |  |  | |


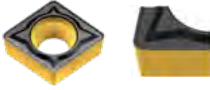
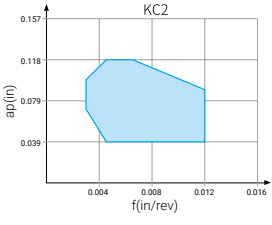
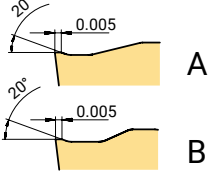
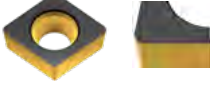
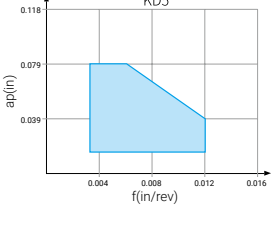


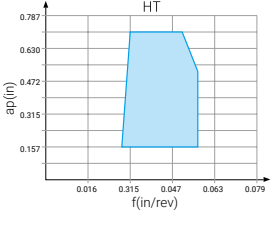
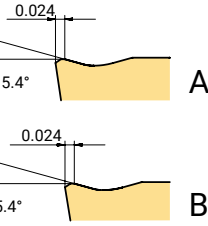

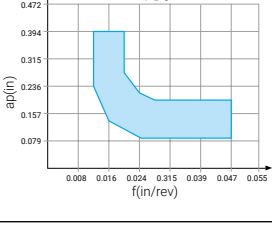
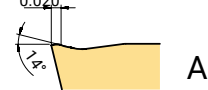

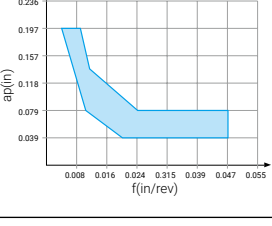
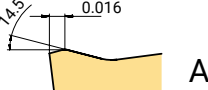
| | 80° Rhombus  | 55° Rhombus  | 90° Square  | 60° Triangle  | 35° Rhombus  | 80° Trigon  | Round  |
|--|--------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|
| | | | | TNGG-UF  P62 | VNGG-UF  P64 | | |
| | | | | TNGG-F  P62 | | | |
| | | | | TNGG-H  P62 | | | |








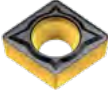




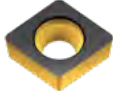






Overview of Turning Insert Geometry

Positive Pressed Insert


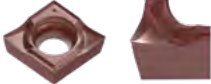
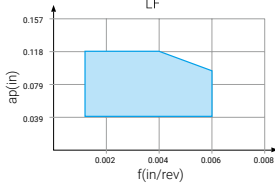
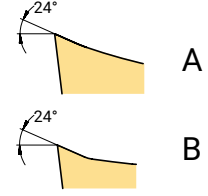

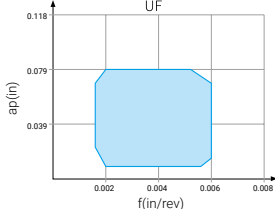
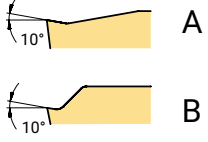

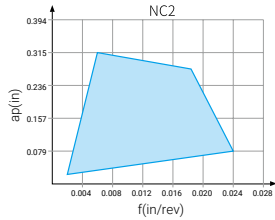
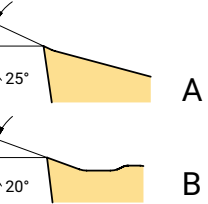

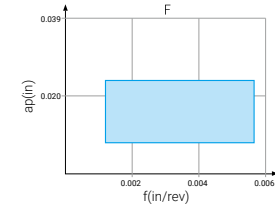


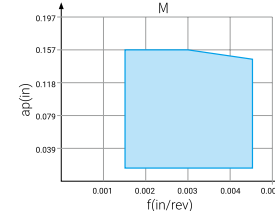

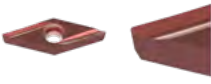
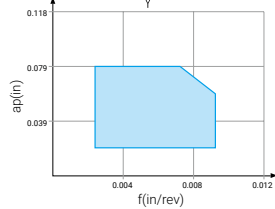
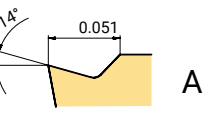
| Application | Chip breaker | Features | Chip breaking range | Cross section geometry  | |
|----------------|-----------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|--|
| Profiling | BS  | Profile turning Profile turning or turning with changing depth of cut, smooth chip evacuation. |  |  | |
| Finishing | PB1  | First choice for steel finish turning Positive rake angle reduces cutting force and built-up edge, and obtains better surface finish and longer tool life. Also can be used in stainless steel turning. |  |  | |
| Semi-finishing | PC2  | First choice for steel and stainless steel semi-finish turning Sharp geometry design ensures low cutting force, less built-up edge and excellent chip control. |  |  | |
































| | 80° Rhombus  | 55° Rhombus  | 90° Square  | 60° Triangle  | 35° Rhombus  | 80° Trigon  | Round  |
|--|--------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|
| | | | | | VBMT-BS  P85 | | |
| | CCMT-PB1 CPMT-PB1  P71 | DCMT-PB1  P75 | SCMT-PB1  P78 | TCMT-PB1 TPMT-PB1  P80 | VBMT-PB1 VCMT-PB1  P86 | | |
| | CCMT-PC2 CPMT-PC2  P71 | DCMT-PC2  P75 | SCMT-PC2  P78 | TCMT-PC2 TPMT-PC2  P80 | VBMT-PC2 VCMT-PC2  P86 | | |

| Application | Chip breaker | Features | Chip breaking range | Cross section geometry  | |
|----------------|---------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|--|
| Medium | KC2  | General purpose geometry for steel, stainless steel and cast iron turning Suitable for medium and rough turning. Simple and durable chip breaker design, very good versatility and wide application range. |  |  | |
| Roughing | KD5  | Geometry for cast iron rough turning Suitable for unstable machining due to its strong cutting edge. Reduced chipping. |  |  | |
| | HT  | Geometry for steel turning with large cutting depth Open chip breaker is suitable for large cutting depth with smooth chip evacuation. Good cost efficiency. |  |  | |
| Semi-finishing | PD8  | Geometry for carbon steel and alloy steel heavy turning The wide chip breaker avoids chip jamming at deep depth of cut. Has good chip control at light depth of cut as well. |  |  | |
| Medium | No code  | Alternative chipbreaker for cast iron and alloy steel medium turning Negative land and big rake angle design ensure cutting edge strength and sharpness. |  |  | |

| | 80° Rhombus  | 55° Rhombus  | 90° Square  | 60° Triangle  | 35° Rhombus  | 80° Trigon  | Round  |
|--|------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|
| | CCMT-KC2  P72 | DCMT-KC2  P75 | SCMT-KC2  P78 | TCMT-KC2  P81 | VBMT-KC2  P86 | | |
| | CCMW-KD5  P72 | DCMW-KD5  P76 | SCMW-KD5  P78 | TCMW-KD5  P81 | | | |
| | | | SCMT-HT  P78 | | | | |
| | | | | | | | RCMX-PD8  P90 |
| | | | | | | | RCMX  P90 |

Positive Ground Insert

| Application | Chip breaker | Features | Chip breaking range | Cross section geometry  | |
|----------------|---------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|--|
| Finishing | LF  | Finish turning Sharp cutting edge, low cutting force, suitable for Swiss-type automatic lathe with 2 direction machining. |  |  | |
| | UF  | First choice for heat resistant alloy turning Peripheral ground finish turning inserts. High repeatability on insert positioning. Sharp cutting edge can achieve good machining tolerance. |  |  | |
| Semi-finishing | NC2  | Choice for aluminium alloy turning Very positive rake angle is designed for non-ferrous metal finish and semi-finish turning. It reduces the cutting force and make smooth chip evacuation. The polished rake surface, with reduced friction and built-up edge. |  |  | |
| Finishing | F  | Choice for finish turning Excellent chip control at low feed rate. Very low cutting force. |  |  | |
| Low feed | M  | Suitable for medium turning in automatic lathes Excellent chip control at low to medium feed rates. Reliable machining. Big rake angle avoids work hardening. |  |  | |
| Semi-finishing | Y  | Choice for semi-finish rough turning in automatic lathe The strong edge can be used in rough turning. Good chip control for low to medium feed rate |  |  | |

| | 80° Rhombus  | 55° Rhombus  | 90° Square  | 60° Triangle  | 35° Rhombus  | 80° Trigon  | Round  |
|--|--------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|
| | CCGT-LF  P70 | DCGT-LF  P74 | | TCGT-LF  P79 | VBGT-LF VCGT-LF VPGT-LF  P84 | | |
| | CCGT-UF  P70 | DCGT-UF  P74 | | TCGT-UF  P79 | VBGT-UF VCGT-UF VPGT-UF  P84, 85 | | |
| | CCGT-NC2  P71 | DCGT-NC2  P75 | SCGT-NC2  P78 | TCGT-NC2  P79 | VCGT-NC2  P85 | | RCGT-NC2  P90 |
| | CCET-F  P73 | DCET-F  P76 | | TBET-F TCET-F TPEH-F  P81, 82, 83 | VBET-F VCET-F VPET-F  P86, 87 | WBET-F  P89 | |
| | CCET-M  P73 | DCET-M  P77 | | TCET-M  P83 | VBET-M VPET-M  P87, 88 | | |
| | | | | | VBET-Y  P88 | | |

Turning Grade Description

Basic Grades for Turning

P Steel, cast steel, ferrite/martensite stainless steel and malleable cast iron

Basic grade

AC052P P05(P01-P15)

CVD coated grade, has good crater resistance and chipping resistance, which is recommended for high productivity medium and rough turning in stable condition, can keep edge reliability in dry or wet machining with high temperature.

AC150P P15(P10-P25)

CVD coated grade, can be used in finish to rough turning on steel and cast steel, and is recommended in continuous and light interrupted cutting where it can keep high metal removal rate.

AC250P P25(P20-P35)

CVD coated grade, 1st choice for steel turning, used in finish to rough turning on steel and cast steel. It's recommended for continuous and interrupted machining.

AC350P P35(P25-P45)

CVD coated grade, can be used in rough turning on steel and cast steel under poor conditions. Reliable cutting edge made this grade good for interrupted machining with high metal removal rate.

Supplemental grade

AP200U P25(P15-P35)

PVD coated grade, recommended for finish turning on low carbon steel with low cutting speed or low feed.

AC200M P35(P25-P40)

CVD coated grade. Supplemental grade for steel turning where high toughness is required.

AT202 P15(P10-P20)

Uncoated cermet grade. It has excellent built-up edge resistance and chipping resistance which can be used in finish turning with good surface quality or where low cutting force are required.

M Austenitic stainless steel, cast steel, manganese steel, alloyed cast iron, malleable cast iron and free cutting iron.

Basic grade

AC100M M15(M05-M20)

CVD coated grade. It's recommended for finish machining and light rough machining. It's suitable for machining at medium to high cutting speed due to its heat resistance feature of wear resistant coating.

AC200M M25(M15-M30)

CVD coated grade, optimised for semi-finish to rough turning, can be used in interrupted machining in which it can keep edge reliability due to good thermal shock stability and mechanical shock resistance.

AP200U M25(M15-M35)

PVD coated grade, used in finish turning at low to medium speed and also in interrupted turning due to excellent thermal stability, outstanding performance in machining when sharp edge and edge toughness or good surface quality are required.

AP301M M25(M15-M35)

PVD coated grade. Mainly used in machining steel and stainless steel small parts. It has excellent built-up edge resistance, good machining stability, can obtain good surface quality, and achieve longer tool life.

Supplemental grade

AP100S M15(M05-M25)

PVD coated grade, recommended for finish turning due to its high hardness and resistance to plastic deformation.

K**Cast iron, chilled cast iron and short chip malleable cast iron****Basic grade****AC100K K05(K01-K15)**

CVD coated grade, has thick and smooth wear resistant coating and hard substrate, recommended for grey cast iron high speed turning.

AC102K K05(K01-K15)

CVD coated grade, has thick and smooth wear resistant coating and hard substrate, recommended for nodular cast iron high speed turning.

AC202K K15(K10-K30)

1st choice for cast iron turning. It can deal with interrupted cutting due to its high wear resistant CVD coating, used in finish to rough turning on cast iron at low to medium cutting speed.

Supplemental grade**PB90 K10(K01-K20)**

CBN grade. Suitable for grey cast iron and chilled cast iron interrupted finish turning due to its good edge strength and wear resistance.

AT202 K15(K10-K20)

Uncoated cermet grade. It has excellent built-up edge resistance and good plastic deformation resistance. It can be used in nodular cast iron finish turning when surface quality, small tolerance or low cutting force are required.

N**Non-ferrous metals****Basic grade****AW100K N15 (N05-N15)**

Uncoated grade. It has both excellent wear resistance and sharp edge. Used in Al alloy rough to finish machining.

PD20 N10 (N01-N20)

PCD grade, used in non-ferrous material and non-metal material machining which can have longer tool life, completely clean cutting and good surface quality.

S**Heat resistant alloys****Basic grade****AP100S S15(S05-S25)**

1st choice for heat resistant alloys. PVD coated grade has high hardness and plastic deformation resistance, can keep high performance and good wear resistance.

AP200U S25(S15-S35)

PVD coated grade. Used in low cutting speed or light interrupted cutting. Suitable for semi-roughing or continuous machining for a short time due to its good notch wear resistance and anti-heat shock capability.

Supplemental grade**AC100M S15(S05-S20)**

CVD coated grade, suitable for heat resistant alloy continuous high speed machining.

AC200M S25(S15-S35)

CVD coated grade, suitable for heat resistant alloy general machining.

H**Hardened materials****Basic grade****PB30 H10(H05-H15)**

CBN grade with low CBN content, is used in hardened steel continuous machining at high speed and light interrupted machining.

PB60 H15(H10-H25)

1st choice of CBN grade medium CBN content for hardened steel interrupted machining and continuous machining at medium speed.

Cutting Data Recommendation--Negative Insert

| Materials | | | | | | | | | | | | | | | | | | | |
|--------------------------|------------------------------------------------|-----------------------------------------------------------------------|--------------|--------|-----------------------|-------------------------------------------|------------|-------|-------|------------|-------|-------|------------|-------|-------|------------|-------|-------|--|
| ISO | Workpiece Materials | | | | Brinell Hardness (HB) | Tensile strength Rm(lbs/in ²) | | | | | | | | | | | | | |
| | | | | | | | AT202 | | | AC052P | | | AC150P | | | AC250P | | | |
| | | | | | | | f (in/rev) | | | f (in/rev) | | | f (in/rev) | | | f (in/rev) | | | |
| | | | | | | | 0.004 | 0.012 | 0.020 | 0.004 | 0.016 | 0.024 | 0.004 | 0.016 | 0.024 | 0.004 | 0.016 | 0.024 | |
| P | Unalloyed steel | C ≤ 0.25% | Annealed | 125 | 62000 | 650 | 330 | 230 | 2000 | 1470 | 1080 | 1590 | 1180 | 880 | 1240 | 850 | 680 | | |
| | | 0.25 < C ≤ 0.55% | Annealed | 190 | 92700 | 650 | 330 | 230 | 1800 | 1300 | 960 | 1200 | 880 | 680 | 920 | 650 | 490 | | |
| | | 0.25 < C ≤ 0.55% | Heat-treated | 210 | 103000 | 650 | 260 | 160 | 1300 | 920 | 650 | 850 | 720 | 550 | 650 | 520 | 440 | | |
| | | C > 0.55% | Annealed | 190 | 92700 | 650 | 260 | 160 | 1700 | 1260 | 900 | 880 | 720 | 520 | 780 | 520 | 410 | | |
| | | C > 0.55% | Heat-treated | 300 | 147000 | 650 | 260 | 160 | 1200 | 800 | 590 | 680 | 590 | 490 | 520 | 390 | 360 | | |
| | | Free cutting steel(short chip) | Annealed | 220 | 108000 | 650 | 260 | 160 | 1900 | 1380 | 980 | 1440 | 1010 | 820 | 1110 | 720 | 570 | | |
| | Low-alloyed steel | Annealed | | | 175 | 85700 | 590 | 260 | 160 | 2000 | 1300 | 930 | 1140 | 850 | 720 | 780 | 570 | 440 | |
| | | Heat-treated | | | 300 | 146900 | 590 | 260 | 160 | 1700 | 1150 | 820 | 720 | 550 | 490 | 460 | 320 | 270 | |
| | | Heat-treated | | | 380 | 186000 | 590 | 260 | 160 | 1080 | 750 | 570 | 520 | 390 | 320 | 320 | 230 | 180 | |
| | | Heat-treated | | | 430 | 214200 | 590 | 260 | 160 | 870 | 600 | 460 | 290 | 230 | | | | | |
| | High-alloyed steel and high-alloyed tool steel | Annealed | | | 200 | 97900 | 520 | 260 | 160 | 1460 | 960 | 700 | 1080 | 750 | 490 | 680 | 470 | 270 | |
| | | Hardened and tempered | | | 300 | 147000 | 520 | 260 | 160 | 980 | 650 | 520 | 750 | 460 | 360 | 420 | 270 | 210 | |
| Hardened and tempered | | | 400 | 197000 | 490 | 260 | 160 | 720 | 460 | 340 | 260 | 230 | | | | | | | |
| Stainless steel | | Ferritic/Martensite,Annealed | | | 200 | 97900 | | | | | | | | | | 590 | 490 | 390 | |
| | Martensite,Heat-treated | | | 330 | 162000 | | | | | | | | | | 460 | 320 | 230 | | |
| M | Stainless steel | Austenitic,hardened | | | 200 | 97900 | | | | | | | | | | | | | |
| | | Austenitic,precipitation hardened stainless steel(PH stainless steel) | | | 300 | 147000 | | | | | | | | | | | | | |
| | | Austenitic,ferritic,duplex | | | 230 | 113000 | | | | | | | | | | | | | |
| K | Malleable cast iron | Ferritic | | | 200 | 58000 | | | | | | | | | | | | | |
| | | Pearlitic | | | 260 | 101000 | | | | | | | | | | | | | |
| | Grey cast iron | Low tensile strength | | | 180 | 29000 | | | | | | | | | | | | | |
| | | High tensile strength/Austenitic | | | 245 | 50800 | | | | | | | | | | | | | |
| | Nodular cast iron | Ferritic | | | 155 | 58000 | | | | | | | | | | | | | |
| | | Pearlitic | | | 265 | 101000 | | | | | | | | | | | | | |
| | | GGV(CGI) | | | 230 | 58000 | | | | | | | | | | | | | |
| N | Wrought aluminum alloy | Non-aging alloy | | | 30 | - | | | | | | | | | | | | | |
| | | Aged alloy | | | 100 | 49300 | | | | | | | | | | | | | |
| | Cast aluminum alloy | ≤ 12% Si, non-aging alloy | | | 75 | 37700 | | | | | | | | | | | | | |
| | | ≤ 12% Si, aged alloy | | | 90 | 45000 | | | | | | | | | | | | | |
| | | > 12% Si, non-aging alloy | | | 130 | 65300 | | | | | | | | | | | | | |
| | Magnesium alloy | | | 70 | 36300 | | | | | | | | | | | | | | |
| | Copper and copper alloy(bronze/ brass) | Unalloyed,electrolytic copper | | | 100 | 49300 | | | | | | | | | | | | | |
| | | Brass,bronze,red brass | | | 90 | 45000 | | | | | | | | | | | | | |
| | | Cu alloy,short chip | | | 110 | 55100 | | | | | | | | | | | | | |
| High tensile,Ampco alloy | | | 300 | 146500 | | | | | | | | | | | | | | | |
| S | Heat-resistant alloy | Fe-based | Annealed | 200 | 98600 | | | | | | | | | | | | | | |
| | | | Aged | 280 | 136000 | | | | | | | | | | | | | | |
| | | Ni or Co based | Annealed | 250 | 122000 | | | | | | | | | | | | | | |
| | | | Aged | 350 | 171000 | | | | | | | | | | | | | | |
| | | | Cast | 320 | 156600 | | | | | | | | | | | | | | |
| | Titanium alloy | Pure Titanium | | | 200 | 98600 | | | | | | | | | | | | | |
| | | α and β alloy,aged | | | 375 | 182700 | | | | | | | | | | | | | |
| | | β alloy | | | 410 | 203000 | | | | | | | | | | | | | |
| | Tungsten alloy | | | | 300 | 146500 | | | | | | | | | | | | | |
| | Molybdenum alloy | | | | 300 | 146500 | | | | | | | | | | | | | |
| H | Hardened steel | Hardened and tempered | | | 50HRC | | | | | | | | | | | | | | |
| | | Hardened and tempered | | | 55HRC | | | | | | | | | | | | | | |
| | | Hardened and tempered | | | 60HRC | | | | | | | | | | | | | | |
| | Chilled cast iron | Hardened and tempered | | | 50HRC | | | | | | | | | | | | | | |

*The recommended cutting data always refer to general cutting conditions. The actual selection should be adjusted according to the factors such as machine rigidity, tool body, workpiece conditions and coolant (f should be adjust according to insert radius)

[illegible]

Cutting Data Recommendation--Positive Insert

| Materials | | | | | | | | | | | | | | | | | | | | | |
|--------------------------|------------------------------------------------|-----------------------------------------------------------------------|-----------------------|--------------|--------------------------|----------------------------------------------|------------|-------|-------|------------|-------|-------|------------|-------|-------|------------|-------|-------|--|--|--|
| ISO | Workpiece Materials | | | | Brinell Hardness (HB) | Tensile strength Rm(lbs/in ²) | | | | | | | | | | | | | | | |
| | | | | | | | AT202 | | | AC052P | | | AC150P | | | AC250P | | | | | |
| | | | | | | | f (in/rev) | | | f (in/rev) | | | f (in/rev) | | | f (in/rev) | | | | | |
| | | | | | | | 0.004 | 0.008 | 0.016 | 0.004 | 0.008 | 0.016 | 0.004 | 0.008 | 0.016 | 0.004 | 0.008 | 0.016 | | | |
| P | Unalloyed steel | C ≤ 0.25% | | Annealed | 125 | 62000 | 656 | 328 | 230 | 1960 | 1410 | 1010 | 1520 | 1310 | 1080 | 1180 | 1010 | 850 | | | |
| | | 0.25 < C ≤ 0.55% | | Annealed | 190 | 92700 | 656 | 328 | 230 | 1770 | 1260 | 900 | 1180 | 1080 | 850 | 950 | 820 | 620 | | | |
| | | 0.25 < C ≤ 0.55% | | Heat-treated | 210 | 103000 | 650 | 260 | 160 | 1250 | 850 | 590 | 880 | 780 | 720 | 650 | 590 | 520 | | | |
| | | C > 0.55% | | Annealed | 190 | 92700 | 650 | 260 | 160 | 1700 | 1190 | 830 | 1080 | 980 | 950 | 820 | 720 | 680 | | | |
| | | C > 0.55% | | Heat-treated | 300 | 147000 | 650 | 260 | 160 | 1180 | 730 | 520 | 680 | 590 | 550 | 520 | 420 | 390 | | | |
| | Free cutting steel(short chip) | | Annealed | 220 | 108000 | 650 | 260 | 160 | 1900 | 1310 | 910 | 1440 | 1310 | 1240 | 1050 | 950 | 900 | | | | |
| | Low-alloyed steel | Annealed | | 175 | 85700 | 590 | 260 | 160 | 1930 | 1280 | 860 | 1140 | 1010 | 980 | 850 | 780 | 720 | | | | |
| | | Heat-treated | | 300 | 146900 | 590 | 260 | 160 | 1670 | 1080 | 750 | 650 | 550 | 520 | 440 | 390 | 320 | | | | |
| | | Heat-treated | | 380 | 186000 | 590 | 260 | 160 | 1050 | 680 | 500 | 390 | 320 | 290 | 320 | 270 | 210 | | | | |
| | Heat-treated | | 430 | 214200 | 590 | 260 | 160 | 870 | 540 | 390 | 260 | 230 | | 210 | 180 | | | | | | |
| | High-alloyed steel and high-alloyed tool steel | Annealed | | 200 | 97900 | 520 | 260 | 160 | 1390 | 900 | 640 | 1050 | 950 | 910 | 880 | 780 | 720 | | | | |
| | | Hardened and tempered | | 300 | 147000 | 520 | 260 | 160 | 920 | 590 | 460 | 650 | 550 | 490 | 550 | 450 | 390 | | | | |
| | | Hardened and tempered | | 400 | 197000 | 490 | 260 | 160 | 650 | 390 | 340 | 260 | 230 | | 210 | 180 | | | | | |
| | Stainless steel | Ferritic/Martensite,Annealed | | 200 | 97900 | | | | | | | | | | 620 | 550 | 490 | | | | |
| | | Martensite,Heat-treated | | 330 | 162000 | | | | | | | | | | 290 | 260 | 190 | | | | |
| M | Stainless steel | Austenitic,hardened | | 200 | 97900 | | | | | | | | | | | | | | | | |
| | | Austenitic,precipitation hardened stainless steel(PH stainless steel) | | 300 | 147000 | | | | | | | | | | | | | | | | |
| | | Austenitic,ferritic,duplex | | 230 | 113000 | | | | | | | | | | | | | | | | |
| K | Malleable cast iron | Ferritic | | 200 | 58000 | | | | | | | | | | | | | | | | |
| | | Pearlitic | | 260 | 101000 | | | | | | | | | | | | | | | | |
| | Grey cast iron | Low tensile strength | | 180 | 29000 | | | | | | | | | | | | | | | | |
| | | High tensile strength/Austenitic | | 245 | 50800 | | | | | | | | | | | | | | | | |
| | Nodular cast iron | Ferritic | | 155 | 58000 | | | | | | | | | | | | | | | | |
| | | Pearlitic | | 265 | 101000 | | | | | | | | | | | | | | | | |
| GGV(CGI) | | | | 230 | 58000 | | | | | | | | | | | | | | | | |
| N | Wrought aluminum alloy | Non-aging alloy | | 30 | - | | | | | | | | | | | | | | | | |
| | | Aged alloy | | 100 | 49300 | | | | | | | | | | | | | | | | |
| | Cast aluminum alloy | ≤ 12% Si, non-aging alloy | | 75 | 37700 | | | | | | | | | | | | | | | | |
| | | ≤ 12% Si, aged alloy | | 90 | 45000 | | | | | | | | | | | | | | | | |
| | | > 12% Si, non-aging alloy | | 130 | 65300 | | | | | | | | | | | | | | | | |
| | Magnesium alloy | | | | 70 | 36300 | | | | | | | | | | | | | | | |
| | Copper and copper alloy(bronze/ brass) | Unalloyed,electrolytic copper | | 100 | 49300 | | | | | | | | | | | | | | | | |
| | | Brass,bronze,red brass | | 90 | 45000 | | | | | | | | | | | | | | | | |
| Cu alloy,short chip | | 110 | 55100 | | | | | | | | | | | | | | | | | | |
| High tensile,Ampco alloy | | 300 | 146500 | | | | | | | | | | | | | | | | | | |
| S | Heat-resistant alloy | Fe-based | Annealed | 200 | 98600 | | | | | | | | | | | | | | | | |
| | | | Aged | 280 | 136000 | | | | | | | | | | | | | | | | |
| | | Ni or Co based | Annealed | 250 | 122000 | | | | | | | | | | | | | | | | |
| | | | Aged | 350 | 171000 | | | | | | | | | | | | | | | | |
| | | | Cast | 320 | 156600 | | | | | | | | | | | | | | | | |
| | Titanium alloy | Pure Titanium | | 200 | 98600 | | | | | | | | | | | | | | | | |
| | | α and β alloy,aged | | 375 | 182700 | | | | | | | | | | | | | | | | |
| | | β alloy | | 410 | 203000 | | | | | | | | | | | | | | | | |
| | Tungsten alloy | | | | 300 | 146500 | | | | | | | | | | | | | | | |
| Molybdenum alloy | | | | 300 | 146500 | | | | | | | | | | | | | | | | |
| H | Hardened steel | Hardened and tempered | | 50HRC | | | | | | | | | | | | | | | | | |
| | | Hardened and tempered | | 55HRC | | | | | | | | | | | | | | | | | |
| | | Hardened and tempered | | 60HRC | | | | | | | | | | | | | | | | | |
| | Chilled cast iron | | Hardened and tempered | | 50HRC | | | | | | | | | | | | | | | | |

*The recommended cutting data always refer to general cutting conditions. The actual selection should be adjusted according to the factors such as machine rigidity, tool body, workpiece conditions and coolant (f should be adjust according to insert radius)

IO Turning Inserter