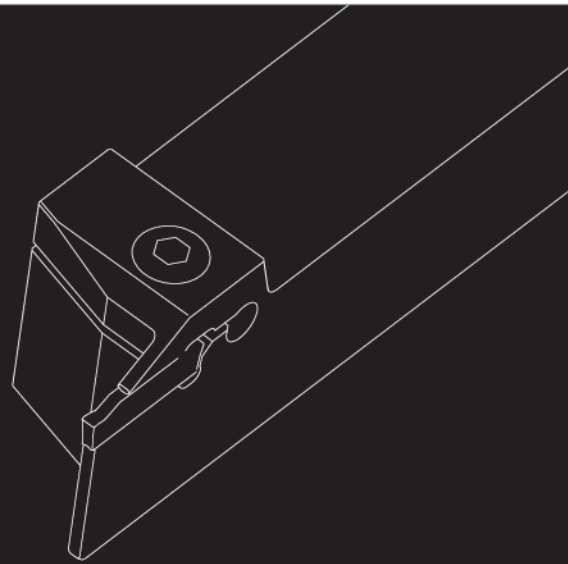


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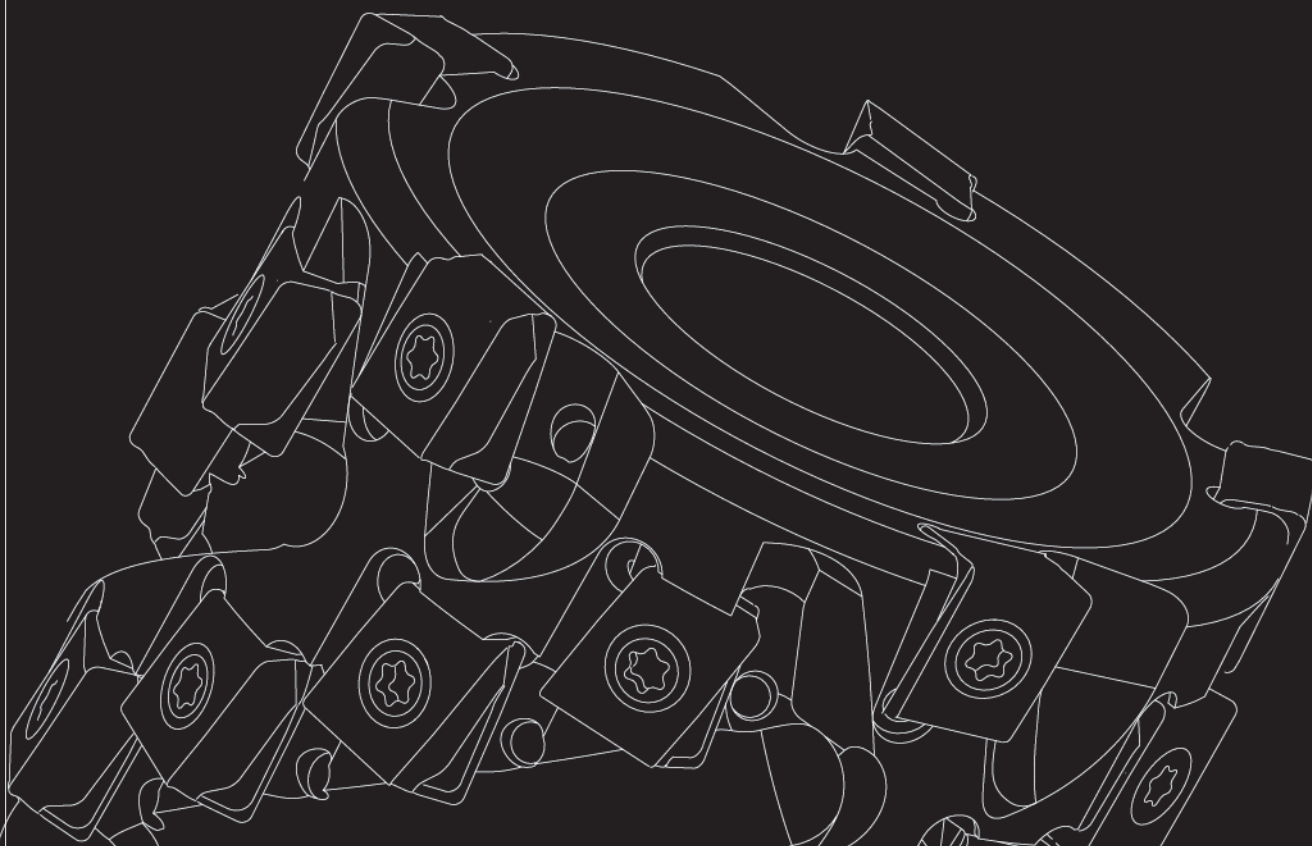
CUTTING TOOL CATALOGUE

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CUTTING TOOL CATALOGUE



**2021**



THE EXPERT OF DIFFICULT MACHINING



## Company Profile

Ganzhou Achteck Tool Technology Co., Ltd. is a wholly-owned subsidiary of Chongyi Zhangyuan Tungsten Co., Ltd. (Listed Company with stock code 002378). The registered capital of Achteck is 260 million USD with 600 employees. The main products include: Coated Carbide Inserts, Carbide Rods and etc. Achteck has the outstanding R&D competence, the production and testing equipments, and the coated carbide insert production technology. The inserts covering Turning, Grooving, Milling and Drilling are widely applied in automotive, energy, die & mold, general machinery, aerospace and other industries.

Achteck Tool is technology oriented, owns a strong research team and keeps on innovation. Having "Benefit from Resources, Reliance on Technologies, Devotion to Humanity and Top with Trust" as the operation philosophy and "Safety, Harmony, Efficiency and Innovation" as the target, Achteck aims to become a well-known brand in the world and a first-class cemented carbide manufacturer in China.



# Swiss Tool Inserts

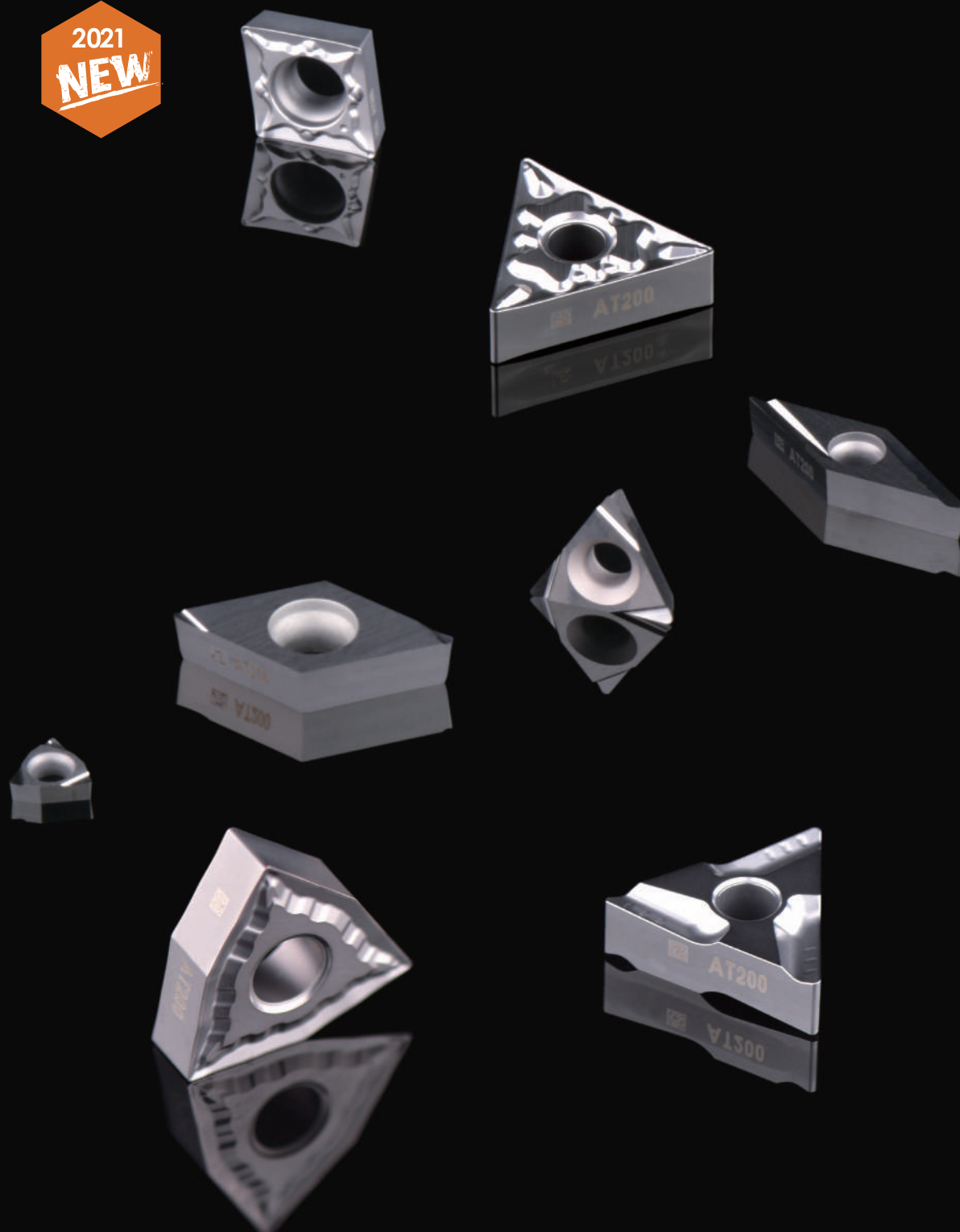


## AP301M Features

- PVD grade for stainless steel turning
- Good machining performance, reduced built up edge, better surface finish, and longer tool life
- Submicron cemented carbide substrate combined with nanostructured multi layer PVD coating
- Good wear resistance and chipping resistance
- Obtain more reliable machining performance
- For continuous and interrupt cutting

# Cermet

## AT200



### Product Features and Applications

- Suitable for steel and cast iron finish and semi-finish turning, high oxidation resistance, can be used in high-speed dry machining
- High chemical stability, effectively reduced built up edge to obtain better surface finish

# Grooving Tool

2021  
**NEW**



## Product Features and Applications

- Holders can cover external, internal and face grooving.
- Insert width range: 2-8mm
- Three parting and grooving geometries: CS, CM, CH
- Two turning geometries: TM, TS.
- Two Profiling geometries: RM, RA
- High precision ground insert series, covering 1-8mm insert width, can be used in parting, grooving and profiling machining.
- Unique rake geometry design combined with double relief angle on the flank, obtained more clearance in smaller diameter face grooving and internal grooving

# Profile Milling

APM00-RO

## Product Features and Applications

- Main applications in blade and aircraft component profile milling
- Inserts are with anti-rotation design
- New AP403S and AP403M grade can cover stainless steel and super alloy machining
- Cutter diameter range:  $\Phi 25\text{mm}$  -  $\Phi 160\text{mm}$
- MM3 geometry, precision ground flank and optimized cutting edge treatment, offer longer insert tool life
- Multiple coupling types: screw clamping, cylindrical shank and arbor cutter



## Product Features and Applications

- AFF40-LN12/LN15 series cutters are mainly used in cast iron engine cylinder block, cylinder head and other kinds of valve housing type milling
- The cutter used 40°approaching angel, close pitch design guaranteed high productivity
- Stable wedge clamping for main cutting inserts, easy to handle
- Wiper inserts are easy to be adjusted and reliable, can achieve good surface finish
- 16 cutting edges of each insert, offer constant performance and high cost efficiency.
- Cutter surface is blackened, with high precision insert pockets, and good wear resistance



AFF40-LN12/LN15

**Cast Iron Finishing Milling Cutter**





### Product Features and Applications

LN09 insert series can be used not only in square shoulder milling cutter, but also in porcupine cutter

- Accurate 90° square shoulder milling cutter provides excellent verticality
- Tangential mounted insert design offers strong insert toughness with better cutter rigidity.
- Positive axial angle design makes the cutting smoothly. H-class insert tolerance offers high repeatability of insert positioning
- Double-sided 4-edge insert, more cost efficient choice, while each insert is with wiper edge which can obtain good surface finish
- Full tooth type of porcupine milling cutter, with high metal removal rate, large cutting depth, high efficiency, known as the "powerful tool for rough machining"

LN09

# Shoulder Milling

### Product Features and Applications

- Product range: 3\*Dc and 5\*Dc. With internal and external coolant,
- Diameter range: 3-16mm;
- 140° drill tip angle design, good versatility, suitable for drilling in different materials
- Nanostructured PVD coating technology improves the toughness and wear resistance of tools.



D106

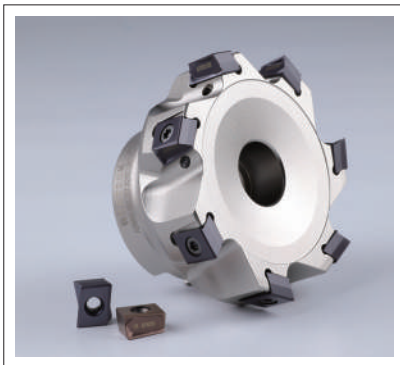
**Solid Carbide Drill for Universal Use**



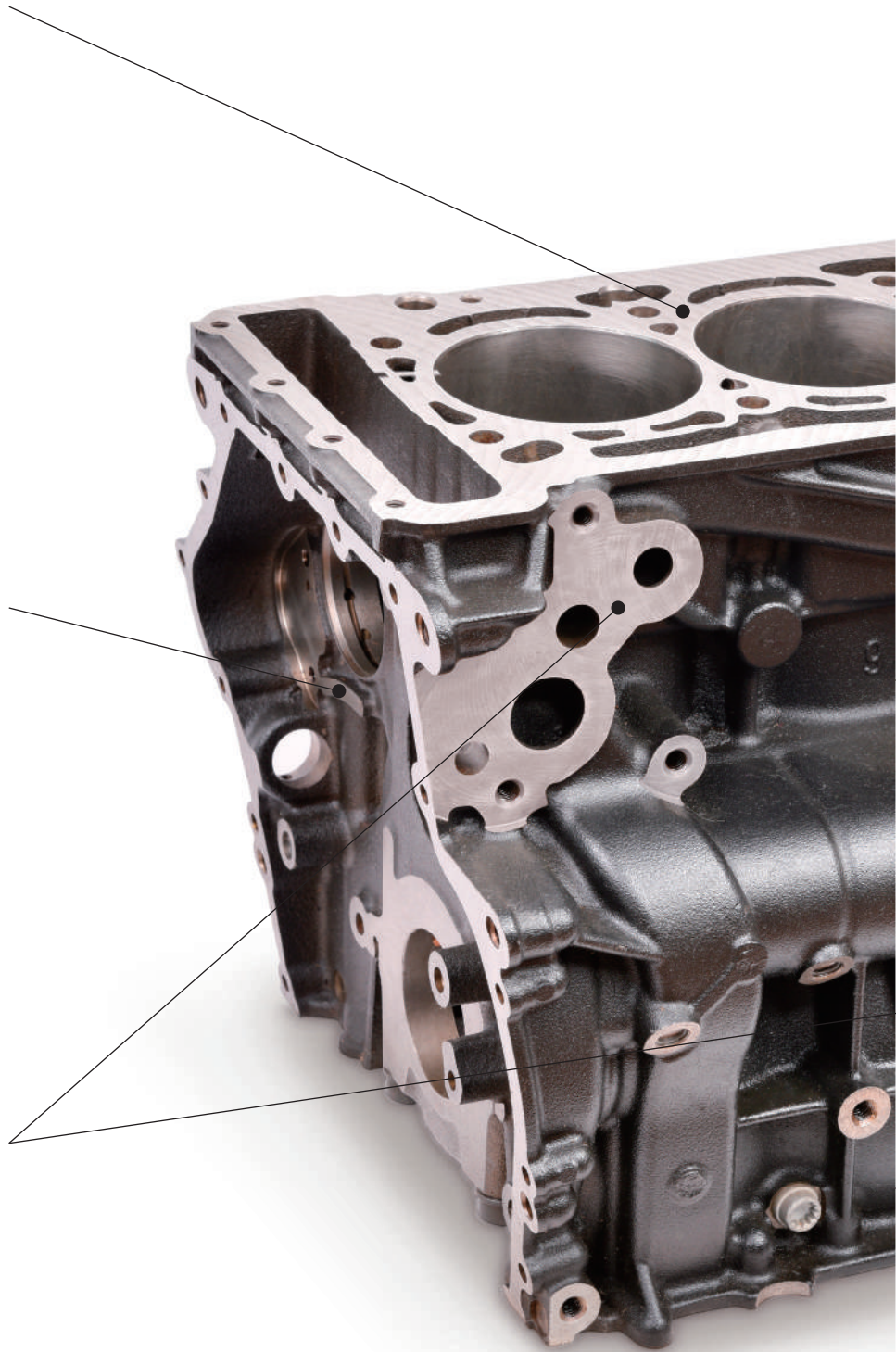
AFM45-XN09-W milling cutter with heptagon inserts, extra close pitch with wedge clamping, combined with heat resistant CVD coated inserts. The ideal choice of cast iron rough milling.

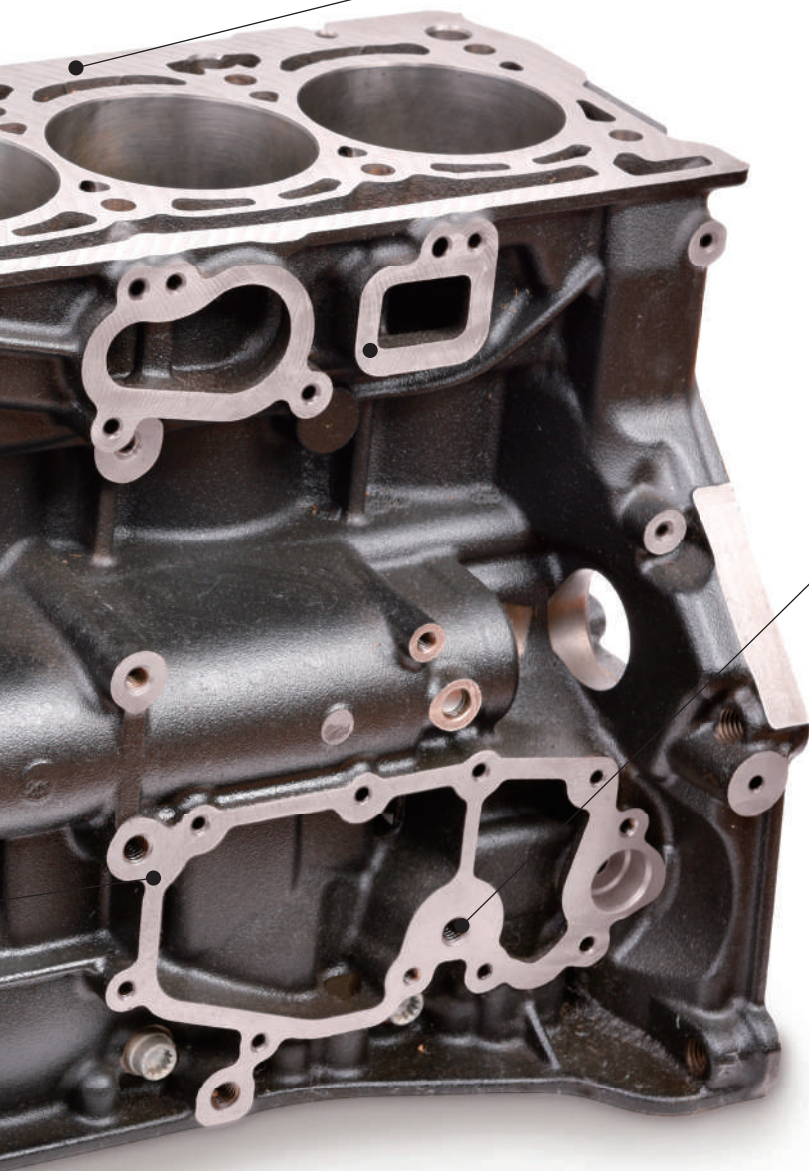


APE90-LN09/LN13 porcupine milling cutter uses tangential insert with helical edge profile. The high strength insert have 4 cutting edges, offering high productivity, machining reliability and cost efficiency.



ASM90-LN09/LN13 square shoulder milling cutter with 4 cutting edge tangential inserts with helical edge profile. The reliable cutting edge can adopt increased fz by 30%, and also bring on higher metal removal rate and productivity.





AFF0-LN15 cast iron finish milling cutter, combined with octagon main cutting inserts and wiper inserts. It's cost efficient and easy to handle. The good wear resistant grade and high precision cutting edge guaranteed excellent surface finishing and longer tool life.



D106 drill series, the substrate has both hardness and toughness, combined with high wear resistant PVD coating. It can reach higher tool life in cast iron machining. The unique drill tip geometry can reduce the edge chipping.

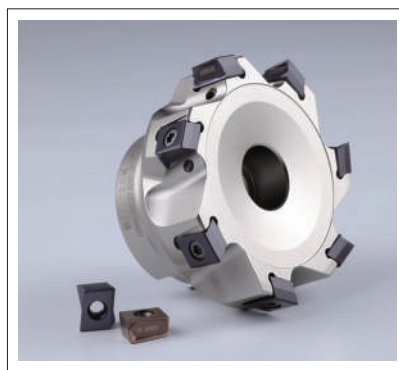
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Machining Solutions for Engine Block

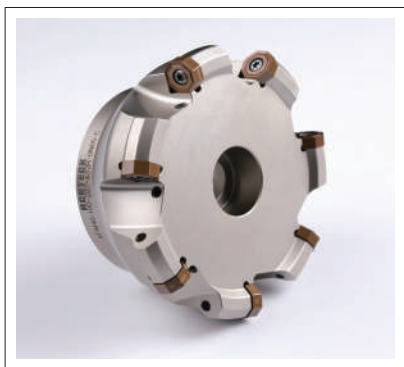
## Turbocharger Housing Application Case



Special side face milling cutter used in machining the back face of flange.



ASM90-LN13 square shoulder milling cutter with tangential mounted inserts. The insert has 4 cutting edges, can be used to machine the boss surface on the turbocharger.



AFM40-ON05-C-45, with 45 degree approach angle, using 16 cutting edge insert with wiper edge. Used in finish milling the flange face of turbocharger casing



AFM45-XN07 face milling cutter with heptagon inserts, 14 cutting edges, with nanostructured PVD coating. Used in rough milling the flange face, with a high performance/cost ratio.





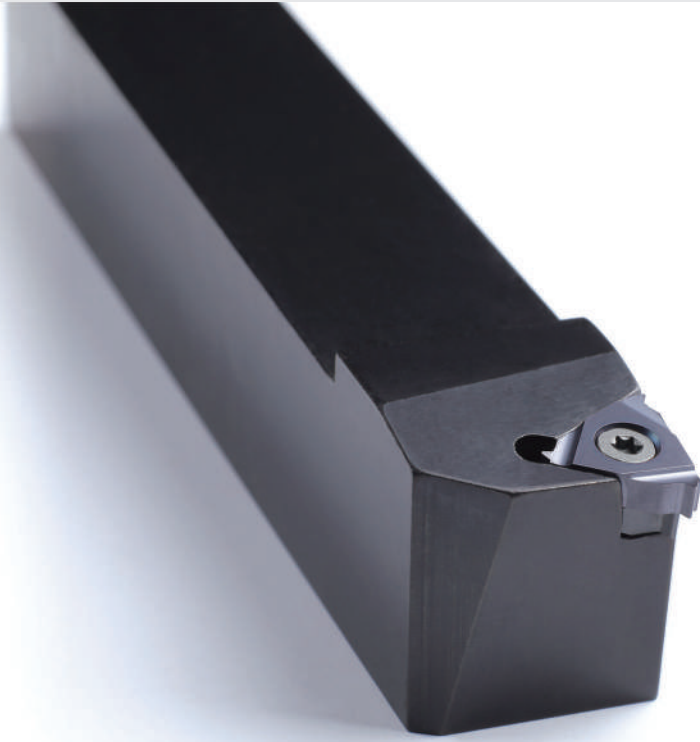
AP100S/AP301M PVD grades, used in rough external turning and face turning of turbocharger housing



ATD grooving insert series can be used in external, face and V-shaped grooving.



Special boring tool, used in the turbocharger housing boring.

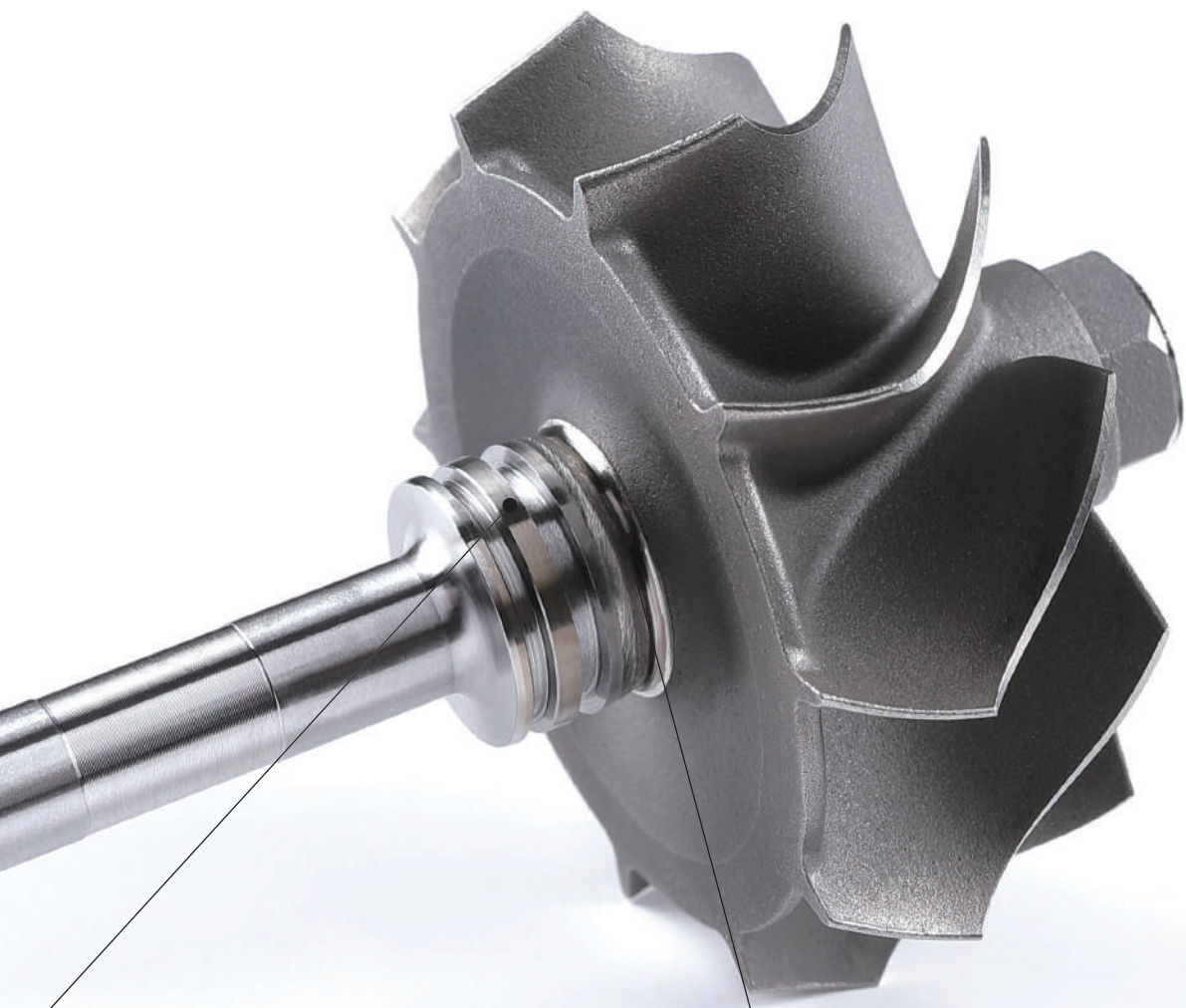


16ER 100ISO AP220U threading insert, used in threading operation of turbine shaft.



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Turbine Shaft Machining Cases



Grooving holder ATSER2525-3T12 and grooving insert ATD302-TS AP301U are used in external grooving of turbine shaft.

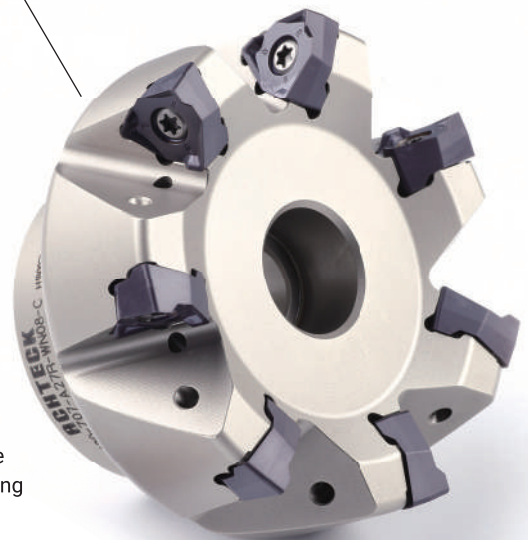
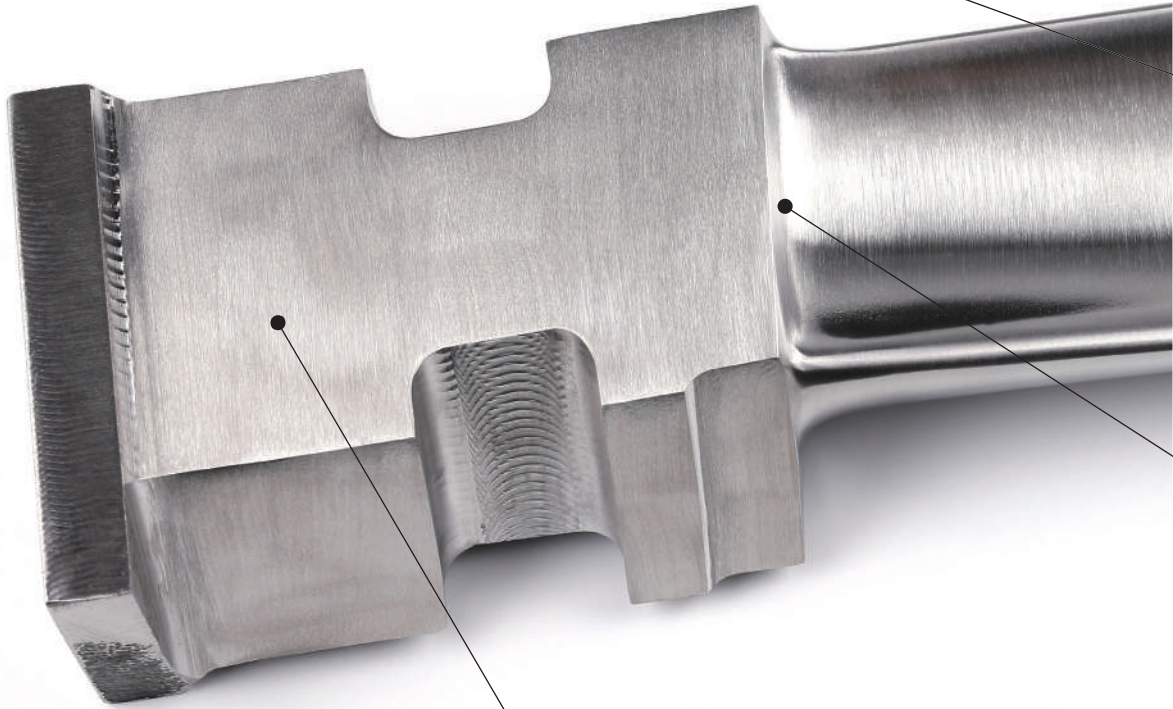


DNMG150608-SC3 AP100S, turning insert for heat resistant alloy, used in brazed surface contour machining





APM00-RP06-12 cutter, used in rough milling of blade airfoil



ASM90-WN08 square shoulder milling cutter with negative insert, 6 cutting edges, accurate 90 degree design, used in rough or finish milling blade root and shroud.

## Steam Turbine and Aerospace Blade Solutions



APM00-RBM08-20 is used in rough milling the transition area between blade airfoil and root

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## CUTTING TOOL CATALOGUE

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ISO Turning Insert Denomination System

**C**  
1

**N**  
2

**M**  
3

**G**  
4

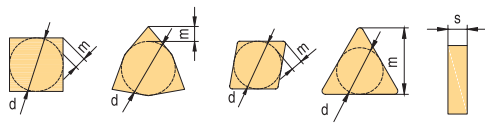
**1- Shape/code**

|          |          |               |          |          |
|----------|----------|---------------|----------|----------|
| <b>A</b> | <b>B</b> | <b>C</b>      | <b>D</b> | <b>E</b> |
|          |          |               |          |          |
| <b>H</b> | <b>K</b> | <b>L</b>      | <b>M</b> | <b>O</b> |
|          |          |               |          |          |
| <b>P</b> | <b>R</b> | <b>S</b>      | <b>T</b> | <b>V</b> |
|          |          |               |          |          |
| <b>W</b> | <b>Z</b> | <b>Others</b> |          |          |
|          |          |               |          |          |

**2- Clearance angle**

|          |          |                              |          |
|----------|----------|------------------------------|----------|
| <b>A</b> | <b>B</b> | <b>C</b>                     | <b>D</b> |
|          |          |                              |          |
| <b>E</b> | <b>F</b> | <b>G</b>                     | <b>N</b> |
|          |          |                              |          |
| <b>P</b> | <b>O</b> | <b>Other clearance angle</b> |          |
|          |          |                              |          |

**3- Tolerance**



| Class | Unit | In. Circle dimension d | Nose height m | Thickness s |
|-------|------|------------------------|---------------|-------------|
| A     | mm   | ± 0,025                | ± 0,005       | ± 0,025     |
| C     | mm   | ± 0,025                | ± 0,013       | ± 0,025     |
| E     | mm   | ± 0,025                | ± 0,025       | ± 0,025     |
| F     | mm   | ± 0,013                | ± 0,005       | ± 0,025     |
| G     | mm   | ± 0,025                | ± 0,025       | ± 0,130     |
| H     | mm   | ± 0,013                | ± 0,013       | ± 0,025     |
| J     | mm   | *                      | ± 0,005       | ± 0,025     |
| K     | mm   | *                      | ± 0,013       | ± 0,025     |
| L     | mm   | *                      | ± 0,025       | ± 0,025     |
| M     | mm   | *                      | *             | ± 0,127     |
| U     | mm   | *                      | *             | ± 0,127     |
| N     | mm   | *                      | *             | ± 0,025     |

\* For details refer to right and below tables

| IC     | Shape: C, E, H, M, O, P, S, T, R, W |        |        |        |
|--------|-------------------------------------|--------|--------|--------|
|        | d                                   |        | m      |        |
|        | J,K,L,M,N                           | U      | M, N   | U      |
| 4.76   | ± 0,05                              | ± 0,08 | ± 0,08 | ± 0,13 |
| 5.56   | ± 0,05                              | ± 0,08 | ± 0,08 | ± 0,13 |
| 6      | ± 0,05                              | ± 0,08 | ± 0,08 | ± 0,13 |
| 6.35   | ± 0,05                              | ± 0,08 | ± 0,08 | ± 0,13 |
| 7.94   | ± 0,05                              | ± 0,08 | ± 0,08 | ± 0,13 |
| 8      | ± 0,05                              | ± 0,08 | ± 0,08 | ± 0,13 |
| 9.525  | ± 0,05                              | ± 0,08 | ± 0,08 | ± 0,13 |
| 10     | ± 0,05                              | ± 0,08 | ± 0,08 | ± 0,13 |
| 12     | ± 0,08                              | ± 0,13 | ± 0,13 | ± 0,2  |
| 12.7   | ± 0,08                              | ± 0,13 | ± 0,13 | ± 0,2  |
| 15.875 | ± 0,1                               | ± 0,18 | ± 0,15 | ± 0,27 |
| 16     | ± 0,1                               | ± 0,18 | ± 0,15 | ± 0,27 |
| 19.05  | ± 0,1                               | ± 0,18 | ± 0,15 | ± 0,27 |
| 20     | ± 0,1                               | ± 0,18 | ± 0,15 | ± 0,27 |
| 25     | ± 0,13                              | ± 0,25 | ± 0,18 | ± 0,38 |
| 25.4   | ± 0,13                              | ± 0,25 | ± 0,18 | ± 0,38 |
| 31.75  | ± 0,15                              | ± 0,25 | ± 0,2  | ± 0,38 |
| 32     | ± 0,15                              | ± 0,25 | ± 0,2  | ± 0,38 |

| M&N shape | D shape |        | V shape |        |
|-----------|---------|--------|---------|--------|
| IC        | d       | m      | d       | m      |
| 5.56      | ± 0,05  | ± 0,11 |         |        |
| 6.35      | ± 0,05  | ± 0,11 | ± 0,05  | ± 0,16 |
| 7.94      | ± 0,05  | ± 0,11 | ± 0,05  | ± 0,16 |
| 9.525     | ± 0,05  | ± 0,11 | ± 0,05  | ± 0,16 |
| 12.7      | ± 0,08  | ± 0,15 | ± 0,08  | ± 0,2  |
| 15.875    | ± 0,10  | ± 0,18 | ± 0,10  | ± 0,27 |
| 19.05     | ± 0,10  | ± 0,18 | ± 0,10  | ± 0,27 |

**4 - Type of insert**

|          |          |          |          |                |
|----------|----------|----------|----------|----------------|
| <b>A</b> | <b>B</b> | <b>C</b> | <b>F</b> | <b>G</b>       |
|          |          |          |          |                |
| <b>H</b> | <b>J</b> | <b>M</b> | <b>N</b> | <b>Q</b>       |
|          |          |          |          |                |
| <b>R</b> | <b>T</b> | <b>U</b> | <b>W</b> | <b>Z</b>       |
|          |          |          |          | <b>Special</b> |

|           |           |
|-----------|-----------|
| <b>12</b> | <b>04</b> |
| <b>5</b>  | <b>6</b>  |

| 5- Cutting edge length    |              |    |    |    |    |    |    |    |
|---------------------------|--------------|----|----|----|----|----|----|----|
| In. Circle Dimension (mm) | insert shape |    |    |    |    |    |    |    |
|                           | C            | D  | R  | S  | T  | V  | W  | K  |
| 3.97                      |              |    |    |    | 06 |    |    | 02 |
| 5.0                       |              |    |    | 05 |    |    |    |    |
| 5.56                      |              |    |    | 09 |    |    |    |    |
| 6.0                       |              |    | 06 |    |    |    |    |    |
| 6.35                      | 06           | 07 |    |    | 11 | 11 | 04 |    |
| 8.0                       |              |    |    | 08 |    |    |    |    |
| 9.525                     | 09           | 11 | 09 | 09 | 16 | 16 | 06 | 16 |
| 10.0                      |              |    |    | 10 |    |    |    |    |
| 12.0                      |              |    |    | 12 |    |    |    |    |
| 12.7                      | 12           | 15 | 12 | 12 | 22 | 22 | 08 |    |
| 15.875                    | 16           |    | 15 | 15 | 27 |    |    |    |
| 16.0                      |              |    |    | 16 |    |    |    |    |
| 19.05                     | 19           |    | 19 | 19 | 33 |    |    |    |
| 20.0                      |              |    |    | 20 |    |    |    |    |
| 25.0                      |              |    |    | 25 |    |    |    |    |
| 25.4                      | 25           |    | 25 | 25 |    |    |    |    |
| 31.75                     |              |    |    | 31 |    |    |    |    |
| 32                        |              |    |    | 32 |    |    |    |    |

| 6- Thickness              |  |
|---------------------------|--|
| Round down plus zero or T |  |
| A, B, C, N, O, W,         |  |
| H, M, R, T,               |  |
| F, G, J, U,               |  |

| Example: | Value |
|----------|-------|
| 01       | 1.59  |
| T1       | 1.98  |
| 02       | 2.38  |
| 03       | 3.18  |
| T3       | 3.97  |
| 04       | 4.76  |
| 05       | 5.56  |
| 06       | 6.35  |
| 07       | 7.94  |
| 09       | 9.525 |
| 11       | 11.11 |
| 12       | 12.70 |
| 14       | 14.29 |
| 15       | 15.88 |

|           |          |          |            |
|-----------|----------|----------|------------|
| <b>08</b> | <b>E</b> | <b>-</b> | <b>KC4</b> |
| <b>7</b>  | <b>8</b> | <b>-</b> | <b>9</b>   |

| 7- Nose radius             |            |
|----------------------------|------------|
| Corner radius              |            |
| Example:                   |            |
| MO = round insert (metric) |            |
| 00 = Sharp                 | 20 = 2.0   |
| 003 = 0.03                 | 24 = 2.4   |
| 005 = 0.05                 | 28 = 2.8   |
| 01 = 0.1                   | 32 = 3.2   |
| 02 = 0.2                   | 40 = 4.0   |
| 04 = 0.4                   | 48 = 4.8   |
| 08 = 0.8                   | 56 = 5.6   |
| 12 = 1.2                   | 64 = 6.4   |
| 16 = 1.6                   | X = Others |

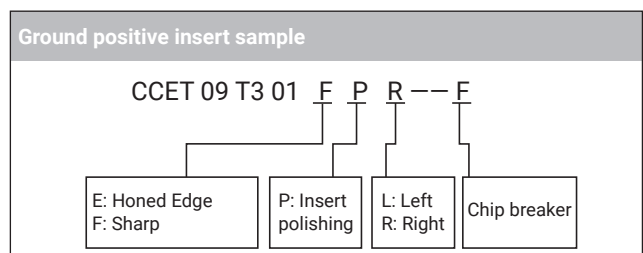
  

| Wiper | Approaching angle (Kr) | Wiper clearance angle (an) |
|-------|------------------------|----------------------------|
|       | A = 45°                | A = 3°                     |
|       | D = 60°                | B = 5°                     |
|       | E = 75°                | C = 7°                     |
|       | F = 85°                | D = 15°                    |
|       | G = 87°                | E = 20°                    |
|       | P = 90°                | F = 25°                    |
|       | Z = Others             | G = 30°                    |
|       |                        | N = 0°                     |
|       |                        | P = 11°                    |
|       |                        | Z = Others                 |

| 8- Edge preparation |            |                                    |
|---------------------|------------|------------------------------------|
| Code                | Edge Shape | Illustration                       |
| F                   |            | Sharp cutting edge                 |
| E                   |            | Honed cutting edge                 |
| T                   |            | Negative Land                      |
| S                   |            | Negative land + honed cutting edge |



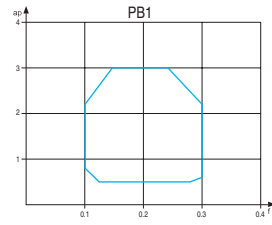
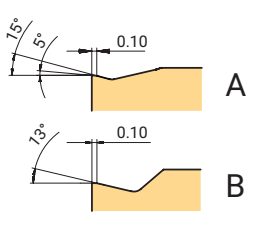
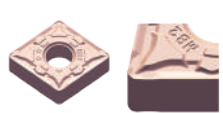
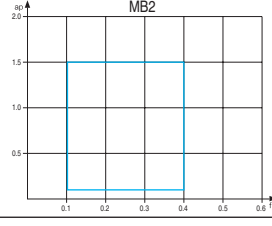
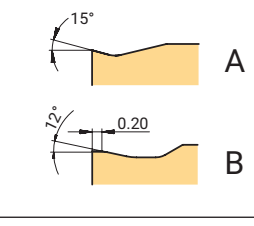
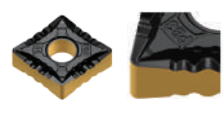
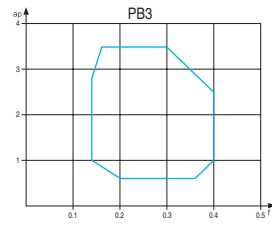
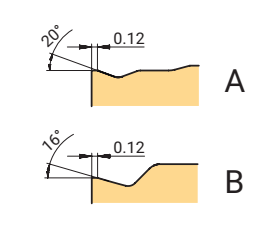
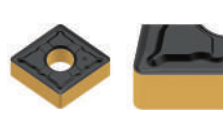
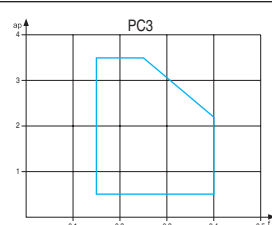
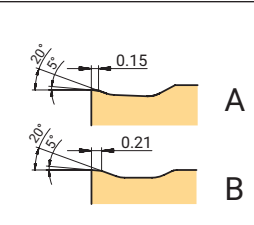

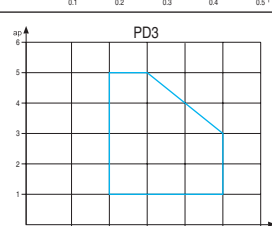
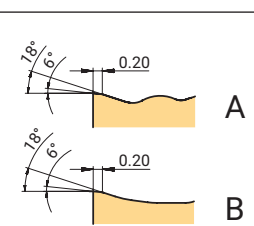
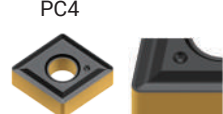
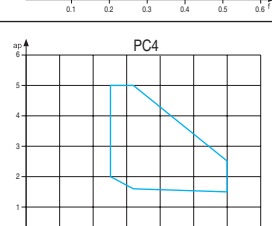
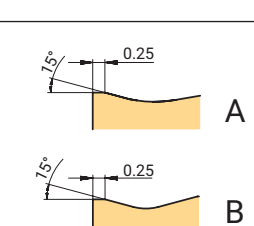

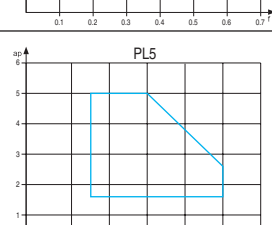
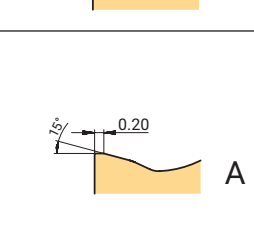
9-Chip breaker illustration









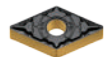





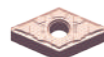










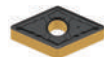











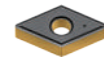





Refer to page : 22-33



Overview of Turning Insert Geometries


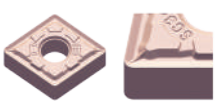
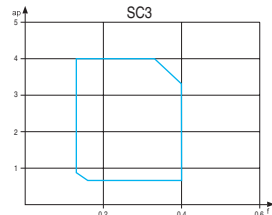
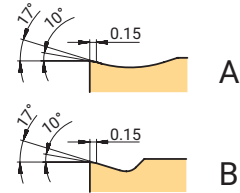
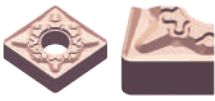
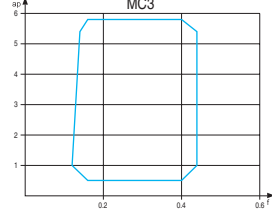
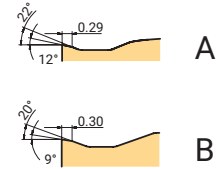
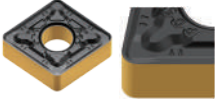
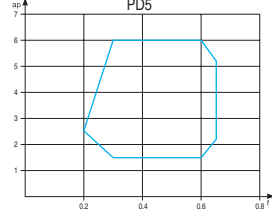
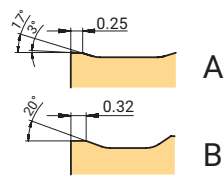

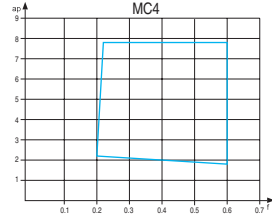
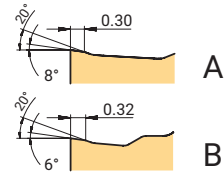
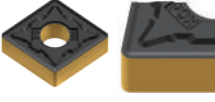
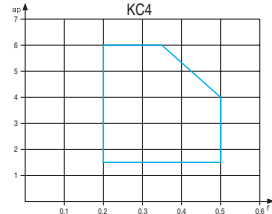
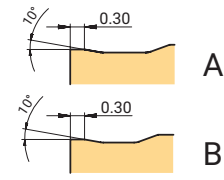
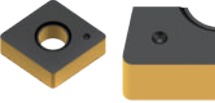
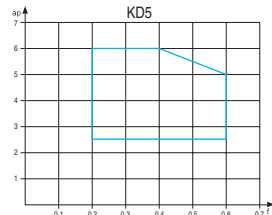


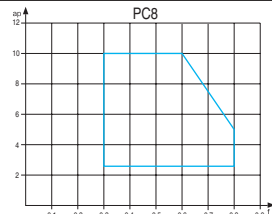
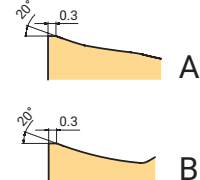

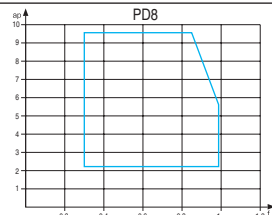
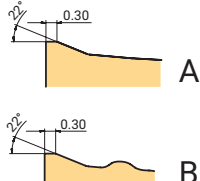
Negative inserts













































| Application   | Chip breaker   | Features  | Chip breaker range   | Cross section geometry  |
|---------------|--|---|--|--|
| Finishing     | <p>PB1</p>    | <p><b>First choice for steel finish turning</b><br/>Light cutting chip breaker, low cutting force, suitable for machining slender shaft, thin wall and unstable clamping parts, good cutting performance</p>  |    |                         |
|               | <p>MB2</p>    | <p><b>First choice for stainless steel finish turning</b><br/>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.</p>  |    |                         |
| Semifinishing | <p>PB3</p>   | <p><b>First choice for steel semi finish turning</b><br/>The positive rake angle combined with small land guaranteed edge strength and sharpness, reduced the cutting force. The wavy side edge design has a good chip breaking result in out-copying turning on the shoulder, and in profile turning at different cutting depths</p> |   |                        |
|               | <p>PC3</p>  | <p><b>Alternative chipbreaker for steel semi-finish turning</b><br/>Unique geometry design offers wider chip breaking range. Double rake angle makes the cutting smoothly. Enhanced insert tip reduced crater wear.</p>   |  |                       |
| Medium        | <p>PD3</p>  | <p><b>First choice for steel medium turning</b><br/>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.</p>      |  |                       |
|               | <p>PC4</p>  | <p><b>First choice for cast iron medium turning</b><br/><b>Alternative chipbreaker for carbon steel and alloy steel medium turning</b><br/>Flat T-land guarantee the strength of cutting edge. This multi-purpose geometry can be used in universal applications.</p>   |  |                       |
|               | <p>PL5</p>  | <p><b>First choice for steel slender shaft turning</b><br/>Open chip breaker leads to smooth cutting with low cutting force, which is suitable for slender shaft turning.</p>   |  |                       |

|                       |                       |                       |                       |                       |                       |  |
|--|--|--|--|---|--|---|
| CNMG-PB1<br><br>P38   | DNMG-PB1<br><br>P42   | SNMG-PB1<br><br>P45   | TNMG-PB1<br><br>P48   | VNMG-PB1<br><br>P51   | WNMG-PB1<br><br>P52   |   |
| CNMG-MB2<br><br>P38   | DNMG-MB2<br><br>P42   | SNMG-MB2<br><br>P45   | TNMG-MB2<br><br>P48   | VNMG-MB2<br><br>P51   | WNMG-MB2<br><br>P52   |   |
| CNMG-PB3<br><br>P38  | DNMG-PB3<br><br>P42  |  | TNMG-PB3<br><br>P48  | VNMGP-PB3<br><br>P51 | WNMG-PB3<br><br>P52  |   |
| CNMG-PC3<br><br>P38 | DNMG-PC3<br><br>P42 | SNMG-PC3<br><br>P45 | TNMG-PC3<br><br>P48 | VNMG-PC3<br><br>P51 | WNMG-PC3<br><br>P52 |   |
| CNMG-PD3<br><br>P38 | DNMG-PD3<br><br>P42 | SNMG-PD3<br><br>P45 | TNMG-PD3<br><br>P48 | VNMG-PD3<br><br>P51 | WNMG-PD3<br><br>P52 |   |
| CNMG-PC4<br><br>P39 | DNMG-PC4<br><br>P43 | SNMG-PC4<br><br>P46 | TNMG-PC4<br><br>P49 | VNMG-PC4<br><br>P51 | WNMG-PC4<br><br>P53 |   |
|  |  |  | TNMG-PL5<br><br>P48 |   |  |   |


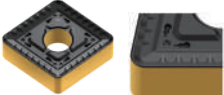
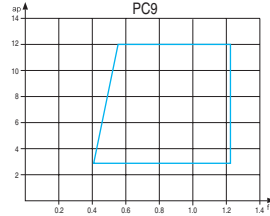
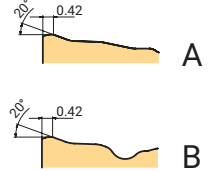
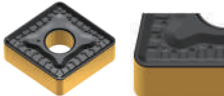
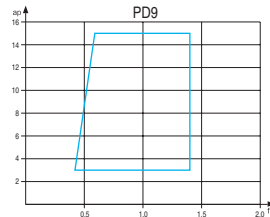
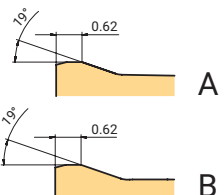
Turning inserts




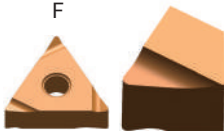
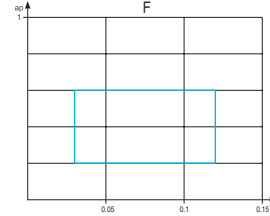

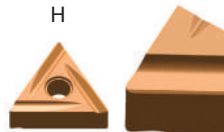
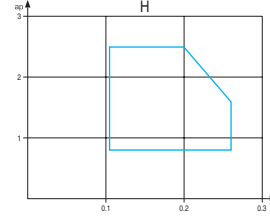
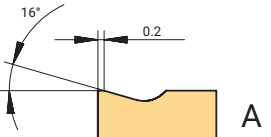
| Application    | Chip breaker   | Features  | Chip breaker range   | Cross section geometry  |
|----------------|--|---|--|--|
| Medium         | <p>SC3</p>    | <p><b>First choice for high temperature alloy medium turning</b><br/>Used in medium turning high temperature alloy and titanium alloy. Large rake angle + small land width design, easy cutting, also suitable in soft steel turning.</p> |    |                         |
|                | <p>MC3</p>    | <p><b>First choice for stainless steel medium turning</b><br/>Sharp cutting edge, low cutting force, wide chip breaking range and chip removal ability</p>  |    |                         |
| Roughing       | <p>PD5</p>    | <p><b>Alternative chipbreaker for steel rough turning</b><br/>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><b>Alternative chipbreaker for stainless steel and superalloy rough turning</b><br/>Large chip breaker design, smooth chip evacuation, good chip breaking, with high metal removal rate.</p>   |   |                       |
|                | <p>KC4</p>  | <p><b>First choice for cast iron rough turning</b><br/>It has strong cutting edge, reliable and stable performance.</p>   |  |                       |
|                | <p>KD5</p>  | <p><b>First choice for cast iron rough turning</b><br/>High cutting edge strength, suitable for interrupt cutting and unstable cutting</p>  |  |                       |
| Heavy roughing | <p>PC8</p>  | <p><b>Light cutting geometry for heavy turning</b><br/>Positive rake angle and curved cutting edge design, low cutting force</p>  |  |                       |
|                | <p>PD8</p>  | <p><b>Heavy turning geometry for soft steel and stainless steel</b><br/>The geometry design ensures low cutting force. Suitable for low power machine tools. Applied in steel, stainless steel and cast iron heavy turning.</p>           |  |                       |








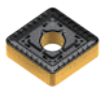
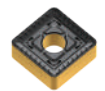
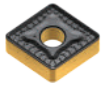
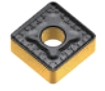
|                               |                               |                               |                               |                               |                               |  |
|--|--|--|--|---|--|---|
| <p>CNMG-SC3</p>  <p>P39</p>   | <p>DNMG-SC3</p>  <p>P43</p>   | <p>SNMG-SC3</p>  <p>P45</p>   | <p>TNMG-SC3</p>  <p>P48</p>   | <p>VNMG-SC3</p>  <p>P51</p>   | <p>WNMG-SC3</p>  <p>P52</p>   |   |
| <p>CNMG-MC3</p>  <p>P39</p>   | <p>DNMG-MC3</p>  <p>P43</p>   | <p>SNMG-MC3</p>  <p>P45</p>   | <p>TNMG-MC3</p>  <p>P49</p>   | <p>VNMG-MC3</p>  <p>P51</p>   | <p>WNMG-MC3</p>  <p>P52</p>   |   |
| <p>CNMG-PD5</p>  <p>P40</p>   | <p>DNMG-PD5</p>  <p>P44</p>   | <p>SNMG-PD5</p>  <p>P46</p>   | <p>TNMG-PD5</p>  <p>P50</p>   |   | <p>WNMG-PD5</p>  <p>P53</p>   |   |
| <p>CNMG-MC4</p>  <p>P39</p> | <p>DNMG-MC4</p>  <p>P43</p> | <p>SNMG-MC4</p>  <p>P46</p> | <p>TNMG-MC4</p>  <p>P49</p> |   | <p>WNMG-MC4</p>  <p>P53</p> |   |
| <p>CNMG-KC4</p>  <p>P40</p> | <p>DNMG-KC4</p>  <p>P44</p> | <p>SNMG-KC4</p>  <p>P46</p> | <p>TNMG-KC4</p>  <p>P49</p> | <p>VNMG-KC4</p>  <p>P51</p> | <p>WNMG-KC4</p>  <p>P53</p> |   |
| <p>CNMA-KD5</p>  <p>P40</p> | <p>DNMA-KD5</p>  <p>P44</p> | <p>SNMA-KD5</p>  <p>P47</p> | <p>TNMA-KD5</p>  <p>P50</p> |   | <p>WNMA-KD5</p>  <p>P53</p> |   |
| <p>CNMM-PC8</p>  <p>P41</p> |  |  |  |   |  |   |
| <p>CNMM-PD8</p>  <p>P41</p> |  | <p>SNMM-PD8</p>  <p>P47</p> | <p>TNMM-PD8</p>  <p>P50</p> |   |  |   |

Turning inserts










| Application    | Chip breaker   | Features   | Chip breaker range   | Cross section geometry  |
|----------------|--|--|--|--|
| Heavy roughing | <p>PC9</p>  | <p><b>First choice for steel heavy turning</b><br/>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><b>Alternative chipbreaker for steel heavy turning</b><br/>High edge strength is suitable for big cutting depth and high feed turning. High machining reliability.</p>              |  |                         |

Negative ground insert

| Application            | Chip breaker   | Features   | Chip breaker range   | Cross section geometry  |
|------------------------|--|--|--|--|
| Finishing              | <p>F</p>  | <p><b>Finishing turning</b><br/>Low cutting force, good chip control. The sharp edge produces a good surface finish.</p> |  |                         |
| Semifinishing-roughing | <p>H</p>  | <p><b>Light turning</b><br/>Excellent chip control at low to medium feed rates. Strong edge strength.</p>                |  |                         |


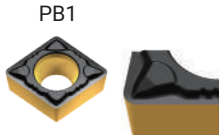
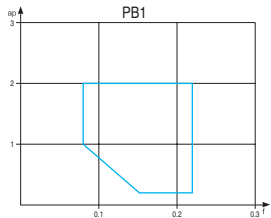




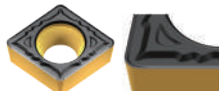
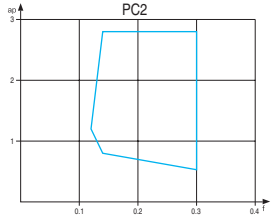
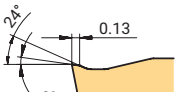


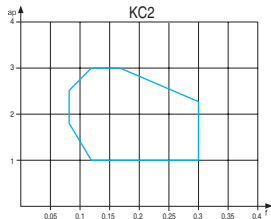
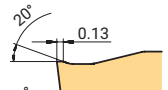
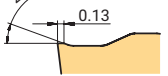

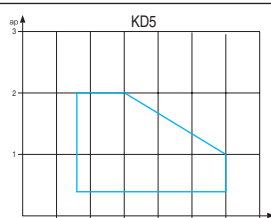


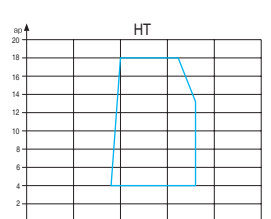
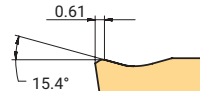
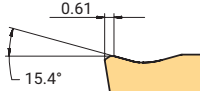

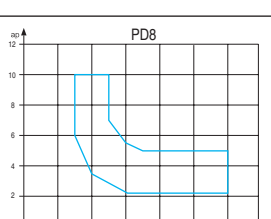
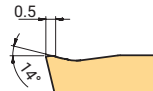

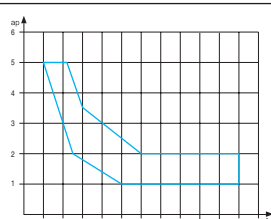
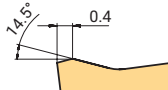
|                     |  |                     |  |  |  |  |
|--|---|--|---|--|---|---|
| CNMM-PC9<br><br>P41 |   | SNMM-PC9<br><br>P47 |   |  |   |   |
| CNMM-PD9<br><br>P41 |   | SNMM-PD9<br><br>P47 |   |  |   |   |









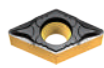


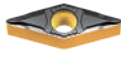

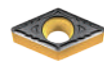


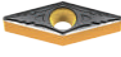

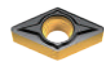


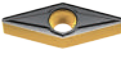

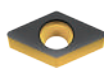





Turning inserts

|  |  |  |                   |  |  |  |
|---|---|---|--|--|---|---|
|   |   |   | TNGG-F<br><br>P50 |  |   |   |
|   |   |   | TNGG-H<br><br>P50 |  |   |   |


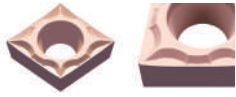
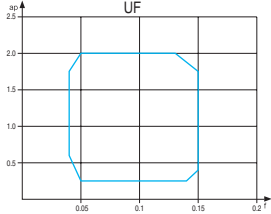


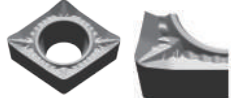
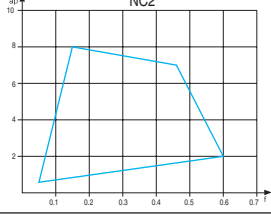
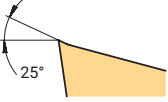
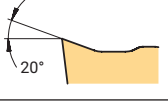

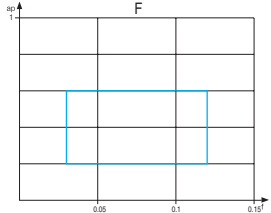
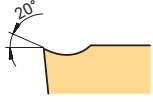

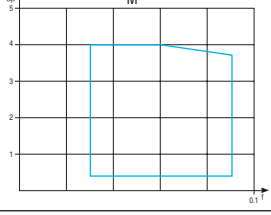
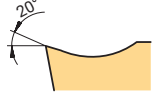
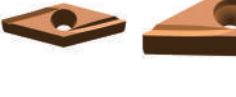
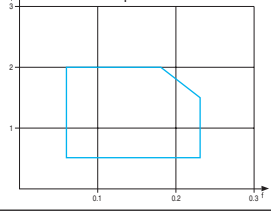
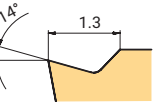
Overview of Turning Insert Geometries

Positive inserts

| Application   | Chip breaker   | Features   | Chip breaker range   | Cross section geometry    |
|---------------|--|--|--|--|
| Finishing     |  <p>PB1</p>       | <p><b>First choice for steel finish turning</b><br/>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.</p>    |    |  A<br> B     |
|               |  |  |  |  A<br> B     |
| Semifinishing |  <p>PC2</p>       | <p><b>First choice for steel and stainless steel semi-finish turning</b><br/>Sharp geometry design ensures low cutting force, less built-up edge and excellent chip control.</p>   |    |  A<br> B     |
| Medium        |  <p>KC2</p>      | <p><b>General purpose geometry for steel, stainless steel and cast iron turning</b><br/>Suitable for medium and rough turning. Simple and durable chip breaker design, very good versatility and wide application range.</p> |   |  A<br> B  |
| Roughing      |  <p>KD5</p>     | <p><b>Geometry for cast iron rough turning</b><br/>Suitable for unstable machining due to its strong cutting edge. Reduced chipping.</p>   |  |  A  |
|               |  <p>HT</p>      | <p><b>Geometry for steel turning with large cutting depth</b><br/>Open chip breaker is suitable for large cutting depth with smooth chip evacuation. Good cost efficiency.</p>   |  |  A<br> B |
| Medium        |  <p>PD8</p>     | <p><b>Geometry for carbon steel and alloy steel heavy turning</b><br/>A wide chipbreaker avoid chip jam at big cutting depth. Chip control can be also good at small cutting depth.</p>                                      |  |  A  |
|               |  <p>No code</p> | <p><b>Alternative chipbreaker for cast iron and alloy steel medium turning</b><br/>Negative land and big rake angle design ensure cutting edge strength and sharpness</p>  |  |  A  |

|                               |                               |                               |                               |    |  |                               |
|--|--|--|--|--|---|--|
| <p>CCMT-PB1</p>  <p>P55</p>   | <p>DCMT-PB1</p>  <p>P58</p>   | <p>SCMT-PB1</p>  <p>P61</p>   | <p>TNMG-PB1</p>  <p>P62</p>   | <p>VNMG-PB1</p>  <p>P65</p>              |   |  |
| <p>CCMT-PC2</p>  <p>P55</p>   | <p>DCMT-PC2</p>  <p>P58</p>   | <p>SCMT-PC2</p>  <p>P61</p>   | <p>TCMT-PC2</p>  <p>P62</p>   | <p>VBMT-PC2<br/>VCMT-PC2</p>  <p>P65</p> |   |  |
| <p>CCMT-KC2</p>  <p>P56</p>  | <p>DCMT-KC2</p>  <p>P59</p>  | <p>SCMT-KC2</p>  <p>P61</p>  | <p>TCMT-KC2</p>  <p>P63</p>  | <p>VBMT-KC2</p>  <p>P66</p>            |   |  |
| <p>CCMW-KD5</p>  <p>P56</p> | <p>DCMW-KD5</p>  <p>P59</p> | <p>SCMW-KD5</p>  <p>P61</p> | <p>TCMW-KD5</p>  <p>P63</p> |  |   |  |
|  |  | <p>SCMT-HT</p>  <p>P61</p>  |  |  |   |  |
|  |  |  |  |  |   | <p>RCMX-PD8</p>  <p>P69</p> |
|  |  |  |  |  |   | <p>RCMX</p>  <p>P69</p>     |

Positive ground inserts

| Application   | Chip breaker   | Features  | Chip breaker range   | Cross section geometry    |
|---------------|--|---|--|--|
| Finishing     | <p>UF</p>   | <p><b>First choice for high temperature alloy turning</b><br/>Peripheral ground finish turning inserts. High repeatability on insert positioning. Sharp cutting edge can achieve good machining tolerance.</p>  |    |  A  |
|               |  |   |  |  B  |
| Semifinishing | <p>NC2</p>  | <p><b>Choice for aluminium alloy turning</b><br/>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.</p> |    |  A<br> B |
| Finishing     | <p>F</p>  | <p><b>Choice for finish turning</b><br/>Excellent chip control at low feed rates. Very low cutting force.</p>   |   |  A  |
| Low feed      | <p>M</p>  | <p><b>Geometry for low feed turning in automatic lathe</b><br/>Excellent chip control at low to medium feed rates. Reliable machining. Big rake angle avoid work hardening.</p>   |  |  A  |
|               | <p>Y</p>  | <p><b>Choice for Semi finish-rough turning in automatic lathe</b><br/>The strong edge can be used in rough turning. Good chip control for low to medium feed rate</p>   |  |  A  |

|                             |                             |                             |                                        |    |                             |                             |
|--|--|--|---|---|--|--|
| <p>CCGT-UF</p>  <p>P55</p>  | <p>DCGT-UF</p>  <p>P58</p>  |  | <p>TCGT-UF</p>  <p>P62</p>             | <p>VBGT-UF<br/>VCGT-UF</p>  <p>P65</p>                |  |  |
| <p>CCGT-NC2</p>  <p>P55</p> | <p>DCGT-NC2</p>  <p>P58</p> | <p>SCGT-NC2</p>  <p>P61</p> | <p>TCGT-NC2</p>  <p>P62</p>            | <p>VCGT-NC2</p>  <p>P66</p>                           |  | <p>RCGT-NC2</p>  <p>P69</p> |
| <p>CCET-F</p>  <p>P56</p> | <p>DCET-F</p>  <p>P59</p> |  | <p>TBET-F<br/>TPEH-F</p>  <p>P64</p> | <p>VBET-F<br/>VCET-F<br/>VPET-F</p>  <p>P66, 67</p> | <p>WBET-F</p>  <p>P68</p> |  |
| <p>CCET-M</p>  <p>P57</p> | <p>DCET-M</p>  <p>P60</p> |  | <p>TCET-M</p>  <p>P64</p>            | <p>VBET-M<br/>VPET-M</p>  <p>P66, 67</p>            |  |  |
|  |  |  |   | <p>VBET-Y</p>  <p>P67</p>                           |  |  |



Grade Application Guide

| Turning grade application for ISO material group |                                    |     |            |        |        |        |        |            |        |          |        |        |
|--|------------------------------------|-----|------------|--------|--------|--------|--------|------------|--------|----------|--------|--------|
| Material Group                                   | Materials                          | ISO | CVD coated |        |        |        |        | PVD coated |        | Uncoated | ISO    |        |
|  |                                    |     | AC150P     | AC200P | AC250P | AC350P | ACK15A | AC150K     | AP301M |          |        | AP100S |
| P  | Unalloyed steels / Alloyed steels  | P01 |            |        |        |        |        |            |        |          |        | P01    |
|  |                                    | P05 |            |        |        |        |        |            |        |          |        | P05    |
|  |                                    | P10 | AC150P     |        |        |        |        |            |        |          |        | P10    |
|  |                                    | P15 |            | AC200P |        |        |        |            |        |          |        | P15    |
|  |                                    | P20 |            |        | AC250P |        |        |            |        |          |        | P20    |
|  |                                    | P25 |            |        |        | AC350P |        |            |        |          |        | P25    |
|  |                                    | P30 |            |        |        |        |        |            |        |          |        | P30    |
|  |                                    | P35 |            |        |        |        |        |            |        |          |        | P35    |
|  |                                    | P40 |            |        |        |        |        |            |        |          |        | P40    |
|  |                                    | P45 |            |        |        |        |        |            |        |          |        | P45    |
|  |                                    | P50 |            |        |        |        |        |            |        |          |        | P50    |
| M  | Stainless steels                   | M01 |            |        |        |        |        |            |        |          |        | M01    |
|  |                                    | M05 |            |        |        |        |        |            |        |          |        | M05    |
|  |                                    | M10 |            |        |        |        |        |            |        |          |        | M10    |
|  |                                    | M15 |            |        |        |        |        |            |        | AP100S   |        | M15    |
|  |                                    | M20 |            |        |        |        |        |            | AP301M |          |        | M20    |
|  |                                    | M25 |            |        |        |        |        |            |        |          |        | M25    |
|  |                                    | M30 |            |        |        |        |        |            |        |          |        | M30    |
|  |                                    | M35 |            |        |        |        |        |            |        |          |        | M35    |
|  |                                    | M40 |            |        |        |        |        |            |        |          |        | M40    |
|  |                                    | M45 |            |        |        |        |        |            |        |          |        | M45    |
| K  | Cast iron                          | K01 |            |        |        |        |        |            |        |          |        | K01    |
|  |                                    | K05 |            |        |        |        |        |            |        |          |        | K05    |
|  |                                    | K10 |            |        |        |        |        |            |        |          |        | K10    |
|  |                                    | K15 |            |        |        |        |        |            |        |          |        | K15    |
|  |                                    | K20 |            |        |        |        | ACK15A | AC150K     |        |          |        | K20    |
|  |                                    | K25 |            |        |        |        |        |            |        |          |        | K25    |
|  |                                    | K30 |            |        |        |        |        |            |        |          |        | K30    |
|  |                                    | K35 |            |        |        |        |        |            |        |          |        | K35    |
|  |                                    | K40 |            |        |        |        |        |            |        |          |        | K40    |
|  |                                    | K45 |            |        |        |        |        |            |        |          |        | K45    |
|  |                                    | K50 |            |        |        |        |        |            |        |          |        | K50    |
| S  | Heat resistant alloy               | S01 |            |        |        |        |        |            |        |          |        | S01    |
|  |                                    | S05 |            |        |        |        |        |            |        |          |        | S05    |
|  |                                    | S10 |            |        |        |        |        |            |        |          |        | S10    |
|  |                                    | S15 |            |        |        |        |        |            |        | AP100S   |        | S15    |
|  |                                    | S20 |            |        |        |        |        |            | AP301M |          |        | S20    |
|  |                                    | S25 |            |        |        |        |        |            |        |          |        | S25    |
|  |                                    | S30 |            |        |        |        |        |            |        |          |        | S30    |
|  |                                    | S35 |            |        |        |        |        |            |        |          |        | S35    |
|  |                                    | S40 |            |        |        |        |        |            |        |          |        | S40    |
| N  | Aluminum/ Aluminum alloys          | N01 |            |        |        |        |        |            |        |          |        | N01    |
|  |                                    | N05 |            |        |        |        |        |            |        |          |        | N05    |
|  |                                    | N10 |            |        |        |        |        |            |        |          |        | N10    |
|  |                                    | N15 |            |        |        |        |        |            |        |          | AW100K | N15    |
|  |                                    | N20 |            |        |        |        |        |            |        |          |        | N20    |
|  |                                    | N25 |            |        |        |        |        |            |        |          |        | N25    |
|  |                                    | N30 |            |        |        |        |        |            |        |          |        | N30    |
| H  | Hardened steels/ Chilled cast iron | H01 |            |        |        |        |        |            |        |          |        | H01    |
|  |                                    | H05 |            |        |        |        |        |            |        |          |        | H05    |
|  |                                    | H10 |            |        |        |        |        |            |        |          |        | H10    |
|  |                                    | H15 |            |        |        |        |        |            |        |          |        | H15    |
|  |                                    | H20 |            |        |        |        |        |            |        |          |        | H20    |
|  |                                    | H25 |            |        |        |        |        |            |        |          |        | H25    |
| H30  |                                    |     |            |        |        |        |        |            |        | H30      |        |        |

**Turning Grade Description**

**AC150P**

Coating: CVD coating

The ultra-fine crystal substrate combined with MTCVD TiCN coating, and plus a thick layer of  $\alpha$ -Al<sub>2</sub>O<sub>3</sub> coating offers excellent wear resistance to extend tool life under high speed continuous or slight interrupted cutting.



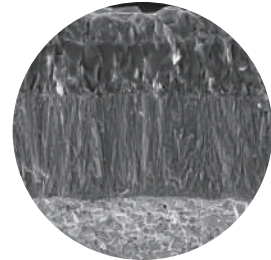
| Application range  |    |        |    |    |    |    |    |    |    |    |    |
|--------------------|----|--------|----|----|----|----|----|----|----|----|----|
| ISO Classification | 01 | 05     | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 |
| P                  |    | AC150P |    |    |    |    |    |    |    |    |    |
| M                  |    |        |    |    |    |    |    |    |    |    |    |
| K                  |    |        |    |    |    |    |    |    |    |    |    |
| S                  |    |        |    |    |    |    |    |    |    |    |    |
| N                  |    |        |    |    |    |    |    |    |    |    |    |
| H                  |    |        |    |    |    |    |    |    |    |    |    |

Remark:  Best choice

**AC200P**

Coating: CVD coating

The thickened ultra-fine crystal MTCVD TiCN coating and columnar  $\alpha$  - Al<sub>2</sub>O<sub>3</sub> coating has higher wear resistance and toughness, and can obtain longer tool life and better stability.



| Application range  |    |    |        |    |    |    |    |    |    |    |    |
|--------------------|----|----|--------|----|----|----|----|----|----|----|----|
| ISO Classification | 01 | 05 | 10     | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 |
| P                  |    |    | AC200P |    |    |    |    |    |    |    |    |
| M                  |    |    |        |    |    |    |    |    |    |    |    |
| K                  |    |    |        |    |    |    |    |    |    |    |    |
| S                  |    |    |        |    |    |    |    |    |    |    |    |
| N                  |    |    |        |    |    |    |    |    |    |    |    |
| H                  |    |    |        |    |    |    |    |    |    |    |    |

Remark:  Best choice

Turning inserts

**AC250P**

Coating: CVD coating

Cobalt enriched tough substrate with MTCVD TiCN and Al<sub>2</sub>O<sub>3</sub> coating provides excellent wear resistance and chipping resistance. Very good versatility.



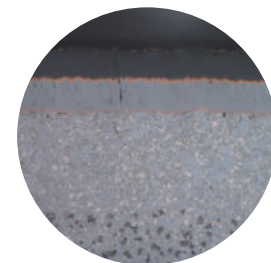
| Application range  |    |    |    |    |        |    |    |    |    |    |    |
|--------------------|----|----|----|----|--------|----|----|----|----|----|----|
| ISO Classification | 01 | 05 | 10 | 15 | 20     | 25 | 30 | 35 | 40 | 45 | 50 |
| P                  |    |    |    |    | AC250P |    |    |    |    |    |    |
| M                  |    |    |    |    |        |    |    |    |    |    |    |
| K                  |    |    |    |    |        |    |    |    |    |    |    |
| S                  |    |    |    |    |        |    |    |    |    |    |    |
| N                  |    |    |    |    |        |    |    |    |    |    |    |
| H                  |    |    |    |    |        |    |    |    |    |    |    |

Remark:  Best choice

**AC350P**

Coating: CVD coating

For rough turning steel. Very tough cobalt enriched substrate with specific coating. Excellent performance in interrupted cutting.



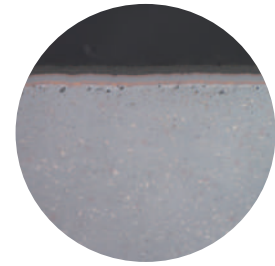
| Application range  |    |    |    |    |    |    |        |    |    |    |    |
|--------------------|----|----|----|----|----|----|--------|----|----|----|----|
| ISO Classification | 01 | 05 | 10 | 15 | 20 | 25 | 30     | 35 | 40 | 45 | 50 |
| P                  |    |    |    |    |    |    | AC350P |    |    |    |    |
| M                  |    |    |    |    |    |    |        |    |    |    |    |
| K                  |    |    |    |    |    |    |        |    |    |    |    |
| S                  |    |    |    |    |    |    |        |    |    |    |    |
| N                  |    |    |    |    |    |    |        |    |    |    |    |
| H                  |    |    |    |    |    |    |        |    |    |    |    |

Remark:  Best choice

**ACK15A**

Coating: CVD coating

Very good performance in cast iron medium and rough turning. Good for continuous and interrupted cutting.



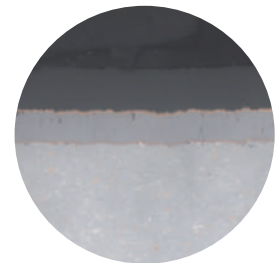
| Application range  |    |    |        |    |    |    |    |    |    |    |    |
|--------------------|----|----|--------|----|----|----|----|----|----|----|----|
| ISO Classification | 01 | 05 | 10     | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 |
| P                  |    |    |        |    |    |    |    |    |    |    |    |
| M                  |    |    |        |    |    |    |    |    |    |    |    |
| K                  |    |    | ACK15A |    |    |    |    |    |    |    |    |
| S                  |    |    |        |    |    |    |    |    |    |    |    |
| N                  |    |    |        |    |    |    |    |    |    |    |    |
| H                  |    |    |        |    |    |    |    |    |    |    |    |

Remark:  Best choice

**AC150K**

Coating: CVD coating

Suitable for cast iron semi finish and medium turning. New thicker CVD coating on ultra-fine crystal substrate, with optimized coating structure and adhesive strength, and polished smooth coating surface, result in good wear resistance and chipping resistance.



| Application range  |    |    |        |    |    |    |    |    |    |    |    |
|--------------------|----|----|--------|----|----|----|----|----|----|----|----|
| ISO Classification | 01 | 05 | 10     | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 |
| P                  |    |    |        |    |    |    |    |    |    |    |    |
| M                  |    |    |        |    |    |    |    |    |    |    |    |
| K                  |    |    | AC150K |    |    |    |    |    |    |    |    |
| S                  |    |    |        |    |    |    |    |    |    |    |    |
| N                  |    |    |        |    |    |    |    |    |    |    |    |
| H                  |    |    |        |    |    |    |    |    |    |    |    |

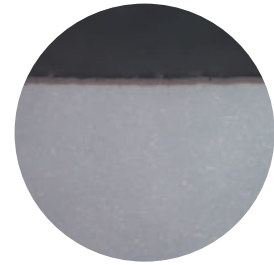
Remark:  Best choice

Turning inserts

**AP301M**

Coating: PVD coating

For stainless steel semi finish and medium turning. Tough and good wear resistance substrate with nanostructured PVD coating, provides better machining stability and longer tool life.



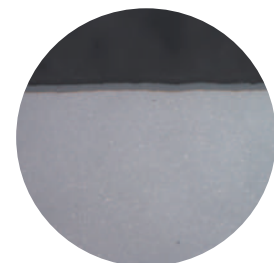
| Application range  |    |    |    |        |    |    |    |    |    |    |    |
|--------------------|----|----|----|--------|----|----|----|----|----|----|----|
| ISO Classification | 01 | 05 | 10 | 15     | 20 | 25 | 30 | 35 | 40 | 45 | 50 |
| P                  |    |    |    |        |    |    |    |    |    |    |    |
| M                  |    |    |    | AP301M |    |    |    |    |    |    |    |
| K                  |    |    |    |        |    |    |    |    |    |    |    |
| S                  |    |    |    | AP301M |    |    |    |    |    |    |    |
| N                  |    |    |    |        |    |    |    |    |    |    |    |
| H                  |    |    |    |        |    |    |    |    |    |    |    |

Remark:   Best choice  
  2nd choice

**AP100S**

Coating: PVD coating

For heat resistant alloy turning. Ultra-fine grain substrate and nanostructured PVD coating provide strong adhesive strength and anti oxidation, and result in longer tool life.



| Application range  |    |        |    |    |    |    |    |    |    |    |    |
|--------------------|----|--------|----|----|----|----|----|----|----|----|----|
| ISO Classification | 01 | 05     | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 |
| P                  |    |        |    |    |    |    |    |    |    |    |    |
| M                  |    | AP100S |    |    |    |    |    |    |    |    |    |
| K                  |    |        |    |    |    |    |    |    |    |    |    |
| S                  |    | AP100S |    |    |    |    |    |    |    |    |    |
| N                  |    |        |    |    |    |    |    |    |    |    |    |
| H                  |    |        |    |    |    |    |    |    |    |    |    |

Remark:   Best choice  
  2nd choice

**AW100K**

Coating: Uncoated

For nonferrous alloy turning. Fine grain size substrate, uncoated, with special edge preparation.

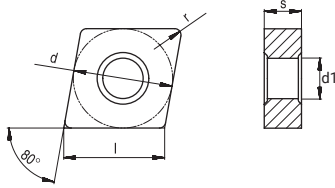


Turning inserts

| Application range  |    |        |    |    |    |    |    |    |    |    |    |
|--------------------|----|--------|----|----|----|----|----|----|----|----|----|
| ISO Classification | 01 | 05     | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 |
| P                  |    |        |    |    |    |    |    |    |    |    |    |
| M                  |    |        |    |    |    |    |    |    |    |    |    |
| K                  |    |        |    |    |    |    |    |    |    |    |    |
| S                  |    |        |    |    |    |    |    |    |    |    |    |
| N                  |    | AW100K |    |    |    |    |    |    |    |    |    |
| H                  |    |        |    |    |    |    |    |    |    |    |    |

Remark:  Best choice

Negative 80° (C) Rhombic Inserts

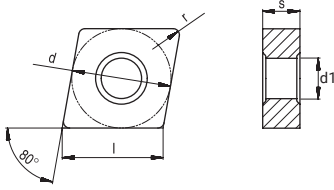


| Dimensions (mm) |       |      |      |      |
|-----------------|-------|------|------|------|
| Type            | d     | l    | s    | d1   |
| CN_1204_        | 12.7  | 12.9 | 4.76 | 5.16 |
| CN_1606_        | 15.87 | 16.1 | 6.35 | 6.35 |
| CN_1906_        | 19.05 | 19.3 | 6.35 | 7.94 |

| Inserts  | Type  | r (mm)   | Recommended parameters |           | Grades   |        |        |        |        |        |        |        |        |  |   |
|--|---|--|------------------------|-----------|----------|--------|--------|--------|--------|--------|--------|--------|--------|--|---|
|  |   |  | f (mm/rev)             | ap (mm)   | AC150P   | AC200P | AC250P | AC350P | AP301M | AC150K | ACK15A | AW100K | AP100S |  |   |
| Finishing  | <br>CNMG 120404E-PB1<br>120408E-PB1<br>120412E-PB1  | 0.4  | 0.05-0.15              | 0.26-3.2  | ●        | ○      | ●      |        |        |        |        |        |        |  |   |
|  |   | 0.8  | 0.10-0.30              | 0.52-3.2  | ●        | ○      | ●      |        |        |        |        |        |        |  |   |
|  |   | 1.2  | 0.15-0.45              | 0.78-3.2  | ●        | ○      | ○      |        |        |        |        |        |        |  |   |
|  | <br>CNMG 120404E-MB2<br>120408E-MB2   | 0.4  | 0.05-0.15              | 0.26-3.2  |          |        |        |        | ●      |        |        |        |        |  | ● |
|  |   | 0.8  | 0.10-0.30              | 0.52-3.2  |          |        |        |        | ●      |        |        |        |        |  | ● |
|  | Semifinishing   | <br>CNMG 120404E-PB3<br>120408E-PB3<br>120412E-PB3 | 0.4                    | 0.06-0.18 | 0.30-3.5 | ●      | ○      | ●      |        |        |        |        |        |  |   |
| 0.8  |   |  | 0.12-0.36              | 0.60-3.5  | ●        | ○      | ●      |        |        |        |        |        |        |  |   |
| 1.2  |   |  | 0.18-0.54              | 0.90-3.5  | ●        | ○      | ○      |        |        |        |        |        |        |  |   |
| <br>CNMG 120404E-PC3<br>120408E-PC3<br>120412E-PC3<br>190608E-PC3<br>190612E-PC3 |   | 0.4  | 0.07-0.20              | 0.34-3.9  | ○        | ○      | ●      |        |        |        |        |        |        |  |   |
|  |   | 0.8  | 0.14-0.40              | 0.68-3.9  | ●        | ●      | ●      |        |        |        |        |        |        |  |   |
|  |   | 1.2  | 0.20-0.60              | 1.02-3.9  | ○        | ○      | ●      |        |        |        |        |        |        |  |   |
| Medium   | <br>CNMG 120404E-PD3<br>120408E-PD3<br>120412E-PD3<br>160608E-PD3<br>160612E-PD3<br>190608E-PD3 | 0.4  | 0.08-0.22              | 0.40-4.3  | ●        | ●      | ●      | ○      |        |        |        |        |        |  |   |
|  |   | 0.8  | 0.15-0.44              | 0.80-4.3  | ●        | ●      | ●      | ●      |        |        |        |        |        |  |   |
|  |   | 1.2  | 0.23-0.66              | 1.20-4.3  | ●        | ●      | ●      | ●      |        |        |        |        |        |  |   |
|  |   | 0.8  | 0.15-0.44              | 0.80-5.3  | ●        | ○      | ●      | ○      |        |        |        |        |        |  |   |
|  |   | 1.2  | 0.23-0.66              | 1.20-5.3  | ●        | ●      | ●      | ○      |        |        |        |        |        |  |   |
|  |   | 0.8  | 0.15-0.44              | 0.80-6.4  | ○        | ○      | ●      | ○      |        |        |        |        |        |  |   |

Marked: ● Stock available ○ Non-stocked standard

**Negative 80° (C) Rhombic Inserts**



| Dimensions (mm) |       |      |      |      |
|-----------------|-------|------|------|------|
| Type            | d     | l    | s    | d1   |
| CN_1204_        | 12.7  | 12.9 | 4.76 | 5.16 |
| CN_1606_        | 15.87 | 16.1 | 6.35 | 6.35 |
| CN_1906_        | 19.05 | 19.3 | 6.35 | 7.94 |

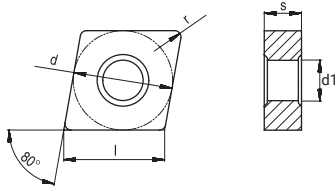
| Inserts  | Type        | r (mm)           | Recommended parameters |           | Grades   |        |        |        |        |        |        |        |         |   |
|----------|-------------|------------------|------------------------|-----------|----------|--------|--------|--------|--------|--------|--------|--------|---------|---|
|          |             |                  | f (mm/rev)             | ap (mm)   | AC150P   | AC200P | AC250P | AC350P | AP301M | AC150K | ACK15A | AW100K | APT100S |   |
| Medium   |             | CNMG 120404E-SC3 | 0.4                    | 0.08-0.22 | 0.40-4.3 |        |        |        |        |        |        |        |         | ● |
|          |             | 120408E-SC3      | 0.8                    | 0.15-0.44 | 0.80-4.3 |        |        |        |        | ○      |        |        |         | ● |
|          |             | 120412E-SC3      | 1.2                    | 0.23-0.66 | 1.20-4.3 |        |        |        |        | ○      |        |        |         | ● |
|          |             | 160612E-SC3      | 1.2                    | 0.23-0.66 | 1.20-5.3 |        |        |        |        | ○      |        |        |         | ● |
|          |             | 160616E-SC3      | 1.6                    | 0.30-0.88 | 1.60-5.3 |        |        |        |        |        |        |        |         | ○ |
|          |             | 190612E-SC3      | 1.2                    | 0.23-0.66 | 1.20-6.4 |        |        |        |        |        |        |        |         | ● |
|          |             | 190616E-SC3      | 1.6                    | 0.30-0.88 | 1.60-6.4 |        |        |        |        |        |        |        |         | ○ |
|          |             | CNMG 120404E-MC3 | 0.4                    | 0.08-0.22 | 0.32-4.3 |        |        |        |        | ●      |        |        |         | ○ |
|          |             | 120408E-MC3      | 0.8                    | 0.15-0.44 | 0.64-4.3 |        |        |        |        | ●      |        |        |         | ● |
|          |             | 120412E-MC3      | 1.2                    | 0.23-0.66 | 0.96-4.3 |        |        |        |        | ●      |        |        |         | ○ |
|          |             | 120416E-MC3      | 1.6                    | 0.30-0.88 | 1.28-4.3 |        |        |        |        | ○      |        |        |         |   |
|          |             | 160608E-MC3      | 0.8                    | 0.15-0.44 | 0.64-5.3 |        |        |        |        | ○      |        |        |         |   |
|          |             | 160612E-MC3      | 1.2                    | 0.23-0.66 | 0.96-5.3 |        |        |        |        | ○      |        |        |         |   |
|          |             | 190608E-MC3      | 0.8                    | 0.15-0.44 | 0.64-6.4 |        |        |        |        | ○      |        |        |         |   |
|          | 190612E-MC3 | 1.2              | 0.23-0.66              | 0.96-6.4  |          |        |        |        | ○      |        |        |        |         |   |
|          |             | CNMG 120404E-PC4 | 0.4                    | 0.08-0.22 | 0.40-4.3 | ○      |        | ●      | ○      |        | ○      | ●      |         |   |
|          |             | 120408E-PC4      | 0.8                    | 0.15-0.44 | 0.80-4.3 | ●      |        | ●      | ○      |        | ●      | ●      |         |   |
|          |             | 120412E-PC4      | 1.2                    | 0.23-0.66 | 1.20-4.3 | ●      |        | ●      | ○      |        | ○      | ●      |         |   |
|          |             | 160612E-PC4      | 1.2                    | 0.23-0.66 | 1.20-5.3 | ○      |        | ●      | ○      |        | ○      | ○      |         |   |
|          |             | 160616E-PC4      | 1.6                    | 0.30-0.88 | 1.60-5.3 | ○      |        | ○      | ○      |        | ○      | ●      |         |   |
|          |             | 190612E-PC4      | 1.2                    | 0.23-0.66 | 1.20-6.4 | ○      |        | ●      |        |        | ○      | ○      |         |   |
| Roughing |             | CNMG 120408E-MC4 | 0.8                    | 0.20-0.60 | 1.20-6.4 |        |        |        |        | ●      |        |        |         | ● |
|          |             | 120412E-MC4      | 1.2                    | 0.30-0.90 | 1.80-6.4 |        |        |        |        | ●      |        |        |         | ● |
|          |             | 160612E-MC4      | 1.2                    | 0.30-0.90 | 1.80-8.1 |        |        |        |        | ●      |        |        |         | ○ |
|          |             | 160616E-MC4      | 1.6                    | 0.40-1.20 | 2.40-8.1 |        |        |        |        | ○      |        |        |         | ○ |
|          |             | 190612E-MC4      | 1.2                    | 0.30-0.90 | 1.80-9.7 |        |        |        |        | ●      |        |        |         |   |
|          |             | 190616E-MC4      | 1.6                    | 0.40-1.20 | 2.40-9.7 |        |        |        |        | ●      |        |        |         |   |

Marked: ● Stock available ○ Non-stocked standard

Turning inserts



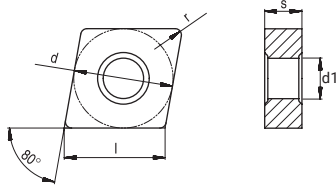
Negative 80° (C) Rhombic Inserts



| Dimensions (mm) |       |      |      |      |
|-----------------|-------|------|------|------|
| Type            | d     | l    | s    | d1   |
| CN_0903_        | 9.52  | 9.67 | 3.18 | 3.81 |
| CN_1204_        | 12.7  | 12.9 | 4.76 | 5.16 |
| CN_1606_        | 15.87 | 16.1 | 6.35 | 6.35 |
| CN_1906_        | 19.05 | 19.3 | 6.35 | 7.94 |

| Inserts     | Type             | r (mm)    | Recommended parameters |          | Grades |        |        |        |        |        |        |        |         |
|-------------|------------------|-----------|------------------------|----------|--------|--------|--------|--------|--------|--------|--------|--------|---------|
|             |                  |           | f (mm/rev)             | ap (mm)  | AC150P | AC200P | AC250P | AC350P | AP301M | AC150K | ACK15A | AW100K | APT100S |
|             | CNMG 090308E-KC4 | 0.8       | 0.18-0.48              | 0.96-3.9 |        |        |        |        |        | ○      | ○      |        |         |
|             | 120404E-KC4      | 0.4       | 0.09-0.24              | 0.48-5.2 |        |        |        |        |        | ○      | ●      |        |         |
|             | 120408E-KC4      | 0.8       | 0.18-0.48              | 0.96-5.2 |        |        |        |        |        | ●      | ●      |        |         |
|             | 120412E-KC4      | 1.2       | 0.26-0.72              | 1.44-5.2 |        |        |        |        |        | ●      | ●      |        |         |
|             | 120416E-KC4      | 1.6       | 0.35-0.96              | 1.92-5.2 |        |        |        |        |        | ●      | ○      |        |         |
|             | 160608E-KC4      | 0.8       | 0.18-0.48              | 0.96-6.4 |        |        |        |        |        | ○      | ○      |        |         |
|             | 160612E-KC4      | 1.2       | 0.26-0.72              | 1.44-6.4 |        |        |        |        |        | ●      | ●      |        |         |
|             | 160616E-KC4      | 1.6       | 0.35-0.96              | 1.92-6.4 |        |        |        |        |        | ○      | ●      |        |         |
|             | 190608E-KC4      | 0.8       | 0.18-0.48              | 0.96-7.7 |        |        |        |        |        | ○      | ○      |        |         |
|             | 190612E-KC4      | 1.2       | 0.26-0.72              | 1.44-7.7 |        |        |        |        |        | ○      | ●      |        |         |
|             | 190616E-KC4      | 1.6       | 0.35-0.96              | 1.92-7.7 |        |        |        |        |        | ○      | ●      |        |         |
|             | 190624E-KC4      | 2.4       | 0.53-1.44              | 2.88-7.7 |        |        |        |        |        | ○      | ○      |        |         |
|             | CNMG 120408E-PD5 | 0.8       | 0.20-0.60              | 1.20-6.4 | ●      |        | ●      | ●      |        |        |        |        |         |
|             | 120412E-PD5      | 1.2       | 0.30-0.90              | 1.80-6.4 | ●      |        | ●      | ○      |        |        |        |        |         |
|             | 160612E-PD5      | 1.2       | 0.30-0.90              | 1.80-8.1 | ●      | ●      | ●      | ●      |        |        |        |        |         |
|             | 160616E-PD5      | 1.6       | 0.40-1.20              | 2.40-8.1 | ●      |        | ●      | ○      |        |        |        |        |         |
|             | 160624E-PD5      | 2.4       | 0.60-1.80              | 3.60-8.1 |        |        | ○      | ○      |        |        |        |        |         |
|             | 190612E-PD5      | 1.2       | 0.30-0.90              | 1.80-9.7 | ●      |        | ●      | ○      |        |        |        |        |         |
| 190616E-PD5 | 1.6              | 0.40-1.20 | 2.40-9.7               | ○        | ●      | ●      | ●      |        |        |        |        |        |         |
|             | CNMA 120404E-KD5 | 0.4       | 0.10-0.30              | 0.60-6.4 |        |        |        |        |        | ○      | ○      |        |         |
|             | 120408E-KD5      | 0.8       | 0.20-0.60              | 1.20-6.4 |        |        |        |        |        | ●      | ●      |        |         |
|             | 120412E-KD5      | 1.2       | 0.30-0.90              | 1.80-6.4 |        |        |        |        |        | ●      | ●      |        |         |
|             | 120416E-KD5      | 1.6       | 0.40-1.20              | 2.40-6.4 |        |        |        |        |        | ○      | ○      |        |         |
|             | 160608E-KD5      | 0.8       | 0.20-0.60              | 1.20-8.1 |        |        |        |        |        | ○      | ○      |        |         |
|             | 160612E-KD5      | 1.2       | 0.30-0.90              | 1.80-8.1 |        |        |        |        |        | ○      | ○      |        |         |
|             | 160616E-KD5      | 1.6       | 0.40-1.20              | 2.40-8.1 |        |        |        |        |        | ●      | ○      |        |         |
|             | 160620E-KD5      | 2.0       | 0.50-1.50              | 3.00-8.1 |        |        |        |        |        | ●      | ○      |        |         |
|             | 190608E-KD5      | 0.8       | 0.20-0.60              | 1.20-9.7 |        |        |        |        |        | ○      | ○      |        |         |
|             | 190612E-KD5      | 1.2       | 0.30-0.90              | 1.80-9.7 |        |        |        |        |        | ○      | ○      |        |         |
| 190616E-KD5 | 1.6              | 0.40-1.20 | 2.40-9.7               |          |        |        |        |        | ○      | ●      |        |        |         |

**Negative 80° (C) Rhombic Inserts**



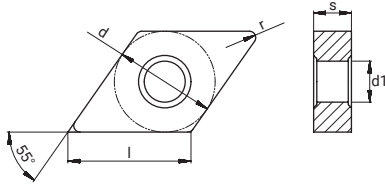
| Dimensions (mm) |       |      |      |      |
|-----------------|-------|------|------|------|
| Type            | d     | l    | s    | d1   |
| CN_1204_        | 12.7  | 12.9 | 4.76 | 5.16 |
| CN_1606_        | 15.87 | 16.1 | 6.35 | 6.35 |
| CN_1906_        | 19.05 | 19.3 | 6.35 | 7.94 |
| CN_2507_        | 25.4  | 25.8 | 7.94 | 9.12 |
| CN_2509_        | 25.4  | 25.8 | 9.53 | 9.12 |

| Inserts     | Type             | r (mm)    | Recommended parameters |           | Grades |        |        |        |        |        |        |        |        |  |
|-------------|------------------|-----------|------------------------|-----------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--|
|             |                  |           | f (mm/rev)             | ap (mm)   | AC150P | AC200P | AC250P | AC350P | AP301M | AC150K | ACK15A | AW100K | AP100S |  |
|             | CNMM 190616E-PC8 | 1.6       | 0.32-0.64              | 2.88-7.7  | ○      | ○      | ○      |        |        |        |        |        |        |  |
|             | 190624E-PC8      | 2.4       | 0.48-0.96              | 4.32-7.7  | ○      | ○      | ○      |        |        |        |        |        |        |  |
|             | CNMM 120408E-PD8 | 0.8       | 0.16-0.32              | 1.44-5.2  | ●      |        | ○      | ○      |        |        |        |        |        |  |
|             | 120412E-PD8      | 1.2       | 0.24-0.48              | 2.16-5.2  | ○      |        | ○      | ○      |        |        |        |        |        |  |
|             | 160612E-PD8      | 1.2       | 0.24-0.48              | 2.16-6.4  | ○      |        | ●      | ○      |        |        |        |        |        |  |
|             | 160616E-PD8      | 1.6       | 0.32-0.64              | 2.88-6.4  | ○      |        | ●      | ○      |        |        |        |        |        |  |
|             | 160624E-PD8      | 2.4       | 0.48-0.96              | 4.32-6.4  | ○      |        | ○      | ○      |        |        |        |        |        |  |
|             | 190612E-PD8      | 1.2       | 0.24-0.48              | 2.16-7.7  | ○      |        | ○      | ○      |        |        |        |        |        |  |
|             | 190616E-PD8      | 1.6       | 0.32-0.64              | 2.88-7.7  | ○      |        | ○      | ●      |        |        |        |        |        |  |
|             | 190624E-PD8      | 2.4       | 0.48-0.96              | 4.32-7.7  | ○      |        | ○      | ○      |        |        |        |        |        |  |
|             | 250724E-PD8      | 2.4       | 0.48-0.96              | 4.32-10.3 | ○      |        | ○      | ○      |        |        |        |        |        |  |
| 250924E-PD8 | 2.4              | 0.48-0.96 | 4.32-10.3              | ○         |        | ○      | ○      |        |        |        |        |        |        |  |
|             | CNMM 190612S-PC9 | 1.2       | 0.26-0.60              | 2.40-9.7  | ○      |        | ○      | ○      |        |        |        |        |        |  |
|             | 190616S-PC9      | 1.6       | 0.35-0.80              | 3.20-9.7  | ○      |        | ○      | ○      |        |        |        |        |        |  |
|             | 190624S-PC9      | 2.4       | 0.53-1.20              | 4.80-9.7  | ○      |        | ○      | ○      |        |        |        |        |        |  |
|             | 250724S-PC9      | 2.4       | 0.53-1.20              | 4.80-12.9 | ○      |        | ○      | ○      |        |        |        |        |        |  |
|             | 250924S-PC9      | 2.4       | 0.53-1.20              | 4.80-12.9 | ○      |        | ●      | ○      |        |        |        |        |        |  |
|             | CNMM 190612S-PD9 | 1.2       | 0.30-0.72              | 2.64-11.6 | ○      |        | ○      | ○      |        |        |        |        |        |  |
|             | 190616S-PD9      | 1.6       | 0.40-0.96              | 3.52-11.6 | ●      | ○      | ●      | ○      |        |        |        |        |        |  |
|             | 190624S-PD9      | 2.4       | 0.60-1.44              | 5.28-11.6 | ○      |        | ●      | ○      |        |        |        |        |        |  |
|             | 250724S-PD9      | 2.4       | 0.60-1.44              | 5.28-15.5 | ○      |        | ○      | ○      |        |        |        |        |        |  |
|             | 250924S-PD9      | 2.4       | 0.60-1.44              | 5.28-15.5 | ○      | ○      | ●      | ●      |        |        |        |        |        |  |

Marked: ● Stock available ○ Non-stocked standard

Turning inserts

Negative 55° (D) Rhombic Inserts

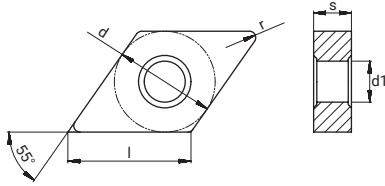


| Dimensions (mm) |      |       |      |      |
|-----------------|------|-------|------|------|
| Type            | d    | l     | s    | d1   |
| DN_1104_        | 9.52 | 11.62 | 4.76 | 3.81 |
| DN_1504_        | 12.7 | 15.5  | 4.76 | 5.16 |
| DN_1506_        | 12.7 | 15.5  | 6.35 | 5.16 |

| Inserts       | Type | r (mm)           | Recommended parameters |           | Grades   |        |        |        |        |        |        |        |         |  |  |   |   |
|---------------|------|------------------|------------------------|-----------|----------|--------|--------|--------|--------|--------|--------|--------|---------|--|--|---|---|
|               |      |                  | f (mm/rev)             | ap (mm)   | AC150P   | AC200P | AC250P | AC350P | AP301M | AC150K | ACK15A | AW100K | APT100S |  |  |   |   |
| Finishing     |      | DNMG 110404E-PB1 | 0.4                    | 0.05-0.15 | 0.26-2.3 | ○      |        | ●      |        |        |        |        |         |  |  |   |   |
|               |      | 150404E-PB1      | 0.4                    | 0.05-0.15 | 0.26-3.1 | ●      | ○      | ●      |        |        |        |        |         |  |  |   |   |
|               |      | 150408E-PB1      | 0.8                    | 0.10-0.30 | 0.52-3.1 | ●      | ○      | ●      |        |        |        |        |         |  |  |   |   |
|               |      | 150604E-PB1      | 0.4                    | 0.05-0.15 | 0.26-3.1 | ●      | ○      | ○      |        |        |        |        |         |  |  |   |   |
|               |      | 150608E-PB1      | 0.8                    | 0.10-0.30 | 0.52-3.1 | ●      | ○      | ●      |        |        |        |        |         |  |  |   |   |
|               |      | DNMG 150404E-MB2 | 0.4                    | 0.05-0.15 | 0.26-2.9 |        |        |        |        | ○      |        |        |         |  |  |   | ● |
|               |      | 150408E-MB2      | 0.8                    | 0.10-0.30 | 0.52-2.9 |        |        |        |        | ○      |        |        |         |  |  |   | ○ |
|               |      | 150604E-MB2      | 0.4                    | 0.05-0.15 | 0.26-2.9 |        |        |        |        | ●      |        |        |         |  |  |   | ● |
| Semifinishing |      | 150608E-MB2      | 0.8                    | 0.10-0.30 | 0.52-2.9 |        |        |        |        | ○      |        |        |         |  |  | ● |   |
|               |      | DNMG 150404E-PB3 | 0.4                    | 0.06-0.18 | 0.30-3.1 | ○      | ○      | ○      |        |        |        |        |         |  |  |   |   |
|               |      | 150408E-PB3      | 0.8                    | 0.12-0.36 | 0.60-3.1 | ●      | ○      | ○      |        |        |        |        |         |  |  |   |   |
|               |      | 150412E-PB3      | 1.2                    | 0.18-0.54 | 0.90-3.1 | ○      | ○      | ○      |        |        |        |        |         |  |  |   |   |
|               |      | 150604E-PB3      | 0.4                    | 0.06-0.18 | 0.30-3.1 | ●      | ○      | ●      |        |        |        |        |         |  |  |   |   |
|               |      | 150608E-PB3      | 0.8                    | 0.12-0.36 | 0.60-3.1 | ●      | ○      | ●      |        |        |        |        |         |  |  |   |   |
|               |      | 150612E-PB3      | 1.2                    | 0.18-0.54 | 0.90-3.1 | ○      | ○      | ○      |        |        |        |        |         |  |  |   |   |
|               |      | DNMG 110408E-PC3 | 0.8                    | 0.14-0.40 | 0.68-2.6 | ●      | ○      | ○      |        |        |        |        |         |  |  |   |   |
|               |      | 110412E-PC3      | 1.2                    | 0.20-0.60 | 1.02-2.6 | ○      | ○      | ○      |        |        |        |        |         |  |  |   |   |
|               |      | 150404E-PC3      | 0.4                    | 0.07-0.20 | 0.34-3.5 | ○      | ○      | ○      |        |        |        |        |         |  |  |   |   |
|               |      | 150408E-PC3      | 0.8                    | 0.14-0.40 | 0.68-3.5 | ●      | ○      | ●      |        |        |        |        |         |  |  |   |   |
|               |      | 150412E-PC3      | 1.2                    | 0.20-0.60 | 1.02-3.5 | ○      | ○      | ○      |        |        |        |        |         |  |  |   |   |
|               |      | 150604E-PC3      | 0.4                    | 0.07-0.20 | 0.34-3.5 | ○      | ○      | ●      |        |        |        |        |         |  |  |   |   |
|               |      | 150608E-PC3      | 0.8                    | 0.14-0.40 | 0.68-3.5 | ●      | ●      | ●      |        |        |        |        |         |  |  |   |   |
| Medium        |      | 150612E-PC3      | 1.2                    | 0.20-0.60 | 1.02-3.5 | ○      | ○      | ○      |        |        |        |        |         |  |  |   |   |
|               |      | DNMG 110404E-PD3 | 0.4                    | 0.08-0.22 | 0.40-2.9 | ○      | ○      | ○      |        |        |        |        |         |  |  |   |   |
|               |      | 110408E-PD3      | 0.8                    | 0.15-0.44 | 0.80-2.9 | ●      | ○      | ●      |        |        |        |        |         |  |  |   |   |
|               |      | 150404E-PD3      | 0.4                    | 0.08-0.22 | 0.40-3.9 | ○      | ●      | ●      |        |        |        |        |         |  |  |   |   |
|               |      | 150408E-PD3      | 0.8                    | 0.15-0.44 | 0.80-3.9 | ●      | ●      | ●      | ○      |        |        |        |         |  |  |   |   |
|               |      | 150412E-PD3      | 1.2                    | 0.23-0.66 | 1.20-3.9 | ●      | ○      | ●      | ○      |        |        |        |         |  |  |   |   |
|               |      | 150604E-PD3      | 0.4                    | 0.08-0.22 | 0.40-3.9 | ●      | ○      | ●      |        |        |        |        |         |  |  |   |   |
|               |      | 150608E-PD3      | 0.8                    | 0.15-0.44 | 0.80-3.9 | ●      | ●      | ●      | ●      |        |        |        |         |  |  |   |   |
| 150612E-PD3   | 1.2  | 0.23-0.66        | 1.20-3.9               | ○         | ●        | ●      | ○      |        |        |        |        |        |         |  |  |   |   |

Marked: ● Stock available ○ Non-stocked standard

**Negative 55° (D) Rhombic Inserts**



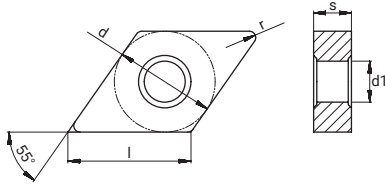
| Dimensions (mm) |      |       |      |      |
|-----------------|------|-------|------|------|
| Type            | d    | l     | s    | d1   |
| DN_1104_        | 9.52 | 11.62 | 4.76 | 3.81 |
| DN_1504_        | 12.7 | 15.5  | 4.76 | 5.16 |
| DN_1506_        | 12.7 | 15.5  | 6.35 | 5.16 |

| Inserts | Type        | r (mm)           | Recommended parameters |           | Grades   |        |        |        |        |        |        |        |        |  |   |
|---------|-------------|------------------|------------------------|-----------|----------|--------|--------|--------|--------|--------|--------|--------|--------|--|---|
|         |             |                  | f (mm/rev)             | ap (mm)   | AC150P   | AC200P | AC250P | AC350P | AP301M | AC150K | ACK15A | AW100K | AP100S |  |   |
| Medium  |             | DNMG 150404E-SC3 | 0.4                    | 0.08-0.22 | 0.40-3.9 |        |        |        |        |        |        |        |        |  | ● |
|         |             | 150408E-SC3      | 0.8                    | 0.15-0.44 | 0.80-3.9 |        |        |        |        |        |        |        |        |  | ● |
|         |             | 150412E-SC3      | 1.2                    | 0.23-0.66 | 1.20-3.9 |        |        |        |        |        |        |        |        |  | ○ |
|         |             | 150604E-SC3      | 0.4                    | 0.08-0.22 | 0.40-3.9 |        |        |        |        |        |        |        |        |  | ● |
|         |             | 150608E-SC3      | 0.8                    | 0.15-0.44 | 0.80-3.9 |        |        |        |        |        |        |        |        |  | ● |
|         |             | 150612E-SC3      | 1.2                    | 0.23-0.66 | 1.20-3.9 |        |        |        |        |        |        |        |        |  | ○ |
|         |             | DNMG 110404E-MC3 | 0.4                    | 0.08-0.22 | 0.32-2.9 |        |        |        |        | ●      |        |        |        |  |   |
|         |             | 110408E-MC3      | 0.8                    | 0.15-0.44 | 0.64-2.9 |        |        |        |        | ○      |        |        |        |  |   |
|         |             | 150404E-MC3      | 0.4                    | 0.08-0.22 | 0.32-3.9 |        |        |        |        | ●      |        |        |        |  |   |
|         |             | 150408E-MC3      | 0.8                    | 0.15-0.44 | 0.64-3.9 |        |        |        |        | ●      |        |        |        |  |   |
|         |             | 150412E-MC3      | 1.2                    | 0.23-0.66 | 0.96-3.9 |        |        |        |        | ○      |        |        |        |  |   |
|         |             | 150604E-MC3      | 0.4                    | 0.08-0.22 | 0.32-3.9 |        |        |        |        | ●      |        |        |        |  |   |
|         |             | 150608E-MC3      | 0.8                    | 0.15-0.44 | 0.64-3.9 |        |        |        |        | ●      |        |        |        |  |   |
|         |             | 150612E-MC3      | 1.2                    | 0.23-0.66 | 0.96-3.9 |        |        |        |        | ○      |        |        |        |  |   |
|         |             | DNMG 150404E-PC4 | 0.4                    | 0.08-0.22 | 0.40-3.9 | ○      |        | ○      |        |        | ○      | ○      |        |  |   |
|         |             | 150408E-PC4      | 0.8                    | 0.15-0.44 | 0.80-3.9 | ○      |        | ●      |        |        | ○      | ●      |        |  |   |
|         |             | 150412E-PC4      | 1.2                    | 0.23-0.66 | 1.20-3.9 | ○      |        | ○      |        |        | ○      | ●      |        |  |   |
|         |             | 150604E-PC4      | 0.4                    | 0.08-0.22 | 0.40-3.9 | ○      |        | ○      |        |        | ○      | ○      |        |  |   |
|         | 150608E-PC4 | 0.8              | 0.15-0.44              | 0.80-3.9  | ●        |        | ○      |        |        | ●      | ●      |        |        |  |   |
|         | 150612E-PC4 | 1.2              | 0.23-0.66              | 1.20-3.9  | ●        |        | ○      |        |        | ○      | ○      |        |        |  |   |
|         |             | DNMG 150408E-MC4 | 0.8                    | 0.20-0.60 | 1.20-5.4 |        |        |        |        | ○      |        |        |        |  | ○ |
|         |             | 150412E-MC4      | 1.2                    | 0.30-0.90 | 1.80-5.4 |        |        |        |        | ○      |        |        |        |  | ○ |
|         |             | 150608E-MC4      | 0.8                    | 0.20-0.60 | 1.20-5.4 |        |        |        |        | ○      |        |        |        |  | ○ |
|         |             | 150612E-MC4      | 1.2                    | 0.30-0.90 | 1.80-5.4 |        |        |        |        | ○      |        |        |        |  | ○ |
|         |             |                  |                        |           |          |        |        |        |        |        |        |        |        |  |   |
|         |             |                  |                        |           |          |        |        |        |        |        |        |        |        |  |   |

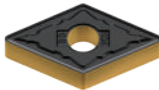
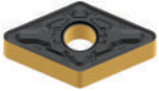
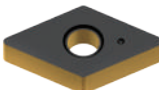
Marked: ● Stock available ○ Non-stocked standard

Turning inserts

Negative 55° (D) Rhombic Inserts

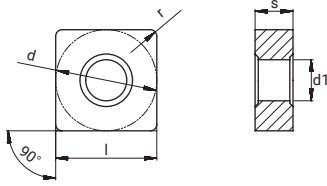


| Dimensions (mm) |      |       |      |      |
|-----------------|------|-------|------|------|
| Type            | d    | l     | s    | d1   |
| DN_1104_        | 9.52 | 11.62 | 4.76 | 3.81 |
| DN_1504_        | 12.7 | 15.5  | 4.76 | 5.16 |
| DN_1506_        | 12.7 | 15.5  | 6.35 | 5.16 |

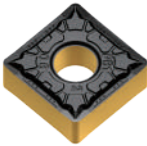


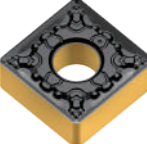


| Inserts  | Type  | r (mm)           | Recommended parameters |           | Grades   |        |        |        |        |        |        |        |        |  |  |  |  |  |  |
|----------|---|------------------|------------------------|-----------|----------|--------|--------|--------|--------|--------|--------|--------|--------|--|--|--|--|--|--|
|          |   |                  | f (mm/rev)             | ap (mm)   | AC150P   | AC200P | AC250P | AC350P | AP301M | AC150K | ACK15A | AW100K | AP100S |  |  |  |  |  |  |
| Roughing |    | DNMG 110404E-KC4 | 0.4                    | 0.09-0.24 | 0.48-3.5 |        |        |        |        |        |        |        |        |  |  |  |  |  |  |
|          |   | 110408E-KC4      | 0.8                    | 0.18-0.48 | 0.96-3.5 |        |        |        |        |        |        |        |        |  |  |  |  |  |  |
|          |   | 150404E-KC4      | 0.4                    | 0.09-0.24 | 0.48-4.6 |        |        |        |        |        |        |        |        |  |  |  |  |  |  |
|          |   | 150408E-KC4      | 0.8                    | 0.18-0.48 | 0.96-4.6 |        |        |        |        |        |        |        |        |  |  |  |  |  |  |
|          |   | 150412E-KC4      | 1.2                    | 0.26-0.72 | 1.44-4.6 |        |        |        |        |        |        |        |        |  |  |  |  |  |  |
|          |   | 150604E-KC4      | 0.4                    | 0.09-0.24 | 0.48-4.6 |        |        |        |        |        |        |        |        |  |  |  |  |  |  |
|          |   | 150608E-KC4      | 0.8                    | 0.18-0.48 | 0.96-4.6 |        |        |        |        |        |        |        |        |  |  |  |  |  |  |
|          | 150612E-KC4   | 1.2              | 0.26-0.72              | 1.44-4.6  |          |        |        |        |        |        |        |        |        |  |  |  |  |  |  |
|          |  | DNMG 150408E-PD5 | 0.8                    | 0.20-0.60 | 1.20-5.4 | ○      | ○      | ●      | ○      |        |        |        |        |  |  |  |  |  |  |
|          |   | 150412E-PD5      | 1.2                    | 0.30-0.90 | 1.80-5.4 | ○      | ○      | ●      | ○      |        |        |        |        |  |  |  |  |  |  |
|          |   | 150416E-PD5      | 1.6                    | 0.40-1.20 | 2.40-5.4 | ○      | ○      | ●      | ○      |        |        |        |        |  |  |  |  |  |  |
|          |   | 150608E-PD5      | 0.8                    | 0.20-0.60 | 1.20-5.4 | ○      | ○      | ○      | ●      |        |        |        |        |  |  |  |  |  |  |
|          |   | 150612E-PD5      | 1.2                    | 0.30-0.90 | 1.80-5.4 | ●      | ○      | ●      | ○      |        |        |        |        |  |  |  |  |  |  |
|          |   | 150616E-PD5      | 1.6                    | 0.40-1.20 | 2.40-5.4 | ○      | ○      | ●      | ○      |        |        |        |        |  |  |  |  |  |  |
|          |  | DNMA 150404E-KD5 | 0.4                    | 0.10-0.30 | 0.60-5.4 |        |        |        |        |        |        |        |        |  |  |  |  |  |  |
|          |   | 150408E-KD5      | 0.8                    | 0.20-0.60 | 1.20-5.4 |        |        |        |        |        |        |        |        |  |  |  |  |  |  |
|          |   | 150412E-KD5      | 1.2                    | 0.30-0.90 | 1.80-5.4 |        |        |        |        |        |        |        |        |  |  |  |  |  |  |
|          |   | 150604E-KD5      | 0.4                    | 0.10-0.30 | 0.60-5.4 |        |        |        |        |        |        |        |        |  |  |  |  |  |  |
|          |   | 150608E-KD5      | 0.8                    | 0.20-0.60 | 1.20-5.4 |        |        |        |        |        |        |        |        |  |  |  |  |  |  |
|          |   | 150612E-KD5      | 1.2                    | 0.30-0.90 | 1.80-5.4 |        |        |        |        |        |        |        |        |  |  |  |  |  |  |
|          |   |                  |                        |           |          |        |        |        |        |        |        |        |        |  |  |  |  |  |  |
|          |   |                  |                        |           |          |        |        |        |        |        |        |        |        |  |  |  |  |  |  |
|          |   |                  |                        |           |          |        |        |        |        |        |        |        |        |  |  |  |  |  |  |

Marked: ● Stock available ○ Non-stocked standard

**Negative 55° (D) Rhombic Inserts**



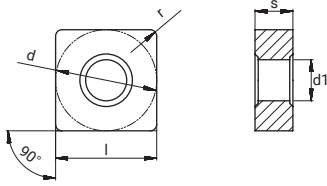
| Dimensions (mm) |       |       |      |      |
|-----------------|-------|-------|------|------|
| Type            | d     | l     | s    | d1   |
| SN_1204_        | 12.7  | 12.7  | 4.76 | 5.16 |
| SN_1506_        | 15.87 | 15.87 | 6.35 | 6.35 |
| SN_1906_        | 19.05 | 19.05 | 6.35 | 7.94 |

| Inserts       | Type  | r (mm) | Recommended parameters |          | Grades |        |        |        |        |        |        |        |        |   |
|---------------|---|--------|------------------------|----------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---|
|               |   |        | f (mm/rev)             | ap (mm)  | AC150P | AC200P | AC250P | AC350P | AP301M | AC150K | ACK15A | AW100K | AP100S |   |
| Finishing     | <br>SNMG 120404E-PB1<br>120408E-PB1<br>120412E-PB1   | 0.4    | 0.05-0.15              | 0.26-3.2 | ○      | ○      | ○      |        |        |        |        |        |        |   |
|               |   | 0.8    | 0.10-0.30              | 0.52-3.2 | ○      | ○      | ●      |        |        |        |        |        |        |   |
|               |   | 1.2    | 0.15-0.45              | 0.78-3.2 | ●      | ○      | ○      |        |        |        |        |        |        |   |
|               | <br>SNMG 120404E-MB2<br>120408E-MB2   | 0.4    | 0.05-0.15              | 0.26-3.2 |        |        |        |        | ○      |        |        |        |        | ● |
|               |   | 0.8    | 0.10-0.30              | 0.52-3.2 |        |        |        |        | ○      |        |        |        |        | ○ |
|               |   |        |                        |          |        |        |        |        |        |        |        |        |        |   |
| Semifinishing | <br>SNMG 120404E-PC3<br>120408E-PC3<br>120412E-PC3   | 0.4    | 0.07-0.20              | 0.34-3.8 | ○      |        | ○      |        |        |        |        |        |        |   |
|               |   | 0.8    | 0.14-0.40              | 0.68-3.8 | ○      |        | ●      |        |        |        |        |        |        |   |
|               |   | 1.2    | 0.20-0.60              | 1.02-3.8 | ○      |        | ○      |        |        |        |        |        |        |   |
| Medium        | <br>SNMG 120404E-PD3<br>120408E-PD3<br>120412E-PD3<br>190608E-PD3  | 0.4    | 0.08-0.22              | 0.40-4.2 | ○      | ○      | ○      | ○      |        |        |        |        |        |   |
|               |   | 0.8    | 0.15-0.44              | 0.80-4.2 | ●      | ○      | ●      | ●      |        |        |        |        |        |   |
|               |   | 1.2    | 0.23-0.66              | 1.20-4.2 | ○      | ○      | ○      | ○      |        |        |        |        |        |   |
|               |   | 0.8    | 0.15-0.44              | 0.80-6.3 | ○      | ○      | ○      | ○      |        |        |        |        |        |   |
|               | <br>SNMG 120408E-SC3<br>120412E-SC3<br>150612E-SC3<br>150616E-SC3<br>190612E-SC3                               | 0.8    | 0.15-0.44              | 0.80-4.2 |        |        |        |        |        |        |        |        |        | ● |
|               |   | 1.2    | 0.23-0.66              | 1.20-4.2 |        |        |        |        |        |        |        |        |        | ● |
|               |   | 1.2    | 0.23-0.66              | 1.20-5.2 |        |        |        |        |        |        |        |        |        | ○ |
|               |   | 1.6    | 0.30-0.88              | 1.60-5.2 |        |        |        |        |        |        |        |        |        | ○ |
|               |   | 1.2    | 0.23-0.66              | 1.20-6.3 |        |        |        |        |        |        |        |        |        | ● |
|               | <br>SNMG 120404E-MC3<br>120408E-MC3<br>120412E-MC3<br>150612E-MC3<br>150616E-MC3<br>190612E-MC3<br>190616E-MC3 | 0.4    | 0.08-0.22              | 0.32-4.2 |        |        |        |        | ○      |        |        |        |        |   |
|               |   | 0.8    | 0.15-0.44              | 0.64-4.2 |        |        |        |        | ●      |        |        |        |        |   |
|               |   | 1.2    | 0.23-0.66              | 0.96-4.2 |        |        |        |        | ○      |        |        |        |        |   |
|               |   | 1.2    | 0.23-0.66              | 0.96-5.2 |        |        |        |        | ○      |        |        |        |        |   |
|               |   | 1.6    | 0.30-0.88              | 1.28-5.2 |        |        |        |        | ○      |        |        |        |        |   |
|               |   | 1.2    | 0.23-0.66              | 0.96-6.3 |        |        |        |        | ○      |        |        |        |        |   |

Marked: ● Stock available ○ Non-stocked standard

Turning inserts

Negative 90° (S) Square Inserts

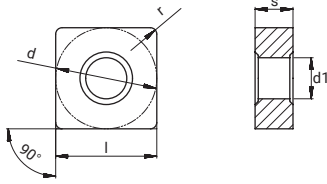


| Dimensions (mm) |       |       |      |      |
|-----------------|-------|-------|------|------|
| Type            | d     | l     | s    | d1   |
| SN_0903_        | 9.52  | 9.52  | 3.18 | 3.81 |
| SN_1204_        | 12.7  | 12.7  | 4.76 | 5.16 |
| SN_1506_        | 15.87 | 15.87 | 6.35 | 6.35 |
| SN_1906_        | 19.05 | 19.05 | 6.35 | 7.94 |

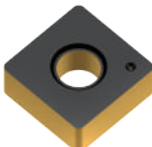
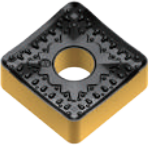
| Inserts     | Type             | r (mm)           | Recommended parameters |           | Grades   |        |        |        |        |        |        |        |         |   |  |
|-------------|------------------|------------------|------------------------|-----------|----------|--------|--------|--------|--------|--------|--------|--------|---------|---|--|
|             |                  |                  | f (mm/rev)             | ap (mm)   | AC150P   | AC200P | AC250P | AC350P | AP301M | AC150K | ACK15A | AW100K | APT100S |   |  |
| Medium      | SNMG 120404E-PC4 | 0.4              | 0.08-0.22              | 0.40-4.2  | ○        | ○      | ○      |        |        | ○      | ○      |        |         |   |  |
|             | 120408E-PC4      | 0.8              | 0.15-0.44              | 0.80-4.2  | ●        | ○      | ●      |        |        | ○      | ●      |        |         |   |  |
|             | 120412E-PC4      | 1.2              | 0.23-0.66              | 1.20-4.2  | ●        | ○      | ●      |        |        | ○      | ●      |        |         |   |  |
| Roughing    | SNMG 120408E-MC4 | 0.8              | 0.20-0.60              | 1.20-6.4  |          |        |        |        | ○      |        |        |        |         | ● |  |
|             | 120412E-MC4      | 1.2              | 0.30-0.90              | 1.80-6.4  |          |        |        |        | ○      |        |        |        |         | ○ |  |
|             | 150612E-MC4      | 1.2              | 0.30-0.90              | 1.80-7.9  |          |        |        |        | ○      |        |        |        |         | ○ |  |
|             | 150616E-MC4      | 1.6              | 0.40-1.20              | 2.40-7.9  |          |        |        |        | ○      |        |        |        |         | ○ |  |
|             | 190612E-MC4      | 1.2              | 0.30-0.90              | 1.80-9.5  |          |        |        |        | ○      |        |        |        |         | ○ |  |
|             | 190616E-MC4      | 1.6              | 0.40-1.20              | 2.40-9.5  |          |        |        |        | ○      |        |        |        |         | ○ |  |
|             | SNMG 090304E-KC4 | 0.4              | 0.09-0.24              | 0.48-3.8  |          |        |        |        |        | ○      | ○      |        |         |   |  |
|             | 090308E-KC4      | 0.8              | 0.18-0.48              | 0.96-3.8  |          |        |        |        |        | ○      | ○      |        |         |   |  |
|             | 120404E-KC4      | 0.4              | 0.09-0.24              | 0.48-5.1  |          |        |        |        |        | ○      | ●      |        |         |   |  |
|             | 120408E-KC4      | 0.8              | 0.18-0.48              | 0.96-5.1  |          |        |        |        |        | ●      | ●      |        |         |   |  |
|             | 120412E-KC4      | 1.2              | 0.26-0.72              | 1.44-5.1  |          |        |        |        |        | ●      | ●      |        |         |   |  |
|             | 150608E-KC4      | 0.8              | 0.18-0.48              | 0.96-6.4  |          |        |        |        |        | ○      | ○      |        |         |   |  |
|             | 150612E-KC4      | 1.2              | 0.26-0.72              | 1.44-6.4  |          |        |        |        |        | ○      | ●      |        |         |   |  |
|             | 150616E-KC4      | 1.6              | 0.35-0.96              | 1.92-6.4  |          |        |        |        |        | ○      | ○      |        |         |   |  |
|             | 190608E-KC4      | 0.8              | 0.18-0.48              | 0.96-7.6  |          |        |        |        |        | ○      | ○      |        |         |   |  |
|             | 190612E-KC4      | 1.2              | 0.26-0.72              | 1.44-7.6  |          |        |        |        |        | ○      | ●      |        |         |   |  |
|             | 190616E-KC4      | 1.6              | 0.35-0.96              | 1.92-7.6  |          |        |        |        |        | ○      | ●      |        |         |   |  |
|             | 190624E-KC4      | 2.4              | 0.53-1.44              | 2.88-7.6  |          |        |        |        |        | ○      | ○      |        |         |   |  |
|             |                  | SNMG 150608E-PD5 | 0.8                    | 0.20-0.60 | 1.20-7.9 | ○      | ○      | ○      | ○      |        |        |        |         |   |  |
|             |                  | 150612E-PD5      | 1.2                    | 0.30-0.90 | 1.80-7.9 | ○      | ○      | ●      | ○      |        |        |        |         |   |  |
| 150616E-PD5 |                  | 1.6              | 0.40-1.20              | 2.40-7.9  | ○        | ○      | ○      | ○      |        |        |        |        |         |   |  |
| 190612E-PD5 |                  | 1.2              | 0.30-0.90              | 1.80-9.5  | ●        | ○      | ●      | ○      |        |        |        |        |         |   |  |
| 190616E-PD5 |                  | 1.6              | 0.40-1.20              | 2.40-9.5  | ○        | ○      | ●      | ○      |        |        |        |        |         |   |  |

Marked: ● Stock available ○ Non-stocked standard

**Negative 90° (S) Square Inserts**



| Dimensions (mm) |       |       |      |      |
|-----------------|-------|-------|------|------|
| Type            | d     | l     | s    | d1   |
| SN_1204_        | 12.7  | 12.7  | 4.76 | 5.16 |
| SN_1506_        | 15.87 | 15.88 | 6.35 | 6.35 |
| SN_1906_        | 19.05 | 19.05 | 6.35 | 7.94 |
| SN_2507_        | 25.4  | 25.4  | 7.94 | 9.12 |
| SN_2509_        | 25.4  | 25.4  | 9.52 | 9.12 |
| SN_3109_        | 31.75 | 31.75 | 9.52 | 9.45 |

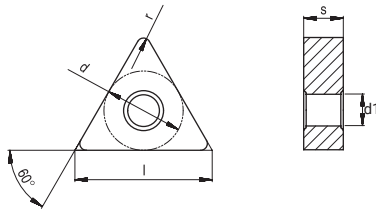
| Inserts   | Type             | r (mm)    | Recommended parameters |           | Grades |        |        |        |        |        |        |        |         |
|---|------------------|-----------|------------------------|-----------|--------|--------|--------|--------|--------|--------|--------|--------|---------|
|   |                  |           | f (mm/rev)             | ap (mm)   | AC150P | AC200P | AC250P | AC350P | AP301M | AC150K | ACK15A | AW100K | APT100S |
| <br>Roughing         | SNMA 120408E-KD5 | 0.8       | 0.20-0.60              | 1.20-6.4  |        |        |        |        |        | ○      | ○      |        |         |
|   | 120412E-KD5      | 1.2       | 0.30-0.90              | 1.80-6.4  |        |        |        |        |        | ●      | ●      |        |         |
|   | 120416E-KD5      | 1.6       | 0.40-1.20              | 2.40-6.4  |        |        |        |        |        | ●      | ○      |        |         |
|   | 150612E-KD5      | 1.2       | 0.30-0.90              | 1.80-7.9  |        |        |        |        |        | ○      | ●      |        |         |
|   | 150616E-KD5      | 1.6       | 0.40-1.20              | 2.40-7.9  |        |        |        |        |        | ○      | ○      |        |         |
|   | 190612E-KD5      | 1.2       | 0.30-0.90              | 1.80-9.5  |        |        |        |        |        | ○      | ●      |        |         |
| 190616E-KD5   | 1.6              | 0.40-1.20 | 2.40-9.5               |           |        |        |        |        | ●      | ●      |        |        |         |
| <br>Heavy roughing | SNMM 120408E-PD8 | 0.8       | 0.16-0.32              | 1.44-5.1  | ○      |        | ○      | ○      |        |        |        |        |         |
|   | 120412E-PD8      | 1.2       | 0.24-0.48              | 2.16-5.1  | ○      |        | ○      | ○      |        |        |        |        |         |
|   | 150612E-PD8      | 1.2       | 0.24-0.48              | 2.16-6.4  | ○      |        | ○      | ○      |        |        |        |        |         |
|   | 150616E-PD8      | 1.6       | 0.32-0.64              | 2.88-6.4  | ○      |        | ○      | ○      |        |        |        |        |         |
|   | 190612E-PD8      | 1.2       | 0.24-0.48              | 2.16-7.6  | ○      |        | ○      | ○      |        |        |        |        |         |
|   | 190616E-PD8      | 1.6       | 0.32-0.64              | 2.88-7.6  | ○      |        | ○      | ●      |        |        |        |        |         |
|   | 190624E-PD8      | 2.4       | 0.48-0.96              | 4.32-7.6  | ○      |        | ○      | ○      |        |        |        |        |         |
|   | 250724E-PD8      | 2.4       | 0.48-0.96              | 4.32-10.2 | ○      |        | ○      | ○      |        |        |        |        |         |
|   | 250924E-PD8      | 2.4       | 0.48-0.96              | 4.32-10.2 | ○      |        | ○      | ○      |        |        |        |        |         |
|   | SNMM 190612S-PC9 | 1.2       | 0.26-0.60              | 2.40-9.5  | ●      | ○      | ○      | ○      |        |        |        |        |         |
|   | 190616S-PC9      | 1.6       | 0.35-0.80              | 3.20-9.5  | ○      | ○      | ○      | ○      |        |        |        |        |         |
|   | 190624S-PC9      | 2.4       | 0.53-1.20              | 4.80-9.5  | ○      | ○      | ○      | ○      |        |        |        |        |         |
|   | 250724S-PC9      | 2.4       | 0.53-1.20              | 4.80-12.7 | ○      | ○      | ○      | ○      |        |        |        |        |         |
|   | 250924S-PC9      | 2.4       | 0.53-1.20              | 4.80-12.7 | ●      | ○      | ●      | ○      |        |        |        |        |         |
|   | SNMH 310924S-PC9 | 2.4       | 0.53-1.20              | 4.80-15.9 |        |        | ○      | ●      |        |        |        |        |         |
|   | SNMM 190612S-PD9 | 1.2       | 0.30-0.72              | 2.64-11.4 | ○      | ○      | ○      | ○      |        |        |        |        |         |
|   | 190616S-PD9      | 1.6       | 0.40-0.96              | 3.52-11.4 | ○      | ○      | ○      | ○      |        |        |        |        |         |
|   | 190624S-PD9      | 2.4       | 0.60-1.44              | 5.28-11.4 | ○      | ○      | ●      | ○      |        |        |        |        |         |
| 250724S-PD9   | 2.4              | 0.60-1.44 | 5.28-15.2              | ○         | ○      | ○      | ○      |        |        |        |        |        |         |
| 250924S-PD9   | 2.4              | 0.60-1.44 | 5.28-15.2              | ●         | ○      | ●      | ●      |        |        |        |        |        |         |
| SNMX 310924S-PD9  | 2.4              | 0.60-1.44 | 5.28-19.1              |           |        | ○      | ●      |        |        |        |        |        |         |

Marked: ● Stock available ○ Non-stocked standard

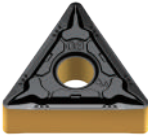

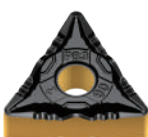
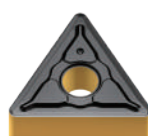
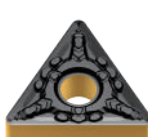


Turning inserts



Negative 60° (T) Triangle Inserts

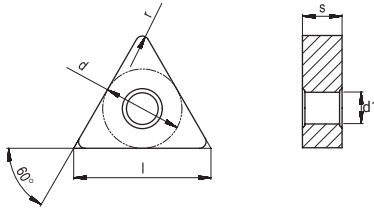


| Dimensions (mm) |      |      |      |      |
|-----------------|------|------|------|------|
| Type            | d    | l    | s    | d1   |
| TN_1604_        | 9.52 | 16.5 | 4.76 | 3.81 |

| Inserts<br>Right-hand shown where it's applicable   | Type   | r (mm)  | Recommended parameters |           | Grades   |        |        |        |        |        |        |        |        |  |  |   |  |
|---|--|---|------------------------|-----------|----------|--------|--------|--------|--------|--------|--------|--------|--------|--|--|---|--|
|   |  |   | f (mm/rev)             | ap (mm)   | AC150P   | AC200P | AC250P | AC350P | AP301M | AC150K | ACK15A | AW100K | AP100S |  |  |   |  |
| Finishing   | <br>TNMG 160404E-PB1<br>160408E-PB1<br>160412E-PB1                  | 0.4   | 0.05-0.15              | 0.26-3.1  | ●        | ○      | ●      |        |        |        |        |        |        |  |  |   |  |
|   |  | 0.8   | 0.10-0.30              | 0.52-3.1  | ●        | ●      | ●      |        |        |        |        |        |        |  |  |   |  |
|   |  | 1.2   | 0.15-0.45              | 0.78-3.1  | ●        | ○      | ○      |        |        |        |        |        |        |  |  |   |  |
|   | <br>TNMG 160404E-MB2<br>160408E-MB2                                | 0.4   | 0.05-0.15              | 0.26-3.1  |          |        |        |        | ●      |        |        |        |        |  |  | ● |  |
|   |  | 0.8   | 0.10-0.30              | 0.52-3.1  |          |        |        |        | ○      |        |        |        |        |  |  | ● |  |
|   | Semifinishing  | <br>TNMG 160404E-PB3<br>160408E-PB3<br>160412E-PB3 | 0.4                    | 0.06-0.18 | 0.30-3.3 | ●      | ○      | ●      |        |        |        |        |        |  |  |   |  |
| 0.8   |  |   | 0.12-0.36              | 0.60-3.3  | ●        | ●      | ●      |        |        |        |        |        |        |  |  |   |  |
| 1.2   |  |   | 0.18-0.54              | 0.90-3.3  | ●        | ○      | ●      |        |        |        |        |        |        |  |  |   |  |
| <br>TNMG 160404E-PC3<br>160408E-PC3<br>160412E-PC3 |  | 0.4   | 0.07-0.20              | 0.34-3.7  | ●        | ○      | ●      |        |        |        |        |        |        |  |  |   |  |
|   |  | 0.8   | 0.14-0.40              | 0.68-3.7  | ●        | ○      | ●      |        |        |        |        |        |        |  |  |   |  |
|   |  | 1.2   | 0.20-0.60              | 1.02-3.7  | ○        | ○      | ○      |        |        |        |        |        |        |  |  |   |  |
| Medium  | <br>TNMG 160404E-PD3<br>160408E-PD3<br>160412E-PD3                | 0.4   | 0.08-0.22              | 0.40-4.1  | ●        | ○      | ●      | ○      |        |        |        |        |        |  |  |   |  |
|   |  | 0.8   | 0.15-0.44              | 0.80-4.1  | ●        | ●      | ●      | ○      |        |        |        |        |        |  |  |   |  |
|   |  | 1.2   | 0.23-0.66              | 1.20-4.1  | ●        | ●      | ●      | ○      |        |        |        |        |        |  |  |   |  |
|   | <br>TNMG 160404R-PL5<br>160408R-PL5<br>160404L-PL5<br>160408L-PL5 | 0.4   | 0.08-0.22              | 0.40-4.1  | ●        | ○      | ●      |        |        |        |        |        |        |  |  |   |  |
|   |  | 0.8   | 0.15-0.44              | 0.80-4.1  | ●        | ○      | ●      |        |        |        |        |        |        |  |  |   |  |
|   |  | 0.4   | 0.08-0.22              | 0.40-4.1  | ●        | ○      | ●      |        |        |        |        |        |        |  |  |   |  |
|   |  | 0.8   | 0.15-0.44              | 0.80-4.1  | ●        | ○      | ●      |        |        |        |        |        |        |  |  |   |  |
|   | <br>TNMG 160404E-SC3<br>160408E-SC3<br>160412E-SC3                | 0.4   | 0.08-0.22              | 0.40-4.1  |          |        |        |        |        |        |        |        |        |  |  | ● |  |
|   |  | 0.8   | 0.15-0.44              | 0.80-4.1  |          |        |        |        |        |        |        |        |        |  |  | ● |  |
|   |  | 1.2   | 0.23-0.66              | 1.20-4.1  |          |        |        |        |        |        |        |        |        |  |  | ○ |  |

Marked: ● Stock available ○ Non-stocked standard

**Negative 60° (T) Triangle Inserts**



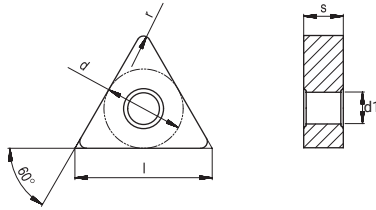
| Dimensions (mm) |      |      |      |      |
|-----------------|------|------|------|------|
| Type            | d    | l    | s    | d1   |
| TN_1103_        | 6.35 | 11.0 | 3.18 | 2.26 |
| TN_1604_        | 9.52 | 16.5 | 4.76 | 3.81 |
| TN_2204_        | 12.7 | 22.0 | 4.76 | 5.16 |

| Inserts     | Type | r (mm)           | Recommended parameters |           | Grades   |        |        |        |        |        |        |        |        |  |   |
|-------------|------|------------------|------------------------|-----------|----------|--------|--------|--------|--------|--------|--------|--------|--------|--|---|
|             |      |                  | f (mm/rev)             | ap (mm)   | AC150P   | AC200P | AC250P | AC350P | AP301M | AC150K | ACK15A | AW100K | AP100S |  |   |
| Medium      |      | TNMG 160404E-MC3 | 0.4                    | 0.08-0.22 | 0.32-4.1 |        |        |        |        | ●      |        |        |        |  | ○ |
|             |      | 160408E-MC3      | 0.8                    | 0.15-0.44 | 0.64-4.1 |        |        |        |        | ●      |        |        |        |  | ○ |
|             |      | 160412E-MC3      | 1.2                    | 0.23-0.66 | 0.96-4.1 |        |        |        |        | ●      |        |        |        |  | ○ |
|             |      | 220408E-MC3      | 0.8                    | 0.15-0.44 | 0.64-4.9 |        |        |        |        | ●      |        |        |        |  | ● |
|             |      | 220412E-MC3      | 1.2                    | 0.23-0.66 | 0.96-4.9 |        |        |        |        | ○      |        |        |        |  | ○ |
|             |      | TNMG 160404E-PC4 | 0.4                    | 0.08-0.22 | 0.40-4.1 | ●      | ○      | ○      |        |        | ○      | ○      |        |  |   |
|             |      | 160408E-PC4      | 0.8                    | 0.15-0.44 | 0.80-4.1 | ●      | ○      | ●      |        |        | ●      | ●      |        |  |   |
|             |      | 160412E-PC4      | 1.2                    | 0.23-0.66 | 1.20-4.1 | ○      | ○      | ○      |        |        | ●      | ○      |        |  |   |
| 220412E-PC4 |      | 1.2              | 0.23-0.66              | 1.20-4.9  | ○        | ○      | ○      |        |        | ○      | ○      |        |        |  |   |
| Roughing    |      | TNMG 160408E-MC4 | 0.8                    | 0.20-0.60 | 1.20-5.8 |        |        |        |        | ●      |        |        |        |  | ● |
|             |      | 160412E-MC4      | 1.2                    | 0.30-0.90 | 1.80-5.8 |        |        |        |        | ○      |        |        |        |  | ○ |
|             |      | 220408E-MC4      | 0.8                    | 0.20-0.60 | 1.20-6.6 |        |        |        |        | ○      |        |        |        |  | ○ |
|             |      | 220412E-MC4      | 1.2                    | 0.30-0.90 | 1.80-6.6 |        |        |        |        | ○      |        |        |        |  | ○ |
|             |      | TNMG 110304E-KC4 | 0.4                    | 0.09-0.24 | 0.48-3.3 |        |        |        |        |        | ○      | ○      |        |  |   |
|             |      | 160404E-KC4      | 0.4                    | 0.09-0.24 | 0.48-4.9 |        |        |        |        |        | ○      | ●      |        |  |   |
|             |      | 160408E-KC4      | 0.8                    | 0.18-0.48 | 0.96-4.9 |        |        |        |        |        | ●      | ●      |        |  |   |
|             |      | 160412E-KC4      | 1.2                    | 0.26-0.72 | 1.44-4.9 |        |        |        |        |        | ○      | ○      |        |  |   |
|             |      | 160416E-KC4      | 1.6                    | 0.35-0.96 | 1.92-4.9 |        |        |        |        |        | ○      | ○      |        |  |   |
|             |      | 220412E-KC4      | 1.2                    | 0.26-0.72 | 1.44-6.0 |        |        |        |        |        | ○      | ●      |        |  |   |
|             |      | 220416E-KC4      | 1.6                    | 0.35-0.96 | 1.92-6.0 |        |        |        |        |        | ○      | ○      |        |  |   |
|             |      |                  |                        |           |          |        |        |        |        |        |        |        |        |  |   |

Marked: ● Stock available ○ Non-stocked standard

Turning inserts

Negative 60° (T) Triangle Inserts

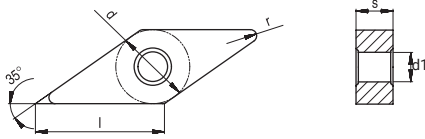


| Dimensions (mm) |      |      |      |      |
|-----------------|------|------|------|------|
| Type            | d    | l    | s    | d1   |
| TN_1604_        | 9.52 | 16.5 | 4.76 | 3.81 |
| TN_2204_        | 12.7 | 22.0 | 4.76 | 5.16 |

| Inserts<br>Right-hand shown where it's applicable | Type | r (mm)           | Recommended parameters |           | Grades   |        |        |        |        |        |        |        |        |  |  |  |
|---|------|------------------|------------------------|-----------|----------|--------|--------|--------|--------|--------|--------|--------|--------|--|--|--|
|   |      |                  | f (mm/rev)             | ap (mm)   | AC150P   | AC200P | AC250P | AC350P | AP301M | AC150K | ACK15A | AW100K | AP100S |  |  |  |
| Roughing  |      | TNMG 160408E-PD5 | 0.8                    | 0.20-0.60 | 1.20-5.8 | ○      | ○      | ○      | ●      |        |        |        |        |  |  |  |
|   |      | 160412E-PD5      | 1.2                    | 0.30-0.90 | 1.80-5.8 | ○      | ○      | ○      | ●      |        |        |        |        |  |  |  |
|   |      | 220408E-PD5      | 0.8                    | 0.20-0.60 | 1.20-7.7 | ○      | ○      | ●      | ○      |        |        |        |        |  |  |  |
|   |      | 220412E-PD5      | 1.2                    | 0.30-0.90 | 1.80-7.7 | ○      | ○      | ○      | ○      |        |        |        |        |  |  |  |
|   |      | 220416E-PD5      | 1.6                    | 0.40-1.20 | 2.40-7.7 | ○      | ○      | ○      | ○      |        |        |        |        |  |  |  |
|   |      | TNMA 160404E-KD5 | 0.4                    | 0.10-0.30 | 0.60-5.8 |        |        |        |        |        | ●      | ○      |        |  |  |  |
|   |      | 160408E-KD5      | 0.8                    | 0.20-0.60 | 1.20-5.8 |        |        |        |        |        | ●      | ●      |        |  |  |  |
|   |      | 160412E-KD5      | 1.2                    | 0.30-0.90 | 1.80-5.8 |        |        |        |        |        | ●      | ●      |        |  |  |  |
|   |      | 160416E-KD5      | 1.6                    | 0.40-1.20 | 2.40-5.8 |        |        |        |        |        | ○      | ○      |        |  |  |  |
|   |      | 220408E-KD5      | 0.8                    | 0.20-0.60 | 1.20-7.7 |        |        |        |        |        | ○      | ○      |        |  |  |  |
| 220412E-KD5                                       |      | 1.2              | 0.30-0.90              | 1.80-7.7  |          |        |        |        |        | ○      | ○      |        |        |  |  |  |
| Heavy roughing                                    |      | TNMM 160408E-PD8 | 0.8                    | 0.16-0.32 | 1.44-4.9 | ○      |        | ○      | ○      |        |        |        |        |  |  |  |
|   |      | 160412E-PD8      | 1.2                    | 0.24-0.48 | 2.16-4.9 | ○      |        | ○      | ○      |        |        |        |        |  |  |  |
|   |      | 220408E-PD8      | 0.8                    | 0.16-0.32 | 1.44-6.0 | ○      |        | ○      | ○      |        |        |        |        |  |  |  |
|   |      | 220412E-PD8      | 1.2                    | 0.24-0.48 | 2.16-6.0 | ○      |        | ○      | ○      |        |        |        |        |  |  |  |
|   |      | 220416E-PD8      | 1.6                    | 0.32-0.64 | 2.88-6.0 | ○      |        | ○      | ○      |        |        |        |        |  |  |  |
| Finishing   |      | TNGG 160402FR-F  | 0.2                    | 0.08-0.20 | 0.5-2.3  |        |        |        |        | ●      |        |        |        |  |  |  |
|   |      | 160402FL-F       | 0.2                    | 0.08-0.20 | 0.5-2.3  |        |        |        |        | ●      |        |        |        |  |  |  |
|   |      | 160404FR-F       | 0.4                    | 0.08-0.20 | 0.5-2.3  |        |        |        |        | ●      |        |        |        |  |  |  |
|   |      | 160404FL-F       | 0.4                    | 0.08-0.20 | 0.5-2.3  |        |        |        |        | ●      |        |        |        |  |  |  |
| Semifinishing-roughing                            |      | TNGG 160404R-H   | 0.4                    | 0.22-0.38 | 1.2-3.8  |        |        |        |        | ●      |        |        |        |  |  |  |
|   |      | 160404L-H        | 0.4                    | 0.22-0.38 | 1.2-3.8  |        |        |        |        | ●      |        |        |        |  |  |  |
|   |      | 160408R-H        | 0.8                    | 0.22-0.38 | 1.2-3.8  |        |        |        |        | ●      |        |        |        |  |  |  |
|   |      | 160408L-H        | 0.8                    | 0.22-0.38 | 1.2-3.8  |        |        |        |        | ●      |        |        |        |  |  |  |

Marked: ● Stock available ○ Non-stocked standard

**Negative 35° (V) Rhombic Inserts**



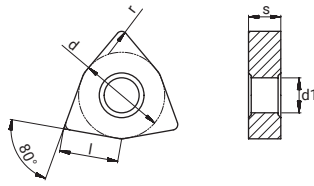
| Dimensions (mm) |      |      |      |      |
|-----------------|------|------|------|------|
| Type            | d    | l    | s    | d1   |
| VN_1604_        | 9.52 | 16.5 | 4.76 | 3.81 |

| Inserts       | Type | r (mm)           | Recommended parameters |           | Grades   |        |        |        |        |        |        |        |         |  |   |
|---------------|------|------------------|------------------------|-----------|----------|--------|--------|--------|--------|--------|--------|--------|---------|--|---|
|               |      |                  | f (mm/rev)             | ap (mm)   | AC150P   | AC200P | AC250P | AC350P | AP301M | AC150K | ACK15A | AW100K | APT100S |  |   |
| Finishing     |      | VNMG 160404E-PB1 | 0.4                    | 0.05-0.15 | 0.26-2.1 | ●      | ○      | ●      |        |        |        |        |         |  |   |
|               |      | 160408E-PB1      | 0.8                    | 0.10-0.30 | 0.52-2.1 | ●      | ●      | ●      |        |        |        |        |         |  |   |
|               |      | VNMG 160404E-MB2 | 0.4                    | 0.05-0.15 | 0.26-2.1 |        |        |        |        | ●      |        |        |         |  | ● |
|               |      | 160408E-MB2      | 0.8                    | 0.10-0.30 | 0.52-2.1 |        |        |        |        | ●      |        |        |         |  | ● |
| Semifinishing |      | VNMG 160404E-PB3 | 0.4                    | 0.06-0.18 | 0.30-3.1 | ●      | ○      | ●      |        |        |        |        |         |  |   |
|               |      | 160408E-PB3      | 0.8                    | 0.12-0.36 | 0.60-3.1 | ●      | ●      | ●      |        |        |        |        |         |  |   |
|               |      | 160412E-PB3      | 1.2                    | 0.18-0.54 | 0.90-3.1 | ●      | ○      | ●      |        |        |        |        |         |  |   |
|               |      | VNMG 160404E-PC3 | 0.4                    | 0.07-0.20 | 0.34-3.3 | ●      | ○      | ●      |        |        |        |        |         |  |   |
|               |      | 160408E-PC3      | 0.8                    | 0.14-0.40 | 0.68-3.3 | ○      | ○      | ●      |        |        |        |        |         |  |   |
|               |      | 160412E-PC3      | 1.2                    | 0.20-0.60 | 1.02-3.3 | ○      | ○      | ○      |        |        |        |        |         |  |   |
| Medium        |      | VNMG 160404E-PD3 | 0.4                    | 0.08-0.22 | 0.40-3.3 | ●      | ○      | ●      | ○      |        |        |        |         |  |   |
|               |      | 160408E-PD3      | 0.8                    | 0.15-0.44 | 0.80-3.3 | ●      | ●      | ●      | ○      |        |        |        |         |  |   |
|               |      | 160412E-PD3      | 1.2                    | 0.23-0.66 | 1.20-3.3 | ●      | ○      | ●      | ○      |        |        |        |         |  |   |
|               |      | VNMG 160404E-SC3 | 0.4                    | 0.08-0.22 | 0.40-3.3 |        |        |        |        |        |        |        |         |  | ● |
|               |      | 160408E-SC3      | 0.8                    | 0.15-0.44 | 0.80-3.3 |        |        |        |        |        |        |        |         |  | ● |
|               |      | 160412E-SC3      | 1.2                    | 0.23-0.66 | 1.20-3.3 |        |        |        |        |        |        |        |         |  | ● |
|               |      | VNMG 160404E-MC3 | 0.4                    | 0.08-0.22 | 0.32-3.3 |        |        |        |        | ●      |        |        |         |  |   |
|               |      | 160408E-MC3      | 0.8                    | 0.15-0.44 | 0.64-3.3 |        |        |        |        | ●      |        |        |         |  |   |
|               |      |                  |                        |           |          |        |        |        |        |        |        |        |         |  |   |
|               |      | VNMG 160404E-PC4 | 0.4                    | 0.08-0.22 | 0.40-3.3 | ○      |        | ●      |        |        | ○      | ●      |         |  |   |
|               |      | 160408E-PC4      | 0.8                    | 0.15-0.44 | 0.80-3.3 | ●      |        | ○      |        |        | ●      | ●      |         |  |   |
|               |      | 160412E-PC4      | 1.2                    | 0.23-0.66 | 1.20-3.3 | ○      |        | ○      |        |        | ●      | ○      |         |  |   |
| Roughing      |      | VNMG 160404E-KC4 | 0.4                    | 0.09-0.24 | 0.48-3.3 |        |        |        |        |        | ○      | ●      |         |  |   |
|               |      | 160408E-KC4      | 0.8                    | 0.18-0.48 | 0.96-3.3 |        |        |        |        |        | ●      | ●      |         |  |   |
|               |      | 160412E-KC4      | 1.2                    | 0.26-0.72 | 1.44-3.3 |        |        |        |        |        | ○      | ○      |         |  |   |

Marked: ● Stock available ○ Non-stocked standard

Turning inserts

Negative 80° (W) Trigon Inserts

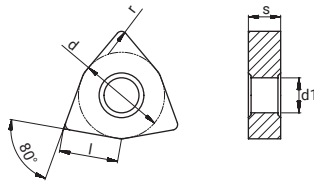


| Dimensions (mm) |      |      |      |      |
|-----------------|------|------|------|------|
| Type            | d    | l    | s    | d1   |
| WN_0604_        | 9.52 | 6.52 | 4.76 | 3.81 |
| WN_0804_        | 12.7 | 8.7  | 4.76 | 5.16 |

| Inserts       | Type | r (mm)           | Recommended parameters |           | Grades   |        |        |        |        |        |        |        |        |   |   |
|---------------|------|------------------|------------------------|-----------|----------|--------|--------|--------|--------|--------|--------|--------|--------|---|---|
|               |      |                  | f (mm/rev)             | ap (mm)   | AC150P   | AC200P | AC250P | AC350P | AP301M | AC150K | ACK15A | AW100K | AP100S |   |   |
| Finishing     |      | WNMG 080404E-PB1 | 0.4                    | 0.05-0.15 | 0.26-2.2 | ●      | ○      | ●      |        |        |        |        |        |   |   |
|               |      | 080408E-PB1      | 0.8                    | 0.10-0.30 | 0.52-2.2 | ●      | ○      | ●      |        |        |        |        |        |   |   |
|               |      | 080412E-PB1      | 1.2                    | 0.15-0.45 | 0.78-2.2 | ○      | ○      | ○      |        |        |        |        |        |   |   |
|               |      | WNMG 080404E-MB2 | 0.4                    | 0.05-0.15 | 0.26-2.2 |        |        |        |        | ●      |        |        |        |   | ● |
|               |      | 080408E-MB2      | 0.8                    | 0.10-0.30 | 0.52-2.2 |        |        |        |        | ●      |        |        |        |   | ● |
|               |      |                  |                        |           |          |        |        |        |        |        |        |        |        |   |   |
| Semifinishing |      | WNMG 080404E-PB3 | 0.4                    | 0.06-0.18 | 0.30-2.3 | ●      | ○      | ●      |        |        |        |        |        |   |   |
|               |      | 080408E-PB3      | 0.8                    | 0.12-0.36 | 0.60-2.3 | ●      | ○      | ●      |        |        |        |        |        |   |   |
|               |      | 080412E-PB3      | 1.2                    | 0.18-0.54 | 0.90-2.3 | ●      | ○      | ●      |        |        |        |        |        |   |   |
|               |      | WNMG 080404E-PC3 | 0.4                    | 0.07-0.20 | 0.34-2.6 | ●      | ○      | ●      |        |        |        |        |        |   |   |
|               |      | 080408E-PC3      | 0.8                    | 0.14-0.40 | 0.68-2.6 | ●      | ○      | ●      |        |        |        |        |        |   |   |
|               |      | 080412E-PC3      | 1.2                    | 0.20-0.60 | 1.02-2.6 | ●      | ○      | ●      |        |        |        |        |        |   |   |
| Medium        |      | WNMG 060408E-PD3 | 0.8                    | 0.15-0.44 | 0.80-2.1 | ●      | ○      | ●      | ○      |        |        |        |        |   |   |
|               |      | 080404E-PD3      | 0.4                    | 0.08-0.22 | 0.40-2.9 | ●      | ○      | ●      | ○      |        |        |        |        |   |   |
|               |      | 080408E-PD3      | 0.8                    | 0.15-0.44 | 0.80-2.9 | ●      | ●      | ●      | ●      |        |        |        |        |   |   |
|               |      | 080412E-PD3      | 1.2                    | 0.23-0.66 | 1.20-2.9 | ●      | ●      | ●      | ●      |        |        |        |        |   |   |
|               |      | WNMG 080404E-SC3 | 0.4                    | 0.08-0.22 | 0.40-2.9 |        |        |        |        |        |        |        |        | ● |   |
|               |      | 080408E-SC3      | 0.8                    | 0.15-0.44 | 0.80-2.9 |        |        |        |        | ○      |        |        |        | ● |   |
|               |      | 080412E-SC3      | 1.2                    | 0.23-0.66 | 1.20-2.9 |        |        |        |        |        |        |        |        | ● |   |
|               |      | WNMG 060408E-MC3 | 0.8                    | 0.15-0.44 | 0.64-2.1 |        |        |        |        | ●      |        |        |        | ○ |   |
|               |      | 060412E-MC3      | 1.2                    | 0.23-0.66 | 0.96-2.1 |        |        |        |        | ●      |        |        |        | ○ |   |
|               |      | 080404E-MC3      | 0.4                    | 0.08-0.22 | 0.32-2.9 |        |        |        |        | ●      |        |        |        | ○ |   |
|               |      | 080408E-MC3      | 0.8                    | 0.15-0.44 | 0.64-2.9 |        |        |        |        | ●      |        |        |        | ● |   |
|               |      | 080412E-MC3      | 1.2                    | 0.23-0.66 | 0.96-2.9 |        |        |        |        | ○      |        |        |        | ○ |   |

Marked: ● Stock available ○ Non-stocked standard

**Negative 80° (W) Trigon Inserts**



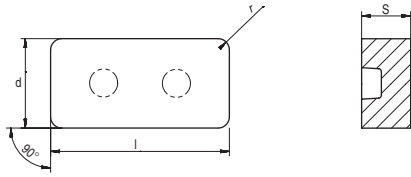
| Dimensions (mm) |      |      |      |      |
|-----------------|------|------|------|------|
| Type            | d    | l    | s    | d1   |
| WN_0604_        | 9.52 | 6.52 | 4.76 | 3.81 |
| WN_0804_        | 12.7 | 8.7  | 4.76 | 5.16 |

| Inserts            | Type                    | r (mm)    | Recommended parameters |          | Grades |        |        |        |        |        |        |        |        |
|--------------------|-------------------------|-----------|------------------------|----------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
|                    |                         |           | f (mm/rev)             | ap (mm)  | AC150P | AC200P | AC250P | AC350P | AP301M | AC150K | ACK15A | AW100K | AP100S |
| Medium             | <b>WNMG 080404E-PC4</b> | 0.4       | 0.08-0.22              | 0.40-2.9 | ○      |        | ●      |        |        | ●      | ●      |        |        |
|                    | <b>080408E-PC4</b>      | 0.8       | 0.15-0.44              | 0.80-2.9 | ●      |        | ●      |        |        | ●      | ●      |        |        |
|                    | <b>080412E-PC4</b>      | 1.2       | 0.23-0.66              | 1.20-2.9 | ●      |        | ●      |        |        | ●      | ●      |        |        |
| Roughing           | <b>WNMG 060408E-MC4</b> | 0.8       | 0.20-0.60              | 1.20-3.3 |        |        |        |        | ○      |        |        |        | ○      |
|                    | <b>060412E-MC4</b>      | 1.2       | 0.30-0.90              | 1.80-3.3 |        |        |        |        | ○      |        |        |        | ○      |
|                    | <b>080408E-MC4</b>      | 0.8       | 0.20-0.60              | 1.20-4.3 |        |        |        |        | ○      |        |        |        | ●      |
|                    | <b>080412E-MC4</b>      | 1.2       | 0.30-0.90              | 1.80-4.3 |        |        |        |        | ○      |        |        |        | ●      |
|                    | <b>WNMG 060404E-KC4</b> | 0.4       | 0.09-0.24              | 0.48-2.6 |        |        |        |        |        | ○      | ●      |        |        |
|                    | <b>060408E-KC4</b>      | 0.8       | 0.18-0.48              | 0.96-2.6 |        |        |        |        |        | ○      | ●      |        |        |
|                    | <b>080404E-KC4</b>      | 0.4       | 0.09-0.24              | 0.48-3.5 |        |        |        |        |        | ○      | ●      |        |        |
|                    | <b>080408E-KC4</b>      | 0.8       | 0.18-0.48              | 0.96-3.5 |        |        |        |        |        | ●      | ●      |        |        |
|                    | <b>080412E-KC4</b>      | 1.2       | 0.26-0.72              | 1.44-3.5 |        |        |        |        |        | ●      | ●      |        |        |
|                    | <b>080416E-KC4</b>      | 1.2       | 0.35-0.96              | 1.92-3.5 |        |        |        |        |        | ○      | ○      |        |        |
|                    | <b>WNMG 080408E-PD5</b> | 0.8       | 0.20-0.60              | 1.20-4.3 | ○      | ●      | ●      | ●      |        |        |        |        |        |
|                    | <b>080412E-PD5</b>      | 1.2       | 0.30-0.90              | 1.80-4.3 | ○      | ○      | ●      | ●      |        |        |        |        |        |
|                    | <b>WNMA 080404E-KD5</b> | 0.4       | 0.10-0.30              | 0.60-4.3 |        |        |        |        |        | ○      | ○      |        |        |
|                    | <b>080408E-KD5</b>      | 0.8       | 0.20-0.60              | 1.20-4.3 |        |        |        |        |        | ○      | ●      |        |        |
|                    | <b>080412E-KD5</b>      | 1.2       | 0.30-0.90              | 1.80-4.3 |        |        |        |        |        | ●      | ●      |        |        |
| <b>080416E-KD5</b> | 1.6                     | 0.40-1.20 | 2.40-4.3               |          |        |        |        |        | ○      | ●      |        |        |        |

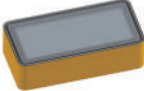
Marked: ● Stock available ○ Non-stocked standard

Turning inserts

Negative 90° (L) Rectangle Inserts

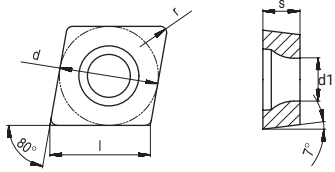


| Dimensions (mm) |      |      |      |
|-----------------|------|------|------|
| Type            | l    | d    | s    |
| LN_5014_        | 50.8 | 25.4 | 14.2 |

| Inserts   | Type            | r (mm) | Recommended parameters |          | Grades |        |        |        |        |        |        |        |        |  |  |  |  |  |  |  |  |
|---|-----------------|--------|------------------------|----------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--|--|--|--|--|--|--|--|
|   |                 |        | f (mm/rev)             | ap (mm)  | AC150P | AC200P | AC250P | AC350P | AP301M | AC150K | ACK15A | AW100K | AP100S |  |  |  |  |  |  |  |  |
| Heavy roughing<br> | LNMX 501432S-HE | 3.2    | 0.70-1.6               | 6.0-40.0 |        |        | ○      | ●      |        |        |        |        |        |  |  |  |  |  |  |  |  |
|   |                 |        |                        |          |        |        |        |        |        |        |        |        |        |  |  |  |  |  |  |  |  |
|   |                 |        |                        |          |        |        |        |        |        |        |        |        |        |  |  |  |  |  |  |  |  |
|   |                 |        |                        |          |        |        |        |        |        |        |        |        |        |  |  |  |  |  |  |  |  |
|   |                 |        |                        |          |        |        |        |        |        |        |        |        |        |  |  |  |  |  |  |  |  |
|   |                 |        |                        |          |        |        |        |        |        |        |        |        |        |  |  |  |  |  |  |  |  |
|   |                 |        |                        |          |        |        |        |        |        |        |        |        |        |  |  |  |  |  |  |  |  |
|   |                 |        |                        |          |        |        |        |        |        |        |        |        |        |  |  |  |  |  |  |  |  |
|   |                 |        |                        |          |        |        |        |        |        |        |        |        |        |  |  |  |  |  |  |  |  |
|   |                 |        |                        |          |        |        |        |        |        |        |        |        |        |  |  |  |  |  |  |  |  |
|   |                 |        |                        |          |        |        |        |        |        |        |        |        |        |  |  |  |  |  |  |  |  |
|   |                 |        |                        |          |        |        |        |        |        |        |        |        |        |  |  |  |  |  |  |  |  |
|   |                 |        |                        |          |        |        |        |        |        |        |        |        |        |  |  |  |  |  |  |  |  |
|   |                 |        |                        |          |        |        |        |        |        |        |        |        |        |  |  |  |  |  |  |  |  |

Marked: ● Stock available ○ Non-stocked standard

**Positive 80° (C) Rhombic Inserts**



| Dimensions (mm) |      |      |      |     |
|-----------------|------|------|------|-----|
| Type            | d    | l    | s    | d1  |
| CC_0602_        | 6.35 | 6.45 | 2.38 | 2.8 |
| CC_09T3_        | 9.52 | 9.67 | 3.97 | 4.4 |
| CC_1204_        | 12.7 | 12.9 | 4.76 | 5.5 |

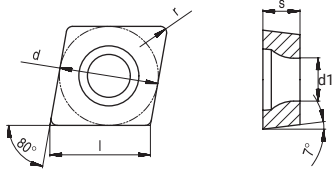
| Inserts       | Type       | r (mm)           | Recommended parameters |           | Grades   |        |        |        |        |        |        |        |         |   |   |
|---------------|------------|------------------|------------------------|-----------|----------|--------|--------|--------|--------|--------|--------|--------|---------|---|---|
|               |            |                  | f (mm/rev)             | ap (mm)   | AC150P   | AC200P | AC250P | AC350P | AP301M | AC150K | ACK15A | AW100K | APT100S |   |   |
| Finishing     |            | CCGT 060201E-UF  | 0.1                    | 0.02-0.15 | 0.10-1.4 |        |        |        |        | ○      |        |        |         |   | ○ |
|               |            | 060202E-UF       | 0.2                    | 0.02-0.15 | 0.10-1.4 |        |        |        |        | ●      |        |        |         |   | ● |
|               |            | 060204E-UF       | 0.4                    | 0.03-0.20 | 0.10-1.4 |        |        |        |        | ●      |        |        |         |   | ● |
|               |            | 09T301E-UF       | 0.1                    | 0.02-0.15 | 0.10-2.4 |        |        |        |        | ●      |        |        |         |   | ● |
|               |            | 09T302E-UF       | 0.2                    | 0.02-0.15 | 0.10-2.4 |        |        |        |        | ●      |        |        |         |   | ● |
|               |            | 09T304E-UF       | 0.4                    | 0.03-0.20 | 0.10-2.4 |        |        |        |        | ○      |        |        |         |   | ○ |
|               | 09T308E-UF | 0.8              | 0.03-0.25              | 0.10-2.4  |          |        |        |        | ●      |        |        |        |         | ○ |   |
|               |            | CCGT 060201F-UF  | 0.1                    | 0.02-0.15 | 0.10-1.4 |        |        |        |        | ●      |        |        |         |   |   |
|               |            | 060202F-UF       | 0.2                    | 0.02-0.15 | 0.10-1.4 |        |        |        |        | ●      |        |        |         |   |   |
|               |            | 060204F-UF       | 0.4                    | 0.03-0.20 | 0.10-1.4 |        |        |        |        | ●      |        |        |         |   |   |
|               |            | 09T301F-UF       | 0.1                    | 0.02-0.15 | 0.10-2.4 |        |        |        |        | ●      |        |        |         |   |   |
|               |            | 09T302F-UF       | 0.2                    | 0.02-0.15 | 0.10-2.4 |        |        |        |        | ●      |        |        |         |   |   |
| 09T304F-UF    |            | 0.4              | 0.03-0.20              | 0.10-2.4  |          |        |        |        | ●      |        |        |        |         |   |   |
| Semifinishing |            | CCGT 060204F-NC2 | 0.4                    | 0.05-0.20 | 0.32-2.9 |        |        |        |        |        |        |        |         | ● |   |
|               |            | 09T302F-NC2      | 0.2                    | 0.02-0.10 | 0.16-4.4 |        |        |        |        |        |        |        |         | ○ |   |
|               |            | 09T304F-NC2      | 0.4                    | 0.05-0.20 | 0.32-4.4 |        |        |        |        |        |        |        |         | ● |   |
|               |            | 09T308F-NC2      | 0.8                    | 0.10-0.40 | 0.64-4.4 |        |        |        |        |        |        |        |         | ● |   |
|               |            | 120404F-NC2      | 0.4                    | 0.05-0.20 | 0.32-5.8 |        |        |        |        |        |        |        |         | ● |   |
|               |            | 120408F-NC2      | 0.8                    | 0.10-0.40 | 0.64-5.8 |        |        |        |        |        |        |        |         | ○ |   |
| Finishing     |            | CCMT 060202E-PB1 | 0.2                    | 0.02-0.07 | 0.15-1.6 | ○      | ○      | ○      |        | ●      |        |        |         |   |   |
|               |            | 060204E-PB1      | 0.4                    | 0.04-0.14 | 0.30-1.6 | ●      | ○      | ●      |        | ●      |        |        |         |   |   |
|               |            | 060208E-PB1      | 0.8                    | 0.09-0.28 | 0.60-1.6 | ○      | ○      | ○      |        | ●      |        |        |         |   |   |
|               |            | 09T302E-PB1      | 0.2                    | 0.02-0.07 | 0.15-2.4 | ○      | ○      | ○      |        | ●      |        |        |         |   |   |
|               |            | 09T304E-PB1      | 0.4                    | 0.04-0.14 | 0.30-2.4 | ●      | ○      | ●      |        | ●      |        |        |         |   | ○ |
|               |            | 09T308E-PB1      | 0.8                    | 0.09-0.28 | 0.60-2.4 | ●      | ●      | ●      |        | ●      |        |        |         |   |   |
| Semifinishing |            | CCMT 060204E-PC2 | 0.4                    | 0.05-0.16 | 0.35-1.9 | ●      | ○      | ●      |        | ●      |        |        |         |   | ● |
|               |            | 060208E-PC2      | 0.8                    | 0.10-0.32 | 0.70-1.9 | ●      | ○      | ●      |        | ●      |        |        |         |   | ● |
|               |            | 09T304E-PC2      | 0.4                    | 0.05-0.16 | 0.35-2.9 | ●      | ●      | ●      |        | ●      |        |        |         |   | ● |
|               |            | 09T308E-PC2      | 0.8                    | 0.10-0.32 | 0.70-2.9 | ●      | ●      | ●      |        | ●      |        |        |         |   | ● |
|               |            | 09T312E-PC2      | 1.2                    | 0.16-0.48 | 1.05-2.9 | ○      | ○      | ○      |        | ●      |        |        |         |   | ○ |
|               |            | 120404E-PC2      | 0.4                    | 0.05-0.16 | 0.35-3.9 | ●      | ○      | ●      |        | ●      |        |        |         |   | ● |
|               |            | 120408E-PC2      | 0.8                    | 0.10-0.32 | 0.70-3.9 | ●      | ○      | ●      |        | ●      |        |        |         |   | ● |
|               |            | 120412E-PC2      | 1.2                    | 0.16-0.48 | 1.05-3.9 | ○      | ○      | ○      |        | ○      |        |        |         |   | ○ |

Marked: ● Stock available ○ Non-stocked standard

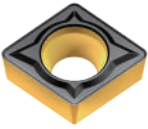
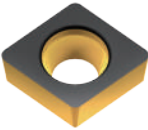

Turning inserts



Positive 80° (C) Rhombic Inserts

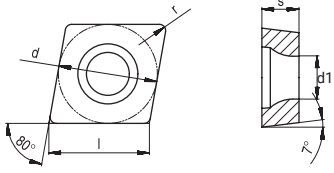


| Dimensions (mm) |      |      |      |     |
|-----------------|------|------|------|-----|
| Type            | d    | l    | s    | d1  |
| CC_0301_        | 3.5  | 3.55 | 1.4  | 2.0 |
| CC_0401_        | 4.3  | 4.37 | 1.8  | 2.3 |
| CC_0602_        | 6.35 | 6.45 | 2.38 | 2.8 |
| CC_09T3_        | 9.52 | 9.67 | 3.97 | 4.4 |
| CC_1204_        | 12.7 | 12.9 | 4.76 | 5.5 |



| Inserts<br>Left-hand shown where it's applicable   | Type             | r (mm)    | Recommended parameters |          | Grades |        |        |        |        |        |        |        |         |
|--|------------------|-----------|------------------------|----------|--------|--------|--------|--------|--------|--------|--------|--------|---------|
|  |                  |           | f (mm/rev)             | ap (mm)  | AC150P | AC200P | AC250P | AC350P | AP301M | AC150K | ACK15A | AW100K | APT100S |
| Semifinishing<br> | CCMT 060204E-KC2 | 0.4       | 0.06-0.18              | 0.40-2.1 | ○      | ○      | ●      | ○      | ●      | ○      | ●      |        | ●       |
|  | 060208E-KC2      | 0.8       | 0.12-0.36              | 0.80-2.1 | ○      | ○      | ○      | ○      | ○      | ○      | ●      |        | ●       |
|  | 09T304E-KC2      | 0.4       | 0.06-0.18              | 0.40-3.2 | ●      | ○      | ●      | ○      | ●      | ●      | ●      |        |         |
|  | 09T308E-KC2      | 0.8       | 0.12-0.36              | 0.80-3.2 | ●      | ●      | ●      | ○      | ●      | ●      | ●      |        |         |
|  | 120404E-KC2      | 0.4       | 0.06-0.18              | 0.40-4.3 | ○      | ○      | ○      | ○      | ○      | ○      | ●      |        |         |
|  | 120408E-KC2      | 0.8       | 0.12-0.36              | 0.80-4.3 | ●      | ○      | ●      | ●      | ●      | ●      | ●      |        |         |
|  | 120412E-KC2      | 1.2       | 0.18-0.54              | 1.20-4.3 | ○      | ○      | ●      | ○      | ○      | ○      | ●      |        |         |
| Roughing<br>    | CCMW 060204E-KD5 | 0.4       | 0.10-0.22              | 0.40-3.2 |        |        |        |        |        | ○      | ○      |        |         |
|  | 09T304E-KD5      | 0.4       | 0.10-0.22              | 0.40-4.8 |        |        |        |        |        | ○      | ○      |        |         |
|  | 09T308E-KD5      | 0.8       | 0.20-0.44              | 0.80-4.8 |        |        |        |        |        | ○      | ●      |        |         |
|  | 120404E-KD5      | 0.4       | 0.10-0.22              | 0.40-6.4 |        |        |        |        |        | ○      | ○      |        |         |
|  | 120408E-KD5      | 0.8       | 0.20-0.44              | 0.80-6.4 |        |        |        |        |        | ○      | ●      |        |         |
| 120412E-KD5  | 1.2              | 0.30-0.66 | 1.20-6.4               |          |        |        |        |        | ○      | ○      |        |        |         |
| Finishing<br>   | CCET 0301003FR-F | <0.03     | 0.01-0.05              | 0.1-0.3  |        |        |        |        | ○      |        |        |        |         |
|  | 0301003FL-F      | <0.03     | 0.01-0.05              | 0.1-0.3  |        |        |        |        | ○      |        |        |        |         |
|  | 030101FR-F       | <0.1      | 0.01-0.05              | 0.1-0.3  |        |        |        |        | ○      |        |        |        |         |
|  | 030101FL-F       | <0.1      | 0.01-0.05              | 0.1-0.3  |        |        |        |        | ○      |        |        |        |         |
|  | 030102FR-F       | <0.2      | 0.01-0.05              | 0.1-0.3  |        |        |        |        | ○      |        |        |        |         |
|  | 030102FL-F       | <0.2      | 0.01-0.05              | 0.1-0.3  |        |        |        |        | ○      |        |        |        |         |
|  | 030104FR-F       | <0.4      | 0.01-0.05              | 0.1-0.3  |        |        |        |        | ○      |        |        |        |         |
|  | 030104FL-F       | <0.4      | 0.01-0.05              | 0.1-0.3  |        |        |        |        | ○      |        |        |        |         |
|  | CCET 0401003FR-F | <0.03     | 0.01-0.06              | 0.1-0.4  |        |        |        |        | ○      |        |        |        |         |
|  | 0401003FL-F      | <0.03     | 0.01-0.06              | 0.1-0.4  |        |        |        |        | ○      |        |        |        |         |
|  | 040101FR-F       | <0.1      | 0.01-0.06              | 0.1-0.4  |        |        |        |        | ○      |        |        |        |         |
|  | 040101FL-F       | <0.1      | 0.01-0.06              | 0.1-0.4  |        |        |        |        | ○      |        |        |        |         |
|  | 040102FR-F       | <0.2      | 0.01-0.06              | 0.1-0.4  |        |        |        |        | ○      |        |        |        |         |
|  | 040102FL-F       | <0.2      | 0.01-0.06              | 0.1-0.4  |        |        |        |        | ○      |        |        |        |         |
|  | 040104FR-F       | <0.4      | 0.01-0.06              | 0.1-0.4  |        |        |        |        | ○      |        |        |        |         |
| 040104FL-F   | <0.4             | 0.01-0.06 | 0.1-0.4                |          |        |        |        | ○      |        |        |        |        |         |

Marked: ● Stock available ○ Non-stocked standard

**Positive 80° (C) Rhombic Inserts**



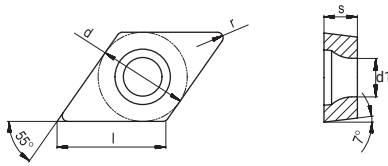
| Dimensions (mm) |      |      |      |     |
|-----------------|------|------|------|-----|
| Type            | d    | l    | s    | d1  |
| CC_0602_        | 6.35 | 6.45 | 2.38 | 2.8 |
| CC_09T3_        | 9.52 | 9.67 | 3.97 | 4.4 |

| Inserts<br>Left-hand shown where it's applicable | Type  | r (mm)  | Recommended parameters  |           | Grades    |         |        |        |        |        |        |        |        |  |  |  |
|--|---|---|-------------------------|-----------|-----------|---------|--------|--------|--------|--------|--------|--------|--------|--|--|--|
|  |   |   | f (mm/rev)              | ap (mm)   | AC150P    | AC200P  | AC250P | AC350P | AP301M | AC150K | ACK15A | AW100K | AP100S |  |  |  |
| Low feed   |  | <b>CCET 0602003FR-M</b>   | <0.03                   | 0.02-0.10 | 0.5-2.5   |         |        |        |        | ○      |        |        |        |  |  |  |
|  |   | <b>0602003FL-M</b>  | <0.03                   | 0.02-0.10 | 0.5-2.5   |         |        |        |        | ○      |        |        |        |  |  |  |
|  |   | <b>060201FR-M</b>   | <0.1                    | 0.02-0.10 | 0.5-2.5   |         |        |        |        | ○      |        |        |        |  |  |  |
|  |   | <b>060201FL-M</b>   | <0.1                    | 0.02-0.10 | 0.5-2.5   |         |        |        |        | ○      |        |        |        |  |  |  |
|  |   | <b>060202FR-M</b>   | <0.2                    | 0.02-0.10 | 0.5-2.5   |         |        |        |        | ○      |        |        |        |  |  |  |
|  |   | <b>060202FL-M</b>   | <0.2                    | 0.02-0.10 | 0.5-2.5   |         |        |        |        | ○      |        |        |        |  |  |  |
|  |   | <b>060204FR-M</b>   | <0.4                    | 0.01-0.10 | 0.5-2.5   |         |        |        |        | ○      |        |        |        |  |  |  |
|  |   | <b>060204FL-M</b>   | <0.4                    | 0.01-0.10 | 0.5-2.5   |         |        |        |        | ○      |        |        |        |  |  |  |
|  |   |  | <b>CCET 09T3003FR-M</b> | <0.03     | 0.02-0.10 | 0.5-4.0 |        |        |        |        | ●      |        |        |  |  |  |
|  |   | <b>09T3003FL-M</b>  | <0.03                   | 0.02-0.10 | 0.5-4.0   |         |        |        |        | ●      |        |        |        |  |  |  |
|  |   | <b>09T301FR-M</b>   | <0.1                    | 0.02-0.10 | 0.5-4.0   |         |        |        |        | ●      |        |        |        |  |  |  |
|  |   | <b>09T301FL-M</b>   | <0.1                    | 0.02-0.10 | 0.5-4.0   |         |        |        |        | ●      |        |        |        |  |  |  |
|  |   | <b>09T302FR-M</b>   | <0.2                    | 0.02-0.10 | 0.5-4.0   |         |        |        |        | ●      |        |        |        |  |  |  |
|  |   | <b>09T302FL-M</b>   | <0.2                    | 0.02-0.10 | 0.5-4.0   |         |        |        |        | ●      |        |        |        |  |  |  |
|  | <b>09T304FR-M</b>   | <0.4  | 0.02-0.10               | 0.5-4.0   |           |         |        |        | ●      |        |        |        |        |  |  |  |
|  | <b>09T304FL-M</b>   | <0.4  | 0.02-0.10               | 0.5-4.0   |           |         |        |        | ●      |        |        |        |        |  |  |  |

Marked: ● Stock available ○ Non-stocked standard

Turning inserts

Positive 55° (D) Rhombic Inserts

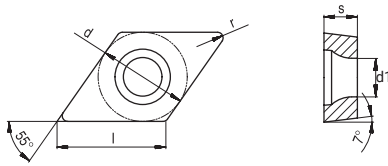


| Dimensions (mm) |      |       |      |     |
|-----------------|------|-------|------|-----|
| Type            | d    | l     | s    | d1  |
| DC_0702_        | 6.35 | 7.75  | 2.38 | 2.8 |
| DC_11T3_        | 9.52 | 11.62 | 3.97 | 4.4 |

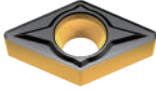
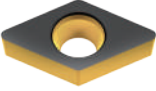

| Inserts       | Type | r (mm)           | Recommended parameters |           | Grades   |        |        |        |        |        |        |        |        |   |   |
|---------------|------|------------------|------------------------|-----------|----------|--------|--------|--------|--------|--------|--------|--------|--------|---|---|
|               |      |                  | f (mm/rev)             | ap (mm)   | AC150P   | AC200P | AC250P | AC350P | AP301M | AC150K | ACK15A | AW100K | AP100S |   |   |
| Finishing     |      | DCGT 070201E-UF  | 0.1                    | 0.02-0.15 | 0.10-1.4 |        |        |        |        | ●      |        |        |        |   | ○ |
|               |      | 070202E-UF       | 0.2                    | 0.02-0.15 | 0.10-1.4 |        |        |        |        | ●      |        |        |        |   | ○ |
|               |      | 070204E-UF       | 0.4                    | 0.03-0.20 | 0.10-1.4 |        |        |        |        | ●      |        |        |        |   | ○ |
|               |      | 11T301E-UF       | 0.1                    | 0.02-0.15 | 0.10-2.4 |        |        |        |        | ●      |        |        |        |   | ● |
|               |      | 11T302E-UF       | 0.2                    | 0.02-0.15 | 0.10-2.4 |        |        |        |        | ●      |        |        |        |   | ● |
|               |      | 11T304E-UF       | 0.4                    | 0.03-0.20 | 0.10-2.4 |        |        |        |        | ●      |        |        |        |   | ● |
|               |      | DCGT 070201F-UF  | 0.1                    | 0.02-0.15 | 0.10-1.4 |        |        |        |        | ●      |        |        |        |   |   |
|               |      | 070202F-UF       | 0.2                    | 0.02-0.15 | 0.10-1.4 |        |        |        |        | ●      |        |        |        |   |   |
|               |      | 070204F-UF       | 0.4                    | 0.03-0.20 | 0.10-1.4 |        |        |        |        | ●      |        |        |        |   |   |
|               |      | 11T301F-UF       | 0.1                    | 0.02-0.15 | 0.10-2.4 |        |        |        |        | ●      |        |        |        |   |   |
|               |      | 11T302F-UF       | 0.2                    | 0.02-0.15 | 0.10-2.4 |        |        |        |        | ●      |        |        |        |   |   |
|               |      | 11T304F-UF       | 0.4                    | 0.03-0.20 | 0.10-2.4 |        |        |        |        | ●      |        |        |        |   |   |
| Semifinishing |      | DCGT 070202F-NC2 | 0.2                    | 0.02-0.10 | 0.16-3.5 |        |        |        |        |        |        |        |        | ○ |   |
|               |      | 070204F-NC2      | 0.4                    | 0.05-0.20 | 0.32-3.5 |        |        |        |        |        |        |        |        | ○ |   |
|               |      | 11T302F-NC2      | 0.2                    | 0.02-0.10 | 0.16-5.2 |        |        |        |        |        |        |        | ●      |   |   |
|               |      | 11T304F-NC2      | 0.4                    | 0.05-0.20 | 0.32-5.2 |        |        |        |        |        |        |        | ●      |   |   |
|               |      | 11T308F-NC2      | 0.8                    | 0.10-0.40 | 0.64-5.2 |        |        |        |        |        |        |        | ○      |   |   |
| Finishing     |      | DCMT 070202E-PB1 | 0.2                    | 0.02-0.07 | 0.15-1.5 | ○      | ○      | ○      |        | ○      |        |        |        |   |   |
|               |      | 070204E-PB1      | 0.4                    | 0.04-0.14 | 0.30-1.5 | ●      | ○      | ●      |        | ●      |        |        |        |   |   |
|               |      | 11T302E-PB1      | 0.2                    | 0.02-0.07 | 0.15-2.3 | ●      | ○      | ●      |        | ●      |        |        |        |   |   |
|               |      | 11T304E-PB1      | 0.4                    | 0.04-0.14 | 0.30-2.3 | ●      | ○      | ●      |        | ●      |        |        |        |   |   |
|               |      | 11T308E-PB1      | 0.8                    | 0.09-0.28 | 0.60-2.3 | ●      | ○      | ●      |        | ○      |        |        |        |   |   |
| Semifinishing |      | DCMT 070204E-PC2 | 0.4                    | 0.05-0.16 | 0.35-2.1 | ○      | ○      | ●      |        | ●      |        |        |        |   | ● |
|               |      | 070208E-PC2      | 0.8                    | 0.10-0.32 | 0.70-2.1 | ●      | ○      | ●      |        | ●      |        |        |        |   | ○ |
|               |      | 11T304E-PC2      | 0.4                    | 0.05-0.16 | 0.35-3.1 | ●      | ○      | ●      |        | ●      |        |        |        |   | ● |
|               |      | 11T308E-PC2      | 0.8                    | 0.10-0.32 | 0.70-3.1 | ●      | ●      | ●      |        | ●      |        |        |        |   | ● |
|               |      | 11T312E-PC2      | 1.2                    | 0.16-0.48 | 1.05-3.1 | ○      | ○      | ○      |        | ○      |        |        |        |   | ● |

Marked: ● Stock available ○ Non-stocked standard

**Positive 55° (D) Rhombic Inserts**



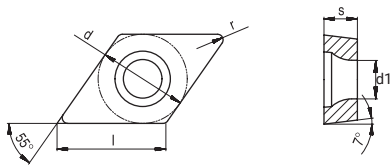
| Dimensions (mm) |      |       |      |     |
|-----------------|------|-------|------|-----|
| Type            | d    | l     | s    | d1  |
| DC_0702_        | 6.35 | 7.75  | 2.38 | 2.8 |
| DC_11T3_        | 9.52 | 11.62 | 3.97 | 4.4 |

| Inserts<br>Left-hand shown where it's applicable   | Type             | r (mm)    | Recommended parameters |          | Grades |        |        |        |        |        |        |        |        |
|--|------------------|-----------|------------------------|----------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
|  |                  |           | f (mm/rev)             | ap (mm)  | AC150P | AC200P | AC250P | AC350P | AP301M | AC150K | ACK15A | AW100K | AP100S |
| Semifinishing<br> | DCMT 070204E-KC2 | 0.4       | 0.06-0.18              | 0.40-2.3 | ○      | ○      | ○      |        |        | ○      | ●      |        |        |
|  | 070208E-KC2      | 0.8       | 0.12-0.36              | 0.80-2.3 | ○      | ○      | ○      |        |        | ○      | ●      |        |        |
|  | 11T304E-KC2      | 0.4       | 0.06-0.18              | 0.40-3.5 | ●      | ○      | ●      |        |        | ●      | ●      |        |        |
|  | 11T308E-KC2      | 0.8       | 0.12-0.36              | 0.80-3.5 | ●      | ○      | ●      | ○      |        | ●      | ●      |        |        |
|  | 11T312E-KC2      | 1.2       | 0.18-0.54              | 1.20-3.5 | ○      | ○      | ○      |        |        | ○      | ○      |        |        |
| Roughing<br>     | DCMW 070204E-KD5 | 0.4       | 0.06-0.18              | 0.40-3.9 |        |        |        |        |        | ○      | ○      |        |        |
|  | 070208E-KD5      | 0.8       | 0.12-0.36              | 0.80-3.9 |        |        |        |        |        | ○      | ○      |        |        |
|  | 11T304E-KD5      | 0.4       | 0.06-0.18              | 0.40-5.8 |        |        |        |        |        | ○      | ○      |        |        |
|  | 11T308E-KD5      | 0.8       | 0.12-0.36              | 0.80-5.8 |        |        |        |        |        | ○      | ○      |        |        |
| Finishing<br>   | DCET 0702003FR-F | <0.03     | 0.02-0.18              | 0.1-0.4  |        |        |        |        | ○      |        |        |        |        |
|  | 0702003FL-F      | <0.03     | 0.02-0.18              | 0.1-0.4  |        |        |        |        | ○      |        |        |        |        |
|  | 070201FR-F       | <0.1      | 0.02-0.18              | 0.1-0.4  |        |        |        |        | ○      |        |        |        |        |
|  | 070201FL-F       | <0.1      | 0.02-0.18              | 0.1-0.4  |        |        |        |        | ○      |        |        |        |        |
|  | 070202FR-F       | <0.2      | 0.02-0.18              | 0.1-0.4  |        |        |        |        | ○      |        |        |        |        |
|  | 070202FL-F       | <0.2      | 0.02-0.18              | 0.1-0.4  |        |        |        |        | ○      |        |        |        |        |
|  | 070204FR-F       | <0.4      | 0.02-0.18              | 0.1-0.4  |        |        |        |        | ○      |        |        |        |        |
|  | 070204FL-F       | <0.4      | 0.02-0.18              | 0.1-0.4  |        |        |        |        | ○      |        |        |        |        |
|  | DCET 11T3003FR-F | <0.03     | 0.02-0.20              | 0.1-0.4  |        |        |        |        | ●      |        |        |        |        |
|  | 11T3003FL-F      | <0.03     | 0.02-0.20              | 0.1-0.4  |        |        |        |        | ●      |        |        |        |        |
|  | 11T301FR-F       | <0.1      | 0.02-0.20              | 0.1-0.4  |        |        |        |        | ●      |        |        |        |        |
|  | 11T301FL-F       | <0.1      | 0.02-0.20              | 0.1-0.4  |        |        |        |        | ●      |        |        |        |        |
|  | 11T302FR-F       | <0.2      | 0.02-0.20              | 0.1-0.4  |        |        |        |        | ●      |        |        |        |        |
|  | 11T302FL-F       | <0.2      | 0.02-0.20              | 0.1-0.4  |        |        |        |        | ●      |        |        |        |        |
|  | 11T304FR-F       | <0.4      | 0.02-0.20              | 0.1-0.4  |        |        |        |        | ●      |        |        |        |        |
| 11T304FL-F   | <0.4             | 0.02-0.20 | 0.1-0.4                |          |        |        |        | ●      |        |        |        |        |        |

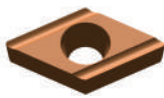
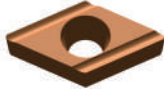
Marked: ● Stock available ○ Non-stocked standard

Turning inserts

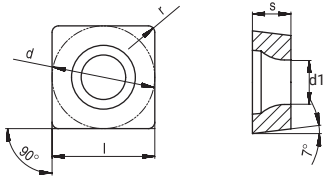
Positive 55° (D) Rhombic Inserts



| Dimensions (mm) |      |       |      |     |
|-----------------|------|-------|------|-----|
| Type            | d    | l     | s    | d1  |
| DC_0702_        | 6.35 | 7.75  | 2.38 | 2.8 |
| DC_11T3_        | 9.52 | 11.62 | 3.97 | 4.4 |

| Inserts<br>Left-hand shown where it's applicable                                    | Type             | r (mm) | Recommended parameters |         | Grades |        |        |        |        |        |        |        |        |  |  |
|---|------------------|--------|------------------------|---------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--|--|
|   |                  |        | f (mm/rev)             | ap (mm) | AC150P | AC200P | AC250P | AC350P | AP301M | AC150K | ACK15A | AW100K | AP100S |  |  |
|    | DCET 0702003FR-M | <0.03  | 0.01-0.08              | 0.5-2.8 |        |        |        |        | ○      |        |        |        |        |  |  |
|   | 0702003FL-M      | <0.03  | 0.01-0.08              | 0.5-2.8 |        |        |        |        | ○      |        |        |        |        |  |  |
|   | 070201FR-M       | <0.1   | 0.01-0.08              | 0.5-2.8 |        |        |        |        | ○      |        |        |        |        |  |  |
|   | 070201FL-M       | <0.1   | 0.01-0.08              | 0.5-2.8 |        |        |        |        | ○      |        |        |        |        |  |  |
|   | 070202FR-M       | <0.2   | 0.01-0.08              | 0.5-2.8 |        |        |        |        | ○      |        |        |        |        |  |  |
|   | 070202FL-M       | <0.2   | 0.01-0.08              | 0.5-2.8 |        |        |        |        | ○      |        |        |        |        |  |  |
|   | 070204FR-M       | <0.4   | 0.01-0.08              | 0.5-2.8 |        |        |        |        | ○      |        |        |        |        |  |  |
|   | 070204FL-M       | <0.4   | 0.01-0.08              | 0.5-2.8 |        |        |        |        | ○      |        |        |        |        |  |  |
|  | DCET 11T3003FR-M | <0.03  | 0.01-0.10              | 0.5-4.0 |        |        |        |        | ●      |        |        |        |        |  |  |
|   | 11T3003FL-M      | <0.03  | 0.01-0.10              | 0.5-4.0 |        |        |        |        | ●      |        |        |        |        |  |  |
|   | 11T301FR-M       | <0.1   | 0.01-0.10              | 0.5-4.0 |        |        |        |        | ●      |        |        |        |        |  |  |
|   | 11T301FL-M       | <0.1   | 0.01-0.10              | 0.5-4.0 |        |        |        |        | ●      |        |        |        |        |  |  |
|   | 11T302FR-M       | <0.2   | 0.01-0.10              | 0.5-4.0 |        |        |        |        | ●      |        |        |        |        |  |  |
|   | 11T302FL-M       | <0.2   | 0.01-0.10              | 0.5-4.0 |        |        |        |        | ●      |        |        |        |        |  |  |
|   | 11T304FR-M       | <0.4   | 0.01-0.10              | 0.5-4.0 |        |        |        |        | ●      |        |        |        |        |  |  |
|   | 11T304FL-M       | <0.4   | 0.01-0.10              | 0.5-4.0 |        |        |        |        | ●      |        |        |        |        |  |  |

### Positive 90° (S) Square Inserts

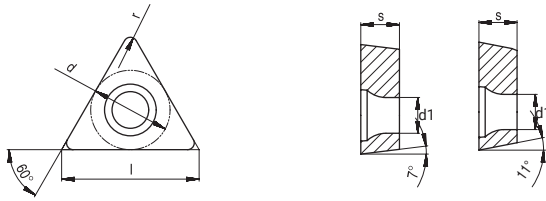


| Dimensions (mm) |      |      |      |     |
|-----------------|------|------|------|-----|
| Type            | d    | l    | s    | d1  |
| SC_09T3_        | 9.52 | 9.52 | 3.97 | 4.4 |
| SC_1204_        | 12.7 | 12.7 | 4.76 | 5.5 |
| SC_3809_        | 38.1 | 38.1 | 9.52 | 9.8 |

| Inserts       | Type             | r (mm) | Recommended parameters |          | Grades |        |        |        |        |        |        |        |        |   |   |
|---------------|------------------|--------|------------------------|----------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---|---|
|               |                  |        | f (mm/rev)             | ap (mm)  | AC150P | AC200P | AC250P | AC350P | AP301M | AC150K | ACK15A | AW100K | AP100S |   |   |
| Finishing     | SCMT 09T304E-PB1 | 0.4    | 0.04-0.14              | 0.30-2.4 | ●      | ○      | ○      |        | ○      |        |        |        |        |   |   |
|               | 09T308E-PB1      | 0.8    | 0.09-0.28              | 0.60-2.4 | ○      | ○      | ○      |        | ●      |        |        |        |        |   |   |
|               | 120404E-PB1      | 0.4    | 0.04-0.14              | 0.30-3.2 | ○      | ○      | ○      |        | ○      |        |        |        |        |   |   |
| Semifinishing | SCMT 09T304E-PC2 | 0.4    | 0.05-0.16              | 0.35-2.9 | ●      | ○      | ●      |        | ●      |        |        |        |        |   | ● |
|               | 09T308E-PC2      | 0.8    | 0.10-0.32              | 0.70-2.9 | ○      | ○      | ●      |        | ○      |        |        |        |        |   | ○ |
|               | 120404E-PC2      | 0.4    | 0.05-0.16              | 0.35-3.8 | ○      | ○      | ●      |        | ●      |        |        |        |        |   | ○ |
|               | 120408E-PC2      | 0.8    | 0.10-0.32              | 0.70-3.8 | ●      | ○      | ○      |        | ●      |        |        |        |        |   | ○ |
|               | 120412E-PC2      | 1.2    | 0.16-0.48              | 1.05-3.8 | ○      | ○      | ○      |        | ○      |        |        |        |        |   | ○ |
|               | SCGT 09T308F-NC2 | 0.8    | 0.10-0.40              | 0.64-4.3 |        |        |        |        |        |        |        |        |        | ○ |   |
|               | SCMT 09T304E-KC2 | 0.4    | 0.06-0.18              | 0.40-3.1 | ○      | ○      | ○      | ○      |        | ○      | ●      |        |        |   |   |
|               | 09T308E-KC2      | 0.8    | 0.12-0.36              | 0.80-3.1 | ●      | ○      | ●      | ○      |        | ○      | ●      |        |        |   |   |
|               | 120404E-KC2      | 0.4    | 0.06-0.18              | 0.40-4.2 | ○      | ○      | ○      | ○      |        | ○      | ○      |        |        |   |   |
|               | 120412E-KC2      | 1.2    | 0.18-0.54              | 1.20-4.2 | ○      | ○      | ○      | ○      |        | ○      | ●      |        |        |   |   |
| Roughing      | SCMW 09T304E-KD5 | 0.4    | 0.10-0.22              | 0.40-4.8 |        |        |        |        |        | ○      | ○      |        |        |   |   |
|               | 09T308E-KD5      | 0.8    | 0.20-0.44              | 0.80-4.8 |        |        |        |        |        | ○      | ○      |        |        |   |   |
|               | 120404E-KD5      | 0.4    | 0.10-0.22              | 0.40-6.4 |        |        |        |        |        | ○      | ○      |        |        |   |   |
|               | 120408E-KD5      | 0.8    | 0.20-0.44              | 0.80-6.4 |        |        |        |        |        | ○      | ○      |        |        |   |   |
|               | SCMT 380932-HT   | 3.2    | 0.70-1.40              | 4.0-18.0 |        |        |        | ○      |        |        |        |        |        |   |   |

Marked: ● Stock available ○ Non-stocked standard

Positive 60° (T) Triangle Inserts

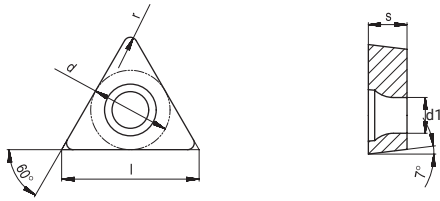


| Dimensions (mm) |      |      |      |     |
|-----------------|------|------|------|-----|
| Type            | d    | l    | s    | d1  |
| TCMT_0902_      | 5.56 | 9.63 | 2.38 | 2.5 |
| TC_1102_        | 6.35 | 11.0 | 2.38 | 2.8 |
| TC_16T3_        | 9.52 | 16.5 | 3.97 | 4.4 |
| TPMT_0902_      | 5.56 | 9.63 | 2.38 | 2.5 |
| TPMT_1103_      | 6.35 | 11.0 | 3.18 | 3.4 |

| Inserts       | Type             | r (mm)           | Recommended parameters |           | Grades   |        |        |        |        |        |        |        |         |   |
|---------------|------------------|------------------|------------------------|-----------|----------|--------|--------|--------|--------|--------|--------|--------|---------|---|
|               |                  |                  | f (mm/rev)             | ap (mm)   | AC150P   | AC200P | AC250P | AC350P | AP301M | AC150K | ACK15A | AW100K | APT100S |   |
| Finishing     |                  | TCGT 110201E-UF  | 0.1                    | 0.02-0.15 | 0.10-2.4 |        |        |        |        | ○      |        |        |         | ○ |
|               |                  | 110202E-UF       | 0.2                    | 0.02-0.15 | 0.20-2.4 |        |        |        |        | ○      |        |        |         | ○ |
|               |                  | 110204E-UF       | 0.4                    | 0.03-0.20 | 0.20-2.4 |        |        |        |        | ●      |        |        |         | ○ |
|               |                  | 16T304E-UF       | 0.4                    | 0.03-0.20 | 0.20-2.4 |        |        |        |        | ○      |        |        |         | ○ |
|               |                  | TCGT 110201F-UF  | 0.1                    | 0.02-0.15 | 0.10-2.4 |        |        |        |        | ●      |        |        |         |   |
|               |                  | 110202F-UF       | 0.2                    | 0.02-0.15 | 0.20-2.4 |        |        |        |        | ●      |        |        |         |   |
|               |                  | 110204F-UF       | 0.4                    | 0.03-0.20 | 0.20-2.4 |        |        |        |        | ●      |        |        |         |   |
|               |                  | 16T304F-UF       | 0.4                    | 0.03-0.20 | 0.20-2.4 |        |        |        |        | ●      |        |        |         |   |
|               |                  | TCMT 090204E-PB1 | 0.4                    | 0.04-0.14 | 0.30-1.9 | ○      | ○      | ○      |        | ○      |        |        |         |   |
|               |                  | 110202E-PB1      | 0.2                    | 0.02-0.07 | 0.15-2.2 | ●      | ○      | ○      |        | ○      |        |        |         |   |
|               |                  | 110204E-PB1      | 0.4                    | 0.04-0.14 | 0.30-2.2 | ○      | ○      | ○      |        | ○      |        |        |         |   |
|               |                  | 110208E-PB1      | 0.8                    | 0.09-0.28 | 0.60-2.2 | ○      | ○      | ○      |        | ○      |        |        |         |   |
| 16T304E-PB1   |                  | 0.4              | 0.04-0.14              | 0.30-3.3  | ●        | ○      | ○      |        | ○      |        |        |        |         |   |
| 16T308E-PB1   |                  | 0.8              | 0.09-0.28              | 0.60-3.3  | ○        | ○      | ○      |        | ○      |        |        |        |         |   |
| Semifinishing |                  | TCMT 090204E-PC2 | 0.4                    | 0.05-0.16 | 0.35-2.6 | ○      | ○      | ●      |        | ●      |        |        |         | ○ |
|               |                  | 090208E-PC2      | 0.8                    | 0.10-0.32 | 0.70-2.6 | ○      | ○      | ○      |        | ○      |        |        |         | ○ |
|               |                  | 110204E-PC2      | 0.4                    | 0.05-0.16 | 0.35-3.0 | ○      | ○      | ●      |        | ●      |        |        |         | ● |
|               |                  | 110208E-PC2      | 0.8                    | 0.10-0.32 | 0.70-3.0 | ○      | ○      | ●      |        | ●      |        |        |         | ● |
|               |                  | 16T304E-PC2      | 0.4                    | 0.05-0.16 | 0.35-4.5 | ●      | ○      | ●      |        | ○      |        |        |         | ○ |
|               |                  | 16T308E-PC2      | 0.8                    | 0.10-0.32 | 0.70-4.5 | ●      | ○      | ●      |        | ●      |        |        |         | ○ |
|               |                  | 16T312E-PC2      | 1.2                    | 0.16-0.48 | 1.05-4.5 | ○      | ○      | ○      |        | ○      |        |        |         | ○ |
|               |                  | TPMT 090204E-PC2 | 0.4                    | 0.05-0.16 | 0.35-2.6 | ○      | ○      | ○      |        | ●      |        |        |         | ○ |
|               |                  | 090208E-PC2      | 0.8                    | 0.10-0.32 | 0.70-2.6 | ○      | ○      | ○      |        | ●      |        |        |         | ○ |
|               |                  | 110304E-PC2      | 0.4                    | 0.05-0.16 | 0.35-3.0 | ●      | ○      | ●      |        | ●      |        |        |         | ○ |
|               |                  | 110308E-PC2      | 0.8                    | 0.10-0.32 | 0.70-3.0 | ○      | ○      | ○      |        | ●      |        |        |         | ○ |
|               |                  |                  |                        |           |          |        |        |        |        |        |        |        |         |   |
|               | TCGT 110204F-NC2 | 0.4              | 0.05-0.20              | 0.32-4.9  |          |        |        |        |        |        |        |        | ○       |   |
|               | 16T304F-NC2      | 0.4              | 0.05-0.20              | 0.32-7.4  |          |        |        |        |        |        |        |        | ○       |   |
|               | 16T308F-NC2      | 0.8              | 0.10-0.40              | 0.64-7.4  |          |        |        |        |        |        |        |        | ○       |   |

Marked: ● Stock available ○ Non-stocked standard

Positive 60° (T) Triangle Inserts



| Dimensions (mm) |      |      |      |     |
|-----------------|------|------|------|-----|
| Type            | d    | l    | s    | d1  |
| TC_0902_        | 5.56 | 9.63 | 2.38 | 2.5 |
| TC_1102_        | 6.35 | 11.0 | 2.38 | 2.8 |
| TC_16T3_        | 9.52 | 16.5 | 3.97 | 4.4 |

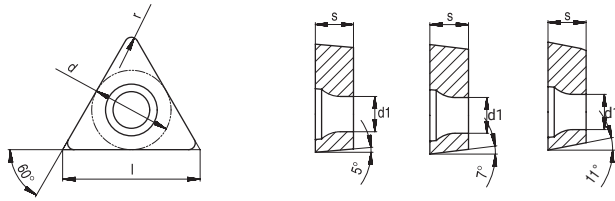
| Inserts       | Type | r (mm)           | Recommended parameters |           | Grades   |        |        |        |        |        |        |        |        |  |
|---------------|------|------------------|------------------------|-----------|----------|--------|--------|--------|--------|--------|--------|--------|--------|--|
|               |      |                  | f (mm/rev)             | ap (mm)   | AC150P   | AC200P | AC250P | AC350P | AP301M | AC150K | ACK15A | AW100K | AP100S |  |
| Semifinishing |      | TCMT 090204E-KC2 | 0.4                    | 0.06-0.18 | 0.40-2.9 | ○      | ○      | ○      |        |        | ○      | ●      |        |  |
|               |      | 090208E-KC2      | 0.8                    | 0.12-0.36 | 0.80-2.9 | ○      | ○      | ○      |        |        | ○      | ●      |        |  |
|               |      | 110204E-KC2      | 0.4                    | 0.06-0.18 | 0.40-3.3 | ○      | ○      | ●      |        |        | ○      | ●      |        |  |
|               |      | 110208E-KC2      | 0.8                    | 0.12-0.36 | 0.80-3.3 | ○      | ○      | ○      |        |        | ○      | ●      |        |  |
|               |      | 16T304E-KC2      | 0.4                    | 0.06-0.18 | 0.40-4.9 | ○      | ○      | ●      |        |        | ○      | ●      |        |  |
|               |      | 16T308E-KC2      | 0.8                    | 0.12-0.36 | 0.80-4.9 | ○      | ○      | ○      |        |        | ●      | ●      |        |  |
|               |      | 16T312E-KC2      | 1.2                    | 0.18-0.54 | 1.20-4.9 | ○      | ○      | ○      |        |        | ○      | ●      |        |  |
| Roughing      |      | TCMW 110204E-KD5 | 0.4                    | 0.06-0.18 | 0.40-5.5 |        |        |        |        |        | ○      | ○      |        |  |
|               |      | 110208E-KD5      | 0.8                    | 0.12-0.36 | 0.80-5.5 |        |        |        |        |        | ○      | ○      |        |  |
|               |      | 16T304E-KD5      | 0.4                    | 0.06-0.18 | 0.40-8.2 |        |        |        |        |        | ○      | ○      |        |  |
|               |      | 16T308E-KD5      | 0.8                    | 0.12-0.36 | 0.80-8.2 |        |        |        |        |        | ○      | ○      |        |  |

Marked: ● Stock available ○ Non-stocked standard

Turning inserts



Positive 60° (T) Triangle Inserts

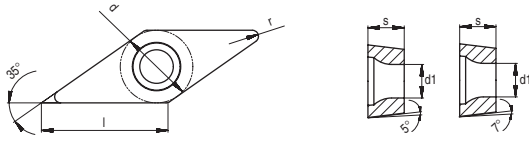


| Dimensions (mm) |      |      |      |     |
|-----------------|------|------|------|-----|
| Type            | d    | l    | s    | d1  |
| TBET_0601_      | 3.97 | 6.88 | 1.59 | 2.3 |
| TPEH_0802_      | 4.76 | 8.24 | 2.38 | 2.3 |
| TCET_0802_      | 4.76 | 8.24 | 2.38 | 2.3 |
| TPEH_0902_      | 5.56 | 9.63 | 2.38 | 3.0 |
| TPEH_1103_      | 6.35 | 11.0 | 3.18 | 3.3 |
| TCET_1103_      | 6.35 | 11.0 | 3.18 | 3.3 |

| Inserts<br>Left-hand shown where it's applicable | Type       | r (mm)           | Recommended parameters |           | Grades  |        |        |        |        |        |        |        |         |  |
|--|------------|------------------|------------------------|-----------|---------|--------|--------|--------|--------|--------|--------|--------|---------|--|
|  |            |                  | f (mm/rev)             | ap (mm)   | AC150P  | AC200P | AC250P | AC350P | AP301M | AC150K | ACK15A | AW100K | APT100S |  |
| Finishing  |            | TBET 0601003FR-F | <0.03                  | 0.03-0.08 | 0.1-0.5 |        |        |        |        | ○      |        |        |         |  |
|  |            | 0601003FL-F      | <0.03                  | 0.03-0.08 | 0.1-0.5 |        |        |        |        | ○      |        |        |         |  |
|  |            | 060101FR-F       | <0.1                   | 0.03-0.08 | 0.1-0.5 |        |        |        |        | ○      |        |        |         |  |
|  |            | 060101FL-F       | <0.1                   | 0.03-0.08 | 0.1-0.5 |        |        |        |        | ○      |        |        |         |  |
|  |            | 060102FR-F       | <0.2                   | 0.03-0.08 | 0.1-0.5 |        |        |        |        | ○      |        |        |         |  |
|  |            | 060102FL-F       | <0.2                   | 0.03-0.08 | 0.1-0.5 |        |        |        |        | ○      |        |        |         |  |
|  |            | 060104FR-F       | <0.4                   | 0.03-0.08 | 0.1-0.5 |        |        |        |        | ○      |        |        |         |  |
|  | 060104FL-F | <0.4             | 0.03-0.08              | 0.1-0.5   |         |        |        |        | ○      |        |        |        |         |  |
|  |            | TPEH 080201FR-F  | <0.1                   | 0.01-0.10 | 0.1-0.8 |        |        |        |        | ○      |        |        |         |  |
|  |            | 080201FL-F       | <0.1                   | 0.01-0.10 | 0.1-0.8 |        |        |        |        | ○      |        |        |         |  |
|  |            | 080202FR-F       | <0.2                   | 0.01-0.10 | 0.1-0.8 |        |        |        |        | ○      |        |        |         |  |
|  |            | 080202FL-F       | <0.2                   | 0.01-0.10 | 0.1-0.8 |        |        |        |        | ○      |        |        |         |  |
|  |            | 080204FR-F       | <0.4                   | 0.01-0.10 | 0.1-0.8 |        |        |        |        | ○      |        |        |         |  |
|  | 080204FL-F | <0.4             | 0.01-0.10              | 0.1-0.8   |         |        |        |        | ○      |        |        |        |         |  |
|  |            | TPEH 090201FR-F  | <0.1                   | 0.01-0.10 | 0.1-0.8 |        |        |        |        | ○      |        |        |         |  |
|  |            | 090201FL-F       | <0.1                   | 0.01-0.10 | 0.1-0.8 |        |        |        |        | ○      |        |        |         |  |
|  |            | 090202FR-F       | <0.2                   | 0.01-0.10 | 0.1-0.8 |        |        |        |        | ○      |        |        |         |  |
|  |            | 090202FL-F       | <0.2                   | 0.01-0.10 | 0.1-0.8 |        |        |        |        | ○      |        |        |         |  |
|  |            | 090204FR-F       | <0.4                   | 0.01-0.10 | 0.1-0.8 |        |        |        |        | ○      |        |        |         |  |
|  | 090204FL-F | <0.4             | 0.01-0.10              | 0.1-0.8   |         |        |        |        | ○      |        |        |        |         |  |
|  |            | TPEH 110302FR-F  | <0.2                   | 0.01-0.12 | 0.2-0.8 |        |        |        |        | ●      |        |        |         |  |
| 110302FL-F                                       |            | <0.2             | 0.01-0.12              | 0.2-0.8   |         |        |        |        | ●      |        |        |        |         |  |
| 110304FR-F                                       |            | <0.4             | 0.01-0.12              | 0.2-0.8   |         |        |        |        | ●      |        |        |        |         |  |
| 110304FL-F                                       |            | <0.4             | 0.01-0.12              | 0.2-0.8   |         |        |        |        | ●      |        |        |        |         |  |
| 110308FR-F                                       |            | <0.8             | 0.01-0.12              | 0.2-0.8   |         |        |        |        | ●      |        |        |        |         |  |
| 110308FL-F                                       |            | <0.8             | 0.01-0.12              | 0.2-0.8   |         |        |        |        | ●      |        |        |        |         |  |
| Low feed   |            | TCET 0802003FR-M | <0.03                  | 0.01-0.08 | 0.5-2.5 |        |        |        |        | ○      |        |        |         |  |
|  |            | 0802003FL-M      | <0.03                  | 0.01-0.08 | 0.5-2.5 |        |        |        |        | ○      |        |        |         |  |
|  |            | 080201FR-M       | <0.1                   | 0.01-0.08 | 0.5-2.5 |        |        |        |        | ○      |        |        |         |  |
|  |            | 080201FL-M       | <0.1                   | 0.01-0.08 | 0.5-2.5 |        |        |        |        | ○      |        |        |         |  |
|  |            | 080202FR-M       | <0.2                   | 0.01-0.08 | 0.5-2.5 |        |        |        |        | ○      |        |        |         |  |
|  | 080202FL-M | <0.2             | 0.01-0.08              | 0.5-2.5   |         |        |        |        | ○      |        |        |        |         |  |
|  |            | TCET 1103003FR-M | <0.03                  | 0.02-0.10 | 0.5-4.0 |        |        |        |        | ●      |        |        |         |  |
|  |            | 1103003FL-M      | <0.03                  | 0.02-0.10 | 0.5-4.0 |        |        |        |        | ●      |        |        |         |  |
|  |            | 110301FR-M       | <0.1                   | 0.02-0.10 | 0.5-4.0 |        |        |        |        | ●      |        |        |         |  |
|  |            | 110301FL-M       | <0.1                   | 0.02-0.10 | 0.5-4.0 |        |        |        |        | ●      |        |        |         |  |
|  |            | 110302FR-M       | <0.2                   | 0.02-0.10 | 0.5-4.0 |        |        |        |        | ●      |        |        |         |  |
|  |            | 110302FL-M       | <0.2                   | 0.02-0.10 | 0.5-4.0 |        |        |        |        | ●      |        |        |         |  |
|  |            | 110304FR-M       | <0.4                   | 0.02-0.10 | 0.5-4.0 |        |        |        |        | ●      |        |        |         |  |
|  |            | 110304FL-M       | <0.4                   | 0.02-0.10 | 0.5-4.0 |        |        |        |        | ●      |        |        |         |  |

Marked: ● Stock available ○ Non-stocked standard

Positive 35° (V) Rhombic Inserts

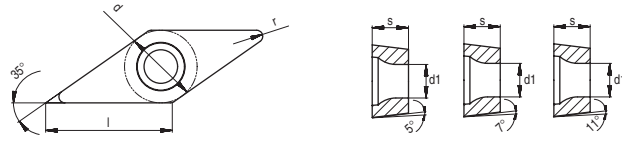


| Dimensions (mm) |      |       |      |     |
|-----------------|------|-------|------|-----|
| Type            | d    | l     | s    | d1  |
| VB_1103_        | 6.35 | 11.07 | 3.18 | 2.8 |
| VB_1604_        | 9.52 | 16.61 | 4.76 | 4.4 |
| VC_1103_        | 6.35 | 11.07 | 3.18 | 2.8 |
| VC_1604_        | 9.52 | 16.61 | 4.76 | 4.4 |

| Inserts       | Type             | r (mm)           | Recommended parameters |           | Grades   |        |        |        |        |        |        |        |         |   |
|---------------|------------------|------------------|------------------------|-----------|----------|--------|--------|--------|--------|--------|--------|--------|---------|---|
|               |                  |                  | f (mm/rev)             | ap (mm)   | AC150P   | AC200P | AC250P | AC350P | AP301M | AC150K | ACK15A | AW100K | APT100S |   |
| Finishing     |                  | VBGT 110301E-UF  | 0.1                    | 0.02-0.15 | 0.10-1.4 |        |        |        |        | ○      |        |        |         |   |
|               |                  | 110302E-UF       | 0.2                    | 0.02-0.15 | 0.20-1.4 |        |        |        |        | ●      |        |        |         | ○ |
|               |                  | 110304E-UF       | 0.4                    | 0.03-0.20 | 0.20-1.4 |        |        |        |        | ○      |        |        |         | ● |
|               |                  | 160401E-UF       | 0.1                    | 0.02-0.15 | 0.10-1.4 |        |        |        |        | ○      |        |        |         | ● |
|               |                  | 160402E-UF       | 0.2                    | 0.02-0.15 | 0.20-1.4 |        |        |        |        | ●      |        |        |         | ○ |
|               |                  | VBGT 110301F-UF  | 0.1                    | 0.02-0.15 | 0.10-1.4 |        |        |        |        | ●      |        |        |         |   |
|               |                  | 110302F-UF       | 0.2                    | 0.02-0.15 | 0.20-1.4 |        |        |        |        | ●      |        |        |         |   |
|               |                  | 110304F-UF       | 0.4                    | 0.03-0.20 | 0.20-1.4 |        |        |        |        | ●      |        |        |         |   |
|               |                  | 160401F-UF       | 0.1                    | 0.02-0.15 | 0.10-1.4 |        |        |        |        | ●      |        |        |         |   |
|               |                  | 160402F-UF       | 0.2                    | 0.02-0.15 | 0.20-1.4 |        |        |        |        | ●      |        |        |         |   |
|               |                  | VCGT 110301E-UF  | 0.1                    | 0.02-0.15 | 0.10-1.4 |        |        |        |        | ●      |        |        |         | ○ |
|               |                  | 110302E-UF       | 0.2                    | 0.02-0.15 | 0.20-1.4 |        |        |        |        | ●      |        |        |         | ● |
|               |                  | 110304E-UF       | 0.4                    | 0.03-0.20 | 0.20-1.4 |        |        |        |        | ○      |        |        |         | ○ |
|               |                  | VCGT 110301F-UF  | 0.1                    | 0.02-0.15 | 0.10-1.4 |        |        |        |        | ●      |        |        |         |   |
|               |                  | 110302F-UF       | 0.2                    | 0.02-0.15 | 0.20-1.4 |        |        |        |        | ●      |        |        |         |   |
|               |                  | 110304F-UF       | 0.4                    | 0.03-0.20 | 0.20-1.4 |        |        |        |        | ●      |        |        |         |   |
|               |                  | VBMT 110304E-PB1 | 0.4                    | 0.04-0.14 | 0.30-1.4 | ○      | ○      | ○      |        | ●      |        |        |         |   |
|               |                  | 110308E-PB1      | 0.8                    | 0.09-0.28 | 0.60-1.4 | ○      | ○      | ○      |        | ●      |        |        |         |   |
|               |                  | 160402E-PB1      | 0.2                    | 0.02-0.07 | 0.15-2.1 | ○      | ○      | ○      |        | ●      |        |        |         |   |
|               |                  | 160404E-PB1      | 0.4                    | 0.04-0.14 | 0.30-2.1 | ●      | ●      | ○      |        | ●      |        |        |         |   |
| 160408E-PB1   |                  | 0.8              | 0.09-0.28              | 0.60-2.1  | ●        | ●      | ○      |        | ○      |        |        |        |         |   |
|               | VCMT 160404E-PB1 | 0.4              | 0.04-0.14              | 0.30-2.1  | ○        |        | ○      |        | ○      |        |        |        |         |   |
|               | 160408E-PB1      | 0.8              | 0.09-0.28              | 0.60-2.1  | ○        |        | ○      |        | ○      |        |        |        |         |   |
| Semifinishing |                  | VBMT 110304E-PC2 | 0.4                    | 0.05-0.16 | 0.35-2.1 | ●      | ○      | ○      |        | ●      |        |        |         | ● |
|               |                  | 110308E-PC2      | 0.8                    | 0.10-0.32 | 0.70-2.1 | ○      | ○      | ○      |        | ○      |        |        |         | ○ |
|               |                  | 160404E-PC2      | 0.4                    | 0.05-0.16 | 0.35-3.1 | ●      | ○      | ●      |        | ●      |        |        |         | ● |
|               |                  | 160408E-PC2      | 0.8                    | 0.10-0.32 | 0.70-3.1 | ●      | ●      | ●      |        | ●      |        |        |         | ● |
|               |                  | 160412E-PC2      | 1.2                    | 0.16-0.48 | 1.05-3.1 | ●      | ○      | ○      |        | ○      |        |        |         | ● |
|               |                  | VCMT 110304E-PC2 | 0.4                    | 0.05-0.16 | 0.35-2.1 | ●      | ○      | ●      |        | ○      |        |        |         |   |
|               |                  | 110308E-PC2      | 0.8                    | 0.10-0.32 | 0.70-2.1 | ○      |        | ○      |        | ○      |        |        |         |   |
|               |                  | 160404E-PC2      | 0.4                    | 0.05-0.16 | 0.35-3.1 | ○      |        | ○      |        | ●      |        |        |         |   |
|               |                  | 160408E-PC2      | 0.8                    | 0.10-0.32 | 0.70-3.1 | ●      |        | ○      |        | ○      |        |        |         |   |

Marked: ● Stock available ○ Non-stocked standard

Positive 35° (V) Rhombic Inserts

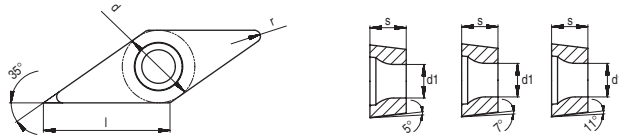


| Dimensions (mm) |      |       |      |     |
|-----------------|------|-------|------|-----|
| Type            | d    | l     | s    | d1  |
| VB_1103_        | 6.35 | 11.07 | 3.18 | 2.8 |
| VB_1604_        | 9.52 | 16.61 | 4.76 | 4.4 |
| VC_1103_        | 6.35 | 11.07 | 3.18 | 2.8 |
| VC_1604_        | 9.52 | 16.61 | 4.76 | 4.4 |
| VC_2205_        | 12.7 | 22.14 | 5.56 | 5.5 |
| VP_2205_        | 12.7 | 22.14 | 5.56 | 5.5 |







| Inserts<br>Left-hand shown where it's applicable | Type  | r (mm)    | Recommended parameters |          | Grades |        |        |        |        |        |        |        |         |  |  |  |  |  |  |  |  |  |
|--|---|-----------|------------------------|----------|--------|--------|--------|--------|--------|--------|--------|--------|---------|--|--|--|--|--|--|--|--|--|
|  |   |           | f (mm/rev)             | ap (mm)  | AC150P | AC200P | AC250P | AC350P | AP301M | AC150K | ACK15A | AW100K | APT100S |  |  |  |  |  |  |  |  |  |
| Semifinishing                                    | <br><b>VCGT 110302F-NC2</b><br><b>110304F-NC2</b><br><b>160404F-NC2</b><br><b>160408F-NC2</b><br><b>160412F-NC2</b><br><b>220530F-NC2</b> | 0.2       | 0.02-0.10              | 0.16-2.8 |        |        |        |        |        |        |        |        |         |  |  |  |  |  |  |  |  |  |
|  |   | 0.4       | 0.05-0.20              | 0.32-2.8 |        |        |        |        |        |        |        |        |         |  |  |  |  |  |  |  |  |  |
|  |   | 0.4       | 0.05-0.20              | 0.32-4.2 |        |        |        |        |        |        |        |        |         |  |  |  |  |  |  |  |  |  |
|  |   | 0.8       | 0.10-0.40              | 0.64-4.2 |        |        |        |        |        |        |        |        |         |  |  |  |  |  |  |  |  |  |
|  |   | 1.2       | 0.14-0.60              | 0.96-4.2 |        |        |        |        |        |        |        |        |         |  |  |  |  |  |  |  |  |  |
|  | 2.0   | 0.24-1.0  | 1.60-5.5               |          |        |        |        |        |        |        |        |        |         |  |  |  |  |  |  |  |  |  |
|  | <br><b>VPGT 220520E-NC2</b><br><br><b>VPGT 220520F-NC2</b>  | 2.0       | 0.24-1.0               | 1.60-5.5 |        |        |        |        |        |        |        |        |         |  |  |  |  |  |  |  |  |  |
|  |   | 2.0       | 0.24-1.0               | 1.60-5.5 |        |        |        |        |        |        |        |        |         |  |  |  |  |  |  |  |  |  |
|  | <br><b>VBMT 160404E-KC2</b><br><b>160408E-KC2</b><br><b>160412E-KC2</b>   | 0.4       | 0.06-0.18              | 0.40-3.3 | ●      | ○      | ●      |        |        |        | ●      | ○      |         |  |  |  |  |  |  |  |  |  |
|  |   | 0.8       | 0.12-0.36              | 0.80-3.3 | ●      | ○      | ○      |        |        |        | ○      | ●      |         |  |  |  |  |  |  |  |  |  |
| 1.2  |   | 0.18-0.54 | 1.20-3.3               | ●        | ○      | ●      |        |        |        | ○      | ○      |        |         |  |  |  |  |  |  |  |  |  |
| Finishing  | <br><b>VBET 1103003FR-F</b><br><b>1103003FL-F</b><br><b>110301FR-F</b><br><b>110301FL-F</b><br><b>110302FR-F</b><br><b>110302FL-F</b>     | <0.03     | 0.01-0.18              | 0.1-0.3  |        |        |        |        |        | ●      |        |        |         |  |  |  |  |  |  |  |  |  |
|  |   | <0.03     | 0.01-0.18              | 0.1-0.3  |        |        |        |        |        |        | ●      |        |         |  |  |  |  |  |  |  |  |  |
|  |   | <0.1      | 0.01-0.18              | 0.1-0.3  |        |        |        |        |        |        | ●      |        |         |  |  |  |  |  |  |  |  |  |
|  |   | <0.1      | 0.01-0.18              | 0.1-0.3  |        |        |        |        |        |        | ●      |        |         |  |  |  |  |  |  |  |  |  |
|  |   | <0.2      | 0.01-0.18              | 0.1-0.3  |        |        |        |        |        |        | ●      |        |         |  |  |  |  |  |  |  |  |  |
|  |   | <0.2      | 0.01-0.18              | 0.1-0.3  |        |        |        |        |        |        | ●      |        |         |  |  |  |  |  |  |  |  |  |
| Low feed   | <br><b>VBET 110301FR-M</b><br><b>110301FL-M</b><br><b>110302FR-M</b><br><b>110302FL-M</b><br><b>110304FR-M</b>                            | <0.1      | 0.01-0.06              | 0.2-2.0  |        |        |        |        |        | ●      |        |        |         |  |  |  |  |  |  |  |  |  |
|  |   | <0.1      | 0.01-0.06              | 0.2-2.0  |        |        |        |        |        |        | ●      |        |         |  |  |  |  |  |  |  |  |  |
|  |   | <0.2      | 0.01-0.06              | 0.2-2.0  |        |        |        |        |        |        | ●      |        |         |  |  |  |  |  |  |  |  |  |
|  |   | <0.2      | 0.01-0.06              | 0.2-2.0  |        |        |        |        |        |        | ●      |        |         |  |  |  |  |  |  |  |  |  |
|  |   | <0.4      | 0.01-0.06              | 0.2-2.0  |        |        |        |        |        |        | ●      |        |         |  |  |  |  |  |  |  |  |  |

Marked: ● Stock available ○ Non-stocked standard

**Positive 35° (V) Rhombic Inserts**



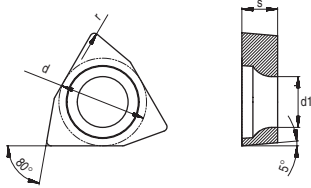
| Dimensions (mm) |      |       |      |     |
|-----------------|------|-------|------|-----|
| Type            | d    | l     | s    | d1  |
| VB_1103_        | 6.35 | 11.07 | 3.18 | 2.8 |
| VB_1604_        | 9.52 | 16.61 | 4.76 | 4.4 |
| VC_1103_        | 6.35 | 11.07 | 3.18 | 2.8 |
| VP_0802_        | 4.76 | 8.3   | 2.38 | 2.3 |
| VP_1103_        | 6.35 | 11.07 | 3.18 | 2.8 |

| Inserts<br>Left-hand shown where it's applicable                                    | Type  | r (mm)           | Recommended parameters |           | Grades   |        |        |        |        |        |        |        |         |  |
|---|---|------------------|------------------------|-----------|----------|--------|--------|--------|--------|--------|--------|--------|---------|--|
|   |   |                  | f (mm/rev)             | ap (mm)   | AC150P   | AC200P | AC250P | AC350P | AP301M | AC150K | ACK15A | AW100K | APT100S |  |
| Finishing   |    | VCET 110301FR-F  | <0.1                   | 0.01-0.18 | 0.1-0.3  |        |        |        |        | ●      |        |        |         |  |
|   |   | 110301FL-F       | <0.1                   | 0.01-0.18 | 0.1-0.3  |        |        |        |        | ●      |        |        |         |  |
|   |   | 110302FR-F       | <0.2                   | 0.01-0.18 | 0.1-0.3  |        |        |        |        | ●      |        |        |         |  |
|   |   | 110302FL-F       | <0.2                   | 0.01-0.18 | 0.1-0.3  |        |        |        |        | ●      |        |        |         |  |
|   |   | 110304FR-F       | <0.4                   | 0.01-0.18 | 0.1-0.3  |        |        |        |        | ●      |        |        |         |  |
|   |   | 110304FL-F       | <0.4                   | 0.01-0.18 | 0.1-0.3  |        |        |        |        | ●      |        |        |         |  |
|   |   | VPET 080201FR-F  | <0.1                   | 0.02-0.15 | 0.05-0.2 |        |        |        |        | ○      |        |        |         |  |
|   |   | 080201FL-F       | <0.1                   | 0.02-0.15 | 0.05-0.2 |        |        |        |        | ○      |        |        |         |  |
|   |   | 080202FR-F       | <0.2                   | 0.02-0.15 | 0.05-0.2 |        |        |        |        | ○      |        |        |         |  |
|   |   | 080202FL-F       | <0.2                   | 0.02-0.15 | 0.05-0.2 |        |        |        |        | ○      |        |        |         |  |
| Low feed  |  | VPET 080201FR-M  | <0.1                   | 0.01-0.06 | 0.2-1.5  |        |        |        |        | ○      |        |        |         |  |
|   |   | 080201FL-M       | <0.1                   | 0.01-0.06 | 0.2-1.5  |        |        |        |        | ○      |        |        |         |  |
|   |   | 080202FR-M       | <0.2                   | 0.01-0.06 | 0.2-1.5  |        |        |        |        | ○      |        |        |         |  |
|   |   | 080202FL-M       | <0.2                   | 0.01-0.06 | 0.2-1.5  |        |        |        |        | ○      |        |        |         |  |
|   |  | VPET 110301FR-M  | <0.1                   | 0.01-0.06 | 0.2-2.0  |        |        |        |        | ○      |        |        |         |  |
|   |   | 110301FL-M       | <0.1                   | 0.01-0.06 | 0.2-2.0  |        |        |        |        | ○      |        |        |         |  |
|   |   | 110302FR-M       | <0.2                   | 0.01-0.06 | 0.2-2.0  |        |        |        |        | ○      |        |        |         |  |
|   |   | 110302FL-M       | <0.2                   | 0.01-0.06 | 0.2-2.0  |        |        |        |        | ○      |        |        |         |  |
|   |   | 110304FR-M       | <0.4                   | 0.01-0.06 | 0.2-2.0  |        |        |        |        | ○      |        |        |         |  |
|   |   | 110304FL-M       | <0.4                   | 0.01-0.06 | 0.2-2.0  |        |        |        |        | ○      |        |        |         |  |
|   |  | VBET 1103003FR-Y | <0.03                  | 0.08-0.22 | 0.5-1.8  |        |        |        |        | ○      |        |        |         |  |
|   |   | 1103003FL-Y      | <0.03                  | 0.08-0.22 | 0.5-1.8  |        |        |        |        | ○      |        |        |         |  |
|   |   | 110301FR-Y       | <0.1                   | 0.08-0.22 | 0.5-1.8  |        |        |        |        | ○      |        |        |         |  |
|   |   | 110301FL-Y       | <0.1                   | 0.08-0.22 | 0.5-1.8  |        |        |        |        | ○      |        |        |         |  |
|   |   | 110302FR-Y       | <0.2                   | 0.08-0.22 | 0.5-1.8  |        |        |        |        | ○      |        |        |         |  |
|   |   | 110302FL-Y       | <0.2                   | 0.08-0.22 | 0.5-1.8  |        |        |        |        | ○      |        |        |         |  |
| 110304FR-Y  |   | <0.4             | 0.08-0.22              | 0.5-1.8   |          |        |        |        | ○      |        |        |        |         |  |
| 110304FL-Y  |   | <0.4             | 0.08-0.22              | 0.5-1.8   |          |        |        |        | ○      |        |        |        |         |  |
|  | VBET 160402FR-Y   | <0.2             | 0.1-0.25               | 0.8-2.0   |          |        |        |        | ○      |        |        |        |         |  |
|   | 160402FL-Y  | <0.2             | 0.1-0.25               | 0.8-2.0   |          |        |        |        | ○      |        |        |        |         |  |
|   | 160404FR-Y  | <0.4             | 0.1-0.25               | 0.8-2.0   |          |        |        |        | ○      |        |        |        |         |  |
|   | 160404FL-Y  | <0.4             | 0.1-0.25               | 0.8-2.0   |          |        |        |        | ○      |        |        |        |         |  |
|   | 160408FR-Y  | 0.8              | 0.1-0.25               | 0.8-2.0   |          |        |        |        | ○      |        |        |        |         |  |
|   | 160408FL-Y  | 0.8              | 0.1-0.25               | 0.8-2.0   |          |        |        |        | ○      |        |        |        |         |  |



Marked: ● Stock available ○ Non-stocked standard

Turning inserts

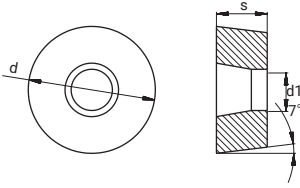
Positive 80° (W) Trigon Inserts



| Dimensions (mm) |      |      |      |     |
|-----------------|------|------|------|-----|
| Type            | d    | l    | s    | d1  |
| WB_0601_        | 3.97 | 3.52 | 1.59 | 2.3 |
| WB_0802_        | 4.76 | 4.78 | 2.38 | 2.3 |

| Inserts<br>Left-hand shown where it's applicable | Type  | r (mm)           | Recommended parameters |           | Grades  |        |        |        |        |        |        |        |        |  |
|--|---|------------------|------------------------|-----------|---------|--------|--------|--------|--------|--------|--------|--------|--------|--|
|  |   |                  | f (mm/rev)             | ap (mm)   | AC150P  | AC200P | AC250P | AC350P | AP301M | AC150K | ACK15A | AW100K | AP100S |  |
| Finishing  |    | WBET 0601003FR-F | <0.03                  | 0.05-0.08 | 0.1-0.8 |        |        |        |        | ○      |        |        |        |  |
|  |   | 0601003FL-F      | <0.03                  | 0.05-0.08 | 0.1-0.8 |        |        |        |        | ○      |        |        |        |  |
|  |   | 060101FR-F       | <0.1                   | 0.05-0.08 | 0.1-0.8 |        |        |        |        | ○      |        |        |        |  |
|  |   | 060101FL-F       | <0.1                   | 0.05-0.08 | 0.1-0.8 |        |        |        |        | ○      |        |        |        |  |
|  |   | 060102FR-F       | <0.2                   | 0.05-0.08 | 0.1-0.8 |        |        |        |        | ○      |        |        |        |  |
|  |   | 060102FL-F       | <0.2                   | 0.05-0.08 | 0.1-0.8 |        |        |        |        | ○      |        |        |        |  |
|  |   | 060104FR-F       | <0.4                   | 0.05-0.08 | 0.1-0.8 |        |        |        |        | ○      |        |        |        |  |
|  |   | 060104FL-F       | <0.4                   | 0.05-0.08 | 0.1-0.8 |        |        |        |        | ○      |        |        |        |  |
|  |  | WBET 0802003FR-F | <0.03                  | 0.05-0.08 | 0.1-0.8 |        |        |        |        | ○      |        |        |        |  |
|  |   | 0802003FL-F      | <0.03                  | 0.05-0.08 | 0.1-0.8 |        |        |        |        | ○      |        |        |        |  |
|  |   | 080201FR-F       | <0.1                   | 0.05-0.08 | 0.1-0.8 |        |        |        |        | ○      |        |        |        |  |
|  |   | 080201FL-F       | <0.1                   | 0.05-0.08 | 0.1-0.8 |        |        |        |        | ○      |        |        |        |  |
|  |   | 080202FR-F       | <0.2                   | 0.05-0.08 | 0.1-0.8 |        |        |        |        | ○      |        |        |        |  |
|  |   | 080202FL-F       | <0.2                   | 0.05-0.08 | 0.1-0.8 |        |        |        |        | ○      |        |        |        |  |
| 080204FR-F                                       |   | <0.4             | 0.05-0.08              | 0.1-0.8   |         |        |        |        | ○      |        |        |        |        |  |
| 080204FL-F                                       |   | <0.4             | 0.05-0.08              | 0.1-0.8   |         |        |        |        | ○      |        |        |        |        |  |

**Positive Round Turning Inserts**



| Dimensions (mm) |      |      |     |
|-----------------|------|------|-----|
| Type            | s    | d    | d1  |
| RCGT_0803_      | 3.18 | 8.0  | 3.4 |
| RCGT_1003_      | 3.18 | 10.0 | 4.4 |
| RCGT_10T3_      | 3.97 | 10.0 | 4.4 |
| RCMX_1003_      | 3.18 | 10.0 | 3.6 |
| RCMX_1204_      | 4.76 | 12.0 | 4.2 |

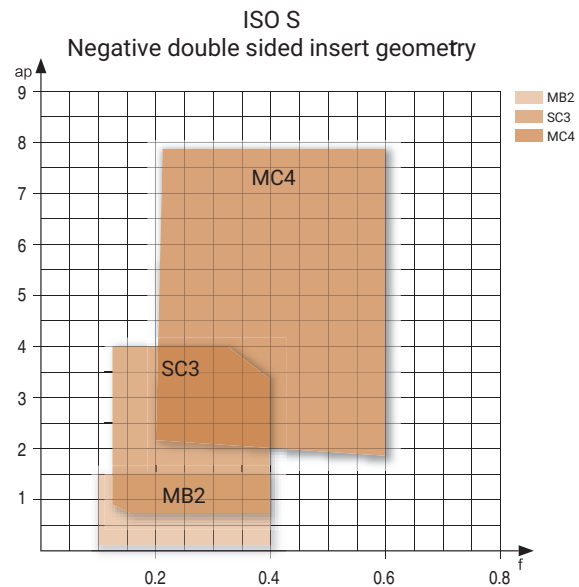
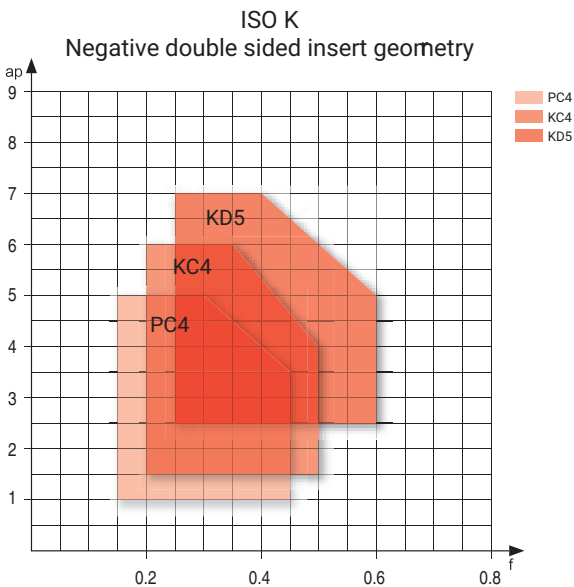
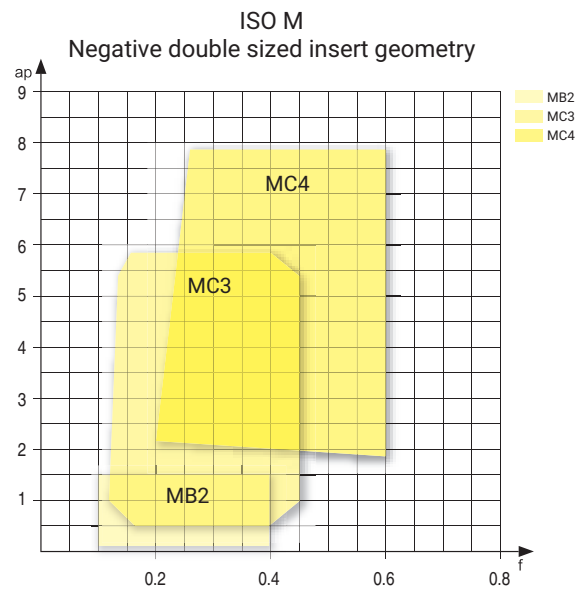
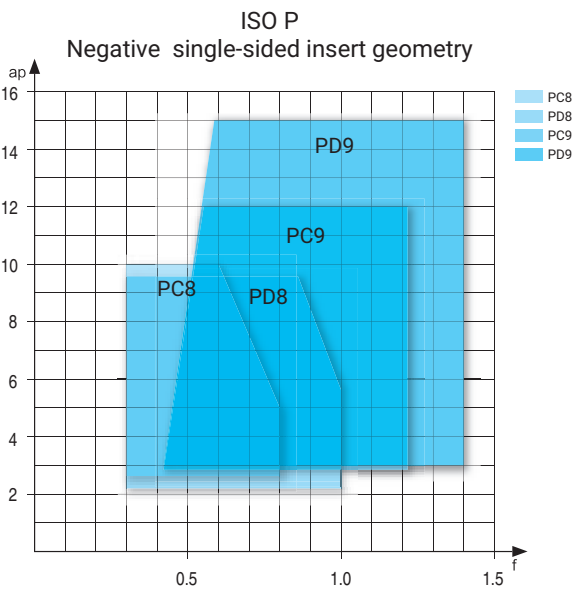
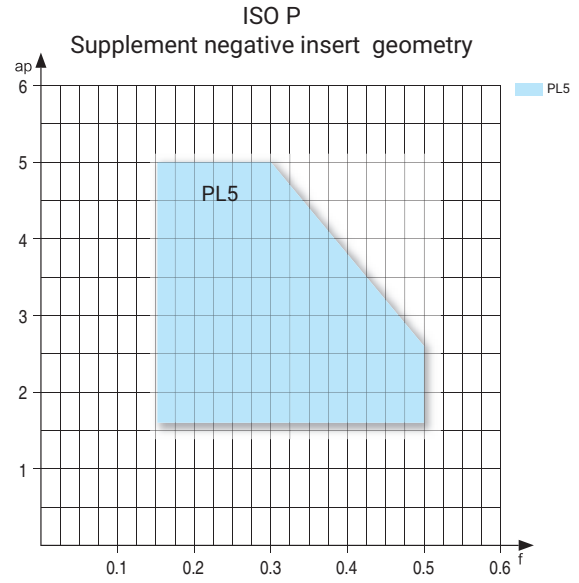
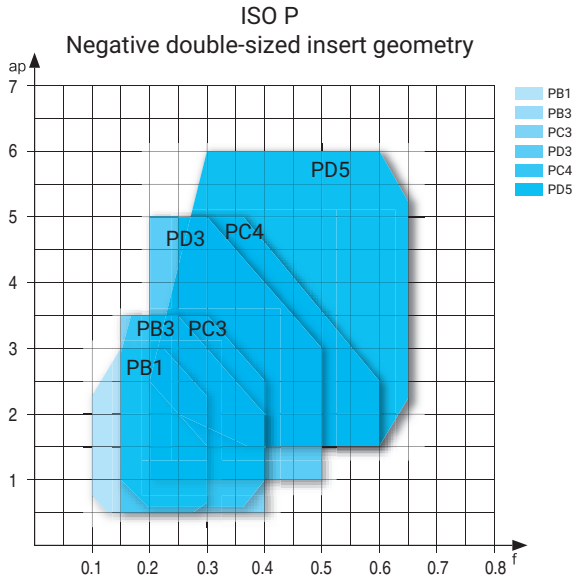
| Dimensions (mm) |      |      |     |
|-----------------|------|------|-----|
| Type            | s    | d    | d1  |
| RCMX_1606_      | 6.35 | 16.0 | 5.2 |
| RCMX_2006_      | 6.35 | 20.0 | 6.5 |
| RCMX_2507_      | 7.94 | 25.0 | 7.2 |
| RCMX_3209_      | 9.52 | 32.0 | 9.6 |

| Inserts       | Type                    | r (mm) | Recommended parameters |          | Grades |        |        |        |        |        |        |        |         |  |  |  |  |  |  |  |
|---------------|-------------------------|--------|------------------------|----------|--------|--------|--------|--------|--------|--------|--------|--------|---------|--|--|--|--|--|--|--|
|               |                         |        | f (mm/rev)             | ap (mm)  | AC150P | AC200P | AC250P | AC350P | AP301M | AC150K | ACK15A | AW100K | APT100S |  |  |  |  |  |  |  |
| Semifinishing | <b>RCGT 0803MOF-NC2</b> | 4      | 0.10-1.00              | 0.70-3.3 |        |        |        |        |        |        |        |        |         |  |  |  |  |  |  |  |
|               | <b>1003MOF-NC2</b>      | 5      | 0.20-1.30              | 0.90-4.0 |        |        |        |        |        |        |        |        |         |  |  |  |  |  |  |  |
|               | <b>10T3MOF-NC2</b>      | 5      | 0.20-1.30              | 0.90-4.0 |        |        |        |        |        |        |        |        |         |  |  |  |  |  |  |  |
| Finishing     | <b>RCMX 2006MOS-PD8</b> | 10     | 0.48-0.90              | 3.5-9.0  | ○      | ○      | ○      |        |        |        |        |        |         |  |  |  |  |  |  |  |
|               | <b>2507MOS-PD8</b>      | 12.5   | 0.55-1.20              | 4.0-12.0 | ○      | ●      | ○      |        |        |        |        |        |         |  |  |  |  |  |  |  |
|               | <b>3209MOS-PD8</b>      | 16     | 0.65-1.50              | 5.0-15.0 | ○      | ○      | ○      |        |        |        |        |        |         |  |  |  |  |  |  |  |
| Medium        | <b>RCMX 100300S</b>     | 5      | 0.25-0.50              | 1.5-4.0  | ○      |        | ●      | ○      |        |        |        |        |         |  |  |  |  |  |  |  |
|               | <b>120400S</b>          | 6      | 0.30-0.60              | 2.5-5.0  | ●      |        | ●      | ○      |        |        |        |        |         |  |  |  |  |  |  |  |
|               | <b>160600S</b>          | 8      | 0.40-0.75              | 3.0-7.0  | ●      |        | ○      | ○      |        |        |        |        |         |  |  |  |  |  |  |  |
|               | <b>200600S</b>          | 10     | 0.48-0.90              | 3.5-9.0  | ●      |        | ○      | ●      |        |        |        |        |         |  |  |  |  |  |  |  |
|               | <b>250700S</b>          | 12.5   | 0.55-1.20              | 4.0-12.0 | ○      |        | ○      | ○      |        |        |        |        |         |  |  |  |  |  |  |  |
|               | <b>320900S</b>          | 16     | 0.65-1.50              | 5.0-15.0 | ●      |        | ○      | ○      |        |        |        |        |         |  |  |  |  |  |  |  |

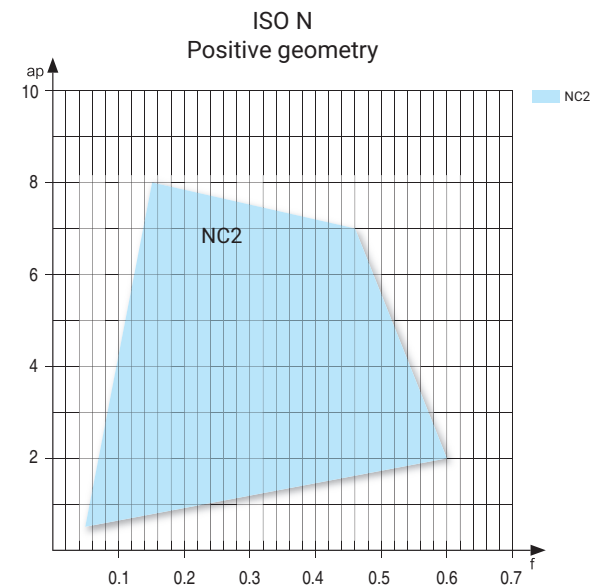
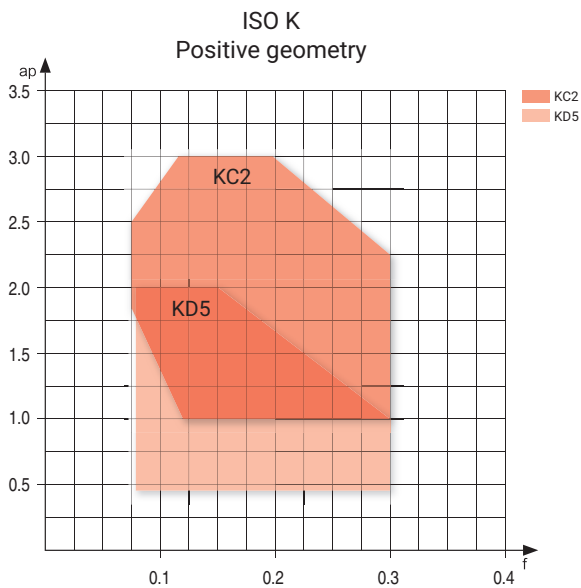
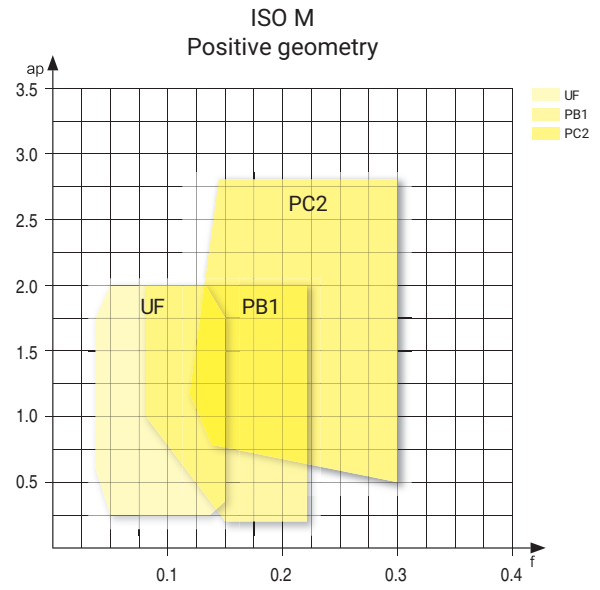
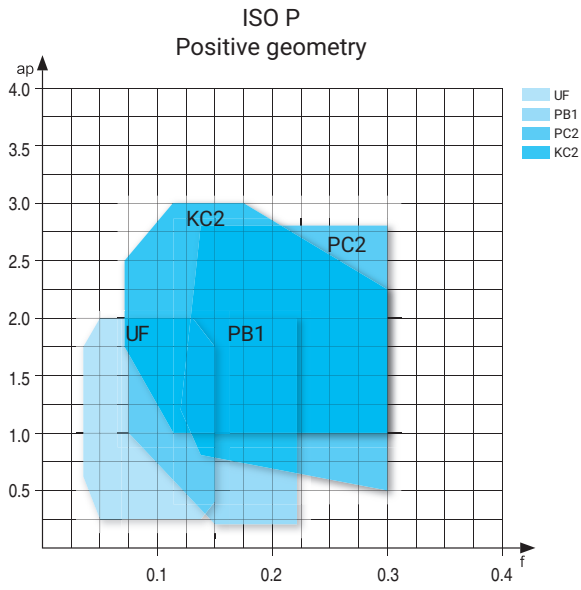
Marked: ● Stock available ○ Non-stocked standard

Turning inserts

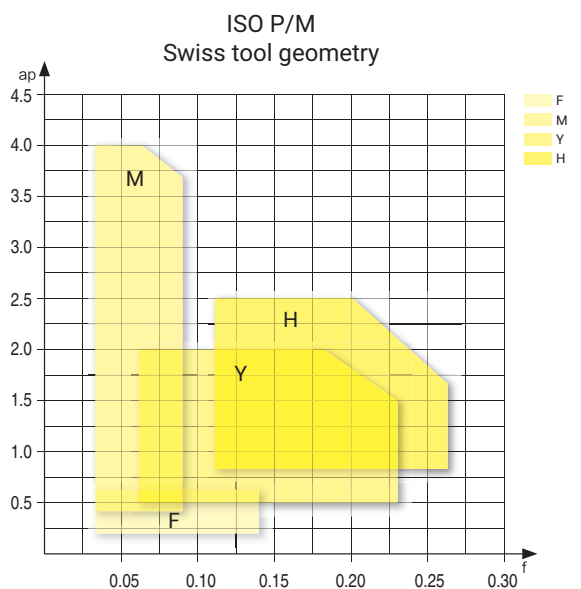
Negative Insert Geometry  
Ap, F Application Range



Positive Insert Geometry  
Ap, F Application Range



Swiss Tool Geometry Ap, F Application Range



Turning inserts

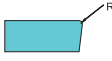
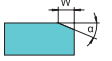
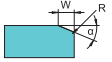











PCBN Insert Denomination System

|                    |   |          |            |           |   |           |   |          |   |           |             |
|--------------------|---|----------|------------|-----------|---|-----------|---|----------|---|-----------|-------------|
| <b>CNGA 120408</b> | - | <b>S</b> | <b>010</b> | <b>20</b> | - | <b>SL</b> | - | <b>1</b> | - | <b>CB</b> | <b>PB30</b> |
| 1                  |   | 2        | 3          | 4         |   | 5         |   | 6        |   | 7         | 8           |

|  |  |  |  |
|--|--|--|--|
| <p><b>1-Standard ISO denomination system</b></p>   | <p><b>2-Cutting edge shape</b></p> <p>E---Honed </p> <p>T-Land without honing </p> <p>S---Land with honed </p> <p>F---Sharp </p> | <p><b>3-T-land width</b></p> <p>005---0.05mm<br/>010---0.10mm<br/>015---0.15mm<br/>020---0.20mm</p>                              | <p><b>4-T-land angle</b></p> <p>10---10°<br/>15---15°<br/>20---20°<br/>25---25°</p>                            |
| <p><b>5-CBN insert structure</b></p> <p>FT-- Full face CBN </p> <p>SD-- Solid CBN </p> <p>SL-- Small size tipped CBN </p> <p>NL-- Standard-tipped CBN (Regrindable) </p> | <p><b>6-Number of cutting edge</b></p> <p>1---One cutting edge<br/>2---Two cutting edges<br/>3---Three cutting edges</p>   | <p><b>7-Cutting edge preparation</b></p> <p>CB---With chip breaker<br/>WG---With wiper edge<br/>"- " ---Without chip breaker</p> | <p><b>8-Grade</b></p> <p>PB30--- Low content CBN<br/>PB60---Medium content CBN<br/>PB90---High content CBN</p> |

PCBN Insert Grade Introduction

| Grade | Feature   | Application  |
|-------|---|--|
| PB30  | Well balanced wear resistance and shock-resistance    | Good versatilely. Suitable for continuous and light interrupted cutting of hardened steel  |
| PB60  | Excellent toughness                                   | Mainly applied in medium interrupted cutting of hardened steel,interrupted and continuous cutting of powder metal and cast iron cutting. |
| PB90  | Good wear resistance, toughness, and shock-resistance | K-mainly applied in cast iron cutting<br>H-heavy interrupted cutting of hardened steel and powder metal machining                        |

PCBN Recommended Cutting Parameter

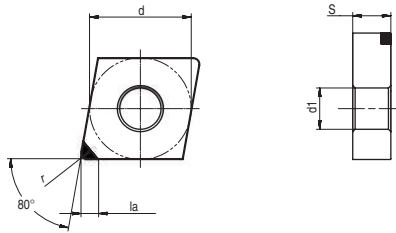
| Grade | Material       | Hardness  | Cutting speed Vc(m/min) | Feed fn(mm/rev) | Cutting depth ap(mm) | Recommended application  |
|-------|----------------|-----------|-------------------------|-----------------|----------------------|--------------------------|
| PB30  | Hardened steel | HRC58-62  | 150-250                 | 0.03-0.2        | 0.05-0.3             | Continuous               |
| PB60  | Hardened steel | HRC55-60  | 50-150                  | 0.03-0.2        | 0.05-0.5             | Interrupted              |
|       | Cast iron      | HB180-220 | 150-450                 | 0.03-0.3        | 0.30-0.5             | Continuous / Interrupted |
|       | Powder metal   | -         | 200-500                 | 0.03-0.3        | 0.10-0.3             | Continuous / Interrupted |
| PB90  | Hardened steel | HRC55-60  | 30-120                  | 0.03-0.2        | 0.05-0.5             | Heavy interrupted        |
|       | Cast iron      | HB180-220 | 150-450                 | 0.03-0.3        | 0.30-0.5             | Continuous / Interrupted |
|       | Powder metal   | -         | 300-800                 | 0.03-0.3        | 0.10-0.3             | Continuous / Interrupted |

Grade Application Guide

| PCBN grade applications |                                 |          |                                    |      |      |     |
|-------------------------|---------------------------------|----------|------------------------------------|------|------|-----|
| Material Group          | Materials                       | ISO      | Uncoated                           |      |      | ISO |
|                         |                                 |          | PB30                               | PB60 | PB90 |     |
| <b>P</b>                | unalloy steels / Alloyed steels | P01      |                                    |      |      | P01 |
|                         |                                 | P05      |                                    |      |      | P05 |
|                         |                                 | P10      |                                    |      |      | P10 |
|                         |                                 | P15      |                                    |      |      | P15 |
|                         |                                 | P20      |                                    |      |      | P20 |
|                         |                                 | P25      |                                    |      |      | P25 |
|                         |                                 | P30      |                                    |      |      | P30 |
|                         |                                 | P35      |                                    |      |      | P35 |
|                         |                                 | P40      |                                    |      |      | P40 |
|                         |                                 | P45      |                                    |      |      | P45 |
|                         |                                 | P50      |                                    |      |      | P50 |
|                         |                                 | <b>M</b> | Stainless steels                   | M01  |      |     |
| M05                     |                                 |          |                                    |      |      | M05 |
| M10                     |                                 |          |                                    |      |      | M10 |
| M15                     |                                 |          |                                    |      |      | M15 |
| M20                     |                                 |          |                                    |      |      | M20 |
| M25                     |                                 |          |                                    |      |      | M25 |
| M30                     |                                 |          |                                    |      |      | M30 |
| M35                     |                                 |          |                                    |      |      | M35 |
| M40                     |                                 |          |                                    |      |      | M40 |
| M45                     |                                 |          |                                    |      |      | M45 |
| <b>K</b>                | Cast iron                       | K01      |                                    |      |      | K01 |
|                         |                                 | K05      |                                    |      |      | K05 |
|                         |                                 | K10      |                                    |      |      | K10 |
|                         |                                 | K15      |                                    |      |      | K15 |
|                         |                                 | K20      |                                    | PB60 |      | K20 |
|                         |                                 | K25      |                                    |      | PB90 | K25 |
|                         |                                 | K30      |                                    |      |      | K30 |
|                         |                                 | K35      |                                    |      |      | K35 |
|                         |                                 | K40      |                                    |      |      | K40 |
|                         |                                 | K45      |                                    |      |      | K45 |
|                         |                                 | K50      |                                    |      |      | K50 |
| <b>N</b>                | Aluminum/ Aluminum alloys       | N01      |                                    |      |      | N01 |
|                         |                                 | N05      |                                    |      |      | N05 |
|                         |                                 | N10      |                                    |      |      | N10 |
|                         |                                 | N15      |                                    |      |      | N15 |
|                         |                                 | N20      |                                    |      |      | N20 |
|                         |                                 | N25      |                                    |      |      | N25 |
|                         |                                 | N30      |                                    |      |      | N30 |
| <b>S</b>                | Heat resistant alloys           | S01      |                                    |      |      | S01 |
|                         |                                 | S05      |                                    |      |      | S05 |
|                         |                                 | S10      |                                    |      |      | S10 |
|                         |                                 | S15      |                                    |      |      | S15 |
|                         |                                 | S20      |                                    |      |      | S20 |
|                         |                                 | S25      |                                    |      |      | S25 |
|                         |                                 | S30      |                                    |      |      | S30 |
|                         |                                 | S35      |                                    |      |      | S35 |
|                         |                                 | S40      |                                    |      |      | S40 |
|                         |                                 | <b>H</b> | Hardened steels/ Chilled cast iron | H01  |      |     |
| H05                     |                                 |          |                                    |      |      | H05 |
| H10                     | PB30                            |          |                                    |      |      | H10 |
| H15                     |                                 |          |                                    | PB60 |      | H15 |
| H20                     |                                 |          |                                    |      | PB90 | H20 |
| H25                     |                                 |          |                                    |      |      | H25 |
| H30                     |                                 |          |                                    |      |      | H30 |

Turning inserts

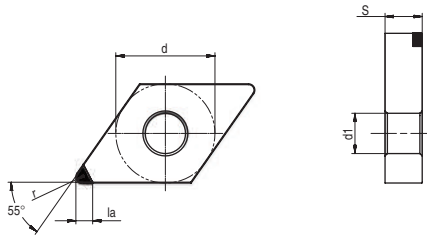
**Negative 80° (CN)**



| Dimensions (mm) |      |      |     |      |
|-----------------|------|------|-----|------|
| Type            | d    | s    | la  | d1   |
| CN_1204_        | 12.7 | 4.76 | 2.2 | 5.16 |

| Inserts | Type                    | r (mm) | Recommended parameters |          | Grade |      |      |
|---------|-------------------------|--------|------------------------|----------|-------|------|------|
|         |                         |        | f (mm/rev)             | ap (mm)  | PB30  | PB60 | PB90 |
|         | CNGA 120402-S01020-SL-1 | 0.2    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | CNGA 120404-S01020-SL-1 | 0.4    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | CNGA 120408-S01020-SL-1 | 0.8    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | CNGA 120412-S01020-SL-1 | 1.2    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | CNGA 120402-S01020-SL-2 | 0.2    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | CNGA 120404-S01020-SL-2 | 0.4    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | CNGA 120408-S01020-SL-2 | 0.8    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | CNGA 120412-S01020-SL-2 | 1.2    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | CNGA 120402-S01020-SL-4 | 0.2    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | CNGA 120404-S01020-SL-4 | 0.4    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | CNGA 120408-S01020-SL-4 | 0.8    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | CNGA 120412-S01020-SL-4 | 1.2    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         |                         |        |                        |          |       |      |      |
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**Negative 55° (DN)**

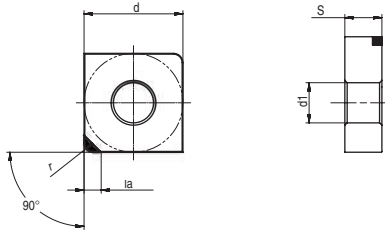


| Dimensions (mm) |      |      |     |      |
|-----------------|------|------|-----|------|
| Type            | d    | s    | la  | d1   |
| DN_1504_        | 12.7 | 4.76 | 2.2 | 5.16 |
| DN_1506_        | 12.7 | 6.35 | 2.2 | 5.16 |

| Inserts | Type                    | r (mm) | Recommended parameters |          | Grade |      |      |
|---------|-------------------------|--------|------------------------|----------|-------|------|------|
|         |                         |        | f (mm/rev)             | ap (mm)  | PB30  | PB60 | PB90 |
|         | DNGA 150402-S01020-SL-1 | 0.2    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | DNGA 150404-S01020-SL-1 | 0.4    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | DNGA 150408-S01020-SL-1 | 0.8    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | DNGA 150412-S01020-SL-1 | 1.2    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | DNGA 150602-S01020-SL-1 | 0.2    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | DNGA 150604-S01020-SL-1 | 0.4    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | DNGA 150608-S01020-SL-1 | 0.8    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | DNGA 150612-S01020-SL-1 | 1.2    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | DNGA 150402-S01020-SL-2 | 0.2    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | DNGA 150404-S01020-SL-2 | 0.4    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | DNGA 150408-S01020-SL-2 | 0.8    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | DNGA 150412-S01020-SL-2 | 1.2    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | DNGA 150602-S01020-SL-2 | 0.2    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | DNGA 150604-S01020-SL-2 | 0.4    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | DNGA 150608-S01020-SL-2 | 0.8    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | DNGA 150612-S01020-SL-2 | 1.2    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | DNGA 150402-S01020-SL-4 | 0.2    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | DNGA 150404-S01020-SL-4 | 0.4    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | DNGA 150408-S01020-SL-4 | 0.8    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | DNGA 150412-S01020-SL-4 | 1.2    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | DNGA 150602-S01020-SL-4 | 0.2    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | DNGA 150604-S01020-SL-4 | 0.4    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | DNGA 150608-S01020-SL-4 | 0.8    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | DNGA 150612-S01020-SL-4 | 1.2    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |

Marked: ● Stock available ○ Non-stocked standard

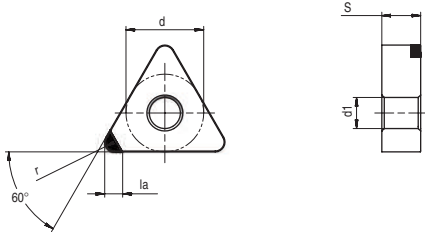
Negative 90° (SN)





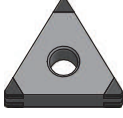
| Dimensions (mm) |      |      |     |      |
|-----------------|------|------|-----|------|
| Type            | d    | s    | la  | d1   |
| SN_1204_        | 12.7 | 4.76 | 2.2 | 5.16 |

| Inserts | Type                    | r (mm) | Recommended parameters |          | Grade |      |      |
|---------|-------------------------|--------|------------------------|----------|-------|------|------|
|         |                         |        | f (mm/rev)             | ap (mm)  | PB30  | PB60 | PB90 |
|         | SNGA 120402-S01020-SL-1 | 0.2    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | SNGA 120404-S01020-SL-1 | 0.4    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | SNGA 120408-S01020-SL-1 | 0.8    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | SNGA 120412-S01020-SL-1 | 1.2    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | SNGA 120402-S01020-SL-4 | 0.2    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | SNGA 120404-S01020-SL-4 | 0.4    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | SNGA 120408-S01020-SL-4 | 0.8    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | SNGA 120412-S01020-SL-4 | 1.2    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | SNGA 120402-S01020-SL-8 | 0.2    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | SNGA 120404-S01020-SL-8 | 0.4    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | SNGA 120408-S01020-SL-8 | 0.8    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | SNGA 120412-S01020-SL-8 | 1.2    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         |                         |        |                        |          |       |      |      |
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|         |                         |        |                        |          |       |      |      |

**Negative 60° (TN)**



| Dimensions (mm) |      |      |     |      |
|-----------------|------|------|-----|------|
| Type            | d    | s    | la  | d1   |
| TN_1604_        | 9.52 | 4.76 | 2.2 | 3.81 |

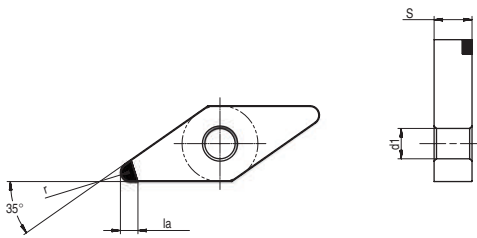
| Inserts   | Type                    | r (mm) | Recommended parameters |          | Grade |      |      |
|---|-------------------------|--------|------------------------|----------|-------|------|------|
|   |                         |        | f (mm/rev)             | ap (mm)  | PB30  | PB60 | PB90 |
|    | TNGA 160402-S01020-SL-1 | 0.2    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|   | TNGA 160404-S01020-SL-1 | 0.4    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|   | TNGA 160408-S01020-SL-1 | 0.8    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|   | TNGA 160412-S01020-SL-1 | 1.2    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|    | TNGA 160402-S01020-SL-3 | 0.2    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|   | TNGA 160404-S01020-SL-3 | 0.4    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|   | TNGA 160408-S01020-SL-3 | 0.8    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|   | TNGA 160412-S01020-SL-3 | 1.2    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|  | TNGA 160402-S01020-SL-6 | 0.2    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|   | TNGA 160404-S01020-SL-6 | 0.4    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|   | TNGA 160408-S01020-SL-6 | 0.8    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|   | TNGA 160412-S01020-SL-6 | 1.2    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|   |                         |        |                        |          |       |      |      |
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|   |                         |        |                        |          |       |      |      |
|   |                         |        |                        |          |       |      |      |

Marked: ● Stock available ○ Non-stocked standard

Turning inserts



Negative 35° (VN)

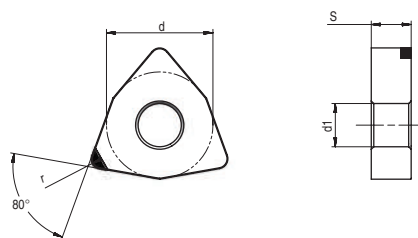


| Dimensions (mm) |      |      |     |      |
|-----------------|------|------|-----|------|
| Type            | d    | s    | la  | d1   |
| VN_1604_        | 9.52 | 4.76 | 2.2 | 3.81 |




| Inserts | Type                    | r<br>(mm) | Recommended parameters |            | Grade |      |      |
|---------|-------------------------|-----------|------------------------|------------|-------|------|------|
|         |                         |           | f<br>(mm/rev)          | ap<br>(mm) | PB30  | PB60 | PB90 |
|         | VNGA 160402-S01020-SL-1 | 0.2       | 0.03-0.3               | 0.05-0.5   | ●     | ●    | ●    |
|         | VNGA 160404-S01020-SL-1 | 0.4       | 0.03-0.3               | 0.05-0.5   | ●     | ●    | ●    |
|         | VNGA 160408-S01020-SL-1 | 0.8       | 0.03-0.3               | 0.05-0.5   | ●     | ●    | ●    |
|         | VNGA 160412-S01020-SL-1 | 1.2       | 0.03-0.3               | 0.05-0.5   | ●     | ●    | ●    |
|         | VNGA 160402-S01020-SL-2 | 0.2       | 0.03-0.3               | 0.05-0.5   | ●     | ●    | ●    |
|         | VNGA 160404-S01020-SL-2 | 0.4       | 0.03-0.3               | 0.05-0.5   | ●     | ●    | ●    |
|         | VNGA 160408-S01020-SL-2 | 0.8       | 0.03-0.3               | 0.05-0.5   | ●     | ●    | ●    |
|         | VNGA 160412-S01020-SL-2 | 1.2       | 0.03-0.3               | 0.05-0.5   | ●     | ●    | ●    |
|         | VNGA 160402-S01020-SL-4 | 0.2       | 0.03-0.3               | 0.05-0.5   | ●     | ●    | ●    |
|         | VNGA 160404-S01020-SL-4 | 0.4       | 0.03-0.3               | 0.05-0.5   | ●     | ●    | ●    |
|         | VNGA 160408-S01020-SL-4 | 0.8       | 0.03-0.3               | 0.05-0.5   | ●     | ●    | ●    |
|         | VNGA 160412-S01020-SL-4 | 1.2       | 0.03-0.3               | 0.05-0.5   | ●     | ●    | ●    |
|         |                         |           |                        |            |       |      |      |
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|         |                         |           |                        |            |       |      |      |
|         |                         |           |                        |            |       |      |      |

Marked: ● Stock available ○ Non-stocked standard

**Negative 80° (WN)**



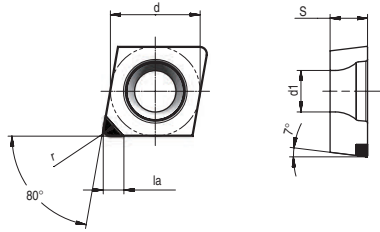
| Dimensions (mm) |      |      |     |      |
|-----------------|------|------|-----|------|
| Type            | d    | s    | la  | d1   |
| WN_0804_        | 12.7 | 4.76 | 2.2 | 5.16 |

| Inserts   | Type                    | r (mm) | Recommended parameters |          | Grade |      |      |
|---|-------------------------|--------|------------------------|----------|-------|------|------|
|   |                         |        | f (mm/rev)             | ap (mm)  | PB30  | PB60 | PB90 |
|    | WNGA 080402-S01020-SL-1 | 0.2    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|   | WNGA 080404-S01020-SL-1 | 0.4    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|   | WNGA 080408-S01020-SL-1 | 0.8    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|   | WNGA 080412-S01020-SL-1 | 1.2    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|    | WNGA 080402-S01020-SL-3 | 0.2    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|   | WNGA 080404-S01020-SL-3 | 0.4    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|   | WNGA 080408-S01020-SL-3 | 0.8    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|   | WNGA 080412-S01020-SL-3 | 1.2    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|  | WNGA 080402-S01020-SL-6 | 0.2    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|   | WNGA 080404-S01020-SL-6 | 0.4    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|   | WNGA 080408-S01020-SL-6 | 0.8    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|   | WNGA 080412-S01020-SL-6 | 1.2    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|   |                         |        |                        |          |       |      |      |
|   |                         |        |                        |          |       |      |      |
|   |                         |        |                        |          |       |      |      |
|   |                         |        |                        |          |       |      |      |
|   |                         |        |                        |          |       |      |      |
|   |                         |        |                        |          |       |      |      |
|   |                         |        |                        |          |       |      |      |
|   |                         |        |                        |          |       |      |      |
|   |                         |        |                        |          |       |      |      |
|   |                         |        |                        |          |       |      |      |
|   |                         |        |                        |          |       |      |      |
|   |                         |        |                        |          |       |      |      |
|   |                         |        |                        |          |       |      |      |
|   |                         |        |                        |          |       |      |      |
|   |                         |        |                        |          |       |      |      |
|   |                         |        |                        |          |       |      |      |
|   |                         |        |                        |          |       |      |      |
|   |                         |        |                        |          |       |      |      |
|   |                         |        |                        |          |       |      |      |

Marked: ● Stock available ○ Non-stocked standard

Turning inserts

**Positive 80° (CC)**

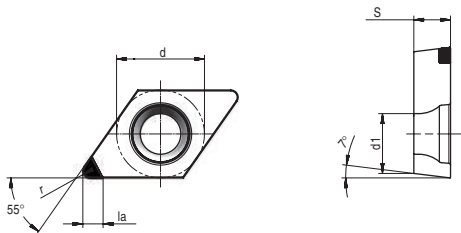


| Dimensions (mm) |      |      |     |     |
|-----------------|------|------|-----|-----|
| Type            | d    | s    | la  | d1  |
| CC_0602_        | 6.35 | 2.38 | 2.2 | 2.8 |
| CC_09T3_        | 9.52 | 3.97 | 2.2 | 4.4 |
| CC_1204_        | 12.7 | 4.76 | 2.2 | 5.5 |

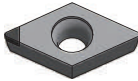
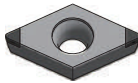
| Inserts | Type                    | r (mm) | Recommended parameters |          | Grade |      |      |
|---------|-------------------------|--------|------------------------|----------|-------|------|------|
|         |                         |        | f (mm/rev)             | ap (mm)  | PB30  | PB60 | PB90 |
|         | CCGW 060202-S01020-SL-1 | 0.2    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | CCGW 060204-S01020-SL-1 | 0.4    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | CCGW 060208-S01020-SL-1 | 0.8    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | CCGW 09T302-S01020-SL-1 | 0.2    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | CCGW 09T304-S01020-SL-1 | 0.4    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | CCGW 09T308-S01020-SL-1 | 0.8    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | CCGW 120402-S01020-SL-1 | 0.2    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | CCGW 120404-S01020-SL-1 | 0.4    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | CCGW 120408-S01020-SL-1 | 0.8    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | CCGW 120412-S01020-SL-1 | 1.2    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | CCGW 060202-S01020-SL-2 | 0.2    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | CCGW 060204-S01020-SL-2 | 0.4    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | CCGW 060208-S01020-SL-2 | 0.8    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | CCGW 09T302-S01020-SL-2 | 0.2    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | CCGW 09T304-S01020-SL-2 | 0.4    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | CCGW 09T308-S01020-SL-2 | 0.8    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | CCGW 120402-S01020-SL-2 | 0.2    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | CCGW 120404-S01020-SL-2 | 0.4    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | CCGW 120408-S01020-SL-2 | 0.8    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | CCGW 120412-S01020-SL-2 | 1.2    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |

Marked: ● Stock available ○ Non-stocked standard

## Positive 55° (DC)

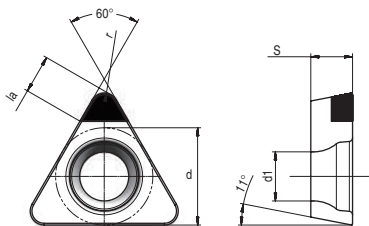


| Dimensions (mm) |      |      |     |     |
|-----------------|------|------|-----|-----|
| Type            | d    | s    | la  | d1  |
| DC_0702_        | 6.35 | 2.38 | 2.2 | 2.8 |
| DC_11T3_        | 9.52 | 3.97 | 2.2 | 4.4 |

| Inserts   | Type                    | r (mm) | Recommended parameters |          | Grade |      |      |
|---|-------------------------|--------|------------------------|----------|-------|------|------|
|   |                         |        | f (mm/rev)             | ap (mm)  | PB30  | PB60 | PB90 |
|    | DCGW 070202-S01020-SL-1 | 0.2    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|   | DCGW 070204-S01020-SL-1 | 0.4    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|   | DCGW 070208-S01020-SL-1 | 0.8    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|   | DCGW 11T302-S01020-SL-1 | 0.2    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|   | DCGW 11T304-S01020-SL-1 | 0.4    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|   | DCGW 11T308-S01020-SL-1 | 0.8    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|   | DCGW 11T312-S01020-SL-1 | 1.2    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|  | DCGW 070202-S01020-SL-2 | 0.2    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|   | DCGW 070204-S01020-SL-2 | 0.4    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|   | DCGW 070208-S01020-SL-2 | 0.8    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|   | DCGW 11T302-S01020-SL-2 | 0.2    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|   | DCGW 11T304-S01020-SL-2 | 0.4    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|   | DCGW 11T308-S01020-SL-2 | 0.8    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|   | DCGW 11T312-S01020-SL-2 | 1.2    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|   |                         |        |                        |          |       |      |      |
|   |                         |        |                        |          |       |      |      |
|   |                         |        |                        |          |       |      |      |
|   |                         |        |                        |          |       |      |      |
|   |                         |        |                        |          |       |      |      |
|   |                         |        |                        |          |       |      |      |
|   |                         |        |                        |          |       |      |      |
|   |                         |        |                        |          |       |      |      |
|   |                         |        |                        |          |       |      |      |
|   |                         |        |                        |          |       |      |      |
|   |                         |        |                        |          |       |      |      |
|   |                         |        |                        |          |       |      |      |
|   |                         |        |                        |          |       |      |      |
|   |                         |        |                        |          |       |      |      |
|   |                         |        |                        |          |       |      |      |
|   |                         |        |                        |          |       |      |      |

Marked: ● Stock available ○ Non-stocked standard

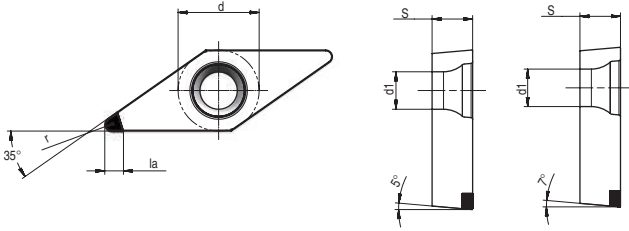
Positive 60° (TP)



| Dimensions (mm) |      |      |     |     |
|-----------------|------|------|-----|-----|
| Type            | d    | s    | la  | d1  |
| TP_0802_        | 4.76 | 2.38 | 2.2 | 2.4 |
| TP_0902_        | 5.56 | 2.38 | 2.2 | 2.8 |
| TP_1103_        | 6.35 | 3.18 | 2.2 | 3.3 |
| TP_1604_        | 9.52 | 4.76 | 2.2 | 4.4 |

| Inserts | Type                    | r (mm) | Recommended parameters |          | Grade |      |      |
|---------|-------------------------|--------|------------------------|----------|-------|------|------|
|         |                         |        | f (mm/rev)             | ap (mm)  | PB30  | PB60 | PB90 |
|         | TPGW 080202-S01020-SL-1 | 0.2    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | TPGW 080204-S01020-SL-1 | 0.4    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | TPGW 090202-S01020-SL-1 | 0.2    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | TPGW 090204-S01020-SL-1 | 0.4    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | TPGW 090208-S01020-SL-1 | 0.8    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | TPGW 110302-S01020-SL-1 | 0.2    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | TPGW 110304-S01020-SL-1 | 0.4    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | TPGW 160402-S01020-SL-1 | 0.2    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | TPGW 160404-S01020-SL-1 | 0.4    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | TPGW 160408-S01020-SL-1 | 0.8    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | TPGW 080202-S01020-SL-3 | 0.2    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | TPGW 080204-S01020-SL-3 | 0.4    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | TPGW 090202-S01020-SL-3 | 0.2    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | TPGW 090204-S01020-SL-3 | 0.4    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | TPGW 090208-S01020-SL-3 | 0.8    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | TPGW 110302-S01020-SL-3 | 0.2    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | TPGW 110304-S01020-SL-3 | 0.4    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | TPGW 160402-S01020-SL-3 | 0.2    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | TPGW 160404-S01020-SL-3 | 0.4    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | TPGW 160408-S01020-SL-3 | 0.8    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         |                         |        |                        |          |       |      |      |
|         |                         |        |                        |          |       |      |      |
|         |                         |        |                        |          |       |      |      |
|         |                         |        |                        |          |       |      |      |
|         |                         |        |                        |          |       |      |      |
|         |                         |        |                        |          |       |      |      |
|         |                         |        |                        |          |       |      |      |
|         |                         |        |                        |          |       |      |      |
|         |                         |        |                        |          |       |      |      |
|         |                         |        |                        |          |       |      |      |
|         |                         |        |                        |          |       |      |      |
|         |                         |        |                        |          |       |      |      |

Positive 35° (V)



| Dimensions (mm) |      |      |     |     |
|-----------------|------|------|-----|-----|
| Type            | d    | s    | la  | d1  |
| VB_1103_        | 6.35 | 3.18 | 2.2 | 2.8 |
| VC_1103_        | 6.35 | 3.18 | 2.2 | 2.8 |
| VB_1604_        | 9.52 | 4.76 | 2.2 | 4.4 |
| VC_1604_        | 9.52 | 4.76 | 2.2 | 4.4 |



| Inserts | Type                    | r (mm) | Recommended parameters |          | Grade |      |      |
|---------|-------------------------|--------|------------------------|----------|-------|------|------|
|         |                         |        | f (mm/rev)             | ap (mm)  | PB30  | PB60 | PB90 |
|         | VBGW 110302-S01020-SL-1 | 0.2    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | VBGW 110304-S01020-SL-1 | 0.4    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | VBGW 110308-S01020-SL-1 | 0.8    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | VBGW 160402-S01020-SL-1 | 0.2    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | VBGW 160404-S01020-SL-1 | 0.4    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | VBGW 160408-S01020-SL-1 | 0.8    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | VBGW 110302-S01020-SL-2 | 0.2    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | VBGW 110304-S01020-SL-2 | 0.4    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | VBGW 110308-S01020-SL-2 | 0.8    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | VBGW 160402-S01020-SL-2 | 0.2    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | VBGW 160404-S01020-SL-2 | 0.4    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | VBGW 160408-S01020-SL-2 | 0.8    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | VCGW 110302-S01020-SL-1 | 0.2    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | VCGW 110304-S01020-SL-1 | 0.4    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | VCGW 110308-S01020-SL-1 | 0.8    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | VCGW 160402-S01020-SL-1 | 0.2    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | VCGW 160404-S01020-SL-1 | 0.4    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | VCGW 160408-S01020-SL-1 | 0.8    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | VCGW 110302-S01020-SL-2 | 0.2    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | VCGW 110304-S01020-SL-2 | 0.4    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | VCGW 110308-S01020-SL-2 | 0.8    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | VCGW 160402-S01020-SL-2 | 0.2    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | VCGW 160404-S01020-SL-2 | 0.4    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |
|         | VCGW 160408-S01020-SL-2 | 0.8    | 0.03-0.3               | 0.05-0.5 | ●     | ●    | ●    |

Marked: ● Stock available ○ Non-stocked standard

Turning inserts

PCD Insert Denomination System

|                    |   |          |   |           |   |          |   |           |             |
|--------------------|---|----------|---|-----------|---|----------|---|-----------|-------------|
| <b>CCGW 09T304</b> | - | <b>2</b> | - | <b>NL</b> | - | <b>5</b> | - | <b>CB</b> | <b>PD20</b> |
| 1                  |   | 2        |   | 3         |   | 4        |   | 5         | 6           |

|   |   |  |   |
|---|---|--|---|
| <p>1-Standard ISO denomination system</p>   | <p>2-Number of cutting edge</p> <p>1-One cutting edge<br/>2-Two cutting edges<br/>3-Three cutting edges</p> | <p>3-PCD insert structure</p> <p>NL--Standard structure with tipped PCD </p> <p>LL-- Full edge tipped PCD </p> | <p>4-Rake angle</p> <p>00---0°<br/>05---5°<br/>10---10°</p> |
| <p>5-Cutting edge preparation</p> <p>CB-- With chip breaker<br/>WG--With wiper edge<br/>"- " Without chip breaker</p> | <p>6-Grade</p> <p>PD20--Coarse grain PCD</p>  |  |   |

PCD Insert Grade Introduction

| Grade | Feature   | Application   |
|-------|---|---|
| PD20  | Universal grade, balanced wear resistance and toughness | 1st choice for general machining of aluminum alloys |

PCD Recommended Cutting Parameter

| Grade | Material                         | Cutting speed Vc(m/min) | Feed f(mm/rev) | Cutting depth ap(mm) | Recommended application |
|-------|----------------------------------|-------------------------|----------------|----------------------|-------------------------|
| PD20  | Low-Si Aluminium Alloy (Si < 6%) | 300-4000                | 0.03-0.2       | 0.05-0.5             | Continuous/interrupt    |

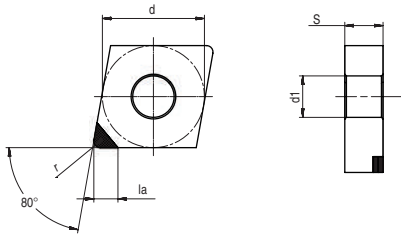
**Grade Application Guide**

| PCD insert applications |                                 |          |                                    |     |
|-------------------------|---------------------------------|----------|------------------------------------|-----|
| Material Group          | Materials                       | ISO      | Uncoated                           | ISO |
|                         |                                 |          | PD20                               |     |
| <b>P</b>                | unalloy steels / Alloyed steels | P01      |                                    | P01 |
|                         |                                 | P05      |                                    | P05 |
|                         |                                 | P10      |                                    | P10 |
|                         |                                 | P15      |                                    | P15 |
|                         |                                 | P20      |                                    | P20 |
|                         |                                 | P25      |                                    | P25 |
|                         |                                 | P30      |                                    | P30 |
|                         |                                 | P35      |                                    | P35 |
|                         |                                 | P40      |                                    | P40 |
|                         |                                 | P45      |                                    | P45 |
|                         |                                 | P50      |                                    | P50 |
|                         |                                 | <b>M</b> | Stainless steels                   | M01 |
| M05                     |                                 |          |                                    | M05 |
| M10                     |                                 |          |                                    | M10 |
| M15                     |                                 |          |                                    | M15 |
| M20                     |                                 |          |                                    | M20 |
| M25                     |                                 |          |                                    | M25 |
| M30                     |                                 |          |                                    | M30 |
| M35                     |                                 |          |                                    | M35 |
| M40                     |                                 |          |                                    | M40 |
| M45                     |                                 |          |                                    | M45 |
| <b>K</b>                | Cast iron                       | K01      |                                    | K01 |
|                         |                                 | K05      |                                    | K05 |
|                         |                                 | K10      |                                    | K10 |
|                         |                                 | K15      |                                    | K15 |
|                         |                                 | K20      |                                    | K20 |
|                         |                                 | K25      |                                    | K25 |
|                         |                                 | K30      |                                    | K30 |
|                         |                                 | K35      |                                    | K35 |
|                         |                                 | K40      |                                    | K40 |
|                         |                                 | K45      |                                    | K45 |
|                         |                                 | K50      |                                    | K50 |
| <b>N</b>                | Aluminum/ Aluminum alloys       | N01      |                                    | N01 |
|                         |                                 | N05      |                                    | N05 |
|                         |                                 | N10      | PD20                               | N10 |
|                         |                                 | N15      |                                    | N15 |
|                         |                                 | N20      |                                    | N20 |
|                         |                                 | N25      |                                    | N25 |
| N30                     | N30                             |          |                                    |     |
| <b>S</b>                | Heat resistant alloys           | S01      |                                    | S01 |
|                         |                                 | S05      |                                    | S05 |
|                         |                                 | S10      |                                    | S10 |
|                         |                                 | S15      |                                    | S15 |
|                         |                                 | S20      |                                    | S20 |
|                         |                                 | S25      |                                    | S25 |
|                         |                                 | S30      |                                    | S30 |
|                         |                                 | S35      |                                    | S35 |
|                         |                                 | S40      |                                    | S40 |
|                         |                                 | <b>H</b> | Hardened steels/ Chilled cast iron | H01 |
| H05                     |                                 |          |                                    | H05 |
| H10                     |                                 |          |                                    | H10 |
| H15                     |                                 |          |                                    | H15 |
| H20                     |                                 |          |                                    | H20 |
| H25                     |                                 |          |                                    | H25 |
| H30                     |                                 | H30      |                                    |     |

Turning inserts



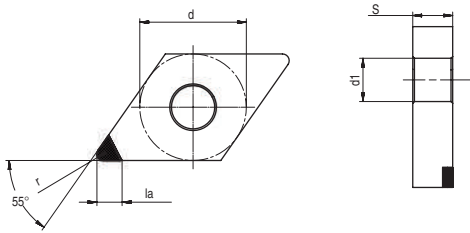
Negative 80° (CN)



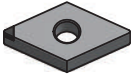
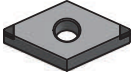
| Dimensions (mm) |      |      |     |      |
|-----------------|------|------|-----|------|
| Type            | d    | s    | la  | d1   |
| CN_1204_        | 12.7 | 4.76 | 3.0 | 5.16 |

| Inserts | Type                | r (mm) | Recommended parameters |          | Grade |
|---------|---------------------|--------|------------------------|----------|-------|
|         |                     |        | f (mm/rev)             | ap (mm)  | PD20  |
|         | CNGA 120402-1-NL-00 | 0.2    | 0.03-0.2               | 0.05-0.5 | ●     |
|         | CNGA 120404-1-NL-00 | 0.4    | 0.03-0.2               | 0.05-0.5 | ●     |
|         | CNGA 120408-1-NL-00 | 0.8    | 0.03-0.2               | 0.05-0.5 | ●     |
|         | CNGA 120402-2-NL-00 | 0.2    | 0.03-0.2               | 0.05-0.5 | ●     |
|         | CNGA 120404-2-NL-00 | 0.4    | 0.03-0.2               | 0.05-0.5 | ●     |
|         | CNGA 120408-2-NL-00 | 0.8    | 0.03-0.2               | 0.05-0.5 | ●     |
|         |                     |        |                        |          |       |
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Marked: ● Stock available ○ Non-stocked standard

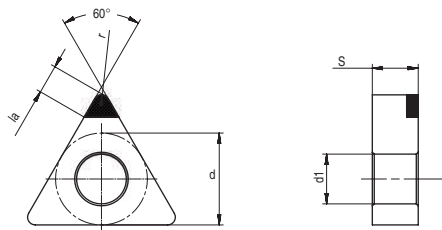
**Negative 55° (DN)**


| Dimensions (mm) |      |      |     |      |
|-----------------|------|------|-----|------|
| Type            | d    | s    | la  | d1   |
| DN_1504_        | 12.7 | 4.76 | 3.0 | 5.16 |

| Inserts   | Type                       | r<br>(mm) | Recommended parameters |            | Grade |
|---|----------------------------|-----------|------------------------|------------|-------|
|   |                            |           | f<br>(mm/rev)          | ap<br>(mm) |       |
|  | <b>DNGA 150402-1-NL-00</b> | 0.2       | 0.03-0.2               | 0.05-0.5   | ●     |
|   | <b>DNGA 150404-1-NL-00</b> | 0.4       | 0.03-0.2               | 0.05-0.5   | ●     |
|   | <b>DNGA 150408-1-NL-00</b> | 0.8       | 0.03-0.2               | 0.05-0.5   | ●     |
|  | <b>DNGA 150402-2-NL-00</b> | 0.2       | 0.03-0.2               | 0.05-0.5   | ●     |
|   | <b>DNGA 150404-2-NL-00</b> | 0.4       | 0.03-0.2               | 0.05-0.5   | ●     |
|   | <b>DNGA 150408-2-NL-00</b> | 0.8       | 0.03-0.2               | 0.05-0.5   | ●     |
|   |                            |           |                        |            |       |
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Marked: ● Stock available ○ Non-stocked standard

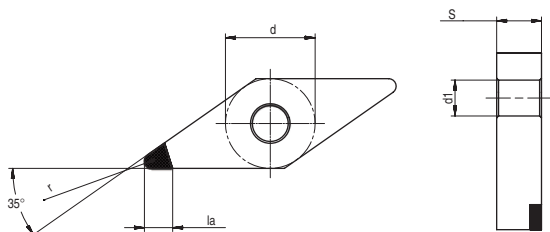
Negative 60° (TN)



| Dimensions (mm) |      |      |     |      |
|-----------------|------|------|-----|------|
| Type            | d    | s    | la  | d1   |
| TN_1604_        | 9.52 | 4.76 | 3.0 | 3.81 |

| Inserts | Type                | r<br>(mm) | Recommended parameters |            | Grade |
|---------|---------------------|-----------|------------------------|------------|-------|
|         |                     |           | f<br>(mm/rev)          | ap<br>(mm) | PD20  |
|         | TNGA 160402-1-NL-00 | 0.2       | 0.03-0.2               | 0.05-0.5   | ●     |
|         | TNGA 160404-1-NL-00 | 0.4       | 0.03-0.2               | 0.05-0.5   | ●     |
|         | TNGA 160408-1-NL-00 | 0.8       | 0.03-0.2               | 0.05-0.5   | ●     |
|         | TNGA 160402-3-NL-00 | 0.2       | 0.03-0.2               | 0.05-0.5   | ●     |
|         | TNGA 160404-3-NL-00 | 0.4       | 0.03-0.2               | 0.05-0.5   | ●     |
|         | TNGA 160408-3-NL-00 | 0.8       | 0.03-0.2               | 0.05-0.5   | ●     |
|         |                     |           |                        |            |       |
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**Negative 35° (VN)**



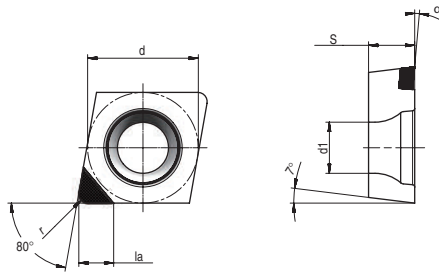
| Dimensions (mm) |       |      |     |      |
|-----------------|-------|------|-----|------|
| Type            | d     | s    | la  | d1   |
| VN_1604_        | 9.525 | 4.76 | 3.0 | 3.81 |

| Inserts | Type                | r<br>(mm) | Recommended parameters |            | Grade<br><br>PD20 |
|---------|---------------------|-----------|------------------------|------------|-------------------|
|         |                     |           | f<br>(mm/rev)          | ap<br>(mm) |                   |
|         | VNGA 160402-1-NL-00 | 0.2       | 0.03-0.2               | 0.05-0.5   | ●                 |
|         | VNGA 160404-1-NL-00 | 0.4       | 0.03-0.2               | 0.05-0.5   | ●                 |
|         | VNGA 160408-1-NL-00 | 0.8       | 0.03-0.2               | 0.05-0.5   | ●                 |
|         | VNGA 160402-2-NL-00 | 0.2       | 0.03-0.2               | 0.05-0.5   | ●                 |
|         | VNGA 160404-2-NL-00 | 0.4       | 0.03-0.2               | 0.05-0.5   | ●                 |
|         | VNGA 160408-2-NL-00 | 0.8       | 0.03-0.2               | 0.05-0.5   | ●                 |
|         |                     |           |                        |            |                   |
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|         |                     |           |                        |            |                   |

Marked: ● Stock available ○ Non-stocked standard

Turning inserts

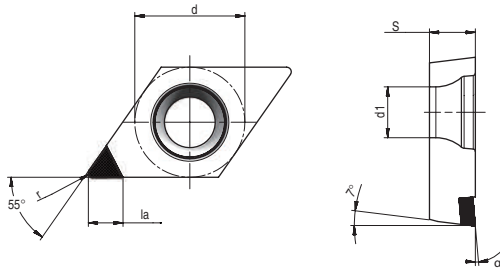
Positive 80° (CC)



| Dimensions (mm) |      |      |     |     |
|-----------------|------|------|-----|-----|
| Type            | d    | s    | la  | d1  |
| CC_0602_        | 6.35 | 2.38 | 3.0 | 2.8 |
| CC_09T3_        | 9.52 | 3.97 | 3.0 | 4.4 |
| CC_1204_        | 12.7 | 4.76 | 3.0 | 5.5 |

| Inserts | Type                 | r (mm) | α (°) | Recommended parameters |          | Grade |
|---------|----------------------|--------|-------|------------------------|----------|-------|
|         |                      |        |       | f (mm/rev)             | ap (mm)  | PD20  |
|         | CCGW 060202-1-NL-05  | 0.2    | 5°    | 0.03-0.2               | 0.05-0.5 | ●     |
|         | CCGW 060204-1-NL-05  | 0.4    | 5°    | 0.03-0.2               | 0.05-0.5 | ●     |
|         | CCGW 060208-1-NL-05  | 0.8    | 5°    | 0.03-0.2               | 0.05-0.5 | ●     |
|         | CCGW 09T302-1-NL-05  | 0.2    | 5°    | 0.03-0.2               | 0.05-0.5 | ●     |
|         | CCGW 09T304-1-NL-05  | 0.4    | 5°    | 0.03-0.2               | 0.05-0.5 | ●     |
|         | CCGW 09T308-1-NL-05  | 0.8    | 5°    | 0.03-0.2               | 0.05-0.5 | ●     |
|         | CCGW 120402-1-NL-05  | 0.2    | 5°    | 0.03-0.2               | 0.05-0.5 | ●     |
|         | CCGW 120404-1-NL-05  | 0.4    | 5°    | 0.03-0.2               | 0.05-0.5 | ●     |
|         | CCGW 120408-1-NL-05  | 0.8    | 5°    | 0.03-0.2               | 0.05-0.5 | ●     |
|         | CCGW 060202 -2-NL-05 | 0.2    | 5°    | 0.03-0.2               | 0.05-0.5 | ●     |
|         | CCGW 060204 -2-NL-05 | 0.4    | 5°    | 0.03-0.2               | 0.05-0.5 | ●     |
|         | CCGW 060208 -2-NL-05 | 0.8    | 5°    | 0.03-0.2               | 0.05-0.5 | ●     |
|         | CCGW 09T302 -2-NL-05 | 0.2    | 5°    | 0.03-0.2               | 0.05-0.5 | ●     |
|         | CCGW 09T304 -2-NL-05 | 0.4    | 5°    | 0.03-0.2               | 0.05-0.5 | ●     |
|         | CCGW 09T308 -2-NL-05 | 0.8    | 5°    | 0.03-0.2               | 0.05-0.5 | ●     |
|         | CCGW 120402 -2-NL-05 | 0.2    | 5°    | 0.03-0.2               | 0.05-0.5 | ●     |
|         | CCGW 120404 -2-NL-05 | 0.4    | 5°    | 0.03-0.2               | 0.05-0.5 | ●     |
|         | CCGW 120408 -2-NL-05 | 0.8    | 5°    | 0.03-0.2               | 0.05-0.5 | ●     |

**Positive 55° (DC)**



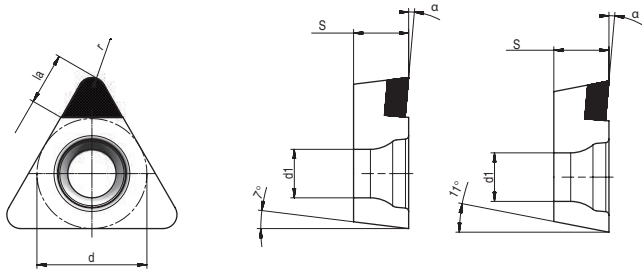
| Dimensions (mm) |      |      |     |     |
|-----------------|------|------|-----|-----|
| Type            | d    | s    | la  | d1  |
| DC_0702_        | 6.35 | 2.38 | 3.0 | 2.8 |
| DC_11T3_        | 9.52 | 3.97 | 3.0 | 4.4 |

| Inserts | Type                | r<br>(mm) | α<br>(°) | Recommended parameters |            | Grade |
|---------|---------------------|-----------|----------|------------------------|------------|-------|
|         |                     |           |          | f<br>(mm/rev)          | ap<br>(mm) | PD20  |
|         | DCGW 070202-1-NL-05 | 0.2       | 5°       | 0.03-0.2               | 0.05-0.5   | ●     |
|         | DCGW 070204-1-NL-05 | 0.4       | 5°       | 0.03-0.2               | 0.05-0.5   | ●     |
|         | DCGW 070208-1-NL-05 | 0.8       | 5°       | 0.03-0.2               | 0.05-0.5   | ●     |
|         | DCGW 11T302-1-NL-05 | 0.2       | 5°       | 0.03-0.2               | 0.05-0.5   | ●     |
|         | DCGW 11T304-1-NL-05 | 0.4       | 5°       | 0.03-0.2               | 0.05-0.5   | ●     |
|         | DCGW 11T308-1-NL-05 | 0.8       | 5°       | 0.03-0.2               | 0.05-0.5   | ●     |
|         | DCGW 070202-2-NL-05 | 0.2       | 5°       | 0.03-0.2               | 0.05-0.5   | ●     |
|         | DCGW 070204-2-NL-05 | 0.4       | 5°       | 0.03-0.2               | 0.05-0.5   | ●     |
|         | DCGW 070208-2-NL-05 | 0.8       | 5°       | 0.03-0.2               | 0.05-0.5   | ●     |
|         | DCGW 11T302-2-NL-05 | 0.2       | 5°       | 0.03-0.2               | 0.05-0.5   | ●     |
|         | DCGW 11T304-2-NL-05 | 0.4       | 5°       | 0.03-0.2               | 0.05-0.5   | ●     |
|         | DCGW 11T308-2-NL-05 | 0.8       | 5°       | 0.03-0.2               | 0.05-0.5   | ●     |
|         |                     |           |          |                        |            |       |
|         |                     |           |          |                        |            |       |
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|         |                     |           |          |                        |            |       |

Marked: ● Stock available ○ Non-stocked standard

Turning inserts

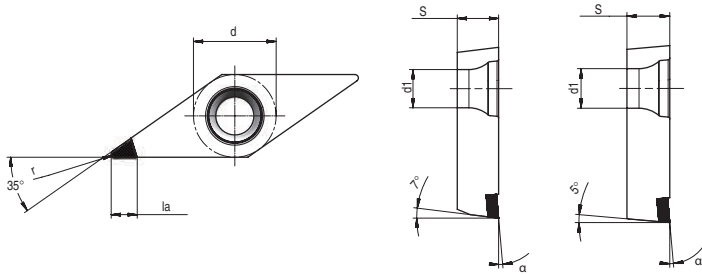
Positive 60° (T)



| Dimensions (mm) |      |      |     |     |
|-----------------|------|------|-----|-----|
| Type            | d    | s    | la  | d1  |
| TC_0802_        | 4.76 | 2.38 | 3.0 | 2.4 |
| TC_1103_        | 6.35 | 3.18 | 3.0 | 2.8 |
| TC_1604_        | 9.52 | 4.76 | 3.0 | 4.4 |
| TP_0802_        | 4.76 | 2.38 | 3.0 | 2.4 |
| TP_1604_        | 9.52 | 4.76 | 3.0 | 4.4 |

| Inserts | Type                | r (mm) | α (°) | Recommended parameters |          | Grade |
|---------|---------------------|--------|-------|------------------------|----------|-------|
|         |                     |        |       | f (mm/rev)             | ap (mm)  |       |
|         | TCGW 080202-1-NL-05 | 0.2    | 5°    | 0.03-0.2               | 0.05-0.5 | ●     |
|         | TCGW 080204-1-NL-05 | 0.4    | 5°    | 0.03-0.2               | 0.05-0.5 | ●     |
|         | TCGW 080208-1-NL-05 | 0.8    | 5°    | 0.03-0.2               | 0.05-0.5 | ●     |
|         | TCGW 110202-1-NL-05 | 0.2    | 5°    | 0.03-0.2               | 0.05-0.5 | ●     |
|         | TCGW 110204-1-NL-05 | 0.4    | 5°    | 0.03-0.2               | 0.05-0.5 | ●     |
|         | TCGW 110302-1-NL-05 | 0.2    | 5°    | 0.03-0.2               | 0.05-0.5 | ●     |
|         | TCGW 110304-1-NL-05 | 0.4    | 5°    | 0.03-0.2               | 0.05-0.5 | ●     |
|         | TCGW 110308-1-NL-05 | 0.8    | 5°    | 0.03-0.2               | 0.05-0.5 | ●     |
|         | TCGW 160402-1-NL-05 | 0.2    | 5°    | 0.03-0.2               | 0.05-0.5 | ●     |
|         | TCGW 160404-1-NL-05 | 0.4    | 5°    | 0.03-0.2               | 0.05-0.5 | ●     |
|         | TCGW 160408-1-NL-05 | 0.8    | 5°    | 0.03-0.2               | 0.05-0.5 | ●     |
|         | TCGW 080202-3-NL-05 | 0.2    | 5°    | 0.03-0.2               | 0.05-0.5 | ●     |
|         | TCGW 080204-3-NL-05 | 0.4    | 5°    | 0.03-0.2               | 0.05-0.5 | ●     |
|         | TCGW 080208-3-NL-05 | 0.8    | 5°    | 0.03-0.2               | 0.05-0.5 | ●     |
|         | TCGW 110302-3-NL-05 | 0.2    | 5°    | 0.03-0.2               | 0.05-0.5 | ●     |
|         | TCGW 110304-3-NL-05 | 0.4    | 5°    | 0.03-0.2               | 0.05-0.5 | ●     |
|         | TCGW 110308-3-NL-05 | 0.8    | 5°    | 0.03-0.2               | 0.05-0.5 | ●     |
|         | TCGW 160402-3-NL-05 | 0.2    | 5°    | 0.03-0.2               | 0.05-0.5 | ●     |
|         | TCGW 160404-3-NL-05 | 0.4    | 5°    | 0.03-0.2               | 0.05-0.5 | ●     |
|         | TPGW 080202-1-NL-05 | 0.2    | 5°    | 0.03-0.2               | 0.05-0.5 | ●     |
|         | TPGW 080204-1-NL-05 | 0.4    | 5°    | 0.03-0.2               | 0.05-0.5 | ●     |
|         | TPGW 080208-1-NL-05 | 0.8    | 5°    | 0.03-0.2               | 0.05-0.5 | ●     |
|         | TPGW 160402-1-NL-05 | 0.2    | 5°    | 0.03-0.2               | 0.05-0.5 | ●     |
|         | TPGW 160404-1-NL-05 | 0.4    | 5°    | 0.03-0.2               | 0.05-0.5 | ●     |
|         | TPGW 160404-1-NL-05 | 0.8    | 5°    | 0.03-0.2               | 0.05-0.5 | ●     |
|         | TPGW 080202-3-NL-05 | 0.2    | 5°    | 0.03-0.2               | 0.05-0.5 | ●     |
|         | TPGW 080204-3-NL-05 | 0.4    | 5°    | 0.03-0.2               | 0.05-0.5 | ●     |
|         | TPGW 080208-3-NL-05 | 0.8    | 5°    | 0.03-0.2               | 0.05-0.5 | ●     |
|         | TPGW 160402-3-NL-05 | 0.2    | 5°    | 0.03-0.2               | 0.05-0.5 | ●     |
|         | TPGW 160404-3-NL-05 | 0.4    | 5°    | 0.03-0.2               | 0.05-0.5 | ●     |
|         | TPGW 160408-3-NL-05 | 0.8    | 5°    | 0.03-0.2               | 0.05-0.5 | ●     |

**Positive 35° (V)**



| Dimensions (mm) |      |      |     |     |
|-----------------|------|------|-----|-----|
| Type            | d    | s    | la  | d1  |
| VB_1103_        | 6.35 | 3.18 | 3.0 | 2.8 |
| VB_1604_        | 9.52 | 4.76 | 3.0 | 4.4 |
| VC_1103_        | 6.35 | 3.18 | 3.0 | 2.8 |
| VC_1604_        | 9.52 | 4.76 | 3.0 | 4.4 |

| Inserts | Type                       | r (mm) | $\alpha$ (°) | Recommended parameters |            | Grade |
|---------|----------------------------|--------|--------------|------------------------|------------|-------|
|         |                            |        |              | f (mm/rev)             | $a_p$ (mm) | PD20  |
|         | <b>VBGW 110302-1-NL-05</b> | 0.2    | 5°           | 0.03-0.2               | 0.05-0.5   | ●     |
|         | <b>VBGW 110304-1-NL-05</b> | 0.4    | 5°           | 0.03-0.2               | 0.05-0.5   | ●     |
|         | <b>VBGW 160402-1-NL-05</b> | 0.2    | 5°           | 0.03-0.2               | 0.05-0.5   | ●     |
|         | <b>VBGW 160404-1-NL-05</b> | 0.4    | 5°           | 0.03-0.2               | 0.05-0.5   | ●     |
|         | <b>VBGW 110302-2-NL-05</b> | 0.2    | 5°           | 0.03-0.2               | 0.05-0.5   | ●     |
|         | <b>VBGW 110304-2-NL-05</b> | 0.4    | 5°           | 0.03-0.2               | 0.05-0.5   | ●     |
|         | <b>VBGW 160402-2-NL-05</b> | 0.2    | 5°           | 0.03-0.2               | 0.05-0.5   | ●     |
|         | <b>VBGW 160404-2-NL-05</b> | 0.4    | 5°           | 0.03-0.2               | 0.05-0.5   | ●     |
|         | <b>VCGW 110302-1-NL-05</b> | 0.2    | 5°           | 0.03-0.2               | 0.05-0.5   | ●     |
|         | <b>VCGW 110304-1-NL-05</b> | 0.4    | 5°           | 0.03-0.2               | 0.05-0.5   | ●     |
|         | <b>VCGW 160402-1-NL-05</b> | 0.2    | 5°           | 0.03-0.2               | 0.05-0.5   | ●     |
|         | <b>VCGW 160404-1-NL-05</b> | 0.4    | 5°           | 0.03-0.2               | 0.05-0.5   | ●     |
|         | <b>VCGW 110302-2-NL-05</b> | 0.2    | 5°           | 0.03-0.2               | 0.05-0.5   | ●     |
|         | <b>VCGW 110304-2-NL-05</b> | 0.4    | 5°           | 0.03-0.2               | 0.05-0.5   | ●     |
|         | <b>VCGW 160402-2-NL-05</b> | 0.2    | 5°           | 0.03-0.2               | 0.05-0.5   | ●     |
|         | <b>VCGW 160404-2-NL-05</b> | 0.4    | 5°           | 0.03-0.2               | 0.05-0.5   | ●     |
|         |                            |        |              |                        |            |       |
|         |                            |        |              |                        |            |       |
|         |                            |        |              |                        |            |       |
|         |                            |        |              |                        |            |       |
|         |                            |        |              |                        |            |       |
|         |                            |        |              |                        |            |       |
|         |                            |        |              |                        |            |       |
|         |                            |        |              |                        |            |       |
|         |                            |        |              |                        |            |       |
|         |                            |        |              |                        |            |       |
|         |                            |        |              |                        |            |       |
|         |                            |        |              |                        |            |       |
|         |                            |        |              |                        |            |       |
|         |                            |        |              |                        |            |       |
|         |                            |        |              |                        |            |       |
|         |                            |        |              |                        |            |       |
|         |                            |        |              |                        |            |       |
|         |                            |        |              |                        |            |       |
|         |                            |        |              |                        |            |       |

Marked: ● Stock available ○ Non-stocked standard



# ACHTTECK

КОРУН  
CORUN

[www.co-run.ru](http://www.co-run.ru)



## CUTTING TOOL CATALOGUE

---

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Grooving Tool Holder

MTH

**Grooving Holder Denomination System**


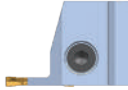
|          |          |          |          |          |           |           |          |          |            |          |           |          |           |          |           |
|----------|----------|----------|----------|----------|-----------|-----------|----------|----------|------------|----------|-----------|----------|-----------|----------|-----------|
| <b>A</b> | <b>G</b> | <b>U</b> | <b>E</b> | <b>R</b> | <b>32</b> | <b>25</b> | <b>-</b> | <b>4</b> | <b>T25</b> | <b>-</b> | <b>40</b> | <b>-</b> | <b>80</b> | <b>-</b> | <b>SW</b> |
| 1        | 2        | 3        | 4        | 5        | 6         | 7         | 8        | 9        | 10         | 11       | 12        | 13       |           |          |           |

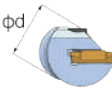
| 1-Company name |
|----------------|
| ACHTECK        |


| 2-Application |          |
|---------------|----------|
| <b>G</b>      | Grooving |
| <b>T</b>      | Turning  |


| 3- Shape of holder head |
|-------------------------|
| S: Straight-180°        |
| U: Under cut-45°        |
| P: Perpendicular-90°    |


| 4-Machining type |
|------------------|
| E: External      |
| I: Internal      |
| F: Facing        |

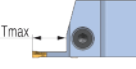
| 5-Hand of tool  |               |
|---|---------------|
|   | L: Left hand  |
|  | R: Right hand |

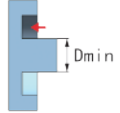
| 6-Holder diameter   |                               |
|---|-------------------------------|
|  $\phi d$ | 20=20mm<br>25=25mm<br>32=32mm |

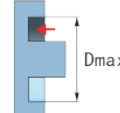
| 7-Holder height  |                               |
|--|-------------------------------|
|  h | 20=20mm<br>25=25mm<br>32=32mm |

| 8-Holder width  |                               |
|---|-------------------------------|
|  b | 20=20mm<br>25=25mm<br>32=32mm |

| 9-Insert width  |                         |
|---|-------------------------|
|  W | 2=2mm<br>3=3mm<br>4=4mm |

| 10-Ap  |
|--|
| T25=Max 25mm   |
|  T <sub>max</sub> |


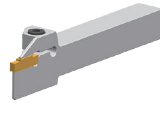


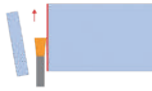
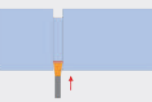
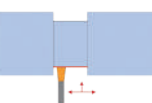



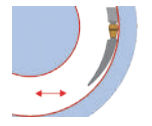

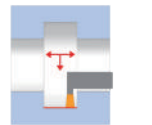
| 11-Minimum cutting diameter  |         |
|--|---------|
|  D <sub>min</sub> | 40=40mm |

| 12-Maximum cutting diameter  |         |
|--|---------|
|  D <sub>max</sub> | 80=80mm |

| 13-Special code   |
|---|
| SW: For swiss machine<br>OB: Outside bulge holders<br>C: With internal coolant<br>D: Reinforced holders |

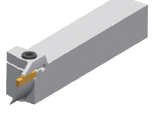
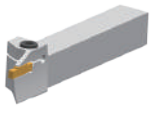
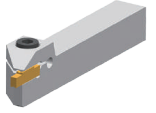
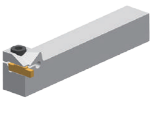
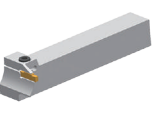
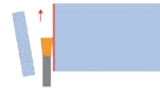
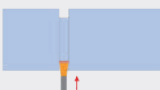
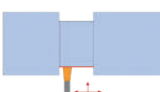


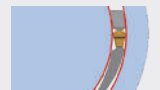
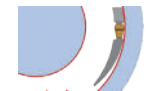

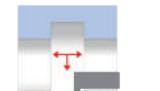
Grooving holders

Overview of Grooving Holders

| Application        |             | Holder  | External grooving   |   |   |   |
|--------------------|-------------|---|---|---|---|---|
|                    |             |   | ATSER/L   | ATSER/L-D   | ATSER/L-SW  | AGUER/L   |
|                    |             |   |  |  |  |  |
| Page               |             | P103  | P105  | P106  | P107  |   |
| External grooving  | Parting off |    | ●   | ●   | ●   |   |
|                    | Grooving    |    | ●   | ●   | ●   |   |
|                    | Turning     |   | ●   | ●   | ●   |   |
|                    | Profiling   |  | ●   | ●   | ●   |   |
|                    | Under cut   |  |   |   |   | ●   |
| Face grooving      | Grooving    |  |   |   |   |   |
|                    | Turning     |  |   |   |   |   |
| Internal machining | Grooving    |  |   |   |   |   |
|                    | Turning     |  |   |   |   |   |

Marked: ● Best choice





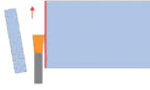

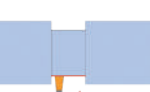


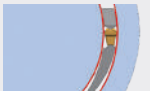
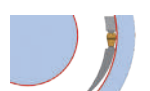


**Overview of Grooving Holders**

| Application        |             | Holder  | Face grooving   |   |  |   |   |
|--------------------|-------------|---|---|---|--|---|---|
|                    |             |   | ATSFR/L   | ATSFR/L-OB  | AGSFR/L  | AGPFR/L   | ATPFR/L   |
|                    |             |   |  |  |  |  |  |
| Page               |             | P108  | P109  | P110  | P111   | P112  |   |
| External grooving  | Parting off |    |   |   |  |   |   |
|                    | Grooving    |    |   |   |  | ●   | ●   |
|                    | Turning     |   |   |   |  | ○   | ○   |
|                    | Profiling   |  |   |   |  |   |   |
|                    | Under cut   |  |   |   |  |   |   |
| Face grooving      | Grooving    |  | ●   | ●   | ●  | ●   | ●   |
|                    | Turning     |  | ●   | ●   | ●  | ●   | ●   |
| Internal machining | Grooving    |  |   |   |  |   |   |
|                    | Turning     |  |   |   |  |   |   |

Marked: ● Best choice

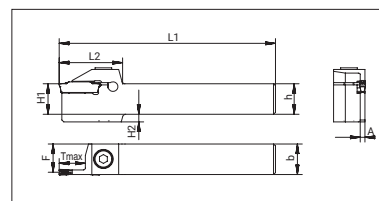
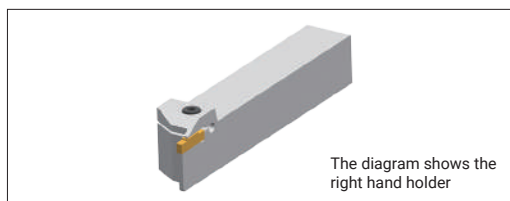
Grooving holders

Overview of Grooving Holders

| Application        |             | Holder  | Internal machining  |   |   |   |
|--------------------|-------------|---|---|---|---|---|
|                    |             |   | ATPIR/L   | ATSIR/L   | AGSIR/L   | AGUIR/L   |
|                    |             |   |  |  |  |  |
| Page               |             | P113  | P114  | P115  | P116  |   |
| External grooving  | Parting off |    |   |   |   |   |
|                    | Grooving    |    |   |   |   |   |
|                    | Turning     |   |   |   |   |   |
|                    | Profiling   |  |   |   |   |   |
|                    | Under cut   |  |   |   |   | ●   |
| Face grooving      | Grooving    |  |   | ●   | ●   |   |
|                    | Turning     |  |   | ●   | ●   |   |
| Internal machining | Grooving    |  | ●   |   |   |   |
|                    | Turning     |  | ●   |   |   |   |

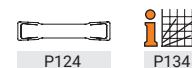
Marked: ● Best choice

**ATSER/L External Turning and Grooving Holder**





| Product code |           | Dimension(mm) |    |    |     |     |     |       |       |      | Inserts*    |
|--------------|-----------|---------------|----|----|-----|-----|-----|-------|-------|------|-------------|
|              |           | h             | b  | H1 | H2  | A   | L1  | L2    | F     | Tmax |             |
| ATSER/L      | 1616-2T08 | 16            | 16 | 16 | 4   | 1.8 | 110 | 32    | 15.1  | 8    | ACD/ACS/ATD |
|              | 1616-2T12 | 16            | 16 | 16 | 4   | 1.8 | 110 | 32    | 15.1  | 12   |             |
|              | 1616-2T17 | 16            | 16 | 16 | 4   | 1.8 | 110 | 38    | 15.1  | 17   |             |
|              | 2020-2T08 | 20            | 20 | 20 | 0   | 1.8 | 125 | 32    | 19.1  | 8    |             |
|              | 2020-2T12 | 20            | 20 | 20 | 0   | 1.8 | 125 | 32    | 19.1  | 12   |             |
|              | 2020-2T17 | 20            | 20 | 20 | 0   | 1.8 | 125 | 38    | 19.1  | 17   |             |
|              | 2525-2T08 | 25            | 25 | 25 | 0   | 1.8 | 150 | 32    | 24.1  | 8    |             |
|              | 2525-2T12 | 25            | 25 | 25 | 0   | 1.8 | 150 | 32    | 24.1  | 12   |             |
| 2525-2T17    | 25        | 25            | 25 | 0  | 1.8 | 150 | 38  | 24.1  | 17    |      |             |
| ATSER/L      | 1616-3T09 | 16            | 16 | 16 | 4   | 2.4 | 110 | 32    | 14.8  | 9    |             |
|              | 1616-3T12 | 16            | 16 | 16 | 4   | 2.4 | 110 | 32    | 14.8  | 12   |             |
|              | 1616-3T20 | 16            | 16 | 16 | 4   | 2.4 | 110 | 38    | 14.8  | 20   |             |
|              | 2020-3T09 | 20            | 20 | 20 | 0   | 2.4 | 125 | 32    | 18.8  | 9    |             |
|              | 2020-3T12 | 20            | 20 | 20 | 0   | 2.4 | 125 | 32    | 18.8  | 12   |             |
|              | 2020-3T20 | 20            | 20 | 20 | 0   | 2.4 | 125 | 38    | 18.8  | 20   |             |
|              | 2525-3T09 | 25            | 25 | 25 | 0   | 2.4 | 150 | 32    | 23.8  | 9    |             |
|              | 2525-3T12 | 25            | 25 | 25 | 0   | 2.4 | 150 | 32    | 23.8  | 12   |             |
|              | 2525-3T20 | 25            | 25 | 25 | 0   | 2.4 | 150 | 38    | 23.8  | 20   |             |
| 2525-3T25    | 25        | 25            | 25 | 0  | 2.4 | 150 | 45  | 23.8  | 25    |      |             |
| ATSER/L      | 1616-4T10 | 16            | 16 | 16 | 4   | 3.0 | 110 | 32    | 14.5  | 10   |             |
|              | 1616-4T15 | 16            | 16 | 16 | 4   | 3.0 | 110 | 32    | 14.5  | 15   |             |
|              | 1616-4T25 | 16            | 16 | 16 | 4   | 3.0 | 110 | 45    | 14.5  | 25   |             |
|              | 2020-4T10 | 20            | 20 | 20 | 0   | 3.0 | 125 | 32    | 18.5  | 10   |             |
|              | 2020-4T15 | 20            | 20 | 20 | 0   | 3.0 | 125 | 32    | 18.5  | 15   |             |
|              | 2020-4T25 | 20            | 20 | 20 | 0   | 3.0 | 125 | 45    | 18.5  | 25   |             |
|              | 2525-4T10 | 25            | 25 | 25 | 0   | 3.0 | 150 | 32    | 23.5  | 10   |             |
|              | 2525-4T15 | 25            | 25 | 25 | 0   | 3.0 | 150 | 32    | 23.5  | 15   |             |
|              | 2525-4T20 | 25            | 25 | 25 | 0   | 3   | 150 | 32    | 23.5  | 20   |             |
| 2525-4T25    | 25        | 25            | 25 | 0  | 3.0 | 150 | 45  | 23.5  | 25    |      |             |
| ATSER/L      | 2020-5T12 | 20            | 20 | 20 | 0   | 4   | 125 | 38    | 18.1  | 12   |             |
|              | 2020-5T20 | 20            | 20 | 20 | 0   | 4   | 125 | 38    | 18.1  | 20   |             |
|              | 2525-5T12 | 25            | 25 | 25 | 0   | 4   | 150 | 38    | 23.1  | 12   |             |
|              | 2525-5T20 | 25            | 25 | 25 | 0   | 4   | 150 | 38    | 23.1  | 20   |             |
|              | 2525-5T32 | 25            | 25 | 25 | 0   | 4   | 150 | 55    | 23    | 32   |             |
|              | 3232-5T12 | 32            | 32 | 32 | 0   | 3.9 | 170 | 35.8  | 30.08 | 12   |             |
|              | 3232-5T20 | 32            | 32 | 32 | 0   | 3.9 | 170 | 37.8  | 30.08 | 20   |             |
|              | 3232-5T25 | 32            | 32 | 32 | 0   | 3.9 | 170 | 44.8  | 30.08 | 25   |             |
| 3232-5T32    | 32        | 32            | 32 | 0  | 3.9 | 170 | 55  | 30.08 | 32    |      |             |
| ATSER/L      | 2020-6T12 | 20            | 20 | 20 | 0   | 5   | 125 | 38    | 17.6  | 12   |             |
|              | 2020-6T20 | 20            | 20 | 20 | 0   | 5   | 125 | 40    | 17.6  | 20   |             |
|              | 2525-6T12 | 25            | 25 | 25 | 7   | 5   | 150 | 38    | 22.6  | 12   |             |
|              | 2525-6T20 | 25            | 25 | 25 | 7   | 5   | 150 | 40    | 22.6  | 20   |             |
|              | 2525-6T32 | 25            | 25 | 25 | 7   | 5   | 150 | 55    | 22.5  | 32   |             |
|              | 3232-6T12 | 32            | 32 | 32 | 0   | 4.9 | 170 | 35.8  | 30.08 | 12   |             |
|              | 3232-6T20 | 32            | 32 | 32 | 0   | 4.9 | 170 | 39.8  | 30.08 | 20   |             |
|              | 3232-6T25 | 32            | 32 | 32 | 0   | 4.9 | 170 | 44.8  | 30.08 | 25   |             |
| 3232-6T32    | 32        | 32            | 32 | 0  | 4.9 | 170 | 55  | 30.08 | 32    |      |             |
| ATSER/L      | 2525-8T16 | 25            | 25 | 25 | 7   | 5.9 | 150 | 45    | 22.1  | 16   |             |
|              | 2525-8T25 | 25            | 25 | 25 | 7   | 5.9 | 150 | 45    | 22.1  | 25   |             |
|              | 2525-8T36 | 25            | 25 | 25 | 7   | 5.9 | 150 | 60    | 22.1  | 36   |             |
|              | 3232-8T25 | 32            | 32 | 32 | 0   | 5.9 | 170 | 45    | 29.1  | 25   |             |
|              | 3232-8T36 | 32            | 32 | 32 | 0   | 5.9 | 170 | 60    | 29.1  | 36   |             |

Inserts\*: ACD/ACS series are only applicable to grooving and parting off machining



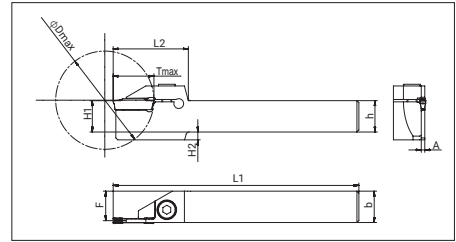
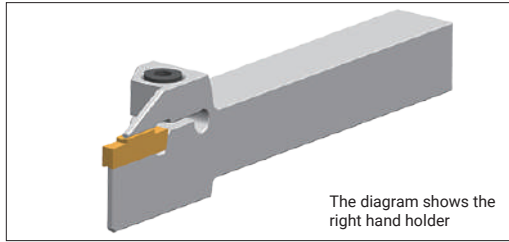
Grooving holders



| Product code     | Screw   | Wrench  |
|------------------|---|---|
|                  |  |  |
| ATSER/L 1616-2/3 | SH050160  | LT-H4   |
| ATSER/L 2020-2/3 | SH050200  | LT-H4   |
| ATSER/L 2525-2/3 | SH050250  | LT-H4   |
| ATSER/L 1616-4/5 | SH060160  | LT-H5   |
| ATSER/L 2020-4/5 | SH060200  | LT-H5   |
| ATSER/L 2525-4/5 | SH060250  | LT-H5   |
| ATSER/L 2020-6   | SH080200  | LT-H6   |
| ATSER/L 2525-6/8 | SH080250  | LT-H6   |
| ATSER/L 3232-5   | SH060250  | LT-H5   |
| ATSER/L 3232-6   | SH080250  | LT-H6   |
| ATSER/L 3232-8   | SH080250  | LT-H6   |



**ATSER/L-D Reinforced External Turning and Grooving Holder**



| Product code  |               | Dimension(mm) |    |    |     |     |     |      |      |      |      | Inserts*        |
|---------------|---------------|---------------|----|----|-----|-----|-----|------|------|------|------|-----------------|
|               |               | h             | b  | H1 | H2  | A   | L1  | L2   | F    | Tmax | Dmax |                 |
| ATSER/L       | 1010-2T15-D40 | 10            | 10 | 10 | 6   | 1.8 | 125 | 32   | 9.1  | 15   | 40   | ACD/ACS/<br>ATD |
|               | 1212-2T15-D40 | 12            | 12 | 12 | 4   | 1.8 | 125 | 32   | 11.1 | 15   | 40   |                 |
|               | 1616-2T20-D45 | 16            | 16 | 16 | 4   | 1.8 | 125 | 38   | 15.1 | 20   | 45   |                 |
|               | 2020-2T20-D45 | 20            | 20 | 20 | 0   | 1.8 | 125 | 38   | 19.1 | 20   | 45   |                 |
|               | 2525-2T20-D45 | 25            | 25 | 25 | 0   | 1.8 | 150 | 38   | 24.1 | 20   | 45   |                 |
|               | 1212-3T15-D40 | 12            | 12 | 12 | 4   | 2.4 | 125 | 32   | 10.8 | 15   | 40   |                 |
|               | 1616-3T20-D45 | 16            | 16 | 16 | 4   | 2.4 | 125 | 32   | 14.8 | 20   | 45   |                 |
|               | 2020-3T20-D45 | 20            | 20 | 20 | 0   | 2.4 | 125 | 32   | 18.8 | 20   | 45   |                 |
|               | 2525-3T20-D45 | 25            | 25 | 25 | 0   | 2.4 | 150 | 32   | 23.8 | 20   | 45   |                 |
| 2525-3T25-D60 | 25            | 25            | 25 | 7  | 2.4 | 150 | 45  | 23.8 | 25   | 60   |      |                 |

Inserts\*: ACD/ACS series are only applicable to grooving and parting off machining

| Product code     | Screw    | Wrench |
|------------------|----------|--------|
|                  |          |        |
| ATSER/L 1010-2   | SH050160 | LT-H4  |
| ATSER/L 1212-2/3 | SH050160 | LT-H4  |
| ATSER/L 1616-2   | SH050160 | LT-H4  |
| ATSER/L 1616-3   | SH050200 | LT-H4  |
| ATSER/L 2020-2/3 | SH050200 | LT-H4  |
| ATSER/L 2525-2/3 | SH050250 | LT-H4  |

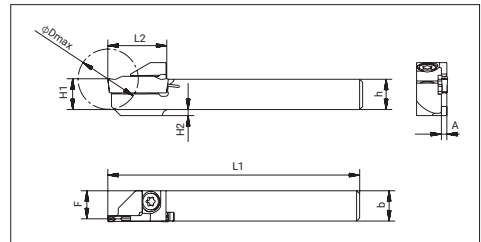
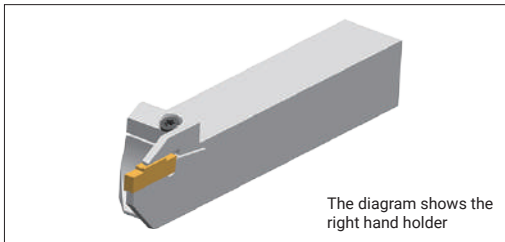
The max. cutting depth vs workpiece diameter.

| Product code |               | Workpiece diameter | Tmax |      |     |     |     |     |     |     |     |     |     |     |     |    |    |    |    |    |
|--------------|---------------|--------------------|------|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|----|----|----|----|
|              |               |                    | ≤8   | 9    | 10  | 11  | 12  | 13  | 14  | 15  | 17  | 18  | 19  | 20  | 21  | 22 | 23 | 24 | 25 |    |
| ATSER/L      | 1010-2T15-D40 | Dmax               | ∞    | ∞    | ∞   | 269 | 120 | 79  | 59  | 40  | -   | -   | -   | -   | -   | -  | -  | -  | -  |    |
|              | 1212-2T15-D40 |                    | ∞    | ∞    | ∞   | 269 | 120 | 79  | 59  | 40  | -   | -   | -   | -   | -   | -  | -  | -  | -  |    |
|              | 1616-2T20-D45 |                    | ∞    | ∞    | ∞   | ∞   | ∞   | 432 | 193 | 125 | 76  | 64  | 57  | 45  | -   | -  | -  | -  | -  |    |
|              | 2020-2T20-D45 |                    | ∞    | ∞    | ∞   | ∞   | ∞   | 432 | 193 | 125 | 76  | 64  | 57  | 45  | -   | -  | -  | -  | -  |    |
|              | 2525-2T20-D45 |                    | ∞    | 1468 | 339 | 193 | 136 | 106 | 87  | 75  | 60  | 56  | 52  | 45  | -   | -  | -  | -  | -  |    |
|              | 1212-3T15-D40 |                    | ∞    | ∞    | ∞   | 269 | 120 | 79  | 59  | 40  | -   | -   | -   | -   | -   | -  | -  | -  | -  | -  |
|              | 1616-3T20-D45 |                    | ∞    | ∞    | ∞   | ∞   | ∞   | 432 | 193 | 125 | 76  | 64  | 57  | 45  | -   | -  | -  | -  | -  | -  |
|              | 2020-3T20-D45 |                    | ∞    | ∞    | ∞   | ∞   | ∞   | 432 | 193 | 125 | 76  | 64  | 57  | 45  | -   | -  | -  | -  | -  | -  |
|              | 2525-3T20-D45 |                    | ∞    | 1468 | 339 | 193 | 136 | 106 | 87  | 75  | 60  | 56  | 52  | 45  | -   | -  | -  | -  | -  | -  |
|              | 2525-3T25-D60 |                    | ∞    | ∞    | ∞   | ∞   | ∞   | ∞   | ∞   | ∞   | 418 | 237 | 167 | 130 | 107 | 91 | 81 | 73 | 60 | 60 |

The diameter is infinite




**ATSER/L-SW External Turning and Grooving Holder for Swiss Lathe**



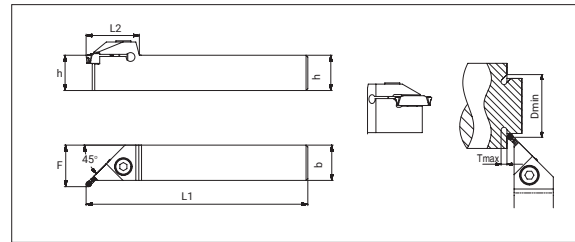
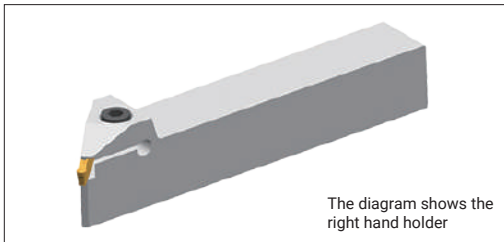
| Product code   |              | Dimension(mm) |    |    |    |     |     |    |      |      | Inserts*        |
|----------------|--------------|---------------|----|----|----|-----|-----|----|------|------|-----------------|
|                |              | h             | b  | H1 | H2 | A   | L1  | L2 | F    | Dmax |                 |
| <b>ATSER/L</b> | 1010-2D20-SW | 10            | 10 | 10 | 2  | 1.8 | 125 | 20 | 9.1  | 20   | ACD/ACS/<br>ATD |
|                | 1212-2D24-SW | 12            | 12 | 12 | 2  | 1.8 | 125 | 20 | 11.1 | 24   |                 |
|                | 1414-2D24-SW | 14            | 14 | 14 | 0  | 1.8 | 125 | 20 | 13.1 | 24   |                 |
|                | 1616-2D32-SW | 16            | 16 | 16 | 0  | 1.8 | 125 | 25 | 15.1 | 32   |                 |
|                | 1212-3D24-SW | 12            | 12 | 12 | 2  | 2.4 | 125 | 20 | 10.8 | 24   |                 |
|                | 1616-3D32-SW | 16            | 16 | 16 | 0  | 2.4 | 125 | 25 | 14.8 | 32   |                 |
|                | 1616-3D38-SW | 16            | 16 | 16 | 0  | 2.4 | 125 | 27 | 14.8 | 38   |                 |
|                | 2020-3D45-SW | 20            | 20 | 20 | 0  | 2.4 | 125 | 24 | 18.8 | 45   |                 |

Inserts\*: ACD/ACS series are only applicable to grooving and parting off machining


| Product code | Screw      | Wrench  |
|--------------|------------|---|
|              | ATSER/L-SW | <br>SP040125 |



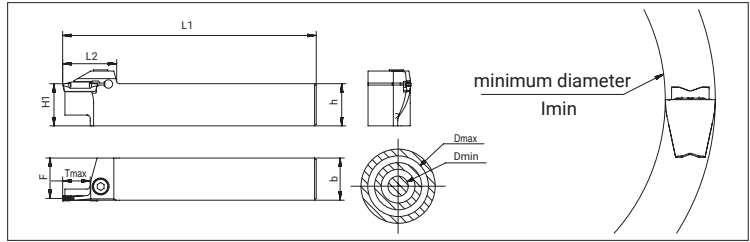
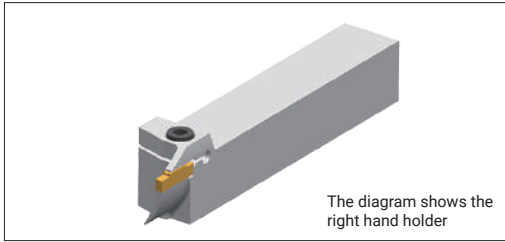
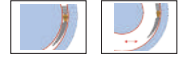
## AGUER/L External Under Cut Holder



| Product code | Insert Dimension (mm) | Dimension(mm) |    |    |    |     |      |      |      |    | Inserts* |
|--------------|-----------------------|---------------|----|----|----|-----|------|------|------|----|----------|
|              |                       | h             | b  | H1 | L1 | L2  | F    | Tmax | Dmin |    |          |
| AGUER/L      | 1616-3                | 2,3           | 16 | 16 | 16 | 110 | 29.5 | 18.8 | 3    | 60 | ATD      |
|              | 1616-4                | 4             | 16 | 16 | 16 | 110 | 29.5 | 18.8 | 3    | 55 |          |
|              | 2020-3                | 2,3           | 20 | 20 | 20 | 125 | 29.5 | 22.8 | 3    | 60 |          |
|              | 2020-4                | 4             | 20 | 20 | 20 | 125 | 29.5 | 22.8 | 3    | 55 |          |
|              | 2525-3                | 2,3           | 25 | 25 | 25 | 150 | 29.5 | 27.8 | 3    | 60 |          |
|              | 2525-4                | 4             | 25 | 25 | 25 | 150 | 29.5 | 27.8 | 3    | 55 |          |
|              | 2525-6                | 5,6           | 25 | 25 | 25 | 150 | 32.5 | 28.0 | 3.5  | 55 |          |

| Product code   | Screw    | Wrench  |
|----------------|----------|---|
|                |          |  |
| AGUER/L 1616-3 | SH050160 | LT-H4   |
| AGUER/L 2020-3 | SH050200 | LT-H4   |
| AGUER/L 2525-3 | SH050250 | LT-H4   |
| AGUER/L 1616-4 | SH060160 | LT-H5   |
| AGUER/L 2020-4 | SH060200 | LT-H5   |
| AGUER/L 2525-4 | SH060250 | LT-H5   |
| AGUER/L 2525-6 | SH060250 | LT-H5   |

ATSFR/L Face Grooving and Turning Holder



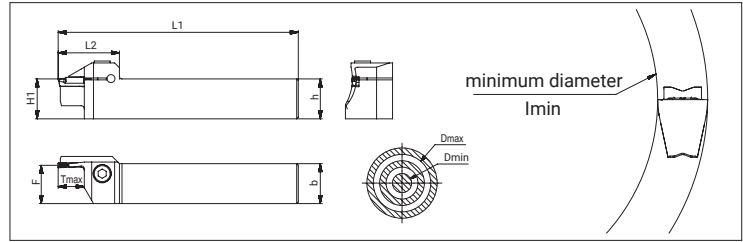
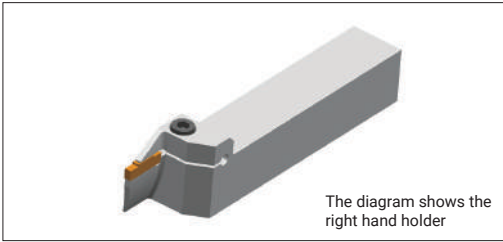
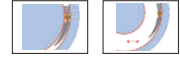
| Product code      | Dimension(mm)     |    |    |     |     |       |       |      |      | Inserts size (mm) | Minimum machining diameter of face grooving inserts Imin(mm) |    |        |    |    |    |    | Inserts* |                     |
|-------------------|-------------------|----|----|-----|-----|-------|-------|------|------|-------------------|--|----|--------|----|----|----|----|----------|---------------------|
|                   | h                 | b  | H1 | L1  | L2  | F     | Tmax  | Dmin | Dmax |                   | TS   | TM | Ground | RM | CS | CM | CH |          |                     |
| ATSFR/L           | 2525-3T10-35-45   | 25 | 25 | 25  | 150 | 32    | 23.95 | 10   | 35   | 45                | 3  | 24 | 24     | -  | -  | -  | -  | -        | ACD/<br>ACS/<br>ATD |
|                   | 2525-3T10-40-55   | 25 | 25 | 25  | 150 | 32    | 23.95 | 10   | 40   | 55                | 3  | 24 | 24     | -  | -  | -  | -  | -        |                     |
|                   | 2525-3T15-45-65   | 25 | 25 | 25  | 150 | 32    | 23.95 | 15   | 45   | 65                | 3  | 24 | 24     | 59 | 59 | -  | -  | -        |                     |
|                   | 2525-3T15-55-85   | 25 | 25 | 25  | 150 | 32    | 23.95 | 15   | 55   | 85                | 3  | 24 | 24     | 59 | 59 | 79 | 79 | 79       |                     |
|                   | 2525-4T15-35-50   | 25 | 25 | 25  | 150 | 32    | 23.55 | 15   | 35   | 50                | 4  | 22 | 22     | 42 | 42 | -  | 42 | 42       |                     |
|                   | 2525-4T15-45-65   | 25 | 25 | 25  | 150 | 32    | 23.55 | 15   | 45   | 65                | 4  | 22 | 22     | 42 | 42 | -  | 42 | 42       |                     |
|                   | 2525-4T15-55-85   | 25 | 25 | 25  | 150 | 32    | 23.55 | 15   | 55   | 85                | 4  | 22 | 22     | 42 | 42 | -  | 42 | 42       |                     |
|                   | 2525-5T20-50-80   | 25 | 25 | 25  | 150 | 40    | 23.05 | 20   | 50   | 80                | 5  | 20 | 20     | 40 | 40 | -  | 50 | 50       |                     |
|                   | 2525-5T20-70-110  | 25 | 25 | 25  | 150 | 40    | 23.05 | 20   | 70   | 110               | 5  | 20 | 20     | 40 | 40 | -  | 50 | 50       |                     |
|                   | 2525-5T20-100-150 | 25 | 25 | 25  | 150 | 40    | 23.05 | 20   | 100  | 150               | 5  | 20 | 20     | 40 | 40 | -  | 50 | 50       |                     |
|                   | 2525-5T20-140-200 | 25 | 25 | 25  | 150 | 40    | 23.05 | 20   | 140  | 200               | 5  | 20 | 20     | 40 | 40 | -  | 50 | 50       |                     |
|                   | 2525-6T20-50-85   | 25 | 25 | 25  | 150 | 40    | 22.55 | 20   | 50   | 85                | 6  | 18 | 18     | 38 | 38 | -  | 48 | 48       |                     |
|                   | 2525-6T20-75-150  | 25 | 25 | 25  | 150 | 40    | 22.55 | 20   | 75   | 150               | 6  | 18 | 18     | 38 | 38 | -  | 48 | 48       |                     |
|                   | 2525-6T20-140-250 | 25 | 25 | 25  | 150 | 40    | 22.55 | 20   | 140  | 250               | 6  | 18 | 18     | 38 | 38 | -  | 48 | 48       |                     |
| 2525-6T20-200-000 | 25                | 25 | 25 | 150 | 40  | 22.55 | 20    | 200  | ∞    | 6                 | 18   | 18 | 38     | 38 | -  | 48 | 48 |          |                     |

- 1.Inserts\*: ACD/ACS series are only applicable to grooving machining
- 2."-"Indicates that the insert is not a choice
- 3.Having selected the range of tool holder, please check the minimum face grooving machining diameter of the selected insert

| Product code   | Screw    | Wrench |
|----------------|----------|--------|
|                |          |        |
| ATSFR/L 2525-3 | SH050250 | LT-H4  |
| ATSFR/L 2525-4 | SH060250 | LT-H5  |
| ATSFR/L 2525-5 | SH080250 | LT-H6  |
| ATSFR/L 2525-6 | SH080250 | LT-H6  |



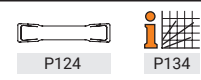
**ATSFR/L-OB Face Grooving and Turning Holder (Outside Bluge Type)**



| Product code         | Dimension(mm) |    |    |     |    |       |      |      |      | Minimum machining diameter of face grooving inserts lmin(mm) |    |        |    |    |    |    | Inserts* |
|----------------------|---------------|----|----|-----|----|-------|------|------|------|--|----|--------|----|----|----|----|----------|
|                      | h             | b  | H1 | L1  | L2 | F     | Tmax | Dmin | Dmax | TS   | TM | Ground | RM | CS | CM | CH |          |
| 2020-3T10-30-40-OB   | 20            | 20 | 20 | 140 | 31 | 18.95 | 10   | 30   | 40   | 24   | 24 | -      | -  | -  | -  | -  |          |
| 2020-3T10-35-50-OB   | 20            | 20 | 20 | 140 | 31 | 18.95 | 10   | 35   | 50   | 24   | 24 | -      | -  | -  | -  | -  |          |
| 2020-3T15-45-70-OB   | 20            | 20 | 20 | 140 | 35 | 18.95 | 15   | 45   | 70   | 24   | 24 | 59     | 59 | -  | -  | -  |          |
| 2020-3T15-65-100-OB  | 20            | 20 | 20 | 140 | 35 | 18.95 | 15   | 65   | 100  | 24   | 24 | 59     | 59 | 79 | 79 | 79 |          |
| 2020-4T10-20-30-OB   | 20            | 20 | 20 | 140 | 31 | 18.55 | 10   | 20   | 30   | 22   | 22 | -      | -  | -  | -  | -  |          |
| 2020-4T10-25-35-OB   | 20            | 20 | 20 | 140 | 31 | 18.55 | 10   | 25   | 35   | 22   | 22 | -      | -  | -  | -  | -  |          |
| 2020-4T16-30-45-OB   | 20            | 20 | 20 | 140 | 36 | 18.55 | 16   | 30   | 45   | 22   | 22 | -      | -  | -  | -  | -  |          |
| 2020-4T16-35-50-OB   | 20            | 20 | 20 | 140 | 36 | 18.55 | 16   | 35   | 50   | 22   | 22 | 42     | 42 | -  | 42 | 42 |          |
| 2020-4T16-45-70-OB   | 20            | 20 | 20 | 140 | 36 | 18.55 | 16   | 45   | 70   | 22   | 22 | 42     | 42 | -  | 42 | 42 |          |
| 2020-4T16-65-120-OB  | 20            | 20 | 20 | 140 | 36 | 18.55 | 16   | 65   | 120  | 22   | 22 | 42     | 42 | -  | 42 | 42 |          |
| 2020-4T16-115-200-OB | 20            | 20 | 20 | 140 | 36 | 18.55 | 16   | 115  | 200  | 22   | 22 | 42     | 42 | -  | 42 | 42 |          |
| 2525-3T10-35-50-OB   | 25            | 25 | 25 | 150 | 38 | 23.95 | 10   | 35   | 50   | 24   | 24 | -      | -  | -  | -  | -  |          |
| 2525-3T15-45-70-OB   | 25            | 25 | 25 | 150 | 38 | 23.95 | 15   | 45   | 70   | 24   | 24 | 59     | 59 | -  | -  | -  |          |
| 2525-3T15-65-100-OB  | 25            | 25 | 25 | 150 | 38 | 23.95 | 15   | 65   | 100  | 24   | 24 | 59     | 59 | 79 | 79 | 79 |          |
| 2525-4T10-25-35-OB   | 25            | 25 | 25 | 150 | 39 | 23.55 | 10   | 25   | 35   | 22   | 22 | -      | -  | -  | -  | -  |          |
| 2525-4T20-30-45-OB   | 25            | 25 | 25 | 150 | 39 | 23.55 | 20   | 30   | 45   | 22   | 22 | -      | -  | -  | -  | -  |          |
| 2525-4T20-35-50-OB   | 25            | 25 | 25 | 150 | 39 | 23.55 | 20   | 35   | 50   | 22   | 22 | 42     | 42 | -  | 42 | 42 |          |
| 2525-4T20-45-70-OB   | 25            | 25 | 25 | 150 | 39 | 23.55 | 20   | 45   | 70   | 22   | 22 | 42     | 42 | -  | 42 | 42 |          |
| 2525-4T20-65-125-OB  | 25            | 25 | 25 | 150 | 39 | 23.55 | 20   | 65   | 125  | 22   | 22 | 42     | 42 | -  | 42 | 42 |          |
| 2525-4T20-115-200-OB | 25            | 25 | 25 | 150 | 39 | 23.55 | 20   | 115  | 200  | 22   | 22 | 42     | 42 | -  | 42 | 42 |          |
| 2525-4T20-190-000-OB | 25            | 25 | 25 | 150 | 39 | 23.55 | 20   | 190  | ∞    | 22   | 22 | 42     | 42 | -  | 42 | 42 |          |
| 2525-5T25-50-80-OB   | 25            | 25 | 25 | 150 | 49 | 23.05 | 25   | 50   | 80   | 20   | 20 | 40     | 40 | -  | 50 | 50 |          |
| 2525-5T15-50-80-OB   | 25            | 25 | 25 | 150 | 41 | 23.05 | 15   | 50   | 80   | 20   | 20 | 40     | 40 | -  | 50 | 50 |          |
| 2525-5T25-70-110-OB  | 25            | 25 | 25 | 150 | 49 | 23.05 | 25   | 70   | 110  | 20   | 20 | 40     | 40 | -  | 50 | 50 |          |
| 2525-5T15-70-110-OB  | 25            | 25 | 25 | 150 | 49 | 23.05 | 15   | 70   | 110  | 20   | 20 | 40     | 40 | -  | 50 | 50 |          |
| 2525-5T25-100-150-OB | 25            | 25 | 25 | 150 | 49 | 23.05 | 25   | 100  | 150  | 20   | 20 | 40     | 40 | -  | 50 | 50 |          |
| 2525-5T25-140-200-OB | 25            | 25 | 25 | 150 | 49 | 23.05 | 25   | 140  | 200  | 20   | 20 | 40     | 40 | -  | 50 | 50 |          |
| 2525-5T25-190-000-OB | 25            | 25 | 25 | 150 | 49 | 23.05 | 25   | 190  | ∞    | 20   | 20 | 40     | 40 | -  | 50 | 50 |          |
| 2525-6T25-50-70-OB   | 25            | 25 | 25 | 150 | 49 | 22.55 | 25   | 50   | 70   | 18   | 18 | 38     | 38 | -  | 48 | 48 |          |
| 2525-6T25-60-100-OB  | 25            | 25 | 25 | 150 | 49 | 22.55 | 25   | 60   | 100  | 18   | 18 | 38     | 38 | -  | 48 | 48 |          |
| 2525-6T25-90-180-OB  | 25            | 25 | 25 | 150 | 49 | 22.55 | 25   | 90   | 180  | 18   | 18 | 38     | 38 | -  | 48 | 48 |          |
| 2525-6T25-170-400-OB | 25            | 25 | 25 | 150 | 49 | 22.55 | 25   | 170  | 400  | 18   | 18 | 38     | 38 | -  | 48 | 48 |          |
| 2525-6T25-390-000-OB | 25            | 25 | 25 | 150 | 49 | 22.55 | 25   | 390  | ∞    | 18   | 18 | 38     | 38 | -  | 48 | 48 |          |

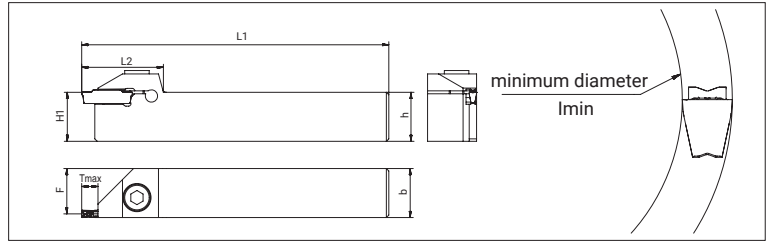
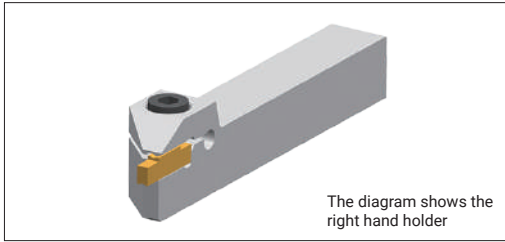
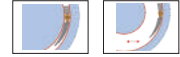
1. Inserts\*: ACD/ACS series are only applicable to grooving machining
2. "-" Indicates that the insert is not a choice
3. Having selected the range of tool holder, please check the minimum face grooving machining diameter of the selected insert

| Product code        | Screw    | Wrench |
|---------------------|----------|--------|
|                     |          |        |
| ATSFR/L-OB 2020-3/4 | SH060200 | LT-H5  |
| ATSFR/L-OB 2525-3   | SH060250 | LT-H5  |
| ATSFR/L-OB 2525-4   | SH060250 | LT-H5  |
| ATSFR/L-OB 2525-5   | SH080250 | LT-H6  |
| ATSFR/L-OB 2525-6   | SH080250 | LT-H6  |



Grooving holders

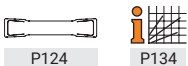
AGSFR/L External & Face Grooving and Turning Holder



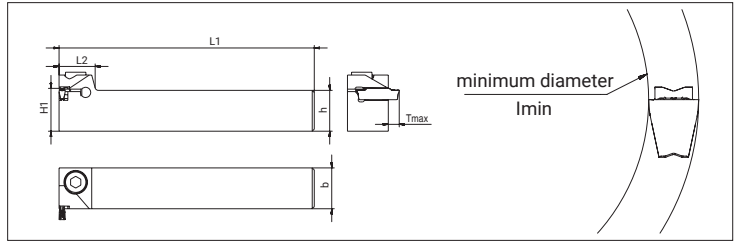
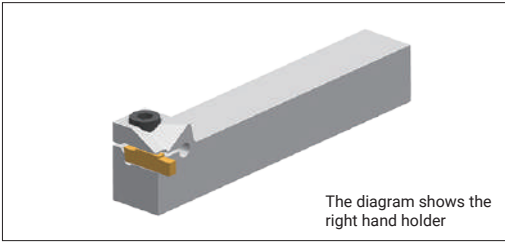
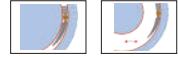
| Product code | Inserts size (mm) | Dimension(mm) |    |    |    |     |    |       |     | Minimum machining diameter of face grooving inserts lmin(mm) |        |     |     |     |     |     | Inserts*        |
|--------------|-------------------|---------------|----|----|----|-----|----|-------|-----|--|--------|-----|-----|-----|-----|-----|-----------------|
|              |                   | h             | b  | H1 | L1 | L2  | F  | Tmax  | TS  | TM   | Ground | RM  | CS  | CM  | CH  |     |                 |
| AGSFR/L      | 1616-4            | 2             | 16 | 16 | 16 | 110 | 32 | 14.55 | 4.6 | 196  | -      | 100 | 196 | 196 | 196 | 196 | ACD/ACS/<br>ATD |
|              |                   | 3             | 16 | 16 | 16 | 110 | 32 | 14.55 | 4.6 | 24   | 24     | 59  | 59  | 79  | 79  | 79  |                 |
|              |                   | 4             | 16 | 16 | 16 | 110 | 32 | 14.55 | 4.6 | 22   | 22     | 42  | 42  | -   | 42  | 42  |                 |
|              | 2020-4            | 2             | 20 | 20 | 20 | 125 | 32 | 18.55 | 4.6 | 196  | -      | 100 | 196 | 196 | 196 | 196 |                 |
|              |                   | 3             | 20 | 20 | 20 | 125 | 32 | 18.55 | 4.6 | 24   | 24     | 59  | 59  | 79  | 79  | 79  |                 |
|              |                   | 4             | 20 | 20 | 20 | 125 | 32 | 18.55 | 4.6 | 22   | 22     | 42  | 42  | -   | 42  | 42  |                 |
|              | 2020-6            | 5             | 20 | 20 | 20 | 125 | 38 | 17.58 | 4.6 | 20   | 20     | 40  | 40  | -   | 50  | 50  |                 |
|              |                   | 6             | 20 | 20 | 20 | 125 | 38 | 17.58 | 4.6 | 18   | 18     | 38  | 38  | -   | 48  | 48  |                 |
|              | 2525-4            | 2             | 25 | 25 | 25 | 150 | 38 | 23.55 | 4.6 | 196  | -      | 100 | 196 | 196 | 196 | 196 |                 |
|              |                   | 3             | 25 | 25 | 25 | 150 | 38 | 23.55 | 4.6 | 24   | 24     | 59  | 59  | 79  | 79  | 79  |                 |
|              |                   | 4             | 25 | 25 | 25 | 150 | 38 | 23.55 | 4.6 | 22   | 22     | 42  | 42  | -   | 42  | 42  |                 |
|              | 2525-6            | 5             | 25 | 25 | 25 | 150 | 38 | 22.58 | 4.6 | 20   | 20     | 40  | 40  | -   | 50  | 50  |                 |
|              |                   | 6             | 25 | 25 | 25 | 150 | 38 | 22.58 | 4.6 | 18   | 18     | 38  | 38  | -   | 48  | 48  |                 |

- 1.Inserts\*: ACD/ACS series are only applicable to grooving machining
- 2."-"Indicates that the insert is not a choice
- 3.Having selected the range of tool holder, please check the minimum face grooving machining diameter of the selected insert

| Product code | Screw    | Wrench |
|--------------|----------|--------|
|              |          |        |
| AGSFR/L 1616 | SH060160 | LT-H5  |
| AGSFR/L 2020 | SH060200 | LT-H5  |
| AGSFR/L 2525 | SH060250 | LT-H5  |





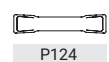
**AGPFR/L Face Grooving and Turning Holder**



| Product code |        | Inserts size (mm) | Dimension(mm) |    |    |     |    |      | Minimum machining diameter of face grooving inserts Imin(mm) |    |        |     |     |     |     | Inserts*    |             |             |
|--------------|--------|-------------------|---------------|----|----|-----|----|------|--|----|--------|-----|-----|-----|-----|-------------|-------------|-------------|
|              |        |                   | h             | b  | H1 | L1  | L2 | Tmax | TS   | TM | Ground | RM  | CS  | CM  | CH  |             |             |             |
| AGPFR/L      | 2020-4 | 2                 | 20            | 20 | 20 | 125 | 20 | 4.6  | 196  | -  | 100    | 196 | 196 | 196 | 196 | ACD/ACS/ATD |             |             |
|              |        | 3                 | 20            | 20 | 20 | 125 | 20 | 4.6  | 24   | 24 | 59     | 59  | 79  | 79  | 79  |             |             |             |
|              |        | 4                 | 20            | 20 | 20 | 125 | 20 | 4.6  | 22   | 22 | 42     | 42  | -   | 42  | 42  |             |             |             |
|              | 2525-4 | 2                 | 25            | 25 | 25 | 150 | 20 | 4.6  | 196  | -  | 100    | 196 | 196 | 196 | 196 |             | ACD/ACS/ATD |             |
|              |        | 3                 | 25            | 25 | 25 | 150 | 20 | 4.6  | 24   | 24 | 59     | 59  | 79  | 79  | 79  |             |             |             |
|              |        | 4                 | 25            | 25 | 25 | 150 | 20 | 4.6  | 22   | 22 | 42     | 42  | -   | 42  | 42  |             |             |             |
|              | 2525-6 | 5                 | 25            | 25 | 25 | 150 | 25 | 4.6  | 20   | 20 | 40     | 40  | -   | 50  | 50  |             |             | ACD/ACS/ATD |
|              |        | 6                 | 25            | 25 | 25 | 150 | 25 | 4.6  | 18   | 18 | 38     | 38  | -   | 48  | 48  |             |             |             |

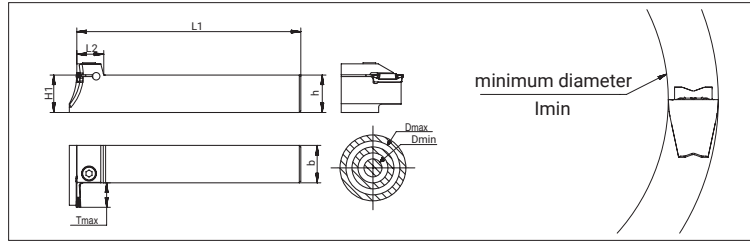
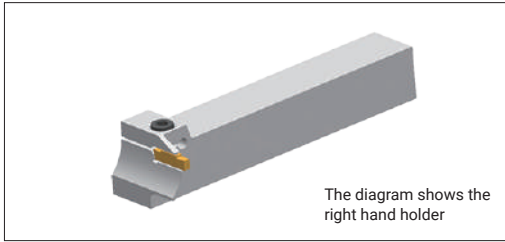
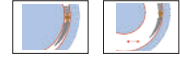
- 1.Inserts\*: ACD/ACS series are only applicable to grooving machining
- 2."-"Indicates that the insert is not a choice
- 3.Having selected the range of tool holder, please check the minimum face grooving machining diameter of the selected insert

| Product code | Screw   | Wrench  |
|--------------|---|---|
|              |  |  |
| AGPFR/L 2020 | SH060200  | LT-H5   |
| AGPFR/L 2525 | SH060250  | LT-H5   |





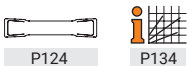
ATPFR/L Face Grooving and Turning Holder



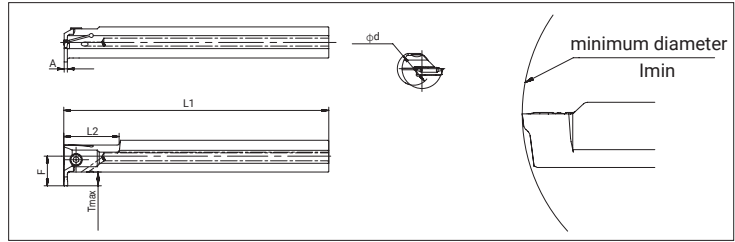
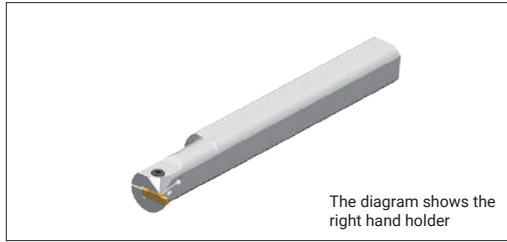
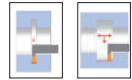
| Product code              | Inserts block size (mm) | Dimension(mm) |    |     |      |      |      |      |    | Minimum machining diameter of face grooving inserts lmin(mm) |        |    |    |    |    |                     | Inserts* |
|---------------------------|-------------------------|---------------|----|-----|------|------|------|------|----|--|--------|----|----|----|----|---------------------|----------|
|                           |                         | h             | b  | L1  | L2   | Tmax | Dmin | Dmax | TS | TM   | Ground | RM | CS | CM | CH |                     |          |
| ATPFR/L 2525-3T10-30-40   | 3                       | 25            | 25 | 150 | 18   | 10   | 30   | 40   | 24 | 24   | -      | -  | -  | -  | -  | ACD/<br>ACS/<br>ATD |          |
| ATPFR/L 2525-3T10-35-50   | 3                       | 25            | 25 | 150 | 18   | 10   | 35   | 50   | 24 | 24   | -      | -  | -  | -  | -  |                     |          |
| ATPFR/L 2525-3T15-45-60   | 3                       | 25            | 25 | 150 | 18   | 15   | 45   | 60   | 24 | 24   | -      | -  | -  | -  | -  |                     |          |
| ATPFR/L 2525-3T15-55-85   | 3                       | 25            | 25 | 150 | 18   | 15   | 55   | 85   | 24 | 24   | 59     | 59 | 79 | 79 | 79 |                     |          |
| ATPFR/L 2525-4T12-25-40   | 4                       | 25            | 25 | 150 | 18.5 | 12   | 25   | 40   | 22 | 22   | -      | -  | -  | -  | -  |                     |          |
| ATPFR/L 2525-4T15-35-50   | 4                       | 25            | 25 | 150 | 18.5 | 15   | 35   | 50   | 22 | 22   | 42     | 42 | -  | 42 | 42 |                     |          |
| ATPFR/L 2525-4T15-45-60   | 4                       | 25            | 25 | 150 | 18.5 | 15   | 45   | 60   | 22 | 22   | 42     | 42 | -  | 42 | 42 |                     |          |
| ATPFR/L 2525-4T15-55-85   | 4                       | 25            | 25 | 150 | 18.5 | 15   | 55   | 85   | 22 | 22   | 42     | 42 | -  | 42 | 42 |                     |          |
| ATPFR/L 2525-5T20-50-80   | 5                       | 25            | 25 | 150 | 22   | 20   | 50   | 80   | 20 | 20   | 40     | 40 | -  | 50 | 50 |                     |          |
| ATPFR/L 2525-5T20-70-110  | 5                       | 25            | 25 | 150 | 22   | 20   | 70   | 110  | 20 | 20   | 40     | 40 | -  | 50 | 50 |                     |          |
| ATPFR/L 2525-5T20-100-150 | 5                       | 25            | 25 | 150 | 22   | 20   | 100  | 150  | 20 | 20   | 40     | 40 | -  | 50 | 50 |                     |          |
| ATPFR/L 2525-5T20-140-200 | 5                       | 25            | 25 | 150 | 22   | 20   | 140  | 200  | 20 | 20   | 40     | 40 | -  | 50 | 50 |                     |          |
| ATPFR/L 2525-5T20-190-000 | 5                       | 25            | 25 | 150 | 22   | 20   | 190  | ∞    | 20 | 20   | 40     | 40 | -  | 50 | 50 |                     |          |
| ATPFR/L 2525-6T20-50-85   | 6                       | 25            | 25 | 150 | 22   | 20   | 50   | 85   | 18 | 18   | 38     | 38 | -  | 48 | 48 |                     |          |
| ATPFR/L 2525-6T20-75-150  | 6                       | 25            | 25 | 150 | 22   | 20   | 75   | 150  | 18 | 18   | 38     | 38 | -  | 48 | 48 |                     |          |
| ATPFR/L 2525-6T20-140-250 | 6                       | 25            | 25 | 150 | 22   | 20   | 140  | 250  | 18 | 18   | 38     | 38 | -  | 48 | 48 |                     |          |
| ATPFR/L 2525-6T20-240-000 | 6                       | 25            | 25 | 150 | 22   | 20   | 240  | ∞    | -  | 48   | 48     | 18 | 18 | 38 | 38 |                     |          |

1. Inserts\*: ACD/ACS series are only applicable to grooving machining
2. "-" Indicates that the insert is not a choice
3. Having selected the range of tool holder, please check the minimum face grooving machining diameter of the selected insert

| Product code  | Screw    | Wrench |
|---------------|----------|--------|
|               |          |        |
| ATPFR/L2525-3 | SH050250 | LT-H4  |
| ATPFR/L2525-4 | SH060250 | LT-H5  |
| ATPFR/L2525-5 | SH080250 | LT-H6  |
| ATPFR/L2525-6 | SH080250 | LT-H6  |



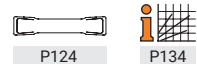
**ATPIR/L Internal Grooving, Turning and Profiling Holder**



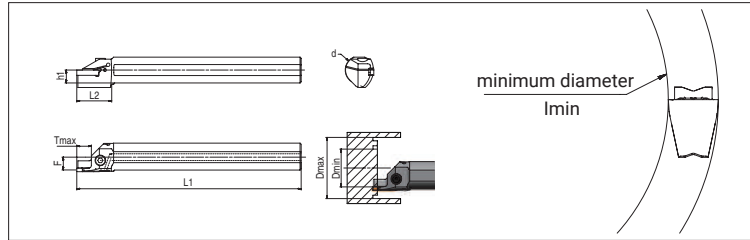
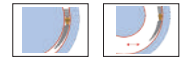
| Product code | Dimension(mm) |     |     |      |      |      |      | Minimum machining diameter of internal grooving inserts lmin(mm) |    |        |    |    |    |    |    | Inserts* |                 |
|--------------|---------------|-----|-----|------|------|------|------|--|----|--------|----|----|----|----|----|----------|-----------------|
|              | d             | L1  | L2  | F    | A    | Tmax | Dmin | TS   | TM | Ground | RM | RA | CS | CM | CH |          |                 |
| ATPIR/L      | 20-2T6-25-C   | 20  | 160 | 40   | 15.8 | 1.6  | 6    | 25   | 25 | -      | 25 | 25 | -  | -  | -  | -        | ACD/ACS/<br>ATD |
|              | 25-2T5-25-C   | 25  | 200 | 40   | 17.5 | 1.6  | 5    | 25   | 25 | -      | 25 | 25 | -  | -  | -  | -        |                 |
|              | 32-2T5-30-C   | 32  | 250 | 40   | 19.8 | 1.6  | 5    | 30   | 25 | -      | 25 | 25 | -  | -  | -  | -        |                 |
|              | 20-3T6-25-C   | 20  | 160 | 40   | 15.8 | 2.1  | 6    | 25   | 25 | 25     | 25 | 25 | 25 | -  | -  | -        |                 |
|              | 25-3T5-25-C   | 25  | 200 | 40   | 17.5 | 2.1  | 5    | 25   | 25 | 25     | 25 | 25 | 25 | -  | -  | -        |                 |
|              | 25-3T8-32-C   | 25  | 200 | 40   | 21.5 | 2.4  | 8    | 32   | 25 | 25     | 25 | 25 | 25 | -  | -  | -        |                 |
|              | 32-3T5-30-C   | 32  | 250 | 60   | 19.8 | 2.1  | 5    | 30   | 25 | 25     | 25 | 25 | 25 | -  | -  | -        |                 |
|              | 32-3T10-40-C  | 32  | 200 | 60   | 27   | 2.4  | 10   | 40   | 25 | 25     | 25 | 25 | 25 | -  | -  | -        |                 |
|              | 40-3T12-50-C  | 40  | 300 | 65   | 33   | 2.4  | 12   | 50   | 25 | 25     | 25 | 25 | 25 | 45 | 45 | 45       |                 |
|              | 20-4T6-25-C   | 20  | 160 | 40   | 15.8 | 3    | 6    | 25   | 25 | 25     | 25 | 25 | 25 | -  | -  | -        |                 |
|              | 25-4T5-25-C   | 25  | 200 | 40   | 17.5 | 2.9  | 5    | 25   | 25 | 25     | 25 | 25 | 25 | -  | -  | -        |                 |
|              | 25-4T8-32-C   | 25  | 200 | 40   | 21.5 | 3    | 8    | 32   | 25 | 25     | 25 | 25 | 25 | -  | -  | -        |                 |
|              | 32-4T5-30-C   | 32  | 250 | 60   | 20.8 | 2.9  | 5    | 30   | 25 | 25     | 25 | 25 | 25 | -  | -  | -        |                 |
|              | 32-4T10-40-C  | 32  | 250 | 60   | 27   | 3    | 10   | 40   | 25 | 25     | 25 | 25 | 25 | -  | -  | -        |                 |
|              | 40-4T12-50-C  | 40  | 300 | 65   | 33   | 3    | 12   | 50   | 25 | 25     | 25 | 25 | 25 | -  | 45 | 45       |                 |
|              | 50-4T14-60-C  | 50  | 350 | 70   | 40   | 3    | 14   | 60   | 25 | 25     | 25 | 25 | 25 | -  | 45 | 45       |                 |
|              | 25-5T5-31-C   | 25  | 200 | 40   | 17.3 | 3.9  | 5    | 31   | 30 | 30     | 30 | 30 | 30 | -  | -  | -        |                 |
|              | 32-5T5-31-C   | 32  | 250 | 60   | 20.8 | 3.9  | 5    | 31   | 30 | 30     | 30 | 30 | 30 | -  | -  | -        |                 |
|              | 32-5T10-40-C  | 32  | 250 | 60   | 27   | 3.85 | 10   | 40   | 30 | 30     | 30 | 30 | 30 | -  | -  | -        |                 |
|              | 40-5T12-50-C  | 40  | 300 | 65   | 33   | 3.85 | 12   | 50   | 30 | 30     | 30 | 30 | 30 | -  | 45 | 45       |                 |
| 50-5T14-60-C | 50            | 350 | 70  | 40   | 3.85 | 14   | 60   | 30   | 30 | 30     | 30 | 30 | -  | 45 | 45 |          |                 |
| 32-6T5-31-C  | 32            | 250 | 60  | 20.8 | 4.9  | 5    | 31   | 30   | 30 | 30     | 30 | 30 | -  | -  | -  |          |                 |
| 32-6T10-40-C | 32            | 250 | 60  | 27   | 4.85 | 10   | 40   | 30   | 30 | 30     | 30 | 30 | -  | -  | -  |          |                 |
| 40-6T12-50-C | 40            | 300 | 65  | 33   | 4.85 | 12   | 50   | 30   | 30 | 30     | 30 | 30 | -  | 45 | 45 |          |                 |
| 50-6T14-60-C | 50            | 350 | 70  | 40   | 4.85 | 14   | 60   | 30   | 30 | 30     | 30 | 30 | -  | 45 | 45 |          |                 |
| 32-8T6-38-C  | 32            | 250 | 60  | 21.3 | 5.85 | 6    | 38   | 32   | 32 | 32     | 32 | 32 | -  | -  | -  |          |                 |
| 40-8T6-42-C  | 40            | 300 | 65  | 25.8 | 5.85 | 6    | 42   | 32   | 32 | 32     | 32 | 32 | -  | -  | -  |          |                 |

1. Inserts\*: ACD/ACS series are only applicable to grooving machining
2. "-" Indicates that the insert is not a choice
3. Having selected the range of tool holder, please check the minimum face grooving machining diameter of the selected insert

| Product code        | Screw    | Wrench |
|---------------------|----------|--------|
|                     |          |        |
| ATPIR/L 20-2/3/4    | SH050120 | LT-H4  |
| ATPIR/L 25-2/3/4    | SH050160 | LT-H4  |
| ATPIR/L 32-3/4      | SH050160 | LT-H4  |
| ATPIR/L 40-3/4      | SH050160 | LT-H4  |
| ATPIR/L 50-4        | SH050200 | LT-H4  |
| ATPIR/L 25-5        | SH060160 | LT-H5  |
| ATPIR/L 32-5/6/8    | SH060200 | LT-H5  |
| ATPIR/L 40/50-5/6/8 | SH060250 | LT-H5  |



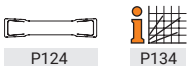
ATSIR/L Internal Facing Grooving and Turning Holder



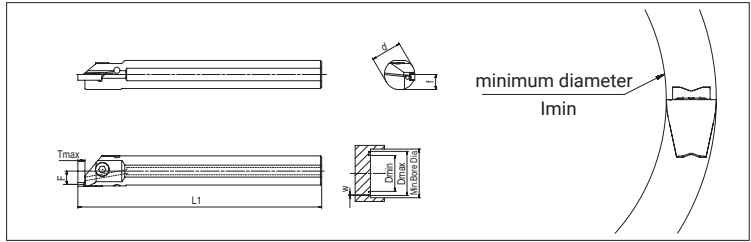
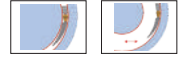
| Product code | Dimension(mm)    |    |     |    |      |      |      |      |     | Minimum machining diameter of face grooving inserts lmin(mm) |        |    |    |    |    |    | Inserts*            |
|--------------|------------------|----|-----|----|------|------|------|------|-----|--|--------|----|----|----|----|----|---------------------|
|              | d                | L1 | L2  | F  | h1   | Tmax | Dmin | Dmax | TS  | TM   | Ground | RM | CS | CM | CH |    |                     |
| ATSIR/L      | 25-3T12-35-45-C  | 25 | 200 | 31 | 11.5 | 11.5 | 12   | 35   | 45  | 24   | 24     | -  | -  | -  | -  | -  | ACD/<br>ACS/<br>ATD |
|              | 25-3T12-40-60-C  | 25 | 200 | 31 | 11.5 | 11.5 | 12   | 40   | 60  | 24   | 24     | -  | -  | -  | -  | -  |                     |
|              | 25-3T12-55-90-C  | 25 | 200 | 31 | 11.5 | 11.5 | 12   | 55   | 90  | 24   | 24     | 59 | 59 | -  | -  | -  |                     |
|              | 25-3T12-80-150-C | 25 | 200 | 31 | 11.5 | 11.5 | 12   | 80   | 150 | 24   | 24     | 59 | 59 | 79 | 79 | 79 |                     |
|              | 25-4T12-20-35-C  | 25 | 200 | 31 | 11   | 11.5 | 12   | 20   | 35  | 22   | 22     | -  | -  | -  | -  | -  |                     |
|              | 25-4T12-28-45-C  | 25 | 200 | 31 | 11   | 11.5 | 12   | 28   | 45  | 22   | 22     | -  | -  | -  | -  | -  |                     |
|              | 25-4T12-35-55-C  | 25 | 200 | 31 | 11   | 11.5 | 12   | 35   | 55  | 22   | 22     | 42 | 42 | -  | 42 | 42 |                     |
|              | 32-4T12-45-70-C  | 32 | 250 | 31 | 14.5 | 15   | 12   | 45   | 70  | 22   | 22     | 42 | 42 | -  | 42 | 42 |                     |
|              | 32-4T12-60-100-C | 32 | 250 | 31 | 14.5 | 15   | 12   | 60   | 100 | 22   | 22     | 42 | 42 | -  | 42 | 42 |                     |
|              | 32-4T12-90-180-C | 32 | 250 | 31 | 14.5 | 15   | 12   | 90   | 180 | 22   | 22     | 42 | 42 | -  | 42 | 42 |                     |

- 1.Inserts\*: ACD/ACS series are only applicable to grooving machining
- 2."-"Indicates that the insert is not a choice
- 3.Having selected the range of tool holder, please check the minimum face grooving machining diameter of the selected insert

| Product code   | Screw    | Wrench |
|----------------|----------|--------|
|                |          |        |
| ATSIR/L 25-3/4 | SH050160 | LT-H4  |
| ATSIR/L 32-4   | SH050160 | LT-H4  |





**AGSIR/L Internal Facing Grooving and Turning Holder**



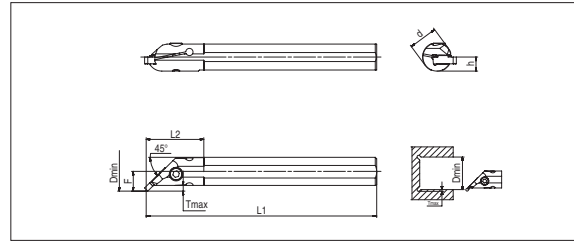
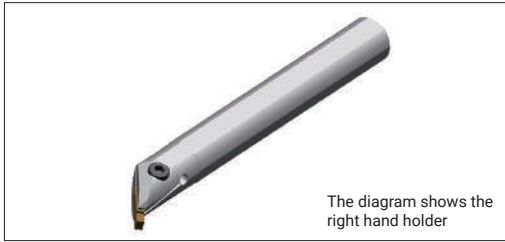
| Product code |          | Inserts size (mm) | Dimension(mm) |     |      |       |      | Minimum machining diameter of face grooving inserts lmin(mm) |    |        |     |     |     |     | Inserts*    |
|--------------|----------|-------------------|---------------|-----|------|-------|------|--|----|--------|-----|-----|-----|-----|-------------|
|              |          |                   | d             | L1  | H1   | F     | Tmax | TS   | TM | Ground | RM  | CS  | CM  | CH  |             |
| AGSIR/L      | 25-4T5-C | 2                 | 25            | 200 | 12.3 | 10.9  | 5.8  | 196  | -  | 100    | 196 | 196 | 196 | 196 | ACD/ACS/ATD |
|              |          | 3                 | 25            | 200 | 12.3 | 10.9  | 5.8  | 24   | 24 | 59     | 59  | 79  | 79  | 79  |             |
|              |          | 4                 | 25            | 200 | 12.3 | 10.9  | 5.8  | 22   | 22 | 42     | 42  | -   | 42  | 42  |             |
|              | 25-6T5-C | 5                 | 25            | 200 | 12.3 | 10.3  | 5.8  | 20   | 20 | 40     | 40  | -   | 50  | 50  |             |
|              |          | 6                 | 25            | 200 | 12.3 | 10.3  | 5.8  | 18   | 18 | 38     | 38  | -   | 48  | 48  |             |
|              | 32-4T5-C | 2                 | 32            | 250 | 15.8 | 14.5  | 5.8  | 196  | -  | 100    | 196 | 196 | 196 | 196 |             |
|              |          | 3                 | 32            | 250 | 15.8 | 14.5  | 5.8  | 24   | 24 | 59     | 59  | 79  | 79  | 79  |             |
|              |          | 4                 | 32            | 250 | 15.8 | 14.5  | 5.8  | 22   | 22 | 42     | 42  | -   | 42  | 42  |             |
|              | 32-6T5-C | 5                 | 32            | 250 | 15.8 | 13.79 | 5.8  | 20   | 20 | 40     | 40  | -   | 50  | 50  |             |
|              |          | 6                 | 32            | 250 | 15.8 | 13.79 | 5.8  | 18   | 18 | 38     | 38  | -   | 48  | 48  |             |

1. Inserts\*: ACD/ACS series are only applicable to grooving machining
2. "-" Indicates that the insert is not a choice
3. Having selected the range of tool holder, please check the minimum face grooving machining diameter of the selected insert

| Product code | Screw   | Wrench  |
|--------------|---|---|
|              |  |  |
| AGSIR/L 25   | SH060160  | LT-H4   |
| AGSIR/L 32   | SH060160  | LT-H4   |



**AGUIR/L Internal Under Cut Machining Holder**



| Product code   |           | Dimension(mm) |     |    |      |      |      | Inserts* |
|----------------|-----------|---------------|-----|----|------|------|------|----------|
|                |           | d             | L1  | L2 | F    | Tmax | Dmin |          |
| <b>AGUIR/L</b> | 20-3T3-45 | 20            | 160 | 40 | 12.3 | 3    | 45   | ATD      |
|                | 20-4T3-45 | 20            | 160 | 40 | 12.3 | 3    | 45   |          |
|                | 25-3T3-45 | 25            | 200 | 40 | 14.4 | 3    | 45   |          |
|                | 25-4T3-45 | 25            | 200 | 40 | 14.4 | 3    | 45   |          |
|                | 25-6T3-45 | 25            | 200 | 40 | 14.4 | 3    | 45   |          |

| Product code | Screw    | Wrench |
|--------------|----------|--------|
|              |          |        |
| AGUIR/L 20-3 | SH050120 | LT-H4  |
| AGUIR/L 20-4 | SH050120 | LT-H4  |
| AGUIR/L 25-3 | SH050160 | LT-H4  |
| AGUIR/L 25-4 | SH050160 | LT-H4  |
| AGUIR/L 25-6 | SH060160 | LT-H5  |




**Insert Denomination System**


|          |          |          |          |          |          |          |           |          |          |          |
|----------|----------|----------|----------|----------|----------|----------|-----------|----------|----------|----------|
| <b>A</b> | <b>C</b> | <b>D</b> | <b>4</b> | <b>0</b> | <b>3</b> | <b>-</b> | <b>CM</b> | <b>-</b> | <b>6</b> | <b>R</b> |
| 1        | 2        | 3        | 4        | 5        |          | -        | 6         | -        | 7        | 8        |


| 1-Company name |
|----------------|
| ACHTECK        |

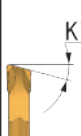
| 2-Application |                      |
|---------------|----------------------|
| <b>C</b>      | Grooving/Parting off |
| <b>T</b>      | Turning/Grooving     |


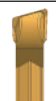
| 3-Insert shape |              |
|----------------|--------------|
| <b>S</b>       | Single-edged |
| <b>D</b>       | Double-edged |

| 4-Insert width  |                               |
|---|-------------------------------|
|  | 2=2.0mm<br>3=3.0mm<br>4=4.0mm |

| 5-Corner radius   |                                  |
|---|----------------------------------|
|  | 02=0.2mm<br>03=0.3mm<br>04=0.4mm |

| 6-Geometry  |                      |
|---|----------------------|
|  | CS<br>CM<br>CH<br>TS |

| 7-Cutting edge angle  |         |
|---|---------|
|  | 6<br>15 |

| 8-Hand of tool  |          |
|---|----------|
|  | L: Left  |
|  | R: Right |


**Insert Denomination System (Ground)**

|          |          |          |            |          |            |          |          |            |
|----------|----------|----------|------------|----------|------------|----------|----------|------------|
| <b>A</b> | <b>T</b> | <b>D</b> | <b>215</b> | <b>E</b> | <b>010</b> | <b>G</b> | <b>-</b> | <b>R/L</b> |
| 1        | 2        | 3        | 4          | 5        | 6          | 7        | -        | 8          |


| 1-Company name |
|----------------|
| ACHTECK        |

| 2-Application |                  |
|---------------|------------------|
| <b>T</b>      | Turning/Grooving |



| 3-Insert shape |              |
|----------------|--------------|
| <b>S</b>       | Single-edged |
| <b>D</b>       | Double-edged |

| 4-Insert width  |                               |
|---|-------------------------------|
|  | 2=2.0mm<br>3=3.0mm<br>4=4.0mm |









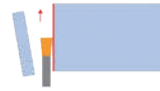
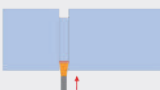
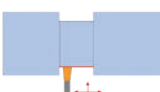


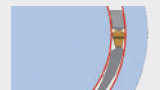
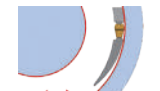


| 5-Application                           |
|---|
| E: External<br>F: Facing<br>I: Internal |

| 6-Corner radius   |  |
|---|--|
|  | 010=0.10mm<br>020=0.20mm<br>200=2.00mm |

| 7-Application limited |                                |
|-----------------------|--------------------------------|
| <b>G</b>              | only applicable to parting off |

| 8-insert direction  |               |
|---|---------------|
|  | L: left hand  |
|  | R: right hand |

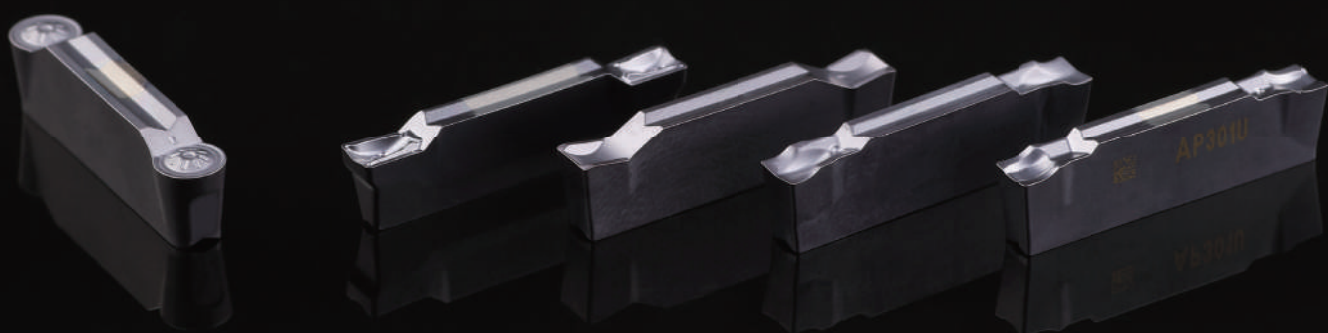
Overview of Grooving Inserts

| Inserts*<br><br>Application |             |   | ACD   |   |   | ATD  |   |   |   |   |
|-----------------------------|-------------|---|---|---|---|--|---|---|---|---|
|                             |             |   | CS  | CM  | CH  | TS   | TM  | RM  | RA  | G   |
|                             |             |   |  |  |  |  |  |  |  |  |
| Page                        |             |   | P124  | P125  | P126  | P127   | P128  | P129  | P130  | P131-133  |
| External<br>grooving        | Parting off |    | ●   | ●   | ●   | ◐  | ◐   |   |   |   |
|                             | Grooving    |    | ●   | ●   | ●   | ●  | ●   | ●   |   | ●   |
|                             | Turning     |   |   |   |   | ●  | ●   | ●   | ◐   | ◐   |
|                             | Profiling   |  |   |   |   |  |   | ●   | ●   | ◐   |
|                             | Under cut   |  |   |   |   |  |   | ●   | ●   | ◐   |
| Face<br>grooving            | Grooving    |  | ◐   | ◐   | ◐   | ●  | ●   |   |   | ●   |
|                             | Turning     |  |   |   |   | ●  | ●   |   |   | ◐   |
| Internal<br>machining       | Grooving    |  | ◐   | ◐   | ◐   | ●  | ●   |   |   | ●   |
|                             | Turning     |  |   |   |   | ●  | ●   | ◐   |   | ◐   |

Marked: ● Best choice  
◐ 2nd choice

# ACHTECK


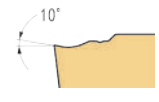



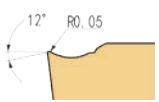

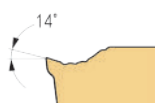



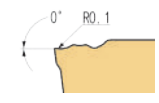

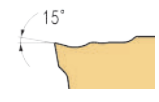
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Grooving inserts



Insert Geometry Introduction

| Inserts   | Geometry | Shape of cutting edge   | Description   |
|---|----------|---|---|
|    | CS       |    | <ol style="list-style-type: none"> <li>Used in parting off &amp; grooving stainless steel, heat resistant alloy and low carbon steel</li> <li>For low feed rate application</li> </ol>  |
|    | CM       |    | <ol style="list-style-type: none"> <li>Used in parting off &amp; grooving low carbon steel and stainless steel</li> <li>For sticky material, pipe fitting, thin-walled part parting off, low cutting force</li> <li>For low to medium feed rate</li> </ol>  |
|    | CH       |    | <ol style="list-style-type: none"> <li>Used in parting off and grooving steel with high hardness and toughness, alloy steel and stainless steel</li> <li>Strong cutting edge</li> <li>For parting off and grooving at medium to high feed rate</li> </ol>   |
|  | TS       |  | <ol style="list-style-type: none"> <li>Multifunctional insert for external, internal turning and grooving, parting off, face grooving and face turning</li> <li>Excellent chip control</li> <li>For low and medium feed rate.</li> <li>There is a wider machining diameter range in the internal grooving and face grooving.</li> </ol> |
|  | TM       |  | <ol style="list-style-type: none"> <li>Multifunctional insert for external, internal turning and grooving, parting off, face grooving and face turning</li> <li>Stronger cutting edge design</li> <li>For medium feed rate</li> </ol>   |
|  | RM       |  | <ol style="list-style-type: none"> <li>External grooving, turning, profiling</li> <li>Medium feed rate</li> </ol>   |
|  | RA       |  | <ol style="list-style-type: none"> <li>For turning and profiling aluminum alloy</li> <li>High positive rake angle and sharp cutting edge</li> <li>Ground inserts with high precision</li> </ol>   |

## Grade Application Guide

| Grooving grade ISO group |                                       |          |                              |          |     |     |
|--------------------------|---------------------------------------|----------|------------------------------|----------|-----|-----|
| Material                 | Materials                             | ISO      | PVD coated                   | Uncoated | ISO |     |
|                          |                                       |          | AP301U                       | AW100K   |     |     |
| <b>P</b>                 | Unalloy steels / Alloyed steels       | P01      |                              |          | P01 |     |
|                          |                                       | P05      |                              |          | P05 |     |
|                          |                                       | P10      |                              |          | P10 |     |
|                          |                                       | P15      | AP301U                       |          |     | P15 |
|                          |                                       | P20      |                              |          |     | P20 |
|                          |                                       | P25      |                              |          |     | P25 |
|                          |                                       | P30      |                              |          |     | P30 |
|                          |                                       | P35      |                              |          | P35 |     |
|                          |                                       | P40      |                              |          | P40 |     |
|                          |                                       | P45      |                              |          | P45 |     |
|                          |                                       | P50      |                              |          | P50 |     |
|                          |                                       | <b>M</b> | Stainless steels             | M01      |     |     |
| M05                      |                                       |          |                              |          | M05 |     |
| M10                      |                                       |          |                              |          | M10 |     |
| M15                      | AP301U                                |          |                              |          |     | M15 |
| M20                      |                                       |          |                              |          |     | M20 |
| M25                      |                                       |          |                              |          |     | M25 |
| M30                      |                                       |          |                              |          |     | M30 |
| M35                      |                                       |          |                              |          | M35 |     |
| M40                      |                                       |          |                              |          | M40 |     |
| M45                      |                                       |          |                              |          | M45 |     |
| <b>K</b>                 | Cast iron                             | K01      |                              |          | K01 |     |
|                          |                                       | K05      |                              |          | K05 |     |
|                          |                                       | K10      |                              |          | K10 |     |
|                          |                                       | K15      | AP301U                       |          |     | K15 |
|                          |                                       | K20      |                              |          |     | K20 |
|                          |                                       | K25      |                              |          |     | K25 |
|                          |                                       | K30      |                              |          |     | K30 |
|                          |                                       | K35      |                              |          | K35 |     |
|                          |                                       | K40      |                              |          | K40 |     |
|                          |                                       | K45      |                              |          | K45 |     |
| K50                      |                                       |          | K50                          |          |     |     |
| <b>S</b>                 | Heat resistant alloys                 | S01      |                              |          | S01 |     |
|                          |                                       | S05      |                              |          | S05 |     |
|                          |                                       | S10      |                              |          | S10 |     |
|                          |                                       | S15      |                              |          | S15 |     |
|                          |                                       | S20      |                              |          | S20 |     |
|                          |                                       | S25      |                              |          | S25 |     |
|                          |                                       | S30      |                              |          | S30 |     |
|                          |                                       | S35      |                              |          | S35 |     |
|                          |                                       | S40      |                              |          | S40 |     |
|                          |                                       | <b>N</b> | Aluminum/<br>Aluminum alloys | N01      |     |     |
| N05                      |                                       |          |                              | AW100K   | N05 |     |
| N10                      |                                       |          |                              |          | N10 |     |
| N15                      |                                       |          |                              |          | N15 |     |
| N20                      |                                       |          |                              |          | N20 |     |
| N25                      |                                       |          |                              |          | N25 |     |
| N30                      |                                       |          |                              |          | N30 |     |
| <b>H</b>                 | Hardened steels/<br>Chilled cast iron | H01      |                              |          | H01 |     |
|                          |                                       | H05      |                              |          | H05 |     |
|                          |                                       | H10      |                              |          | H10 |     |
|                          |                                       | H15      |                              |          | H15 |     |
|                          |                                       | H20      |                              |          | H20 |     |
|                          |                                       | H25      |                              |          | H25 |     |
|                          |                                       | H30      |                              |          | H30 |     |

Grade Application Guide

| Materials |   |                                       |               | Turning grade application |          |
|-----------|---|---------------------------------------|---------------|---------------------------|----------|
|           |   |                                       |               | PVD coated                | Uncoated |
| ISO       | Material classification                 | Tensile strength (N/mm <sup>2</sup> ) | Hardness (HB) | AP301U                    | AW100K   |
| P         | Unalloyed steel                         | <600                                  | <180          | ●                         | -        |
|           |   | <950                                  | <280          | ●                         | -        |
|           | Alloyed steel                           | 700-950                               | 200-280       | ●                         | -        |
|           |   | 950-1200                              | 280-355       | ●                         | -        |
|           |   | 1200-1400                             | 355-415       | ●                         | -        |
| M         | Duplex stainless steel                  | 778                                   | 230           | ●                         | -        |
|           | Austenitic stainless steel              | 675                                   | 200           | ●                         | -        |
|           | Precipitation-hardening stainless steel | 1013                                  | 300           | ●                         | -        |
| K         | Grey cast iron                          | 700                                   | 220           | ◐                         | -        |
|           | Nodular cast iron                       | 880                                   | 260           | ◐                         | -        |
|           | Malleable cast iron                     | 800                                   | 250           | ◐                         | -        |
| S         | Fe-based alloy                          | 943                                   | 280           | -                         | -        |
|           | Co-based alloy                          | 1076                                  | 320           | -                         | -        |
|           | Ni-based alloy                          | 1177                                  | 350           | -                         | -        |
|           | Ti-alloy                                | 1262                                  | 370           | -                         | -        |
| N         | Aluminum                                | 260                                   | 75            | -                         | ●        |
|           | Aluminum alloy                          | 447                                   | 130           | -                         | ●        |
| H         | Hardened steel                          | -                                     | 50-60HRC      | -                         | -        |
|           | Chilled cast iron                       | -                                     | 55HRC         | -                         | -        |

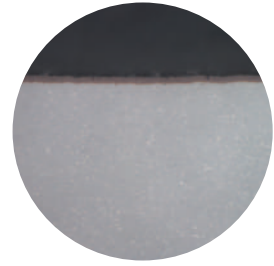
- Best choice
- ◐ 2nd choice
- Inapplicable

**Grooving Grade Description**

**AP301U**

Coating: PVD coating

Suitable for steel, stainless steel and heat resistant alloy grooving. High strength and wear resistance submicron carbide substrate with multi layer nanostructured PVD coating. Good coating adhesion. High wear resistance.



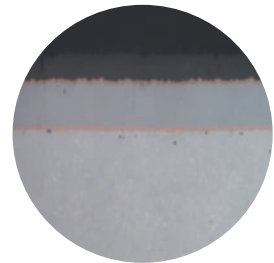
| Application range  |    |    |    |        |    |    |    |    |    |    |    |  |
|--------------------|----|----|----|--------|----|----|----|----|----|----|----|--|
| ISO Classification | 01 | 05 | 10 | 15     | 20 | 25 | 30 | 35 | 40 | 45 | 50 |  |
| P                  |    |    |    | AP301U |    |    |    |    |    |    |    |  |
| M                  |    |    |    | AP301U |    |    |    |    |    |    |    |  |
| K                  |    |    |    | AP301U |    |    |    |    |    |    |    |  |
| S                  |    |    |    |        |    |    |    |    |    |    |    |  |
| N                  |    |    |    |        |    |    |    |    |    |    |    |  |
| H                  |    |    |    |        |    |    |    |    |    |    |    |  |

Remark:  Best choice  
 2nd choice

**AW100K**

Coating: uncoated

Uncoated ultra-fine grain substrate, specially treated cutting edge, suitable for aluminum alloy grooving



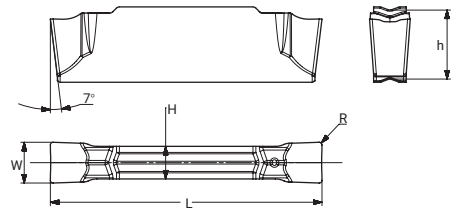
| Application range  |    |        |    |    |    |    |    |    |    |    |    |
|--------------------|----|--------|----|----|----|----|----|----|----|----|----|
| ISO Classification | 01 | 05     | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 |
| P                  |    |        |    |    |    |    |    |    |    |    |    |
| M                  |    |        |    |    |    |    |    |    |    |    |    |
| K                  |    |        |    |    |    |    |    |    |    |    |    |
| S                  |    |        |    |    |    |    |    |    |    |    |    |
| N                  |    | AW100K |    |    |    |    |    |    |    |    |    |
| H                  |    |        |    |    |    |    |    |    |    |    |    |


Remark:  Best choice

Grooving inserts

**Parting Off-Grooving Series**

CS: Double-edged inserts applicable to parting off and grooving



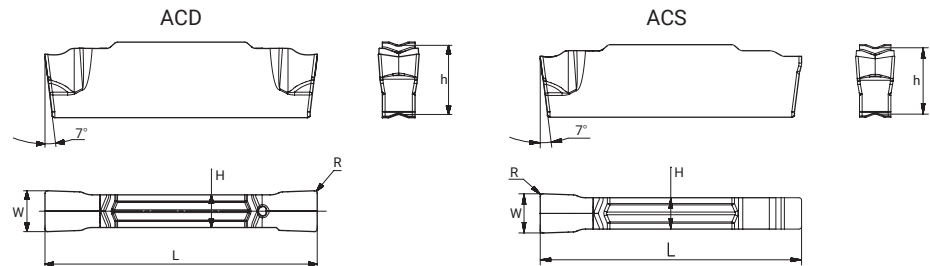
| Inserts   | Product code | Cutting parameter |               | Dimension(mm) |     |    |     |     | Grade  |        |
|---|--------------|-------------------|---------------|---------------|-----|----|-----|-----|--------|--------|
|   |              | Tmax              | Feed (mm/rev) | W             | R   | L  | H   | h   | AP301U | AW100K |
|  | ACD 202-CS   | 19.7              | 0.04-0.13     | 2             | 0.2 | 20 | 1.7 | 5.1 | ●      |        |
|   | ACD 302-CS   | 19.7              | 0.05-0.15     | 3             | 0.2 | 20 | 2.4 | 5.1 | ●      |        |
|   |              |                   |               |               |     |    |     |     |        |        |
|   |              |                   |               |               |     |    |     |     |        |        |
|   |              |                   |               |               |     |    |     |     |        |        |
|   |              |                   |               |               |     |    |     |     |        |        |
|   |              |                   |               |               |     |    |     |     |        |        |
|   |              |                   |               |               |     |    |     |     |        |        |
|   |              |                   |               |               |     |    |     |     |        |        |
|   |              |                   |               |               |     |    |     |     |        |        |
|   |              |                   |               |               |     |    |     |     |        |        |
|   |              |                   |               |               |     |    |     |     |        |        |
|   |              |                   |               |               |     |    |     |     |        |        |
|   |              |                   |               |               |     |    |     |     |        |        |
|   |              |                   |               |               |     |    |     |     |        |        |
|   |              |                   |               |               |     |    |     |     |        |        |
|   |              |                   |               |               |     |    |     |     |        |        |
|   |              |                   |               |               |     |    |     |     |        |        |
|   |              |                   |               |               |     |    |     |     |        |        |
|   |              |                   |               |               |     |    |     |     |        |        |
|   |              |                   |               |               |     |    |     |     |        |        |

Marked: ● Stock available ○ Non-stocked standard



Parting Off-Grooving Series

CM: Double-edged, single-edged inserts applicable to parting off and grooving



| Inserts    | Product code   | Cutting parameter |               | Dimension(mm) |      |      |     |     | Grade  |        |
|------------|----------------|-------------------|---------------|---------------|------|------|-----|-----|--------|--------|
|            |                | Tmax              | Feed (mm/rev) | W             | R    | L    | H   | h   | AP301U | AW100K |
|            | ACD 202-CM     | 19.7              | 0.04-0.15     | 2             | 0.2  | 20.0 | 1.7 | 5.1 | ●      |        |
|            | ACD 202-CM-6R  | 19.7              | 0.03-0.09     | 2             | 0.2  | 20.7 | 1.7 | 5.1 | ●      |        |
|            | ACD 202-CM-6L  | 19.7              | 0.03-0.09     | 2             | 0.2  | 20.7 | 1.7 | 5.1 | ●      |        |
|            | ACD 202-CM-15R | 19.7              | 0.03-0.09     | 2             | 0.2  | 21.0 | 1.7 | 5.1 | ●      |        |
|            | ACD 202-CM-15L | 19.7              | 0.03-0.09     | 2             | 0.2  | 21.0 | 1.7 | 5.1 | ●      |        |
|            | ACD 302-CM     | 19.7              | 0.05-0.16     | 3             | 0.2  | 20.0 | 2.4 | 5.1 | ●      |        |
|            | ACD 302-CM-6R  | 19.7              | 0.04-0.14     | 3             | 0.2  | 20.7 | 2.4 | 5.1 | ●      |        |
|            | ACD 302-CM-6L  | 19.7              | 0.04-0.14     | 3             | 0.2  | 20.7 | 2.4 | 5.1 | ●      |        |
|            | ACD 302-CM-15R | 19.7              | 0.04-0.14     | 3             | 0.2  | 21.0 | 2.4 | 5.1 | ●      |        |
|            | ACD 302-CM-15L | 19.7              | 0.04-0.14     | 3             | 0.2  | 21.0 | 2.4 | 5.1 | ●      |        |
|            | ACD 403-CM     | 19.7              | 0.06-0.18     | 4             | 0.3  | 20.0 | 3.0 | 5.1 | ●      |        |
|            | ACD 403-CM-4R  | 19.7              | 0.05-0.16     | 4             | 0.3  | 20.7 | 3.0 | 5.1 | ●      |        |
|            | ACD 403-CM-4L  | 19.7              | 0.05-0.16     | 4             | 0.3  | 20.7 | 3.0 | 5.1 | ●      |        |
|            | ACD 503-CM     | 24.7              | 0.06-0.20     | 5             | 0.3  | 25.0 | 4.0 | 5.0 | ●      |        |
|            | ACD 503-CM-4R  | 24.7              | 0.06-0.18     | 5             | 0.3  | 25.7 | 4.0 | 5.0 | ○      |        |
|            | ACD 503-CM-4L  | 24.7              | 0.06-0.18     | 5             | 0.3  | 25.7 | 4.0 | 5.0 | ○      |        |
| ACD 603-CM | 29.7           | 0.06-0.22         | 6             | 0.3           | 25.0 | 5.0  | 5.0 | ●   |        |        |
|            | ACS 202-CM     | 19.7              | 0.04-0.15     | 2             | 0.2  | 20.0 | 1.7 | 5.1 | ●      |        |
|            | ACS 302-CM     | 19.7              | 0.05-0.16     | 3             | 0.2  | 20.0 | 2.4 | 5.1 | ●      |        |
|            | ACS 403-CM     | 19.7              | 0.06-0.18     | 4             | 0.3  | 20.0 | 3.0 | 5.1 | ○      |        |
|            | ACS 503-CM     | 24.7              | 0.06-0.20     | 5             | 0.3  | 25.0 | 4.0 | 5.0 | ○      |        |
|            | ACS 603-CM     | 29.7              | 0.06-0.22     | 6             | 0.3  | 25.0 | 5.0 | 5.0 | ○      |        |

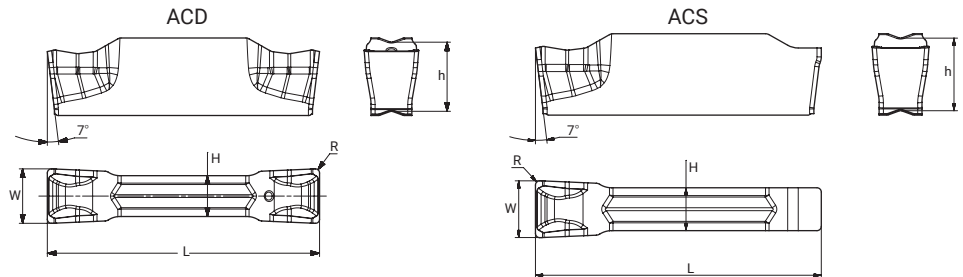
Remark: 1. if R/L style inserts are selected, the feed need to be reduced by 20-40%  
 2. ACS single edged insert's Tmax is determined according to the tool holder.

Marked: ● Stock available ○ Non-stocked standard



Parting Off-Grooving Series

CH: Double-edged, single-edged inserts applicable to parting off and grooving



| inserts*   | Product code   | Cutting parameter |               | Dimension(mm) |      |      |     |     | Grade  |        |
|------------|----------------|-------------------|---------------|---------------|------|------|-----|-----|--------|--------|
|            |                | Tmax              | Feed (mm/rev) | W             | R    | L    | H   | h   | AP301U | AW100K |
|            | ACD 202-CH     | 19.7              | 0.05-0.20     | 2             | 0.2  | 20.0 | 1.7 | 5.1 | ●      |        |
|            | ACD 202-CH-6R  | 19.7              | 0.04-0.16     | 2             | 0.2  | 20.7 | 1.7 | 5.1 | ●      |        |
|            | ACD 202-CH-6L  | 19.7              | 0.04-0.16     | 2             | 0.2  | 20.7 | 1.7 | 5.1 | ●      |        |
|            | ACD 202-CH-15R | 19.7              | 0.04-0.15     | 2             | 0.2  | 21.0 | 1.7 | 5.1 | ●      |        |
|            | ACD 202-CH-15L | 19.7              | 0.04-0.15     | 2             | 0.2  | 21.0 | 1.7 | 5.1 | ●      |        |
|            | ACD 302-CH     | 19.7              | 0.07-0.25     | 3             | 0.2  | 20.0 | 2.4 | 5.1 | ●      |        |
|            | ACD 302-CH-6R  | 20.7              | 0.05-0.20     | 3             | 0.2  | 20.7 | 2.4 | 5.1 | ●      |        |
|            | ACD 302-CH-6L  | 21.7              | 0.05-0.20     | 3             | 0.2  | 20.7 | 2.4 | 5.1 | ●      |        |
|            | ACD 302-CH-15R | 20.0              | 0.05-0.18     | 3             | 0.2  | 21.0 | 2.4 | 5.1 | ●      |        |
|            | ACD 302-CH-15L | 20.0              | 0.05-0.18     | 3             | 0.2  | 21.0 | 2.4 | 5.1 | ●      |        |
|            | ACD 403-CH     | 19.0              | 0.08-0.30     | 4             | 0.3  | 20.0 | 3.0 | 5.1 | ●      |        |
|            | ACD 403-CH-4R  | 19.7              | 0.06-0.25     | 4             | 0.3  | 20.7 | 3.0 | 5.1 | ●      |        |
|            | ACD 403-CH-4L  | 19.7              | 0.06-0.25     | 4             | 0.3  | 20.7 | 3.0 | 5.1 | ●      |        |
|            | ACD 503-CH     | 24.0              | 0.09-0.35     | 5             | 0.3  | 25.0 | 4.0 | 5.0 | ●      |        |
|            | ACD 503-CH-4R  | 24.7              | 0.08-0.30     | 5             | 0.3  | 25.7 | 4.0 | 5.0 | ●      |        |
|            | ACD 503-CH-4L  | 25.7              | 0.08-0.30     | 5             | 0.3  | 25.7 | 4.0 | 5.0 | ●      |        |
| ACD 603-CH | 24.0           | 0.12-0.40         | 6             | 0.3           | 25.0 | 5.0  | 5.0 | ●   |        |        |
| ACD 804-CH | 29.0           | 0.15-0.45         | 8             | 0.4           | 30.0 | 6.0  | 6.1 | ●   |        |        |
|            | ACS 202-CH     | -                 | 0.05-0.20     | 2             | 0.2  | 20.0 | 1.7 | 5.1 | ●      |        |
|            | ACS 302-CH     | -                 | 0.07-0.25     | 3             | 0.2  | 20.0 | 2.4 | 5.1 | ●      |        |
|            | ACS 403-CH     | -                 | 0.08-0.30     | 4             | 0.3  | 20.0 | 3.0 | 5.1 | ●      |        |
|            | ACS 503-CH     | -                 | 0.09-0.35     | 5             | 0.3  | 20.0 | 4.0 | 5.0 | ●      |        |
|            | ACS 603-CH     | -                 | 0.12-0.40     | 6             | 0.3  | 25.0 | 5.0 | 5.0 | ○      |        |

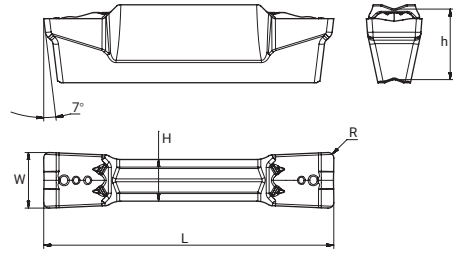
Remark: 1. if R/L style inserts are selected, the feed need to be reduced by 20-40%  
2. ACS single edged insert's Tmax is determined according to the tool holder.

Marked: ● Stock available ○ Non-stocked standard



**Grooving-Turning Series**

TS: Double-edged inserts applicable to external, internal and face turning, grooving and parting off



| inserts* | Product code | Cutting parameter |      |               |           | Dimension(mm) |     |      |     |     | Grade  |        |
|----------|--------------|-------------------|------|---------------|-----------|---------------|-----|------|-----|-----|--------|--------|
|          |              | Grooving          | Tmax | Turning       |           | W             | R   | L    | H   | h   | AP301U | AW100K |
|          |              | Feed (mm/rev)     |      | Feed (mm/rev) | Ap (mm)   |               |     |      |     |     |        |        |
|          | ATD 203-TS   | 0.04-0.20         | 19.7 | 0.12-0.19     | 0.40-1.50 | 2             | 0.3 | 20.7 | 1.7 | 5.1 | ●      |        |
|          | ATD 303-TS   | 0.05-0.25         | 19.7 | 0.15-0.23     | 0.45-2.00 | 3             | 0.3 | 20.7 | 2.2 | 5.1 | ●      |        |
|          | ATD 404-TS   | 0.06-0.27         | 19.7 | 0.18-0.25     | 0.50-2.50 | 4             | 0.4 | 20.7 | 3.0 | 5.1 | ●      |        |
|          | ATD 408-TS   | 0.06-0.27         | 19.7 | 0.18-0.25     | 1.00-2.50 | 4             | 0.8 | 20.7 | 3.0 | 5.1 | ●      |        |
|          | ATD 504-TS   | 0.07-0.30         | 24.7 | 0.20-0.30     | 0.55-3.50 | 5             | 0.4 | 25.7 | 4.0 | 5.0 | ●      |        |
|          | ATD 508-TS   | 0.07-0.30         | 24.7 | 0.20-0.30     | 1.00-3.50 | 5             | 0.8 | 25.7 | 4.0 | 5.0 | ●      |        |
|          | ATD 604-TS   | 0.10-0.40         | 24.7 | 0.22-0.45     | 0.65-3.80 | 6             | 0.4 | 25.7 | 5.0 | 5.0 | ●      |        |
|          | ATD 608-TS   | 0.10-0.40         | 24.7 | 0.22-0.45     | 1.00-3.80 | 6             | 0.8 | 25.7 | 5.0 | 5.0 | ●      |        |
|          | ATD 808-TS   | 0.12-0.45         | 30.5 | 0.28-0.50     | 1.00-4.50 | 8             | 0.8 | 31.5 | 6.0 | 6.1 | ○      |        |

Marked: ● Stock available ○ Non-stocked standard

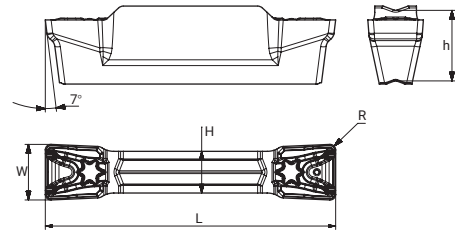


Grooving inserts



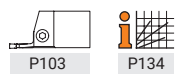
Grooving-Turning Series

TM: Double-edged inserts applicable to external, internal and face turning, grooving and parting off



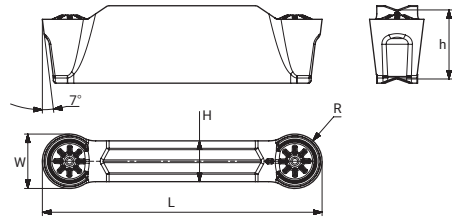
| inserts* | Product code | Cutting parameter |      |               |          | Dimension(mm) |     |      |     |     | Grade  |        |
|----------|--------------|-------------------|------|---------------|----------|---------------|-----|------|-----|-----|--------|--------|
|          |              | Grooving          | Tmax | Turning       |          | W             | R   | L    | H   | h   | AP301U | AW100K |
|          |              | Feed (mm/rev)     |      | Feed (mm/rev) | Ap (mm)  |               |     |      |     |     |        |        |
|          | ATD 304-TM   | 0.10-0.25         | 19.7 | 0.15-0.22     | 0.50-2.0 | 3             | 0.4 | 20.7 | 2.2 | 5.1 | ●      |        |
|          | ATD 404-TM   | 0.15-0.30         | 19.7 | 0.18-0.27     | 0.50-2.5 | 4             | 0.4 | 20.7 | 3.0 | 5.1 | ●      |        |
|          | ATD 408-TM   | 0.15-0.30         | 19.7 | 0.18-0.27     | 1.00-2.5 | 4             | 0.8 | 20.7 | 3.0 | 5.1 | ●      |        |
|          | ATD 504-TM   | 0.18-0.35         | 24.7 | 0.20-0.35     | 0.55-3.5 | 5             | 0.4 | 25.7 | 4.0 | 5.0 | ●      |        |
|          | ATD 508-TM   | 0.18-0.35         | 24.7 | 0.20-0.35     | 1.00-3.5 | 5             | 0.8 | 25.7 | 4.0 | 5.0 | ●      |        |
|          | ATD 604-TM   | 0.20-0.45         | 24.7 | 0.22-0.45     | 0.65-4.0 | 6             | 0.4 | 25.7 | 5.0 | 5.0 | ●      |        |
|          | ATD 608-TM   | 0.20-0.45         | 24.7 | 0.22-0.45     | 1.00-4.0 | 6             | 0.8 | 25.7 | 5.0 | 5.0 | ●      |        |
|          | ATD 808-TM   | 0.22-0.50         | 30.5 | 0.28-0.50     | 1.00-5.0 | 8             | 0.8 | 31.5 | 6.0 | 6.1 | ○      |        |
|          | ATD 812-TM   | 0.22-0.50         | 30.5 | 0.28-0.50     | 1.50-5.0 | 8             | 1.2 | 31.5 | 6.0 | 6.1 | ●      |        |
|          |              |                   |      |               |          |               |     |      |     |     |        |        |
|          |              |                   |      |               |          |               |     |      |     |     |        |        |
|          |              |                   |      |               |          |               |     |      |     |     |        |        |
|          |              |                   |      |               |          |               |     |      |     |     |        |        |
|          |              |                   |      |               |          |               |     |      |     |     |        |        |
|          |              |                   |      |               |          |               |     |      |     |     |        |        |
|          |              |                   |      |               |          |               |     |      |     |     |        |        |
|          |              |                   |      |               |          |               |     |      |     |     |        |        |
|          |              |                   |      |               |          |               |     |      |     |     |        |        |
|          |              |                   |      |               |          |               |     |      |     |     |        |        |
|          |              |                   |      |               |          |               |     |      |     |     |        |        |
|          |              |                   |      |               |          |               |     |      |     |     |        |        |
|          |              |                   |      |               |          |               |     |      |     |     |        |        |

Marked: ● Stock available ○ Non-stocked standard



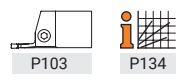
**Grooving-Turning Series**

RM: Double-edged inserts applicable to external turning, grooving and profiling



| inserts* | Product code | Cutting parameter |               |         | Dimension(mm) |     |      |     |     | Grade  |        |
|----------|--------------|-------------------|---------------|---------|---------------|-----|------|-----|-----|--------|--------|
|          |              | Grooving          | Turning       |         | W             | R   | L    | H   | h   | AP301U | AW100K |
|          |              | Feed (mm/rev)     | Feed (mm/rev) | Ap (mm) |               |     |      |     |     |        |        |
|          | ATD 210-RM   | 0.06-0.15         | 0.12-0.25     | 0.4-1.0 | 2             | 1.0 | 20.7 | 1.7 | 5.1 | ●      |        |
|          | ATD 315-RM   | 0.08-0.18         | 0.15-0.30     | 0.5-1.5 | 3             | 1.5 | 20.7 | 2.2 | 5.1 | ●      |        |
|          | ATD 420-RM   | 0.10-0.20         | 0.18-0.35     | 0.6-2.0 | 4             | 2.0 | 20.7 | 3.0 | 5.1 | ●      |        |
|          | ATD 525-RM   | 0.12-0.25         | 0.20-0.40     | 0.7-2.5 | 5             | 2.5 | 25.7 | 4.0 | 5.0 | ●      |        |
|          | ATD 630-RM   | 0.15-0.30         | 0.25-0.50     | 0.9-3.0 | 6             | 3.0 | 25.7 | 5.0 | 5.0 | ●      |        |
|          | ATD 840-RM   | 0.18-0.35         | 0.30-0.60     | 1.0-4.0 | 8             | 4.0 | 31.5 | 6.0 | 6.1 | ●      |        |
|          |              |                   |               |         |               |     |      |     |     |        |        |
|          |              |                   |               |         |               |     |      |     |     |        |        |
|          |              |                   |               |         |               |     |      |     |     |        |        |
|          |              |                   |               |         |               |     |      |     |     |        |        |
|          |              |                   |               |         |               |     |      |     |     |        |        |
|          |              |                   |               |         |               |     |      |     |     |        |        |
|          |              |                   |               |         |               |     |      |     |     |        |        |
|          |              |                   |               |         |               |     |      |     |     |        |        |
|          |              |                   |               |         |               |     |      |     |     |        |        |
|          |              |                   |               |         |               |     |      |     |     |        |        |
|          |              |                   |               |         |               |     |      |     |     |        |        |
|          |              |                   |               |         |               |     |      |     |     |        |        |

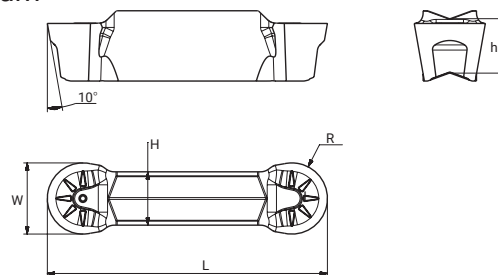
Marked: ● Stock available ○ Non-stocked standard



Grooving inserts

**Grooving-Turning Series**

RA: Double-edged ground inserts applicable to aluminium wheel turning and profiling



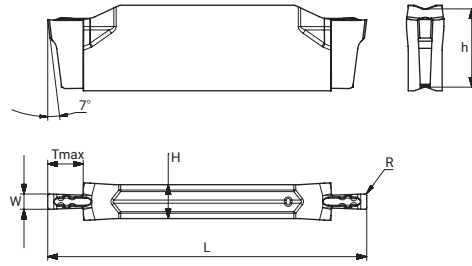
| inserts* | Product code | Cutting parameter            |                             |            | Dimension(mm) |     |      |     |     | Grade  |        |
|----------|--------------|------------------------------|-----------------------------|------------|---------------|-----|------|-----|-----|--------|--------|
|          |              | Grooving<br>Feed<br>(mm/rev) | Turning<br>Feed<br>(mm/rev) |            | W             | R   | L    | H   | h   | AP301U | AW100K |
|          |              |                              | Feed<br>(mm/rev)            | Ap<br>(mm) |               |     |      |     |     |        |        |
|          | ATD 315-RA   | 0.08-0.18                    | 0.15-0.30                   | 0.5-1.5    | 3             | 1.5 | 20.7 | 2.2 | 5.1 |        | ○      |
|          | ATD 420-RA   | 0.10-0.25                    | 0.20-0.45                   | 0.6-2.0    | 4             | 2.0 | 20.7 | 3.0 | 5.1 |        | ○      |
|          | ATD 525-RA   | 0.11-0.28                    | 0.20-0.50                   | 0.7-2.5    | 5             | 2.5 | 25.7 | 4.0 | 5.0 |        | ○      |
|          | ATD 630-RA   | 0.12-0.30                    | 0.22-0.60                   | 0.9-3.0    | 6             | 3.0 | 25.7 | 5.0 | 5.0 |        | ○      |
|          | ATD 840-RA   | 0.15-0.40                    | 0.25-0.65                   | 1.0-4.0    | 8             | 4.0 | 31.5 | 6.0 | 6.1 |        | ○      |
|          |              |                              |                             |            |               |     |      |     |     |        |        |
|          |              |                              |                             |            |               |     |      |     |     |        |        |
|          |              |                              |                             |            |               |     |      |     |     |        |        |
|          |              |                              |                             |            |               |     |      |     |     |        |        |
|          |              |                              |                             |            |               |     |      |     |     |        |        |
|          |              |                              |                             |            |               |     |      |     |     |        |        |
|          |              |                              |                             |            |               |     |      |     |     |        |        |
|          |              |                              |                             |            |               |     |      |     |     |        |        |
|          |              |                              |                             |            |               |     |      |     |     |        |        |
|          |              |                              |                             |            |               |     |      |     |     |        |        |
|          |              |                              |                             |            |               |     |      |     |     |        |        |
|          |              |                              |                             |            |               |     |      |     |     |        |        |
|          |              |                              |                             |            |               |     |      |     |     |        |        |
|          |              |                              |                             |            |               |     |      |     |     |        |        |
|          |              |                              |                             |            |               |     |      |     |     |        |        |
|          |              |                              |                             |            |               |     |      |     |     |        |        |
|          |              |                              |                             |            |               |     |      |     |     |        |        |
|          |              |                              |                             |            |               |     |      |     |     |        |        |
|          |              |                              |                             |            |               |     |      |     |     |        |        |
|          |              |                              |                             |            |               |     |      |     |     |        |        |
|          |              |                              |                             |            |               |     |      |     |     |        |        |
|          |              |                              |                             |            |               |     |      |     |     |        |        |
|          |              |                              |                             |            |               |     |      |     |     |        |        |
|          |              |                              |                             |            |               |     |      |     |     |        |        |

Marked: ● Stock available ○ Non-stocked standard



Grooving Series

Ground inserts applicable to grooving



| inserts*     | Product code  | Suitable tool holder | Cutting parameter |               | Dimension(mm) |      |      |        |        | Grade |        |        |
|--------------|---------------|----------------------|-------------------|---------------|---------------|------|------|--------|--------|-------|--------|--------|
|              |               |                      | Grooving          | Feed (mm/rev) | W             | R    | Tmax | H      | h      | L     | AP301U | AW100K |
|              |               |                      |                   |               |               |      |      |        |        |       |        |        |
|              | ATD 100E000G  | 2mm                  | 0.02-0.05         | 1.00          | 0.00          | 2.00 | 2.20 | 5.1    | 20.700 | ●     |        |        |
|              | ATD 104E000G  | 2mm                  | 0.02-0.05         | 1.04          | 0.00          | 2.00 | 2.20 | 5.1    | 20.700 | ●     |        |        |
|              | *ATD 115E000G | 2mm                  | 0.02-0.05         | 1.15          | 0.00          | 2.00 | 2.20 | 5.1    | 20.700 | ●     |        |        |
|              | ATD 120E000G  | 2mm                  | 0.03-0.05         | 1.20          | 0.00          | 2.00 | 2.20 | 5.1    | 20.700 | ●     |        |        |
|              | ATD 125E010G  | 2mm                  | 0.03-0.05         | 1.25          | 0.10          | 2.00 | 2.20 | 5.1    | 20.700 | ●     |        |        |
|              | *ATD 130E000G | 2mm                  | 0.03-0.05         | 1.30          | 0.00          | 2.00 | 2.20 | 5.1    | 20.700 | ●     |        |        |
|              | ATD 135E000G  | 2mm                  | 0.03-0.05         | 1.35          | 0.00          | 2.00 | 2.20 | 5.1    | 20.700 | ●     |        |        |
|              | ATD 140E000G  | 2mm                  | 0.03-0.06         | 1.40          | 0.00          | 2.00 | 2.20 | 5.1    | 20.700 | ●     |        |        |
|              | ATD 145E010G  | 2mm                  | 0.03-0.06         | 1.45          | 0.10          | 2.00 | 2.20 | 5.1    | 20.700 | ●     |        |        |
|              | ATD 147E000G  | 2mm                  | 0.03-0.06         | 1.47          | 0.00          | 2.50 | 2.20 | 5.1    | 20.700 | ●     |        |        |
|              | ATD 150E010G  | 2mm                  | 0.03-0.06         | 1.50          | 0.10          | 2.50 | 2.20 | 5.1    | 20.700 | ●     |        |        |
|              | ATD 157E015G  | 2mm                  | 0.03-0.07         | 1.57          | 0.15          | 2.70 | 2.20 | 5.1    | 20.700 | ●     |        |        |
|              | *ATD 165E010G | 2mm                  | 0.03-0.07         | 1.65          | 0.10          | 2.70 | 2.20 | 5.1    | 20.700 | ●     |        |        |
|              | ATD 170E010G  | 2mm                  | 0.03-0.07         | 1.70          | 0.10          | 3.00 | 2.20 | 5.1    | 20.700 | ●     |        |        |
|              | ATD 178E018G  | 2mm                  | 0.03-0.07         | 1.78          | 0.18          | 3.00 | 2.20 | 5.1    | 20.700 | ●     |        |        |
|              | *ATD 190E010G | 2mm                  | 0.04-0.09         | 1.90          | 0.10          | 3.00 | 2.20 | 5.1    | 20.700 | ●     |        |        |
|              | ATD 196E015G  | 2mm                  | 0.04-0.09         | 1.96          | 0.15          | 3.00 | 2.20 | 5.1    | 20.700 | ●     |        |        |
|              | ATD 200E020G  | 2mm                  | 0.04-0.09         | 2.00          | 0.20          | 3.00 | 2.20 | 5.1    | 20.700 | ●     |        |        |
|              | *ATD 215E010G | 2mm                  | 0.04-0.10         | 2.15          | 0.10          | 3.00 | 2.20 | 5.1    | 20.700 | ●     |        |        |
|              | ATD 222E015G  | 2mm                  | 0.04-0.10         | 2.22          | 0.15          | 3.50 | 2.20 | 5.1    | 20.700 | ●     |        |        |
|              | ATD 230E020G  | 2mm                  | 0.04-0.10         | 2.30          | 0.20          | 3.50 | 2.20 | 5.1    | 20.700 | ●     |        |        |
|              | ATD 100E050G  | 2mm                  | 0.03-0.06         | 1.00          | 0.50          | 2.00 | 2.20 | 5.1    | 20.700 | ●     |        |        |
|              | ATD 140E070G  | 2mm                  | 0.04-0.07         | 1.40          | 0.70          | 2.00 | 2.20 | 5.1    | 20.700 | ●     |        |        |
| ATD 157E079G | 2mm           | 0.04-0.08            | 1.57              | 0.78          | 2.70          | 2.20 | 5.1  | 20.700 | ●      |       |        |        |
| ATD 200E100G | 2mm           | 0.05-0.11            | 2.00              | 1.00          | 3.00          | 2.20 | 5.1  | 20.700 | ●      |       |        |        |
| ATD 239E120G | 2mm           | 0.06-0.12            | 2.39              | 1.19          | -             | 2.20 | 5.1  | 20.700 | ●      |       |        |        |

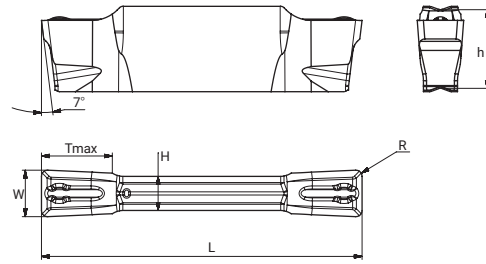
1. \* For circlap grooves  
 2. When the width of the insert is less than 1.78mm, please pay attention to size A of the holder


Marked: ● Stock available ○ Non-stocked standard



Grooving Series

Ground inserts applicable to profiling, turning and grooving



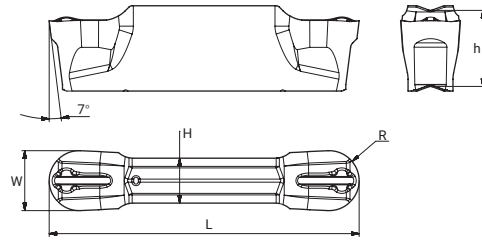
| inserts*   | Product code | Suitable tool holder | Cutting parameter            |                  |            | Dimension(mm) |      |      |      |     |       | Grade  |        |
|--|--------------|----------------------|------------------------------|------------------|------------|---------------|------|------|------|-----|-------|--------|--------|
|  |              |                      | Grooving<br>Feed<br>(mm/rev) | Turning          |            | W             | R    | Tmax | H    | h   | L     | AP301U | AW100K |
|  |              |                      |                              | Feed<br>(mm/rev) | Ap<br>(mm) |               |      |      |      |     |       |        |        |
|  | ATD 265E015  | 3mm                  | 0.04-0.12                    | 0.10-0.18        | 0.20-1.80  | 2.65          | 0.15 | -    | 2.20 | 5.1 | 20.70 | ●      |        |
|  | ATD 300E020  | 3mm                  | 0.06-0.14                    | 0.11-0.20        | 0.30-2.00  | 3.00          | 0.20 | -    | 2.20 | 5.1 | 20.70 | ●      |        |
|  | ATD 300E040  | 3mm                  | 0.06-0.15                    | 0.15-0.23        | 0.50-2.20  | 3.00          | 0.40 | -    | 2.20 | 5.1 | 20.70 | ●      |        |
|  | ATD 400E040  | 4mm                  | 0.08-0.19                    | 0.16-0.30        | 0.50-2.50  | 4.00          | 0.40 | -    | 3.00 | 5.1 | 20.70 | ●      |        |
|  | ATD 400E080  | 4mm                  | 0.08-0.19                    | 0.16-0.30        | 1.00-2.50  | 4.00          | 0.80 | -    | 3.00 | 5.1 | 20.70 | ●      |        |
|  | ATD 415E015  | 4mm                  | 0.08-0.19                    | 0.16-0.30        | 0.20-2.50  | 4.15          | 0.15 | -    | 3.00 | 5.1 | 20.70 | ●      |        |
|  | ATD 478E055  | 5mm                  | 0.10-0.20                    | 0.20-0.35        | 0.60-2.60  | 4.78          | 0.55 | -    | 4.00 | 5.0 | 25.70 | ●      |        |
|  | ATD 500E040  | 5mm                  | 0.10-0.20                    | 0.20-0.35        | 0.50-2.60  | 5.00          | 0.40 | -    | 4.00 | 5.0 | 25.70 | ●      |        |
|  | ATD 500E080  | 5mm                  | 0.10-0.20                    | 0.22-0.35        | 1.00-3.00  | 5.00          | 0.80 | -    | 4.00 | 5.0 | 25.70 | ●      |        |
|  | ATD 515E015  | 5mm                  | 0.10-0.22                    | 0.22-0.35        | 0.20-3.00  | 5.15          | 0.15 | -    | 4.00 | 5.0 | 25.70 | ●      |        |
|  | ATD 555E055  | 6mm                  | 0.12-0.28                    | 0.23-0.40        | 0.60-3.00  | 5.55          | 0.55 | -    | 5.00 | 5.0 | 25.70 | ●      |        |
|  | ATD 600E080  | 6mm                  | 0.12-0.30                    | 0.25-0.45        | 1.00-3.50  | 6.00          | 0.80 | -    | 5.00 | 5.0 | 25.70 | ●      |        |
|  | ATD 600E120  | 6mm                  | 0.12-0.30                    | 0.25-0.45        | 1.30-3.50  | 6.00          | 1.20 | -    | 5.00 | 5.0 | 25.70 | ●      |        |
|  | ATD 635E080  | 6mm                  | 0.13-0.30                    | 0.25-0.45        | 1.00-3.50  | 6.35          | 0.80 | -    | 5.00 | 5.0 | 25.70 | ●      |        |
|  | ATD 800E080  | 8mm                  | 0.15-0.40                    | 0.30-0.55        | 1.00-4.80  | 8.00          | 0.80 | -    | 6.00 | 6.1 | 31.50 | ●      |        |
|  | ATD 800E120  | 8mm                  | 0.15-0.40                    | 0.30-0.55        | 1.20-4.80  | 8.00          | 1.20 | -    | 6.00 | 6.1 | 31.50 | ●      |        |
|  |              |                      |                              |                  |            |               |      |      |      |     |       |        |        |
|  |              |                      |                              |                  |            |               |      |      |      |     |       |        |        |
|  |              |                      |                              |                  |            |               |      |      |      |     |       |        |        |
|  |              |                      |                              |                  |            |               |      |      |      |     |       |        |        |
|  |              |                      |                              |                  |            |               |      |      |      |     |       |        |        |
|  |              |                      |                              |                  |            |               |      |      |      |     |       |        |        |
|  |              |                      |                              |                  |            |               |      |      |      |     |       |        |        |
|  |              |                      |                              |                  |            |               |      |      |      |     |       |        |        |
|  |              |                      |                              |                  |            |               |      |      |      |     |       |        |        |
|  |              |                      |                              |                  |            |               |      |      |      |     |       |        |        |
|  |              |                      |                              |                  |            |               |      |      |      |     |       |        |        |
|  |              |                      |                              |                  |            |               |      |      |      |     |       |        |        |


Marked: ● Stock available ○ Non-stocked standard



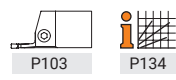
### Grooving Series

Ground inserts applicable to turning and grooving



| inserts*   | Product code | Suitable tool holder | Cutting parameter            |                             |            | Dimension(mm) |      |   |      |     |        | Grade |        |        |
|--|--------------|----------------------|------------------------------|-----------------------------|------------|---------------|------|---|------|-----|--------|-------|--------|--------|
|  |              |                      | Grooving<br>Feed<br>(mm/rev) | Turning<br>Feed<br>(mm/rev) |            | Ap<br>(mm)    | W    | R | Tmax | H   | h      | L     | AP301U | AW100K |
|  |              |                      |                              | Feed<br>(mm/rev)            | Ap<br>(mm) |               |      |   |      |     |        |       |        |        |
|  | ATD 300E150  | 3mm                  | 0.08-0.19                    | 0.15-0.30                   | 0-1.50     | 3.00          | 1.50 | - | 2.20 | 5.1 | 20.700 | ●     |        |        |
|  | ATD 400E200  | 4mm                  | 0.10-0.20                    | 0.18-0.35                   | 0-2.00     | 4.00          | 2.00 | - | 3.00 | 5.1 | 20.700 | ●     |        |        |
|  | ATD 478E239  | 5mm                  | 0.12-0.24                    | 0.22-0.45                   | 0-2.40     | 4.78          | 2.39 | - | 4.00 | 5.0 | 25.700 | ●     |        |        |
|  | ATD 500E250  | 5mm                  | 0.12-0.24                    | 0.22-0.45                   | 0-2.50     | 5.00          | 2.50 | - | 4.00 | 5.0 | 25.700 | ●     |        |        |
|  | ATD 600E300  | 6mm                  | 0.15-0.30                    | 0.25-0.50                   | 0-3.00     | 6.00          | 3.00 | - | 5.00 | 5.0 | 25.700 | ●     |        |        |
|  | ATD 800E400  | 8mm                  | 0.18-0.35                    | 0.30-0.65                   | 0-4.00     | 8.00          | 4.00 | - | 6.00 | 6.1 | 31.500 | ●     |        |        |
|  |              |                      |                              |                             |            |               |      |   |      |     |        |       |        |        |
|  |              |                      |                              |                             |            |               |      |   |      |     |        |       |        |        |
|  |              |                      |                              |                             |            |               |      |   |      |     |        |       |        |        |
|  |              |                      |                              |                             |            |               |      |   |      |     |        |       |        |        |
|  |              |                      |                              |                             |            |               |      |   |      |     |        |       |        |        |
|  |              |                      |                              |                             |            |               |      |   |      |     |        |       |        |        |
|  |              |                      |                              |                             |            |               |      |   |      |     |        |       |        |        |
|  |              |                      |                              |                             |            |               |      |   |      |     |        |       |        |        |
|  |              |                      |                              |                             |            |               |      |   |      |     |        |       |        |        |
|  |              |                      |                              |                             |            |               |      |   |      |     |        |       |        |        |
|  |              |                      |                              |                             |            |               |      |   |      |     |        |       |        |        |
|  |              |                      |                              |                             |            |               |      |   |      |     |        |       |        |        |
|  |              |                      |                              |                             |            |               |      |   |      |     |        |       |        |        |
|  |              |                      |                              |                             |            |               |      |   |      |     |        |       |        |        |
|  |              |                      |                              |                             |            |               |      |   |      |     |        |       |        |        |
|  |              |                      |                              |                             |            |               |      |   |      |     |        |       |        |        |
|  |              |                      |                              |                             |            |               |      |   |      |     |        |       |        |        |
|  |              |                      |                              |                             |            |               |      |   |      |     |        |       |        |        |
|  |              |                      |                              |                             |            |               |      |   |      |     |        |       |        |        |
|  |              |                      |                              |                             |            |               |      |   |      |     |        |       |        |        |
|  |              |                      |                              |                             |            |               |      |   |      |     |        |       |        |        |
|  |              |                      |                              |                             |            |               |      |   |      |     |        |       |        |        |

Marked: ● Stock available ○ Non-stocked standard



Cutting Parameter Recommendation of Parting Off and Grooving Application

| Materials                |  |   |                                |       |                       | Cutting parameter recommended table of parting off and grooving application |               |     |     |        |     |   |
|--------------------------|--|---|--------------------------------|-------|-----------------------|---|---------------|-----|-----|--------|-----|---|
| ISO                      | Workpiece material                             |   |                                |       | Brinell hardness (HB) | Tensile strength Rm(N/mm <sup>2</sup> )                                     | AP301U        |     |     | AW100K |     |   |
|                          |  |   |                                |       |                       |   | feed (mm/rev) |     |     |        |     |   |
|                          | 0.1  | 0.3                                     | 0.5                            | 0.1   |                       |   | 0.2           | 0.4 |     |        |     |   |
| P                        | Unalloyed steel                                | C ≤ 0.25%                               | Annealed                       | 125   | 428                   | 180   | 145           | 130 | -   | -      | -   |   |
|                          |  | 0.25 < C ≤ 0.55%                        | Annealed                       | 190   | 639                   | 145   | 130           | 115 | -   | -      | -   |   |
|                          |  | 0.25 < C ≤ 0.55%                        | Heat-treated                   | 210   | 708                   | 130   | 115           | 100 | -   | -      | -   |   |
|                          |  | C > 0.55%                               | Annealed                       | 190   | 639                   | 145   | 130           | 115 | -   | -      | -   |   |
|                          |  | C > 0.55%                               | Heat-treated                   | 300   | 1013                  | 115   | 100           | 80  | -   | -      | -   |   |
|                          |  | Free cutting steel (short-chip)         | Annealed                       | 220   | 745                   | 130   | 115           | 100 | -   | -      | -   |   |
|                          | Low-alloyed steel                              | Annealed                                |                                | 175   | 591                   | 180   | 145           | 130 | -   | -      | -   |   |
|                          |  | Heat-treated                            |                                | 300   | 1013                  | 115   | 100           | 80  | -   | -      | -   |   |
|                          |  | Heat-treated                            |                                | 380   | 1282                  | 170   | 90            | 105 | -   | -      | -   |   |
|                          |  | Heat-treated                            |                                | 430   | 1477                  | -   | -             | -   | -   | -      | -   |   |
|                          | High-alloyed steel and high-alloyed tool steel | Annealed                                |                                | 200   | 675                   | -   | -             | -   | -   | -      | -   |   |
|                          |  | Hardened and tempered                   |                                | 300   | 1013                  | -   | -             | -   | -   | -      | -   |   |
| Hardened and tempered    |  | 400                                     | 1361                           | -     | -                     | -   | -             | -   | -   |        |     |   |
| Stainless steel          | Ferritic/martensitic, annealed                 |   | 200                            | 675   | 165                   | 135   | 105           | -   | -   | -      |     |   |
|                          | Martensitic, heat-treated                      |   | 330                            | 1114  | 150                   | 115   | 70            | -   | -   | -      |     |   |
| M                        | Stainless steel                                | Austenitic, quench hardened             |                                | 200   | 675                   | 165   | 135           | 105 | -   | -      | -   |   |
|                          |  | Austenitic, precipitation hardened (PH) |                                | 300   | 1013                  | 155   | 120           | 80  | -   | -      | -   |   |
|                          |  | Austenitic/ferritic, duplex             |                                | 230   | 778                   | 135   | 110           | 85  | -   | -      | -   |   |
| K                        | Malleable cast iron                            | Ferritic                                |                                | 200   | 400                   | 115   | 90            | 65  | -   | -      | -   |   |
|                          |  | Pearlitic                               |                                | 260   | 700                   | 115   | 90            | 65  | -   | -      | -   |   |
|                          | Grey cast iron                                 | Low tensile strength                    |                                | 180   | 200                   | 185   | 140           | 95  | -   | -      | -   |   |
|                          |  | High tensile strength/austenitic        |                                | 245   | 350                   | 185   | 140           | 95  | -   | -      | -   |   |
|                          | Nodular cast iron                              | Ferritic                                |                                | 155   | 400                   | 145   | 110           | 80  | -   | -      | -   |   |
|                          |  | Pearlitic                               |                                | 265   | 700                   | 145   | 110           | 80  | -   | -      | -   |   |
|                          | GGV(CGI)                                       |   | 230                            | 400   | -                     | -   | -             | -   | -   | -      |     |   |
| N                        | Wrought aluminium alloys                       | non-aging                               |                                | 30    | -                     | -   | -             | -   | -   | -      | -   |   |
|                          |  | aged                                    |                                | 100   | 340                   | -   | -             | -   | -   | -      | -   |   |
|                          | Cast aluminium alloys                          | ≤ 12% Si, non-aging                     |                                | 75    | 260                   | -   | -             | -   | 850 | 500    | 200 |   |
|                          |  | ≤ 12% Si, aged                          |                                | 90    | 310                   | -   | -             | -   | -   | -      | -   |   |
|                          |  | > 12% Si, non-aging                     |                                | 130   | 450                   | -   | -             | -   | 450 | 250    | 40  |   |
|                          | Magnesium alloys                               |   |                                | 70    | 250                   | -   | -             | -   | -   | -      | -   |   |
|                          |  | Copper and copper alloys (bronze/brass) | Unalloyed, electrolytic copper |       | 100                   | 340   | -             | -   | -   | -      | -   | - |
| Brass, bronze, red brass |  |   | 90                             | 310   | -                     | -   | -             | -   | -   | -      |     |   |
| Cu alloys, short-chip    |  |   | 110                            | 380   | -                     | -   | -             | -   | -   | -      |     |   |
|                          | High tensile, Ampco alloy                      |   | 300                            | 1010  | -                     | -   | -             | -   | -   | -      |     |   |
| S                        | Heat-resistant alloys                          | Fe-based                                | Annealed                       | 200   | 680                   | -   | -             | -   | -   | -      | -   |   |
|                          |  |   | Hardened                       | 280   | 940                   | -   | -             | -   | -   | -      | -   |   |
|                          |  | Ni or Co based                          | Annealed                       | 250   | 840                   | -   | -             | -   | -   | -      | -   |   |
|                          |  |   | Hardened                       | 350   | 1180                  | -   | -             | -   | -   | -      | -   |   |
|                          |  | Cast                                    |                                | 320   | 1080                  | -   | -             | -   | -   | -      |     |   |
|                          | Titanium alloys                                | Pure titanium                           |                                | 200   | 680                   | -   | -             | -   | -   | -      | -   |   |
|                          |  | α and β alloys, hardened                |                                | 375   | 1260                  | -   | -             | -   | -   | -      | -   |   |
|                          |  | β alloys                                |                                | 410   | 1400                  | -   | -             | -   | -   | -      | -   |   |
| Tungsten alloys          | 1177   |   | 300                            | 1010  | -                     | -   | -             | -   | -   | -      |     |   |
| Molybdenum alloys        | 1262   |   | 300                            | 1010  | -                     | -   | -             | -   | -   | -      |     |   |
| H                        | Hardened steel                                 | Hardened and tempered                   |                                | 50HRC | -                     | -   | -             | -   | -   | -      |     |   |
|                          |  | Hardened and tempered                   |                                | 55HRC | -                     | -   | -             | -   | -   | -      |     |   |
|                          |  | Hardened and tempered                   |                                | 60HRC | -                     | -   | -             | -   | -   | -      |     |   |
|                          | Hardened cast steel                            | Hardened and tempered                   |                                | 50HRC | -                     | -   | -             | -   | -   | -      |     |   |

\*The recommended cutting conditions always refer to general conditions. These cutting conditions should be adjusted according to the practical machine rigidity, tools, workpiece clamping and coolant





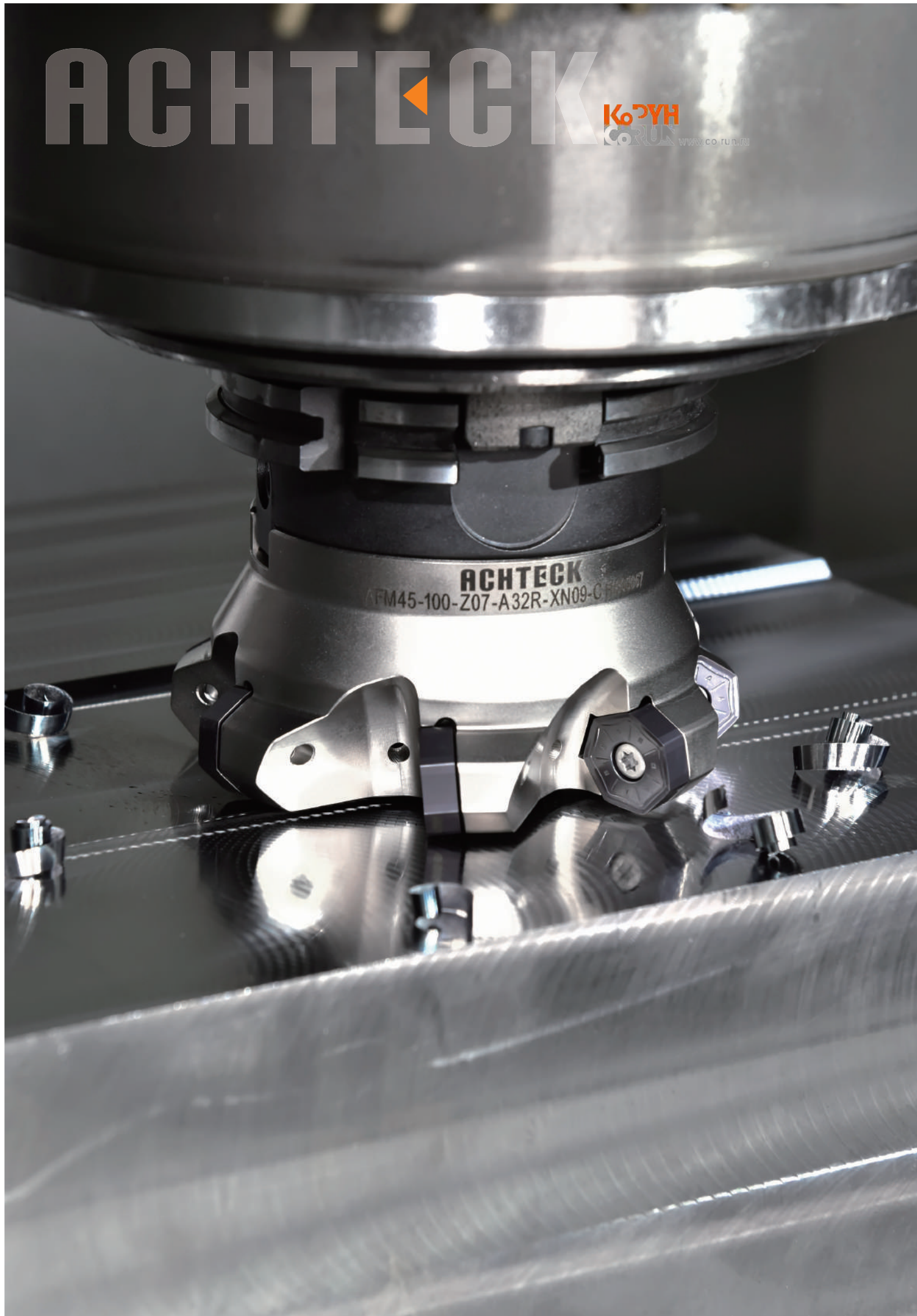
# ACHTECK

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ACHTECK

FM45-100-Z07-A32R-XN09-C

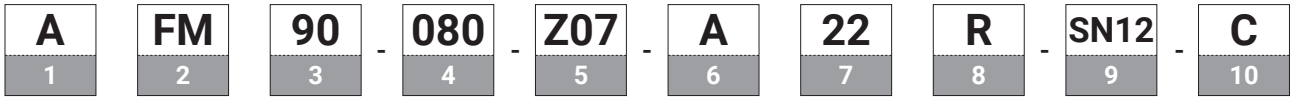


## CUTTING TOOL CATALOGUE

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**Milling Cutter Denomination System**



**1. A--ACHTECK**

| 2. Machining method |    |
|---------------------|----|
| Face milling        | FM |
| Shoulder milling    | SM |
| Profile milling     | PM |
| High feed milling   | HM |
| Side & face milling | DM |
| Thread milling      | TM |
| Chamfer milling     | CM |

| 3. Approach angle (Kr) |              |
|------------------------|--------------|
| Figure                 | Angle        |
| 90                     | 90°          |
| 88                     | 88°          |
| 75                     | 75°          |
| 60                     | 60°          |
| 45                     | 45°          |
| 42                     | 42°          |
| •                      | •            |
| •                      | •            |
| •                      | •            |
| 15                     | 15           |
| 00                     | Round insert |

| 4. Cutter dia. |       |
|----------------|-------|
| 025            | 25mm  |
| 080            | 80mm  |
| •              | •     |
| •              | •     |
| 250            | 250mm |

| 5. Number of teeth |          |
|--------------------|----------|
| Z02                | 2 teeth  |
| •                  | •        |
| Z05                | 5 teeth  |
| •                  | •        |
| Z30                | 30 teeth |

| 6. Connection |                                 |
|---------------|---------------------------------|
| A             | Arbor                           |
| W             | Weldon shank                    |
| C             | Cylinder shank                  |
| N             | Whistle notch shank             |
| M             | Screw clamped with modular head |

| 7. Coupling Size            |
|-----------------------------|
| 22—Connection diameter 22mm |

| 8. Direction of tool |         |
|----------------------|---------|
| R                    | Right   |
| L                    | Left    |
| N                    | Neutral |

| 9. Insert info          |
|-------------------------|
| SN12—SN12 series insert |

| 10. Others |                  |
|------------|------------------|
| C          | Internal coolant |
| No mark    | No coolant       |

## Porcupine Cutter Denomination

|          |           |           |            |            |          |           |          |             |            |          |          |
|----------|-----------|-----------|------------|------------|----------|-----------|----------|-------------|------------|----------|----------|
| <b>A</b> | <b>PE</b> | <b>90</b> | <b>063</b> | <b>Z04</b> | <b>A</b> | <b>27</b> | <b>R</b> | <b>LN13</b> | <b>L56</b> | <b>F</b> | <b>C</b> |
| 1        | 2         | 3         | 4          | 5          | 6        | 7         | 8        | 9           | 10         | 11       | 12       |

### 1. A--ACHTECK

#### 2. Cutting method

|                              |    |
|------------------------------|----|
| Porcupine cutter             | PE |
| Shoulder milling cutter      | SM |
| Profile milling cutter       | PM |
| High feed milling cutter     | HM |
| Side and face Milling cutter | DM |
| Thread milling cutter        | TM |
| Chamfer milling cutter       | CM |
| Face milling cutter          | FM |

#### 3. Approach angle (Kr)

| Figure | Angle |
|--------|-------|
| 90     | 90°   |
| 88     | 88°   |
| 75     | 75°   |
| 60     | 60°   |
| 45     | 45°   |
| 42     | 42°   |
| •      | •     |
| •      | •     |
| •      | •     |

#### 4. Cutter dia.

|     |       |
|-----|-------|
| 025 | 25mm  |
| 063 | 63mm  |
| 080 | 80mm  |
| •   | •     |
| 250 | 250mm |

#### 5. Number of teeth

|     |          |
|-----|----------|
| Z02 | 2 teeth  |
| Z04 | 4 teeth  |
| Z05 | 5 teeth  |
| •   | •        |
| Z30 | 30 teeth |

#### 6. Coupling

|   |                                 |
|---|---------------------------------|
| A | Arbor                           |
| W | Weldon shank                    |
| C | Cylinder shank                  |
| N | Whistle notch shank             |
| M | Screw clamped with modular head |

#### 7. Coupling size

27—Connection diameter 27mm

#### 8. Direction of tool

|   |         |
|---|---------|
| R | Right   |
| L | Left    |
| N | Neutral |

#### 9. Insert information

LN13—LN13 series insert

#### 10. Max. cutting depth

|     |      |
|-----|------|
| L30 | 30MM |
| L45 | 45MM |
| L56 | 56MM |










#### 11. Tool type

|   |            |
|---|------------|
| F | Full teeth |
| H | Half teeth |

#### 10. Others










|               |                          |
|---------------|--------------------------|
| C             | With internal coolant    |
| No indication | Without internal coolant |

Overview of Milling Products

| Product family      |                             |   | AFM42-OD04 | AFM42-OD06 | AFM40-ON05 | AFM45-SD09 | AFM75-SD09 |
|---------------------|-----------------------------|---|------------|------------|------------|------------|------------|
| Page                |                             |   | P148       | P150       | P152       | P154       | P156       |
| Approach angle      |                             |   | 42°        | 42°        | 40°        | 45°        | 75°        |
| Max.ap (mm)         |                             |   | 3.5        | 4.5        | 3.5        | 5          | 6          |
| Diameter range (mm) |                             |   | φ32-φ125   | φ50-φ160   | φ50-φ160   | φ16-φ125   | φ25-φ100   |
| Insert type         |                             |   | OD..0404.. | OD..0605.. | ON..0504.. | SD..09T3.. | SD..09T3.. |
| Application         | Face milling                |    | ●          | ●          | ●          | ●          | ●          |
|                     | Shoulder milling            |    |            |            |            |            |            |
|                     | Slot milling                |   |            |            |            |            |            |
|                     | Ramping                     |  | ●          | ●          |            | ●          | ●          |
|                     | Helical interpolate milling |  | ●          | ●          |            |            |            |
|                     | Plunging                    |  |            |            |            |            |            |
|                     | Profile milling             |  |            |            |            |            |            |
|                     | Chamfer milling             |  | ●          | ●          |            | ●          |            |
|                     | Pocket milling              |  | ●          | ●          |            |            |            |

Remark: ● Recommended application










**Overview of Milling Products**

| Product family      |                             |   | AFM90-SD09 | AFM45-SD12 | AFM75-SD12 | AFM90-SD12 | AFM45-SN12 |
|---------------------|-----------------------------|---|------------|------------|------------|------------|------------|
| Page                |                             |   | P158       | P160       | P162       | P164       | P166       |
| Approach angle      |                             |   | 90°        | 45°        | 75°        | 90°        | 45°        |
| Max.ap (mm)         |                             |   | 6          | 7          | 8          | 9          | 6.5        |
| Diameter range (mm) |                             |   | φ25-φ100   | φ50-φ125   | φ50-φ125   | φ50-φ125   | φ50-φ250   |
| Insert type         |                             |   | SD..09T3.. | SD..1204.. | SD..1204.. | SD..1204.. | SN..1206.. |
| Application         | Face milling                |    | ●          | ●          | ●          | ●          | ●          |
|                     | Shoulder milling            |    |            |            |            |            |            |
|                     | Slot milling                |   |            |            |            |            |            |
|                     | Ramping                     |  |            | ●          | ●          |            |            |
|                     | Helical interpolate milling |  |            |            |            |            |            |
|                     | Plunging                    |  |            |            |            |            |            |
|                     | Profile milling             |  |            |            |            |            |            |
|                     | Chamfer milling             |  |            | ●          |            |            |            |
|                     | Pocket milling              |  |            |            |            |            |            |

Remark: ● Recommended application










Milling cutters

Overview of Milling Products

| Product family      |                             |   | AFM45-SN19 | AFM75-SN12 | AFM88-SN12 | AFM45-XN07 | AFM45-XN09(C) |
|---------------------|-----------------------------|---|------------|------------|------------|------------|---------------|
| Page                |                             |   | P166       | P168       | P170       | P172       | P174          |
| Approach angle      |                             |   | 45°        | 75°        | 88°        | 45°        | 45°           |
| Max.ap (mm)         |                             |   | 11         | 8          | 10         | 4.4        | 6             |
| Diameter range (mm) |                             |   | φ160-φ250  | φ50-φ250   | φ50-φ200   | φ40-φ160   | φ63-φ200      |
| Insert type         |                             |   | SN..1909.. | SN..1206.. | SN..1206.. | XN..0705.. | XN..0906..    |
| Application         | Face milling                |    | ●          | ●          | ●          | ●          | ●             |
|                     | Shoulder milling            |    |            |            |            |            |               |
|                     | Slot milling                |   |            |            |            |            |               |
|                     | Ramping                     |  |            |            |            |            |               |
|                     | Helical interpolate milling |  |            |            |            |            |               |
|                     | Plunging                    |  |            |            |            |            |               |
|                     | Profile milling             |  |            |            |            |            |               |
|                     | Chamfer milling             |  |            |            |            |            |               |
|                     | Pocket milling              |  |            |            |            |            |               |

Remark: ● Recommended application

Overview of Milling Products

| Product family      |                             | AFM45-XN09(W)   | AFF40-LN12               | AFF40-LN15               | ASM90-LN09  | ASM90-LN13  |
|---------------------|-----------------------------|---|--------------------------|--------------------------|-------------|-------------|
| Page                |                             | P174  | P176                     | P176                     | P178        | P180        |
| Approach angle      |                             | 45°   | 40°                      | 40°                      | 90°         | 90°         |
| Max.ap (mm)         |                             | 6   | 0.5                      | 0.5                      | 8           | 12          |
| Diameter range (mm) |                             | φ80-φ200  | φ80-φ100                 | φ125-φ250                | φ20-φ80     | φ40-φ160    |
| Insert type         |                             | XN..0906..  | ON..0504..<br>LN..1204.. | ON..0504..<br>LN..1504.. | LNHU 0904.. | LNHU 1306.. |
| Application         | Face milling                |    | ●                        | ●                        | ●           | ●           |
|                     | Shoulder milling            |    |                          |                          | ●           | ●           |
|                     | Slot milling                |   |                          |                          | ●           | ●           |
|                     | Ramping                     |  |                          |                          |             |             |
|                     | Helical interpolate milling |  |                          |                          |             |             |
|                     | Plunging                    |  |                          |                          |             |             |
|                     | Profile milling             |  |                          |                          |             |             |
|                     | Chamfer milling             |  |                          |                          |             |             |
|                     | Pocket milling              |  |                          |                          |             |             |

Milling cutters

Remark: ● Recommended application












**Overview of Milling Products**

| Product family      |                             | ASM90-LN16  | ASM90-WN08 | ASM90-AP10  | ASM90-AP17  | APE90-LN09  |   |
|---------------------|-----------------------------|---|------------|-------------|-------------|-------------|---|
| Page                |                             | P182  | P184       | P186        | P188        | P190        |   |
| Approach angle      |                             | 90°   | 90°        | 90°         | 90°         | 90°         |   |
| Max.ap (mm)         |                             | 15  | 7          | 8           | 16          | 48          |   |
| Diameter range (mm) |                             | φ63-φ160  | φ40-φ250   | φ16-φ63     | φ25-φ63     | φ25-φ50     |   |
| Insert type         |                             | LNHU 1607..   | WN..0806.. | APKT 1003.. | APKT 1705.. | LNHU 0904.. |   |
| Application         | Face milling                |    | ●          | ●           | ●           | ●           | ● |
|                     | Shoulder milling            |    | ●          | ●           | ●           | ●           | ● |
|                     | Slot milling                |   | ●          | ●           | ●           | ●           |   |
|                     | Ramping                     |  |            |             | ●           | ●           |   |
|                     | Helical interpolate milling |  |            |             | ●           | ●           |   |
|                     | Plunging                    |  |            |             | ●           | ●           |   |
|                     | Profile milling             |  |            |             |             |             |   |
|                     | Chamfer milling             |  |            |             |             |             |   |
|                     | Pocket milling              |  |            |             | ●           | ●           |   |

Remark: ● Recommended application

Overview of Milling Products

| Product family      |                             | APE90-LN13  | APM00-RP      | APM00-RO08  | APM00-RO10 | APM00-RO12 |
|---------------------|-----------------------------|---|---------------|-------------|------------|------------|
| Page                |                             | P192  | P194          | P196        | P198       | P200       |
| Approach angle      |                             | 90°   | -             | -           | -          | -          |
| Max.ap (mm)         |                             | 56  | -             | 4           | 5          | 6          |
| Diameter range (mm) |                             | φ40-φ80   | φ16-φ20       | φ16-φ25     | φ25-φ50    | φ32-φ80    |
| Insert type         |                             | LNHU 1306..   | RPM 080/100.. | RO.. 0803.. | RO..10T3.. | RO..1204.. |
| Application         | Face milling                |    | ●             |             | ●          | ●          |
|                     | Shoulder milling            |    | ●             |             |            |            |
|                     | Slot milling                |   |               |             |            |            |
|                     | Ramping                     |  |               | ●           | ●          | ●          |
|                     | Helical interpolate milling |  |               |             | ●          | ●          |
|                     | Plunging                    |  |               |             |            |            |
|                     | Profile milling             |  |               | ●           | ●          | ●          |
|                     | Chamfer milling             |  |               |             |            |            |
|                     | Pocket milling              |  |               | ●           | ●          | ●          |

Remark: ● Recommended application

Milling cutters

Overview of Milling Products

| Product family      |                             |   | APM00-RO16 | APM00-RO20 | AHM20-LN06 | AHM15-XD09 | AHM15-XD12 |
|---------------------|-----------------------------|---|------------|------------|------------|------------|------------|
| Page                |                             |   | P202       | P204       | P206-207   | P208       | P210       |
| Approach angle      |                             |   | -          | -          | 20°        | 15°        | 15°        |
| Max.ap (mm)         |                             |   | 8          | 10         | 1.0        | 1.5        | 2.5        |
| Diameter range (mm) |                             |   | φ63-φ100   | φ100-φ160  | φ16-φ63    | φ25-φ50    | φ32-φ125   |
| Insert type         |                             |   | RO..1605.. | RO..2006.. | LN..0604.. | XD..0904.. | XD..1205.. |
| Application         | Face milling                |    | ●          | ●          | ●          | ●          | ●          |
|                     | Shoulder milling            |    |            |            |            |            |            |
|                     | Slot milling                |   |            |            | ●          | ●          | ●          |
|                     | Ramping                     |  | ●          | ●          | ●          | ●          | ●          |
|                     | Helical interpolate milling |  | ●          | ●          | ●          | ●          | ●          |
|                     | Plunging                    |  |            |            | ●          | ●          | ●          |
|                     | Profile milling             |  | ●          | ●          |            |            |            |
|                     | Chamfer milling             |  |            |            |            |            |            |
|                     | Pocket milling              |  | ●          | ●          | ●          | ●          | ●          |

Remark: ● Recommended application

# ACHTECK

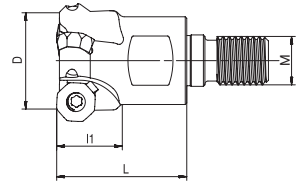
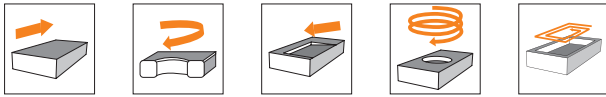
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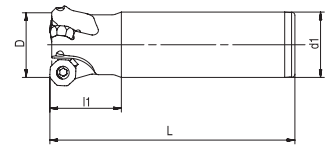
Milling cutters

AFM42-OD04

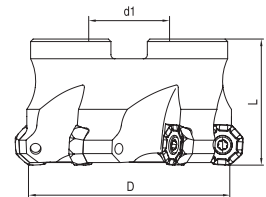
42 ° Approaching angle face milling cutter



| Product code              | D  | M   | L  | apmax | Internal coolant | Z | Inserts  |
|---------------------------|----|-----|----|-------|------------------|---|----------|
| AFM42-032-Z03-M16R-OD04-C | 32 | M16 | 43 | 3.5   |                  | 3 | OD..0404 |



| Product code              | D  | d1 | L   | apmax | Internal coolant | Z | Inserts  |
|---------------------------|----|----|-----|-------|------------------|---|----------|
| AFM42-032-Z03-W32R-OD04-C | 32 | 32 | 120 | 3.5   |                  | 3 | OD..0404 |



| Product code              | D   | d1 | L  | apmax | Internal coolant | Z  | Inserts  |
|---------------------------|-----|----|----|-------|------------------|----|----------|
| AFM42-040-Z04-A16R-OD04-C | 40  | 16 | 40 | 3.5   |                  | 4  | OD..0404 |
| AFM42-050-Z05-A16R-OD04-C | 50  | 16 | 40 | 3.5   |                  | 5  |          |
| AFM42-063-Z05-A22R-OD04-C | 63  | 22 | 40 | 3.5   |                  | 5  |          |
| AFM42-063-Z06-A22R-OD04-C | 63  | 22 | 40 | 3.5   |                  | 6  |          |
| AFM42-080-Z06-A27R-OD04-C | 80  | 27 | 50 | 3.5   |                  | 6  |          |
| AFM42-080-Z08-A27R-OD04-C | 80  | 27 | 50 | 3.5   |                  | 8  |          |
| AFM42-100-Z07-A32R-OD04-C | 100 | 32 | 50 | 3.5   |                  | 7  |          |
| AFM42-100-Z08-A32R-OD04-C | 100 | 32 | 50 | 3.5   |                  | 8  |          |
| AFM42-125-Z08-A40R-OD04-C | 125 | 40 | 63 | 3.5   |                  | 8  |          |
| AFM42-125-Z10-A40R-OD04-C | 125 | 40 | 63 | 3.5   |                  | 10 |          |

| Dimension(mm)   | Spare parts |         |        |
|-----------------|-------------|---------|--------|
| Cutter diameter | Screw       | Wrench  | Torque |
| φ32-125         |             |         | 3.5Nm  |
|                 | SP040112    | DT-TP15 |        |

Note: With internal coolant  
 Without internal coolant



| Product code      | Dimension(mm)           |                 | Grades |        |        |        |        |        |        |
|-------------------|-------------------------|-----------------|--------|--------|--------|--------|--------|--------|--------|
|                   | Insert corner radius mm | Wiper length mm | AP301U | AP351U | AC301P | AP401U | AC301K | AP351K | AW100K |
| ODET 0404APFN-FM2 | -                       | 1.2             |        |        |        |        |        |        | ●      |
| ODHT 0404APEN-MM3 | -                       | 1.2             | ●      | ●      |        | ●      | ●      | ●      |        |
| ODEW 0404APSR-HR2 | -                       | 1.2             | ●      |        |        |        | ●      | ●      |        |
| ODMW 040408EN-HR2 | 0.8                     | -               | ●      |        |        |        | ●      |        |        |
| ODMT 040408EN-MM3 | 0.8                     | -               |        | ●      |        | ●      |        |        |        |
|                   |                         |                 |        |        |        |        |        |        |        |
|                   |                         |                 |        |        |        |        |        |        |        |
|                   |                         |                 |        |        |        |        |        |        |        |
|                   |                         |                 |        |        |        |        |        |        |        |
|                   |                         |                 |        |        |        |        |        |        |        |
|                   |                         |                 |        |        |        |        |        |        |        |
|                   |                         |                 |        |        |        |        |        |        |        |

Marked: ● Stock available ○ Non-stocked standard

| Materials |   |                                       |               | Cutting depth and feed |          |      |      |      |      |   |   |  |
|-----------|---|---------------------------------------|---------------|------------------------|----------|------|------|------|------|---|---|--|
| ISO       | Material classification                 | Tensile strength (N/mm <sup>2</sup> ) | Hardness (HB) | OD..0404               |          |      |      |      |      |   |   |  |
|           |   |                                       |               | ap                     | Geometry |      |      |      |      |   |   |  |
|           |   |                                       |               |                        | HR2      |      | MM3  |      | FM2  |   |   |  |
|           |   |                                       |               |                        | fz       |      |      |      |      |   |   |  |
| (mm)      |   |                                       |               |                        |          |      |      |      |      |   |   |  |
| min       | max                                     | min                                   | max           | min                    | max      | min  | max  |      |      |   |   |  |
| P         | Unalloyed steel                         | <600                                  | <180          | 0.20                   | 3.50     | 0.15 | 0.35 | 0.12 | 0.32 | - | - |  |
|           |   | <950                                  | <280          |                        |          |      |      |      |      |   |   |  |
|           | Alloyed steel                           | 700-950                               | 200-280       |                        |          | 0.12 | 0.30 | 0.10 | 0.28 | - | - |  |
|           |   | 950-1200                              | 280-355       |                        |          |      |      |      |      |   |   |  |
|           | 1200-1400                               | 355-415                               |               |                        |          |      |      |      |      |   |   |  |
| M         | Duplex stainless steel                  | 778                                   | 230           |                        |          |      |      |      |      |   |   |  |
|           | Austenitic stainless steel              | 675                                   | 200           |                        |          | -    | -    | 0.08 | 0.25 | - | - |  |
|           | Precipitation-hardening stainless steel | 1013                                  | 300           |                        |          |      |      |      |      |   |   |  |
| K         | Grey cast iron                          | 700                                   | 220           |                        |          |      |      |      |      |   |   |  |
|           | Nodular cast iron                       | 880                                   | 260           |                        |          | 0.15 | 0.35 | 0.12 | 0.32 | - | - |  |
|           | Malleable cast iron                     | 800                                   | 250           |                        |          |      |      |      |      |   |   |  |
| S         | Fe-based alloy                          | 943                                   | 280           |                        |          |      |      |      |      |   |   |  |
|           | Co-based alloy                          | 1076                                  | 320           |                        |          |      |      |      |      |   |   |  |
|           | Ni-based alloy                          | 1177                                  | 350           | -                      | -        | -    | -    | -    | -    |   |   |  |
|           | Ti-alloy                                | 1262                                  | 370           |                        |          |      |      |      |      |   |   |  |
| N         | Aluminum                                | 260                                   | 75            |                        |          |      |      |      |      |   |   |  |
|           | Aluminum alloy                          | 447                                   | 130           | -                      | -        | -    | -    | 0.10 | 0.32 |   |   |  |
| H         | Hardened steel                          | -                                     | 50-60HRC      |                        |          |      |      |      |      |   |   |  |
|           | Chilled cast iron                       | -                                     | 55HRC         | 0.08                   | 0.20     | -    | -    | -    | -    |   |   |  |

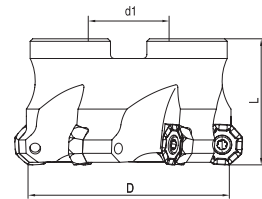
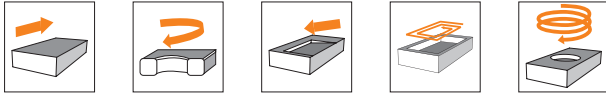
\*The recommended cutting conditions always refer to general conditions. These cutting conditions should be adjusted according to the practical machine rigidity, tools, workpiece clamping and coolants.  $f_z = \frac{h_m}{\sqrt{\frac{a_e}{D_c}}}$ , (calculate for  $\frac{a_e}{D_c} < 30\%$ )



Milling cutters

**AFM42-OD06**

**42 ° Approaching angle face milling cutter**



| Product code              | D   | d1 | L  | apmax | Internal coolant | Z  | Inserts  |
|---------------------------|-----|----|----|-------|------------------|----|----------|
| AFM42-050-Z04-A16R-OD06-C | 50  | 16 | 40 | 4.5   |                  | 4  | OD..0605 |
| AFM42-063-Z05-A22R-OD06-C | 63  | 22 | 40 | 4.5   |                  | 5  |          |
| AFM42-080-Z05-A27R-OD06-C | 80  | 27 | 50 | 4.5   |                  | 5  |          |
| AFM42-080-Z06-A27R-OD06-C | 80  | 27 | 50 | 4.5   |                  | 6  |          |
| AFM42-100-Z06-A32R-OD06-C | 100 | 32 | 50 | 4.5   |                  | 6  |          |
| AFM42-100-Z07-A32R-OD06-C | 100 | 32 | 50 | 4.5   |                  | 7  |          |
| AFM42-125-Z07-A40R-OD06-C | 125 | 40 | 63 | 4.5   |                  | 7  |          |
| AFM42-125-Z08-A40R-OD06-C | 125 | 40 | 63 | 4.5   |                  | 8  |          |
| AFM42-160-Z10-A40R-OD06   | 160 | 40 | 63 | 4.5   |                  | 10 |          |

| Dimension(mm) | Spare parts |         |        |
|---------------|-------------|---------|--------|
|               | Screw       | Wrench  | Torque |
| φ50-160       |             |         | 5.0Nm  |
|               | SP04512043  | DT-TP20 |        |

Note: With internal coolant  
 Without internal coolant



| Product code      | Dimension(mm)           |                 | Grades |        |        |        |        |        |        |
|-------------------|-------------------------|-----------------|--------|--------|--------|--------|--------|--------|--------|
|                   | Insert corner radius mm | Wiper length mm | AP301U | AP351U | AC301P | AP401U | AC301K | AP351K | AW100K |
| ODET 0605APFN-FM2 | -                       | 1.6             |        |        |        |        |        |        | ●      |
| ODMT 060508EN-MM3 | 0.8                     | -               | ●      | ●      | ●      | ●      | ●      | ●      |        |
| ODMT 060512EN-MM3 | 1.2                     | -               | ●      |        |        |        |        |        |        |
| ODHT 0605APEN-MM3 | -                       | 1.6             | ●      | ●      |        | ●      | ●      | ●      |        |
| ODEW 0605APSR-HR2 | -                       | 1.6             |        |        |        |        | ●      | ●      |        |
| ODEW 0605APSN-HR2 | -                       | 1.6             |        |        |        |        | ●      |        |        |
| ODMW 060512EN-HR2 | 1.2                     | -               |        |        |        |        | ●      | ●      |        |
|                   |                         |                 |        |        |        |        |        |        |        |
|                   |                         |                 |        |        |        |        |        |        |        |
|                   |                         |                 |        |        |        |        |        |        |        |
|                   |                         |                 |        |        |        |        |        |        |        |
|                   |                         |                 |        |        |        |        |        |        |        |

Marked: ● Stock available ○ Non-stocked standard

| Materials |   |                                       |               | Cutting depth and feed |          |      |      |      |      |   |   |
|-----------|---|---------------------------------------|---------------|------------------------|----------|------|------|------|------|---|---|
| ISO       | Material classification                 | Tensile strength (N/mm <sup>2</sup> ) | Hardness (HB) | OD..0605               |          |      |      |      |      |   |   |
|           |   |                                       |               | ap                     | Geometry |      |      |      |      |   |   |
|           |   |                                       |               |                        | HR2      |      | MM3  |      | FM2  |   |   |
|           |   |                                       |               |                        | fz       |      |      |      |      |   |   |
| (mm)      |   |                                       |               |                        |          |      |      |      |      |   |   |
| min       | max                                     | min                                   | max           | min                    | max      | min  | max  |      |      |   |   |
| P         | Unalloyed steel                         | <600                                  | <180          | 0.20                   | 4.50     | 0.15 | 0.40 | 0.12 | 0.35 | - | - |
|           |   | <950                                  | <280          |                        |          |      |      |      |      |   |   |
|           | Alloyed steel                           | 700-950                               | 200-280       |                        |          | 0.12 | 0.35 | 0.10 | 0.30 | - | - |
|           |   | 950-1200                              | 280-355       |                        |          |      |      |      |      |   |   |
|           | 1200-1400                               | 355-415                               |               |                        |          |      |      |      |      |   |   |
| M         | Duplex stainless steel                  | 778                                   | 230           |                        |          |      |      |      |      |   |   |
|           | Austenitic stainless steel              | 675                                   | 200           |                        |          | -    | -    | 0.08 | 0.28 | - | - |
|           | Precipitation-hardening stainless steel | 1013                                  | 300           |                        |          |      |      |      |      |   |   |
| K         | Grey cast iron                          | 700                                   | 220           |                        |          |      |      |      |      |   |   |
|           | Nodular cast iron                       | 880                                   | 260           |                        |          | 0.15 | 0.40 | 0.12 | 0.35 | - | - |
|           | Malleable cast iron                     | 800                                   | 250           |                        |          |      |      |      |      |   |   |
| S         | Fe-based alloy                          | 943                                   | 280           |                        |          |      |      |      |      |   |   |
|           | Co-based alloy                          | 1076                                  | 320           |                        |          |      |      |      |      |   |   |
|           | Ni-based alloy                          | 1177                                  | 350           | -                      | -        | -    | -    | -    | -    |   |   |
|           | Ti-alloy                                | 1262                                  | 370           |                        |          |      |      |      |      |   |   |
| N         | Aluminum                                | 260                                   | 75            |                        |          |      |      |      |      |   |   |
|           | Aluminum alloy                          | 447                                   | 130           | -                      | -        | -    | -    | 0.10 | 0.35 |   |   |
| H         | Hardened steel                          | -                                     | 50-60HRC      |                        |          |      |      |      |      |   |   |
|           | Chilled cast iron                       | -                                     | 55HRC         | 0.10                   | 0.25     | -    | -    | -    | -    |   |   |

\*The recommended cutting conditions always refer to general conditions. These cutting conditions should be adjusted according to the practical machine rigidity, tools, workpiece clamping and coolants.  $f_z = \frac{h_m}{\sqrt{\frac{a_e}{D_c}}}$ , (calculate for  $\frac{a_e}{D_c} < 30\%$ )

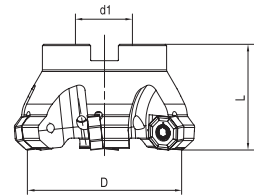


Milling cutters



AFM40-ON05

40° Approaching angle face milling cutter



| Product code                | D   | d1 | L  | apmax | Internal coolant | Z  | Inserts  |
|-----------------------------|-----|----|----|-------|------------------|----|----------|
| AFM40-050-Z04-A22R-ON05-N-C | 50  | 22 | 40 | 3.5   |                  | 4  | ON..0504 |
| AFM40-050-Z06-A22R-ON05-N-C | 50  | 22 | 40 | 3.5   |                  | 6  |          |
| AFM40-063-Z05-A22R-ON05-N-C | 63  | 22 | 40 | 3.5   |                  | 5  |          |
| AFM40-063-Z06-A22R-ON05-N-C | 63  | 22 | 40 | 3.5   |                  | 6  |          |
| AFM40-063-Z08-A22R-ON05-N-C | 63  | 22 | 40 | 3.5   |                  | 8  |          |
| AFM40-080-Z06-A27R-ON05-N-C | 80  | 27 | 50 | 3.5   |                  | 6  |          |
| AFM40-080-Z08-A27R-ON05-N-C | 80  | 27 | 50 | 3.5   |                  | 8  |          |
| AFM40-080-Z09-A27R-ON05-N-C | 80  | 27 | 50 | 3.5   |                  | 9  |          |
| AFM40-100-Z07-A32R-ON05-N-C | 100 | 32 | 50 | 3.5   |                  | 7  |          |
| AFM40-100-Z09-A32R-ON05-N-C | 100 | 32 | 50 | 3.5   |                  | 9  |          |
| AFM40-100-Z11-A32R-ON05-N-C | 100 | 32 | 50 | 3.5   |                  | 11 |          |
| AFM40-125-Z07-A40R-ON05-N-C | 125 | 40 | 63 | 3.5   |                  | 7  |          |
| AFM40-125-Z09-A40R-ON05-N-C | 125 | 40 | 63 | 3.5   |                  | 9  |          |
| AFM40-125-Z14-A40R-ON05-N-C | 125 | 40 | 63 | 3.5   |                  | 14 |          |
| AFM40-160-Z10-A40R-ON05-N   | 160 | 40 | 63 | 3.5   |                  | 10 |          |

| Dimension(mm)   | Spare parts |         |        |
|-----------------|-------------|---------|--------|
| Cutter diameter | Screw       | Wrench  | Torque |
| φ50-160         |             |         | 4.0Nm  |
|                 | SP040090    | DT-TP15 |        |

Note: With internal coolant  
 Without internal coolant



| Product code       | Dimension(mm)           |                 | Grades |        |        |        |        |        |        |
|--------------------|-------------------------|-----------------|--------|--------|--------|--------|--------|--------|--------|
|                    | Insert corner radius mm | Wiper length mm | AP301U | AP351U | AC301P | AP401U | AC301K | AP351K | AW100K |
| ONHU 050408-MM3    | 0.8                     | -               | ●      |        |        |        |        |        |        |
| ONMU 050408-MM4    | 0.8                     | -               | ●      | ●      |        | ●      | ●      | ●      |        |
| ONHU 050408AEN-MM3 | 0.8                     | 0.7             | ●      | ●      |        |        |        | ●      |        |
| ONHU 050408AEN-MM4 | 0.8                     | 0.7             |        | ●      |        |        | ●      | ●      |        |
| ONHU 0504ZNR-MM3   | 0.8                     | 1.4             | ●      |        |        |        |        |        |        |
|                    |                         |                 |        |        |        |        |        |        |        |
|                    |                         |                 |        |        |        |        |        |        |        |
|                    |                         |                 |        |        |        |        |        |        |        |
|                    |                         |                 |        |        |        |        |        |        |        |
|                    |                         |                 |        |        |        |        |        |        |        |
|                    |                         |                 |        |        |        |        |        |        |        |
|                    |                         |                 |        |        |        |        |        |        |        |

Marked: ● Stock available ○ Non-stocked standard

| Materials |   |                                       |               | Cutting depth and feed |          |      |      |      |      |
|-----------|---|---------------------------------------|---------------|------------------------|----------|------|------|------|------|
| ISO       | Material classification                 | Tensile strength (N/mm <sup>2</sup> ) | Hardness (HB) | ON..0504               |          |      |      |      |      |
|           |   |                                       |               | ap                     | Geometry |      |      |      |      |
|           |   |                                       |               |                        | MM3      |      | MM4  |      |      |
|           |   |                                       |               |                        | fz       |      |      |      |      |
|           |   |                                       |               | (mm)                   |          |      |      |      |      |
|           |   | min                                   | max           | min                    | max      | min  | max  |      |      |
| P         | Unalloyed steel                         | <600                                  | <180          | 0.20                   | 3.50     | 0.10 | 0.25 | 0.15 | 0.35 |
|           |   | <950                                  | <280          |                        |          |      |      |      |      |
|           | Alloyed steel                           | 700-950                               | 200-280       |                        |          |      |      |      |      |
|           |   | 950-1200                              | 280-355       |                        |          |      |      |      |      |
| M         | Duplex stainless steel                  | 778                                   | 230           |                        |          | 0.08 | 0.20 | 0.10 | 0.25 |
|           | Austenitic stainless steel              | 675                                   | 200           |                        |          |      |      |      |      |
|           | Precipitation-hardening stainless steel | 1013                                  | 300           |                        |          |      |      |      |      |
| K         | Grey cast iron                          | 700                                   | 220           |                        |          | 0.10 | 0.25 | 0.15 | 0.35 |
|           | Nodular cast iron                       | 880                                   | 260           |                        |          |      |      |      |      |
|           | Malleable cast iron                     | 800                                   | 250           |                        |          |      |      |      |      |
| S         | Fe-based alloy                          | 943                                   | 280           |                        |          | -    | -    | -    | -    |
|           | Co-based alloy                          | 1076                                  | 320           |                        |          |      |      |      |      |
|           | Ni-based alloy                          | 1177                                  | 350           |                        |          |      |      |      |      |
|           | Ti-alloy                                | 1262                                  | 370           |                        |          |      |      |      |      |
| N         | Aluminum                                | 260                                   | 75            | -                      | -        | -    | -    |      |      |
|           | Aluminum alloy                          | 447                                   | 130           |                        |          |      |      |      |      |
| H         | Hardened steel                          | -                                     | 50-60HRC      | -                      | -        | -    | -    |      |      |
|           | Chilled cast iron                       | -                                     | 55HRC         |                        |          |      |      |      |      |

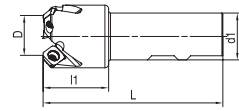
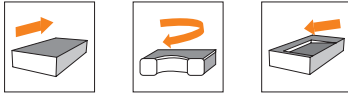
\*The recommended cutting conditions always refer to general conditions. These cutting conditions should be adjusted according to the practical machine rigidity, tools, workpiece clamping and coolants.  $f_z = \frac{h_m}{\sqrt{\frac{a_e}{D_c}}}$ , (calculate for  $\frac{a_e}{D_c} < 30\%$ )



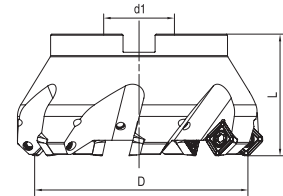
Milling cutters

AFM45-SD09

45° Approaching angle face milling cutter



| Product code              | D  | d1 | L   | l1 | apmax | Internal coolant | Z | Inserts  |
|---------------------------|----|----|-----|----|-------|------------------|---|----------|
| AFM45-016-Z02-W16R-SD09-C | 16 | 16 | 90  | 25 | 5     |                  | 2 | SD..09T3 |
| AFM45-020-Z02-W20R-SD09-C | 20 | 20 | 110 | 30 | 5     |                  | 2 |          |
| AFM45-025-Z03-W25R-SD09-C | 25 | 25 | 120 | 30 | 5     |                  | 3 |          |
| AFM45-032-Z03-W32R-SD09-C | 32 | 32 | 120 | 35 | 5     |                  | 3 |          |



| Product code              | D   | d1 | L  | l1 | apmax | Internal coolant | Z  | Inserts  |
|---------------------------|-----|----|----|----|-------|------------------|----|----------|
| AFM45-032-Z04-A16R-SD09-C | 32  | 16 | 40 | -  | 5     |                  | 4  | SD..09T3 |
| AFM45-040-Z05-A16R-SD09-C | 40  | 16 | 40 | -  | 5     |                  | 5  |          |
| AFM45-050-Z05-A22R-SD09-C | 50  | 22 | 40 | -  | 5     |                  | 5  |          |
| AFM45-050-Z06-A22R-SD09-C | 50  | 22 | 40 | -  | 5     |                  | 6  |          |
| AFM45-063-Z05-A22R-SD09-C | 63  | 22 | 40 | -  | 5     |                  | 5  |          |
| AFM45-063-Z07-A22R-SD09-C | 63  | 22 | 40 | -  | 5     |                  | 7  |          |
| AFM45-080-Z06-A27R-SD09-C | 80  | 27 | 50 | -  | 5     |                  | 6  |          |
| AFM45-080-Z09-A27R-SD09-C | 80  | 27 | 50 | -  | 5     |                  | 9  |          |
| AFM45-100-Z07-A32R-SD09-C | 100 | 32 | 50 | -  | 5     |                  | 7  |          |
| AFM45-100-Z11-A32R-SD09-C | 100 | 32 | 50 | -  | 5     |                  | 11 |          |
| AFM45-125-Z08-A40R-SD09-C | 125 | 40 | 63 | -  | 5     |                  | 8  |          |

| Dimension(mm) | Spare parts |         |        |
|---------------|-------------|---------|--------|
|               | Screw       | Wrench  | Torque |
| φ16-32        |             |         | 3.5Nm  |
|               | ST040075    | DT-T15  |        |
| φ40-125       | SP040090    | DT-TP15 |        |

Note: With internal coolant  
 Without internal coolant



| Product code      | Dimension(mm)           |                 | Grades |        |        |        |        |        |        |
|-------------------|-------------------------|-----------------|--------|--------|--------|--------|--------|--------|--------|
|                   | Insert corner radius mm | Wiper length mm | AP301U | AP351U | AC301P | AP401U | AC301K | AP351K | AW100K |
| SDMT 09T304EN-MM3 | 0.4                     | -               | ●      | ●      | ●      |        | ●      |        |        |
| SDMT 09T308EN-MM3 | 0.8                     | -               | ●      | ●      | ●      |        | ●      |        |        |
| SDGT 09T3AEEN-MM4 | -                       | 1.4             | ●      | ●      |        |        | ●      | ●      |        |
| SDMW 09T308EN-HR2 | 0.8                     | -               | ●      |        |        |        | ●      |        |        |
| SDHW 09T3AESN-HR2 | -                       | 1.5             | ●      |        |        |        | ●      | ●      |        |
|                   |                         |                 |        |        |        |        |        |        |        |
|                   |                         |                 |        |        |        |        |        |        |        |
|                   |                         |                 |        |        |        |        |        |        |        |
|                   |                         |                 |        |        |        |        |        |        |        |
|                   |                         |                 |        |        |        |        |        |        |        |
|                   |                         |                 |        |        |        |        |        |        |        |
|                   |                         |                 |        |        |        |        |        |        |        |

Marked: ● Stock available ○ Non-stocked standard

Milling cutters

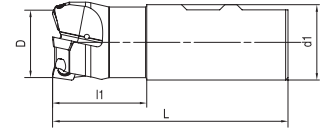
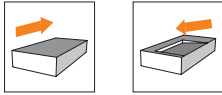
| Materials |   |                                       |               | Cutting depth and feed |          |      |      |      |      |      |      |      |      |
|-----------|---|---------------------------------------|---------------|------------------------|----------|------|------|------|------|------|------|------|------|
| ISO       | Material classification                 | Tensile strength (N/mm <sup>2</sup> ) | Hardness (HB) | SD..09T3..             |          |      |      |      |      |      |      |      |      |
|           |   |                                       |               | ap                     | Geometry |      |      |      | fz   |      |      |      |      |
|           |   |                                       |               |                        | HR2      |      | MM3  |      |      |      |      |      |      |
|           |   |                                       |               |                        | (mm)     |      |      |      |      |      |      |      |      |
| min       | max                                     | min                                   | max           | min                    | max      | min  | max  |      |      |      |      |      |      |
| P         | Unalloyed steel                         | <600                                  | <180          | 0.20                   | 5.00     | 0.10 | 0.35 | 0.08 | 0.30 |      |      |      |      |
|           |   | <950                                  | <280          |                        |          |      |      |      |      |      |      |      |      |
|           | Alloyed steel                           | 700-950                               | 200-280       |                        |          |      |      |      |      | 0.08 | 0.30 | 0.05 | 0.28 |
|           |   | 950-1200                              | 280-355       |                        |          |      |      |      |      |      |      |      |      |
| M         | Duplex stainless steel                  | 778                                   | 230           |                        |          | 0.20 | 5.00 | -    | -    | 0.05 | 0.25 |      |      |
|           | Austenitic stainless steel              | 675                                   | 200           |                        |          |      |      |      |      |      |      |      |      |
|           | Precipitation-hardening stainless steel | 1013                                  | 300           |                        |          |      |      |      |      |      |      |      |      |
| K         | Grey cast iron                          | 700                                   | 220           |                        |          |      |      | 0.20 | 5.00 | 0.10 | 0.35 | 0.08 | 0.30 |
|           | Nodular cast iron                       | 880                                   | 260           |                        |          |      |      |      |      |      |      |      |      |
|           | Malleable cast iron                     | 800                                   | 250           |                        |          |      |      |      |      |      |      |      |      |
| S         | Fe-based alloy                          | 943                                   | 280           | 0.20                   | 5.00     |      |      |      |      | -    | -    | -    | -    |
|           | Co-based alloy                          | 1076                                  | 320           |                        |          |      |      |      |      |      |      |      |      |
|           | Ni-based alloy                          | 1177                                  | 350           |                        |          |      |      |      |      |      |      |      |      |
|           | Ti-alloy                                | 1262                                  | 370           |                        |          |      |      |      |      |      |      |      |      |
| N         | Aluminum                                | 260                                   | 75            |                        |          | 0.20 | 5.00 |      |      | -    | -    | -    | -    |
|           | Aluminum alloy                          | 447                                   | 130           |                        |          |      |      |      |      |      |      |      |      |
| H         | Hardened steel                          | -                                     | 50-60HRC      |                        |          |      |      |      |      | 0.20 | 5.00 | 0.06 | 0.20 |
|           | Chilled cast iron                       | -                                     | 55HRC         |                        |          |      |      |      |      |      |      |      |      |

\*The recommended cutting conditions always refer to general conditions. These cutting conditions should be adjusted according to the practical machine rigidity, tools, workpiece clamping and coolants.  $f_z = \frac{h_m}{\sqrt{\frac{a_e}{D_c}}}$ , (calculate for  $\frac{a_e}{D_c} < 30\%$ )

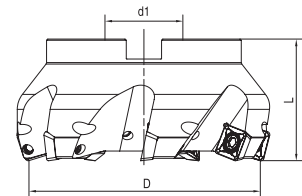
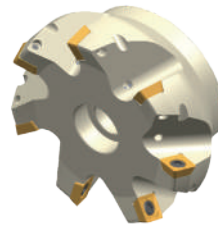


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**AFM75-SD09**  
75° Approach angle milling face cutter



| Product code              | D  | d1 | L   | l1 | apmax | Internal coolant | Z | Inserts  |
|---------------------------|----|----|-----|----|-------|------------------|---|----------|
| AFM75-025-Z02-W25R-SD09-C | 25 | 25 | 96  | 40 | 6     |                  | 2 | SD..09T3 |
| AFM75-032-Z03-W32R-SD09-C | 32 | 32 | 100 | 40 | 6     |                  | 3 |          |



| Product code              | D   | d1 | L  | l1 | apmax | Internal coolant | Z  | Inserts  |
|---------------------------|-----|----|----|----|-------|------------------|----|----------|
| AFM75-040-Z04-A16R-SD09-C | 40  | 16 | 32 | -  | 6     |                  | 4  | SD..09T3 |
| AFM75-050-Z05-A22R-SD09-C | 50  | 22 | 40 | -  | 6     |                  | 5  |          |
| AFM75-063-Z06-A22R-SD09-C | 63  | 22 | 40 | -  | 6     |                  | 6  |          |
| AFM75-080-Z08-A27R-SD09-C | 80  | 27 | 50 | -  | 6     |                  | 8  |          |
| AFM75-100-Z10-A32R-SD09-C | 100 | 32 | 50 | -  | 6     |                  | 10 |          |

| Dimension(mm) | Spare parts |         |        |
|---------------|-------------|---------|--------|
|               | Screw       | Wrench  | Torque |
| φ25-32        |             |         | 3.5Nm  |
|               | ST040075    | DT-T15  |        |
| φ40-100       | SP040090    | DT-TP15 |        |

Note: With internal coolant  
 Without internal coolant



| Product code      | Dimension(mm)           |                 | Grades |        |        |        |        |        |        |
|-------------------|-------------------------|-----------------|--------|--------|--------|--------|--------|--------|--------|
|                   | Insert corner radius mm | Wiper length mm | AP301U | AP351U | AC301P | AP401U | AC301K | AP351K | AW100K |
| SDMT 09T304EN-MM3 | 0.4                     | -               | ●      | ●      | ●      |        | ●      |        |        |
| SDMT 09T308EN-MM3 | 0.8                     | -               | ●      | ●      | ●      |        | ●      |        |        |
| SDMW 09T308EN-HR2 | 0.8                     | -               | ●      |        |        |        | ●      |        |        |
|                   |                         |                 |        |        |        |        |        |        |        |
|                   |                         |                 |        |        |        |        |        |        |        |
|                   |                         |                 |        |        |        |        |        |        |        |
|                   |                         |                 |        |        |        |        |        |        |        |
|                   |                         |                 |        |        |        |        |        |        |        |
|                   |                         |                 |        |        |        |        |        |        |        |
|                   |                         |                 |        |        |        |        |        |        |        |
|                   |                         |                 |        |        |        |        |        |        |        |
|                   |                         |                 |        |        |        |        |        |        |        |

Marked: ● Stock available ○ Non-stocked standard

Milling cutters

| Materials |   |                                       |               | Cutting depth and feed |          |      |      |      |      |      |      |      |      |
|-----------|---|---------------------------------------|---------------|------------------------|----------|------|------|------|------|------|------|------|------|
| ISO       | Material classification                 | Tensile strength (N/mm <sup>2</sup> ) | Hardness (HB) | SD..09T3..             |          |      |      |      |      |      |      |      |      |
|           |   |                                       |               | ap                     | Geometry |      |      |      |      |      |      |      |      |
|           |   |                                       |               |                        | HR2      |      | MM3  |      |      |      |      |      |      |
|           |   |                                       |               |                        | fz       |      |      |      |      |      |      |      |      |
| (mm)      |   |                                       |               |                        |          |      |      |      |      |      |      |      |      |
| min       | max                                     | min                                   | max           | min                    | max      |      |      |      |      |      |      |      |      |
| P         | Unalloyed steel                         | <600                                  | <180          | 0.20                   | 6.00     | 0.10 | 0.35 | 0.08 | 0.30 |      |      |      |      |
|           |   | <950                                  | <280          |                        |          |      |      |      |      |      |      |      |      |
|           | Alloyed steel                           | 700-950                               | 200-280       |                        |          |      |      |      |      | 0.08 | 0.30 | 0.05 | 0.28 |
|           |   | 950-1200                              | 280-355       |                        |          |      |      |      |      |      |      |      |      |
| M         | Duplex stainless steel                  | 778                                   | 230           |                        |          | 0.20 | 6.00 | -    | -    | 0.05 | 0.25 |      |      |
|           | Austenitic stainless steel              | 675                                   | 200           |                        |          |      |      |      |      |      |      |      |      |
|           | Precipitation-hardening stainless steel | 1013                                  | 300           |                        |          |      |      |      |      |      |      |      |      |
| K         | Grey cast iron                          | 700                                   | 220           |                        |          |      |      | 0.20 | 6.00 | 0.10 | 0.35 | 0.08 | 0.30 |
|           | Nodular cast iron                       | 880                                   | 260           |                        |          |      |      |      |      |      |      |      |      |
|           | Malleable cast iron                     | 800                                   | 250           |                        |          |      |      |      |      |      |      |      |      |
| S         | Fe-based alloy                          | 943                                   | 280           | 0.20                   | 6.00     |      |      |      |      | -    | -    | -    | -    |
|           | Co-based alloy                          | 1076                                  | 320           |                        |          |      |      |      |      |      |      |      |      |
|           | Ni-based alloy                          | 1177                                  | 350           |                        |          |      |      |      |      |      |      |      |      |
|           | Ti-alloy                                | 1262                                  | 370           |                        |          |      |      |      |      |      |      |      |      |
| N         | Aluminum                                | 260                                   | 75            |                        |          | 0.20 | 6.00 |      |      | -    | -    | -    | -    |
|           | Aluminum alloy                          | 447                                   | 130           |                        |          |      |      |      |      |      |      |      |      |
| H         | Hardened steel                          | -                                     | 50-60HRC      |                        |          |      |      |      |      | 0.20 | 6.00 | 0.06 | 0.20 |
|           | Chilled cast iron                       | -                                     | 55HRC         |                        |          |      |      |      |      |      |      |      |      |

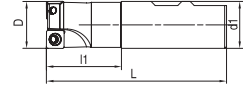
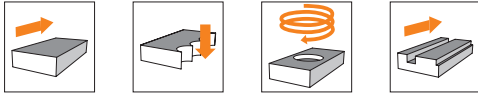
\*The recommended cutting conditions always refer to general conditions. These cutting conditions should be adjusted according to the practical machine rigidity, tools, workpiece clamping and coolants.  $f_z = \frac{h_m}{\sqrt{\frac{a_e}{D_c}}}$ , (calculate for  $\frac{a_e}{D_c} < 30\%$ )



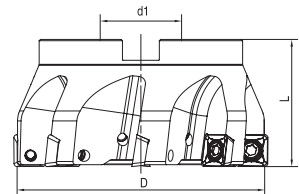
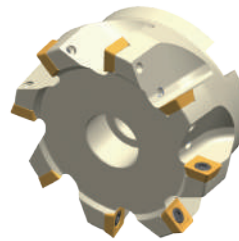
P248

**AFM90-SD09**

**90° Approach angle face milling cutter**



| Product code              | D  | d1 | L   | l1 | apmax | Internal coolant | Z | Inserts  |
|---------------------------|----|----|-----|----|-------|------------------|---|----------|
| AFM90-025-Z02-W25R-SD09-C | 25 | 25 | 120 | 30 | 6     |                  | 2 | SD..09T3 |
| AFM90-032-Z03-W32R-SD09-C | 32 | 32 | 120 | 35 | 6     |                  | 3 |          |



| Product code              | D   | d1 | L  | l1 | apmax | Internal coolant | Z  | Inserts  |
|---------------------------|-----|----|----|----|-------|------------------|----|----------|
| AFM90-040-Z04-A16R-SD09-C | 40  | 16 | 40 | -  | 6     |                  | 4  | SD..09T3 |
| AFM90-050-Z05-A22R-SD09-C | 50  | 22 | 40 | -  | 6     |                  | 5  |          |
| AFM90-063-Z06-A22R-SD09-C | 63  | 22 | 40 | -  | 6     |                  | 6  |          |
| AFM90-080-Z08-A27R-SD09-C | 80  | 27 | 50 | -  | 6     |                  | 8  |          |
| AFM90-100-Z10-A32R-SD09-C | 100 | 32 | 50 | -  | 6     |                  | 10 |          |

| Dimension(mm) | Spare parts |         |        |
|---------------|-------------|---------|--------|
|               | Screw       | Wrench  | Torque |
| φ25-32        |             |         | 3.5Nm  |
|               | ST040075    | DT-T15  |        |
| φ40-100       | SP040090    | DT-TP15 |        |

Note: With internal coolant  
 Without internal coolant



| Product code      | Dimension(mm)           |                 | Grades |        |        |        |        |        |        |
|-------------------|-------------------------|-----------------|--------|--------|--------|--------|--------|--------|--------|
|                   | Insert corner radius mm | Wiper length mm | AP301U | AP351U | AC301P | AP401U | AC301K | AP351K | AW100K |
| SDMT 09T304EN-MM3 | 0.4                     | -               | ●      | ●      | ●      |        | ●      |        |        |
| SDMT 09T308EN-MM3 | 0.8                     | -               | ●      | ●      | ●      |        | ●      |        |        |
| SDGT 09T3PDER-MR6 | 0.8                     | 1.2             | ●      | ●      |        |        | ●      | ●      |        |
| SDMW 09T308EN-HR2 | 0.8                     | -               | ●      |        |        |        | ●      |        |        |
|                   |                         |                 |        |        |        |        |        |        |        |
|                   |                         |                 |        |        |        |        |        |        |        |
|                   |                         |                 |        |        |        |        |        |        |        |
|                   |                         |                 |        |        |        |        |        |        |        |
|                   |                         |                 |        |        |        |        |        |        |        |
|                   |                         |                 |        |        |        |        |        |        |        |
|                   |                         |                 |        |        |        |        |        |        |        |
|                   |                         |                 |        |        |        |        |        |        |        |

Marked: ● Stock available ○ Non-stocked standard

| Materials |   |                                       |               | Cutting depth and feed |          |      |      |      |      |  |  |
|-----------|---|---------------------------------------|---------------|------------------------|----------|------|------|------|------|--|--|
| ISO       | Material classification                 | Tensile strength (N/mm <sup>2</sup> ) | Hardness (HB) | SD..09T3..             |          |      |      |      |      |  |  |
|           |   |                                       |               | ap                     | Geometry |      |      |      |      |  |  |
|           |   |                                       |               |                        | HR2      |      | MM3  |      |      |  |  |
|           |   |                                       |               | fz                     |          |      |      |      |      |  |  |
| (mm)      |   |                                       |               |                        |          |      |      |      |      |  |  |
| min       | max                                     | min                                   | max           | min                    | max      | min  | max  |      |      |  |  |
| P         | Unalloyed steel                         | <600                                  | <180          | 0.20                   | 6.00     | 0.10 | 0.35 | 0.08 | 0.30 |  |  |
|           |   | <950                                  | <280          |                        |          |      |      |      |      |  |  |
|           | Alloyed steel                           | 700-950                               | 200-280       |                        |          | 0.08 | 0.30 | 0.05 | 0.28 |  |  |
|           |   | 950-1200                              | 280-355       |                        |          |      |      |      |      |  |  |
|           | 1200-1400                               | 355-415                               |               |                        |          |      |      |      |      |  |  |
| M         | Duplex stainless steel                  | 778                                   | 230           |                        |          |      |      |      |      |  |  |
|           | Austenitic stainless steel              | 675                                   | 200           |                        |          | -    | -    | 0.05 | 0.25 |  |  |
|           | Precipitation-hardening stainless steel | 1013                                  | 300           |                        |          |      |      |      |      |  |  |
| K         | Grey cast iron                          | 700                                   | 220           |                        |          |      |      |      |      |  |  |
|           | Nodular cast iron                       | 880                                   | 260           |                        |          | 0.10 | 0.35 | 0.08 | 0.30 |  |  |
|           | Malleable cast iron                     | 800                                   | 250           |                        |          |      |      |      |      |  |  |
| S         | Fe-based alloy                          | 943                                   | 280           |                        |          |      |      |      |      |  |  |
|           | Co-based alloy                          | 1076                                  | 320           |                        |          |      |      |      |      |  |  |
|           | Ni-based alloy                          | 1177                                  | 350           | -                      | -        | -    | -    |      |      |  |  |
|           | Ti-alloy                                | 1262                                  | 370           |                        |          |      |      |      |      |  |  |
| N         | Aluminum                                | 260                                   | 75            |                        |          |      |      |      |      |  |  |
|           | Aluminum alloy                          | 447                                   | 130           | -                      | -        | -    | -    |      |      |  |  |
| H         | Hardened steel                          | -                                     | 50-60HRC      |                        |          |      |      |      |      |  |  |
|           | Chilled cast iron                       | -                                     | 55HRC         | 0.06                   | 0.20     | -    | -    |      |      |  |  |

\*The recommended cutting conditions always refer to general conditions. These cutting conditions should be adjusted according to the practical machine rigidity, tools, workpiece clamping and coolants.  $f_z = \frac{h_m}{\sqrt{\frac{a_e}{D_c}}}$ , (calculate for  $\frac{a_e}{D_c} < 30\%$ )

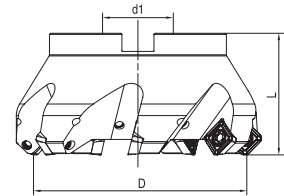
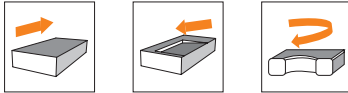


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Milling cutters



**AFM45-SD12**  
45° Approach angle face milling cutter



| Product code              | D   | d1 | L  | l1 | apmax | Internal coolant | Z | Inserts  |
|---------------------------|-----|----|----|----|-------|------------------|---|----------|
| AFM45-050-Z04-A22R-SD12-C | 50  | 22 | 40 | -  | 7     |                  | 4 | SD..1204 |
| AFM45-063-Z05-A22R-SD12-C | 63  | 22 | 40 | -  | 7     |                  | 5 |          |
| AFM45-080-Z06-A27R-SD12-C | 80  | 27 | 50 | -  | 7     |                  | 6 |          |
| AFM45-100-Z07-A32R-SD12-C | 100 | 32 | 50 | -  | 7     |                  | 7 |          |
| AFM45-125-Z08-A40R-SD12-C | 125 | 40 | 63 | -  | 7     |                  | 8 |          |

| Dimension(mm) | Spare parts |         |        |
|---------------|-------------|---------|--------|
|               | Screw       | Wrench  | Torque |
| φ50-125       |             |         | 5.0Nm  |
|               | SP04511555  | DT-TP20 |        |

Note: With internal coolant  
 Without internal coolant



| Product code      | Dimension(mm)           |                 | Grades |        |        |        |        |        |        |
|-------------------|-------------------------|-----------------|--------|--------|--------|--------|--------|--------|--------|
|                   | Insert corner radius mm | Wiper length mm | AP301U | AP351U | AC301P | AP401U | AC301K | AP351K | AW100K |
| SDMT 120408EN-MM4 | 0.8                     | -               | ●      | ●      |        |        | ●      | ●      |        |
| SDMT 120412EN-MM3 | 1.2                     | -               | ●      |        | ●      |        | ●      |        |        |
| SDKT 1204AEEN-MR2 | -                       | 1.5             | ●      | ●      | ●      |        | ●      | ●      |        |
| SDHT 1204AEEN-MR6 | -                       | 1.5             | ●      | ●      |        |        | ●      | ●      |        |
| SDMW 120412EN-HR2 | 1.2                     | -               | ●      |        |        |        | ●      | ●      |        |
| SDHW 1204AESN-HR2 | -                       | 2               | ●      |        |        |        | ●      | ●      |        |
|                   |                         |                 |        |        |        |        |        |        |        |
|                   |                         |                 |        |        |        |        |        |        |        |
|                   |                         |                 |        |        |        |        |        |        |        |
|                   |                         |                 |        |        |        |        |        |        |        |
|                   |                         |                 |        |        |        |        |        |        |        |
|                   |                         |                 |        |        |        |        |        |        |        |
|                   |                         |                 |        |        |        |        |        |        |        |

Marked: ● Stock available ○ Non-stocked standard

| Materials |   |                                       |               | Cutting depth and feed |          |      |      |      |      |      |      |      |      |
|-----------|---|---------------------------------------|---------------|------------------------|----------|------|------|------|------|------|------|------|------|
| ISO       | Material classification                 | Tensile strength (N/mm <sup>2</sup> ) | Hardness (HB) | SD..1204..             |          |      |      |      |      |      |      |      |      |
|           |   |                                       |               | ap                     | Geometry |      |      |      | fz   |      |      |      |      |
|           |   |                                       |               |                        | HR2      |      | MR2  |      | MR6  |      | MM3  |      |      |
|           |   |                                       |               |                        | (mm)     |      |      |      |      |      |      |      |      |
| min       | max                                     | min                                   | max           | min                    | max      | min  | max  | min  | max  |      |      |      |      |
| P         | Unalloyed steel                         | <600                                  | <180          | 0.20                   | 7.00     | 0.20 | 0.40 | 0.15 | 0.30 | 0.15 | 0.35 | 0.12 | 0.28 |
|           |   | <950                                  | <280          |                        |          | 0.20 | 0.35 | 0.15 | 0.25 | 0.15 | 0.30 | 0.10 | 0.25 |
|           | Alloyed steel                           | 700-950                               | 200-280       |                        |          | -    | -    | 0.12 | 0.25 | -    | -    | 0.08 | 0.20 |
|           |   | 950-1200                              | 280-355       |                        |          | 0.15 | 0.30 | 0.10 | 0.22 | 0.15 | 0.30 | 0.12 | 0.28 |
| M         | Duplex stainless steel                  | 778                                   | 230           |                        |          | -    | -    | -    | -    | -    | -    | 0.08 | 0.20 |
|           | Austenitic stainless steel              | 675                                   | 200           |                        |          | 0.15 | 0.30 | 0.10 | 0.22 | 0.15 | 0.30 | 0.12 | 0.28 |
|           | Precipitation-hardening stainless steel | 1013                                  | 300           |                        |          | -    | -    | -    | -    | -    | -    | 0.08 | 0.20 |
| K         | Grey cast iron                          | 700                                   | 220           |                        |          | 0.08 | 0.25 | -    | -    | -    | -    | -    | -    |
|           | Nodular cast iron                       | 880                                   | 260           |                        |          | -    | -    | -    | -    | -    | -    | -    | -    |
|           | Malleable cast iron                     | 800                                   | 250           |                        |          | -    | -    | -    | -    | -    | -    | -    | -    |
| S         | Fe-based alloy                          | 943                                   | 280           |                        |          | -    | -    | -    | -    | -    | -    | 0.08 | 0.20 |
|           | Co-based alloy                          | 1076                                  | 320           |                        |          | -    | -    | -    | -    | -    | -    | -    | -    |
|           | Ni-based alloy                          | 1177                                  | 350           | -                      | -        | -    | -    | -    | -    | -    | -    |      |      |
|           | Ti-alloy                                | 1262                                  | 370           | -                      | -        | -    | -    | -    | -    | -    | -    |      |      |
| N         | Aluminum                                | 260                                   | 75            | -                      | -        | -    | -    | -    | -    | -    | -    |      |      |
|           | Aluminum alloy                          | 447                                   | 130           | -                      | -        | -    | -    | -    | -    | -    | -    |      |      |
| H         | Hardened steel                          | -                                     | 50-60HRC      | 0.08                   | 0.25     | -    | -    | -    | -    | -    | -    |      |      |
|           | Chilled cast iron                       | -                                     | 55HRC         | -                      | -        | -    | -    | -    | -    | -    | -    |      |      |

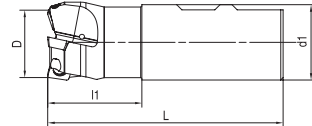
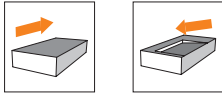
\*The recommended cutting conditions always refer to general conditions. These cutting conditions should be adjusted according to the practical machine rigidity, tools, workpiece clamping and coolants.  $f_z = \frac{h_m}{\sqrt{\frac{a_e}{D_c}}}$ , (calculate for  $\frac{a_e}{D_c} < 30\%$ )



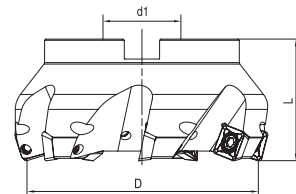
Milling cutters

**AFM75-SD12**

**75° Approach angle face milling cutter**



| Product code              | D  | d1 | L   | l1 | apmax | Internal coolant | Z | Inserts  |
|---------------------------|----|----|-----|----|-------|------------------|---|----------|
| AFM75-032-Z02-W32R-SD12-C | 32 | 32 | 114 | 49 | 8     |                  | 2 | SD..1204 |
| AFM75-040-Z03-W32R-SD12-C | 40 | 32 | 114 | 49 | 8     |                  | 3 |          |



| Product code              | D   | d1 | L  | l1 | apmax | Internal coolant | Z | Inserts  |
|---------------------------|-----|----|----|----|-------|------------------|---|----------|
| AFM75-050-Z04-A22R-SD12-C | 50  | 22 | 40 | -  | 8     |                  | 4 | SD..1204 |
| AFM75-063-Z05-A22R-SD12-C | 63  | 22 | 40 | -  | 8     |                  | 5 |          |
| AFM75-080-Z06-A27R-SD12-C | 80  | 27 | 50 | -  | 8     |                  | 6 |          |
| AFM75-100-Z07-A32R-SD12-C | 100 | 32 | 50 | -  | 8     |                  | 7 |          |
| AFM75-125-Z08-A40R-SD12-C | 125 | 40 | 63 | -  | 8     |                  | 8 |          |

| Dimension(mm) | Spare parts |         |        |
|---------------|-------------|---------|--------|
|               | Screw       | Wrench  | Torque |
| φ32-125       |             |         | 5.0Nm  |
|               | SP04511555  | DT-TP20 |        |

Note: With internal coolant  
 Without internal coolant



| Product code      | Dimension(mm)           |                 | Grades |        |        |        |        |        |        |
|-------------------|-------------------------|-----------------|--------|--------|--------|--------|--------|--------|--------|
|                   | Insert corner radius mm | Wiper length mm | AP301U | AP351U | AC301P | AP401U | AC301K | AP351K | AW100K |
| SDMT 120408EN-MM4 | 0.8                     | -               | ●      | ●      |        |        |        | ●      | ●      |
| SDMT 120412EN-MM3 | 1.2                     | -               | ●      |        | ●      |        |        | ●      |        |
| SDMW 120412EN-HR2 | 1.2                     | -               | ●      |        |        |        |        | ●      | ●      |
|                   |                         |                 |        |        |        |        |        |        |        |
|                   |                         |                 |        |        |        |        |        |        |        |
|                   |                         |                 |        |        |        |        |        |        |        |
|                   |                         |                 |        |        |        |        |        |        |        |
|                   |                         |                 |        |        |        |        |        |        |        |
|                   |                         |                 |        |        |        |        |        |        |        |
|                   |                         |                 |        |        |        |        |        |        |        |
|                   |                         |                 |        |        |        |        |        |        |        |

Marked: ● Stock available ○ Non-stocked standard

| Materials |   |                                       |               | Cutting depth and feed |          |      |      |      |      |      |      |
|-----------|---|---------------------------------------|---------------|------------------------|----------|------|------|------|------|------|------|
| ISO       | Material classification                 | Tensile strength (N/mm <sup>2</sup> ) | Hardness (HB) | SD..1204..             |          |      |      |      |      |      |      |
|           |   |                                       |               | ap                     | Geometry |      |      |      |      |      |      |
|           |   |                                       |               |                        | HR2      |      | MM3  |      |      |      |      |
|           |   |                                       |               | fz                     |          |      |      |      |      |      |      |
| (mm)      |   |                                       |               |                        |          |      |      |      |      |      |      |
| min       |   | max                                   |               | min                    |          | max  |      |      |      |      |      |
| P         | Unalloyed steel                         | <600                                  | <180          | 0.20                   | 8.00     | 0.15 | 0.35 | 0.12 | 0.30 |      |      |
|           |   | <950                                  | <280          |                        |          |      |      |      |      |      |      |
|           | Alloyed steel                           | 700-950                               | 200-280       |                        |          | 0.12 | 0.30 | 0.10 | 0.25 |      |      |
|           |   | 950-1200                              | 280-355       |                        |          |      |      |      |      |      |      |
|           | 1200-1400                               | 355-415                               |               |                        |          |      |      |      |      |      |      |
| M         | Duplex stainless steel                  | 778                                   | 230           |                        |          |      |      |      |      |      |      |
|           | Austenitic stainless steel              | 675                                   | 200           |                        |          | -    | -    | 0.10 | 0.22 |      |      |
|           | Precipitation-hardening stainless steel | 1013                                  | 300           |                        |          |      |      |      |      |      |      |
| K         | Grey cast iron                          | 700                                   | 220           |                        |          |      |      | 0.15 | 0.35 | 0.12 | 0.30 |
|           | Nodular cast iron                       | 880                                   | 260           |                        |          |      |      |      |      |      |      |
|           | Malleable cast iron                     | 800                                   | 250           |                        |          |      |      |      |      |      |      |
| S         | Fe-based alloy                          | 943                                   | 280           |                        |          |      |      | 0.10 | 0.20 |      |      |
|           | Co-based alloy                          | 1076                                  | 320           |                        |          |      |      |      |      |      |      |
|           | Ni-based alloy                          | 1177                                  | 350           |                        |          |      |      |      |      |      |      |
|           | Ti-alloy                                | 1262                                  | 370           |                        |          |      |      |      |      |      |      |
| N         | Aluminum                                | 260                                   | 75            |                        |          |      |      |      |      |      |      |
|           | Aluminum alloy                          | 447                                   | 130           |                        |          |      |      |      |      |      |      |
| H         | Hardened steel                          | -                                     | 50-60HRC      |                        |          | 0.08 | 0.25 | -    | -    |      |      |
|           | Chilled cast iron                       | -                                     | 55HRC         |                        |          |      |      |      |      |      |      |

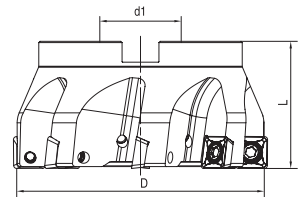
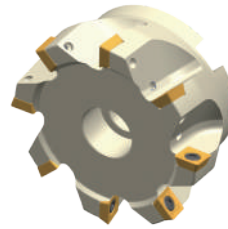
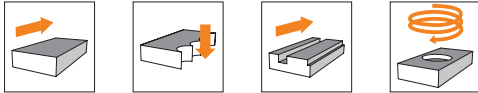
\*The recommended cutting conditions always refer to general conditions. These cutting conditions should be adjusted according to the practical machine rigidity, tools, workpiece clamping and coolants.  $f_z = \frac{h_m}{\sqrt{\frac{a_e}{D_c}}}$ , (calculate for  $\frac{a_e}{D_c} < 30\%$ )



Milling cutters

**AFM90-SD12**

**90° Approach angle face milling cutter**



| Product code              | D   | d1 | L  | l1 | apmax | Internal coolant | Z  | Inserts  |
|---------------------------|-----|----|----|----|-------|------------------|----|----------|
| AFM90-050-Z04-A22R-SD12-C | 50  | 22 | 40 | -  | 9     |                  | 4  | SD..1204 |
| AFM90-063-Z05-A22R-SD12-C | 63  | 22 | 40 | -  | 9     |                  | 5  |          |
| AFM90-080-Z06-A27R-SD12-C | 80  | 27 | 50 | -  | 9     |                  | 6  |          |
| AFM90-100-Z08-A32R-SD12-C | 100 | 32 | 50 | -  | 9     |                  | 8  |          |
| AFM90-125-Z10-A40R-SD12-C | 125 | 40 | 63 | -  | 9     |                  | 10 |          |

| Dimension(mm) | Spare parts |         |        |
|---------------|-------------|---------|--------|
|               | Screw       | Wrench  | Torque |
| φ50-125       |             |         | 5.0Nm  |
|               | SP04511555  | DT-TP20 |        |

Note: With internal coolant  
 Without internal coolant



| Product code      | Dimension(mm)           |                 | Grades |        |        |        |        |        |        |
|-------------------|-------------------------|-----------------|--------|--------|--------|--------|--------|--------|--------|
|                   | Insert corner radius mm | Wiper length mm | AP301U | AP351U | AC301P | AP401U | AC301K | AP351K | AW100K |
| SDMT 120408EN-MM4 | 0.8                     | -               | ●      | ●      |        |        | ●      | ●      |        |
| SDMT 120412EN-MM3 | 1.2                     | -               | ●      |        | ●      |        | ●      |        |        |
| SDGT 1204PDER-MR6 | 0.8                     | 1.6             | ●      | ●      |        |        | ●      | ●      |        |
| SDMW 120412EN-HR2 | 1.2                     | -               | ●      |        |        |        | ●      | ●      |        |
|                   |                         |                 |        |        |        |        |        |        |        |
|                   |                         |                 |        |        |        |        |        |        |        |
|                   |                         |                 |        |        |        |        |        |        |        |
|                   |                         |                 |        |        |        |        |        |        |        |
|                   |                         |                 |        |        |        |        |        |        |        |
|                   |                         |                 |        |        |        |        |        |        |        |
|                   |                         |                 |        |        |        |        |        |        |        |
|                   |                         |                 |        |        |        |        |        |        |        |

Marked: ● Stock available ○ Non-stocked standard

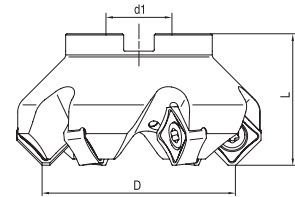
| Materials |   |                                       |               | Cutting depth and feed |          |      |      |      |      |      |      |
|-----------|---|---------------------------------------|---------------|------------------------|----------|------|------|------|------|------|------|
| ISO       | Material classification                 | Tensile strength (N/mm <sup>2</sup> ) | Hardness (HB) | SD..1204..             |          |      |      |      |      |      |      |
|           |   |                                       |               | ap                     | Geometry |      |      |      |      |      |      |
|           |   |                                       |               |                        | HR2      |      | MM3  |      |      |      |      |
|           |   |                                       |               | fz                     |          |      |      |      |      |      |      |
| (mm)      |   |                                       |               |                        |          |      |      |      |      |      |      |
| min       | max                                     | min                                   | max           | min                    | max      | min  | max  |      |      |      |      |
| P         | Unalloyed steel                         | <600                                  | <180          | 0.20                   | 9.00     | 0.15 | 0.35 | 0.12 | 0.30 |      |      |
|           |   | <950                                  | <280          |                        |          |      |      |      |      |      |      |
|           | Alloyed steel                           | 700-950                               | 200-280       |                        |          | 0.12 | 0.30 | 0.10 | 0.25 |      |      |
|           |   | 950-1200                              | 280-355       |                        |          |      |      |      |      |      |      |
|           | 1200-1400                               | 355-415                               |               |                        |          |      |      |      |      |      |      |
| M         | Duplex stainless steel                  | 778                                   | 230           |                        |          |      |      |      |      |      |      |
|           | Austenitic stainless steel              | 675                                   | 200           |                        |          | -    | -    | 0.10 | 0.22 |      |      |
|           | Precipitation-hardening stainless steel | 1013                                  | 300           |                        |          |      |      |      |      |      |      |
| K         | Grey cast iron                          | 700                                   | 220           |                        |          |      |      | 0.15 | 0.35 | 0.12 | 0.30 |
|           | Nodular cast iron                       | 880                                   | 260           |                        |          |      |      |      |      |      |      |
|           | Malleable cast iron                     | 800                                   | 250           |                        |          |      |      |      |      |      |      |
| S         | Fe-based alloy                          | 943                                   | 280           |                        |          |      |      | 0.10 | 0.20 |      |      |
|           | Co-based alloy                          | 1076                                  | 320           |                        |          |      |      |      |      |      |      |
|           | Ni-based alloy                          | 1177                                  | 350           |                        |          |      |      |      |      |      |      |
|           | Ti-alloy                                | 1262                                  | 370           |                        |          |      |      |      |      |      |      |
| N         | Aluminum                                | 260                                   | 75            |                        |          |      |      |      |      |      |      |
|           | Aluminum alloy                          | 447                                   | 130           |                        |          |      |      |      |      |      |      |
| H         | Hardened steel                          | -                                     | 50-60HRC      |                        |          | 0.08 | 0.25 | -    | -    |      |      |
|           | Chilled cast iron                       | -                                     | 55HRC         |                        |          |      |      |      |      |      |      |

\*The recommended cutting conditions always refer to general conditions. These cutting conditions should be adjusted according to the practical machine rigidity, tools, workpiece clamping and coolants.  $f_z = \frac{h_m}{\sqrt{\frac{a_e}{D_c}}}$ , (calculate for  $\frac{a_e}{D_c} < 30\%$ )



Milling cutters

**AFM45-SN12/SN19**  
45° Approach angle face milling cutter



| Product code                | D   | d1 | L  | apmax | Internal coolant | Z  | Inserts                        |
|-----------------------------|-----|----|----|-------|------------------|----|--------------------------------|
| AFM45-050-Z04-A22R-SN12-N-C | 50  | 22 | 40 | 6.5   |                  | 4  | SN □ X 1206ANN<br>SN □ X1206.. |
| AFM45-050-Z06-A22R-SN12-N-C | 50  | 22 | 40 | 6.5   |                  | 6  |                                |
| AFM45-063-Z04-A22R-SN12-N-C | 63  | 22 | 40 | 6.5   |                  | 4  |                                |
| AFM45-063-Z06-A22R-SN12-N-C | 63  | 22 | 40 | 6.5   |                  | 6  |                                |
| AFM45-063-Z08-A22R-SN12-N-C | 63  | 22 | 40 | 6.5   |                  | 8  |                                |
| AFM45-080-Z04-A27R-SN12-N-C | 80  | 27 | 50 | 6.5   |                  | 4  |                                |
| AFM45-080-Z05-A27R-SN12-N-C | 80  | 27 | 50 | 6.5   |                  | 5  |                                |
| AFM45-080-Z07-A27R-SN12-N-C | 80  | 27 | 50 | 6.5   |                  | 7  |                                |
| AFM45-100-Z06-A32R-SN12-N-C | 100 | 32 | 50 | 6.5   |                  | 6  |                                |
| AFM45-100-Z08-A32R-SN12-N-C | 100 | 32 | 50 | 6.5   |                  | 8  |                                |
| AFM45-125-Z07-A40R-SN12-N-C | 125 | 40 | 63 | 6.5   |                  | 7  |                                |
| AFM45-125-Z08-A40R-SN12-N-C | 125 | 40 | 63 | 6.5   |                  | 8  |                                |
| AFM45-125-Z10-A40R-SN12-N-C | 125 | 40 | 63 | 6.5   |                  | 10 |                                |
| AFM45-160-Z10-A40R-SN12-N   | 160 | 40 | 63 | 6.5   |                  | 10 |                                |
| AFM45-200-Z14-A60R-SN12-N   | 200 | 60 | 63 | 6.5   |                  | 14 |                                |
| AFM45-250-Z16-A60R-SN12-N   | 250 | 60 | 63 | 6.5   |                  | 16 |                                |
| AFM45-160-Z08-A40R-SN19     | 160 | 40 | 63 | 11    |                  | 8  | SN □ X1909ANN                  |
| AFM45-200-Z10-A60R-SN19     | 200 | 60 | 63 | 11    |                  | 10 |                                |
| AFM45-250-Z12-A60R-SN19     | 250 | 60 | 63 | 11    |                  | 12 |                                |

| Dimension(mm)         | Spare parts |         |        |
|-----------------------|-------------|---------|--------|
| Cutter diameter       | Screw       | Wrench  | Torque |
| φ50-250(SN..1206ANN)  |             |         |        |
|                       | SP050120    | DT-TP20 | 5.0Nm  |
| φ160-250(SN..1909ANN) | SP06018070  | DT-TP25 | 5.0Nm  |

Note: With internal coolant  
 Without internal coolant



| Product code     | Dimension(mm)           |                 | Grades |        |        |        |        |        |        |
|------------------|-------------------------|-----------------|--------|--------|--------|--------|--------|--------|--------|
|                  | Insert corner radius mm | Wiper length mm | AP301U | AP351U | AC301P | AP401U | AC301K | AP351K | AW100K |
| SNGX 1206ANN-MM3 | -                       | 1.8             | ●      | ●      | ●      |        | ●      | ●      |        |
| SNGX 1206ANN-MM4 | -                       | 1.8             | ●      | ●      | ●      |        | ●      | ●      |        |
| SNGX 1206ANN-MR6 | -                       | 1.8             | ●      | ●      | ●      |        | ●      | ●      |        |
| SNGX 1206ANN-RR2 | -                       | 1.8             | ●      | ●      | ●      |        | ●      | ●      |        |
| SNGX 1909ANN-MM3 | -                       | 2.9             |        | ●      |        |        |        |        |        |
| SNGX 1909ANN-MR6 | -                       | 2.9             |        | ●      |        |        |        |        |        |
| SNGX 120608-MM4  | 0.8                     | -               | ●      | ●      | ●      |        | ●      | ●      |        |
| SNGX 120612-MM4  | 1.2                     | -               | ●      |        |        |        |        |        |        |
| SNMX 1206ANN-MM3 | -                       | 1.8             | ●      | ●      | ●      |        | ●      | ●      |        |
| SNMX 1206ANN-MM4 | -                       | 1.8             | ●      | ●      | ●      |        | ●      | ●      |        |
| SNMX 1206ANN-MR6 | -                       | 1.8             | ●      | ●      | ●      |        | ●      | ●      |        |
| SNMX 120608-MM4  | 0.8                     | -               | ●      | ●      | ●      |        | ●      | ●      |        |
| SNMX 120612-MM3  | 1.2                     | -               | ●      | ●      | ●      |        | ●      | ●      |        |
| SNMX 120612-MM4  | 1.2                     | -               | ●      | ●      | ●      |        | ●      | ●      |        |
| SNMX 120612-MR6  | 1.2                     | -               | ●      | ●      | ●      |        | ●      | ●      |        |
| SNMX 120612-RR2  | 1.2                     | -               | ●      | ●      | ●      |        | ●      | ●      |        |
| SNMX 120620-MM4  | 2.0                     | -               | ●      | ●      | ●      |        | ●      | ●      |        |
| SNMX 120620-RR2  | 2.0                     | -               | ●      | ●      | ●      |        | ●      | ●      |        |
| SNHX 1206ANN-FM2 | -                       | 1.8             |        |        |        |        |        |        | ●      |
| SNHX 1206ANN-W   | -                       | 6.7             | ●      |        |        |        | ●      |        |        |

Marked: ● Stock available ○ Non-stocked standard

| Materials |   |                                       |               | Cutting depth and feed |          |      |      |      |      |      |      |      |      |   |   |
|-----------|---|---------------------------------------|---------------|------------------------|----------|------|------|------|------|------|------|------|------|---|---|
| ISO       | Material classification                 | Tensile strength (N/mm <sup>2</sup> ) | Hardness (HB) | SN..1206..             |          |      |      |      |      |      |      |      |      |   |   |
|           |   |                                       |               | ap                     | Geometry |      |      |      |      | fz   |      |      |      |   |   |
|           |   |                                       |               |                        | MM3      | MM4  | MR6  | RR2  | FM2  |      |      |      |      |   |   |
|           |   |                                       |               | (mm)                   |          |      |      |      |      |      |      |      |      |   |   |
| min       | max                                     | min                                   | max           | min                    | max      | min  | max  | min  | max  | min  | max  |      |      |   |   |
| P         | Unalloyed steel                         | <600                                  | <180          | 0.20                   | 6.50     | 0.15 | 0.35 | 0.18 | 0.38 | 0.18 | 0.40 | 0.18 | 0.45 | - | - |
|           |   | <950                                  | <280          |                        |          |      |      |      |      |      |      |      |      |   |   |
|           | Alloyed steel                           | 700-950                               | 200-280       |                        |          | 0.12 | 0.32 | 0.15 | 0.35 | 0.15 | 0.38 | 0.15 | 0.38 | - | - |
|           |   | 950-1200                              | 280-355       |                        |          |      |      |      |      |      |      |      |      |   |   |
| M         | Duplex stainless steel                  | 778                                   | 230           |                        |          |      |      |      |      |      |      |      |      |   |   |
|           | Austenitic stainless steel              | 675                                   | 200           |                        |          | 0.12 | 0.30 | 0.12 | 0.32 | -    | -    | -    | -    | - | - |
|           | Precipitation-hardening stainless steel | 1013                                  | 300           |                        |          |      |      |      |      |      |      |      |      |   |   |
| K         | Grey cast iron                          | 700                                   | 220           |                        |          |      |      |      |      |      |      |      |      |   |   |
|           | Nodular cast iron                       | 880                                   | 260           |                        |          | 0.15 | 0.35 | 0.18 | 0.38 | 0.18 | 0.40 | 0.18 | 0.45 | - | - |
|           | Malleable cast iron                     | 800                                   | 250           |                        |          |      |      |      |      |      |      |      |      |   |   |
| S         | Fe-based alloy                          | 943                                   | 280           |                        |          |      |      |      |      |      |      |      |      |   |   |
|           | Co-based alloy                          | 1076                                  | 320           |                        |          |      |      |      |      |      |      |      |      |   |   |
|           | Ni-based alloy                          | 1177                                  | 350           | 0.10                   | 0.25     | 0.12 | 0.28 | -    | -    | -    | -    | -    | -    |   |   |
|           | Ti-alloy                                | 1262                                  | 370           |                        |          |      |      |      |      |      |      |      |      |   |   |
| N         | Aluminum                                | 260                                   | 75            |                        |          |      |      |      |      |      |      |      |      |   |   |
|           | Aluminum alloy                          | 447                                   | 130           | -                      | -        | -    | -    | -    | -    | -    | -    | 0.15 | 0.35 |   |   |
| H         | Hardened steel                          | -                                     | 50-60HRC      |                        |          |      |      |      |      |      |      |      |      |   |   |
|           | Chilled cast iron                       | -                                     | 55HRC         | -                      | -        | -    | -    | -    | -    | -    | -    | -    | -    |   |   |

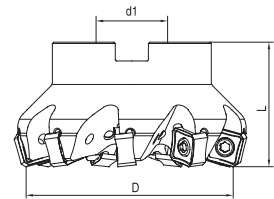
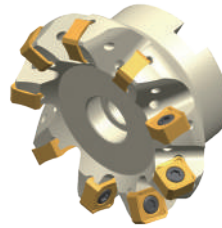
\*The recommended cutting conditions always refer to general conditions. These cutting conditions should be adjusted according to the practical machine rigidity, tools, workpiece clamping and coolants.  $f_z = \frac{h_m}{\sqrt{\frac{a_e}{D_c}}}$ , (calculate for  $\frac{a_e}{D_c} < 30\%$ )

Milling cutters



**AFM75-SN12**

**75° Approach angle face milling cutter**



| Product code                | D   | d1 | L  | apmax | Internal coolant | Z  | Inserts                     |
|-----------------------------|-----|----|----|-------|------------------|----|-----------------------------|
| AFM75-050-Z04-A22R-SN12-N-C | 50  | 22 | 40 | 8.0   |                  | 4  | SNGX1206ENN<br>SN □ X1206.. |
| AFM75-063-Z06-A22R-SN12-N-C | 63  | 22 | 40 | 8.0   |                  | 6  |                             |
| AFM75-080-Z07-A27R-SN12-N-C | 80  | 27 | 50 | 8.0   |                  | 7  |                             |
| AFM75-100-Z08-A32R-SN12-N-C | 100 | 32 | 50 | 8.0   |                  | 8  |                             |
| AFM75-125-Z08-A40R-SN12-N-C | 125 | 40 | 63 | 8.0   |                  | 8  |                             |
| AFM75-125-Z10-A40R-SN12-N-C | 125 | 40 | 63 | 8.0   |                  | 10 |                             |
| AFM75-160-Z10-A40R-SN12-N   | 160 | 40 | 63 | 8.0   |                  | 10 |                             |
| AFM75-200-Z14-A60R-SN12-N   | 200 | 60 | 63 | 8.0   |                  | 14 |                             |
| AFM75-250-Z16-A60R-SN12-N   | 250 | 60 | 63 | 8.0   |                  | 16 |                             |

| Dimension(mm) | Spare parts |         |        |
|---------------|-------------|---------|--------|
|               | Screw       | Wrench  | Torque |
| φ50-250       |             |         | 5.0Nm  |
|               | SP050120    | DT-TP20 |        |

Note: With internal coolant  
 Without internal coolant



| Product code     | Dimension(mm)           |                 | Grades |        |        |        |        |        |        |
|------------------|-------------------------|-----------------|--------|--------|--------|--------|--------|--------|--------|
|                  | Insert corner radius mm | Wiper length mm | AP301U | AP351U | AC301P | AP401U | AC301K | AP351K | AW100K |
| SNGX 1206ENN-MM3 | -                       | 1.2             | ●      | ●      | ●      |        | ●      | ●      |        |
| SNGX 1206ENN-MM4 | -                       | 1.2             | ●      | ●      | ●      |        | ●      | ●      |        |
| SNGX 1206ENN-MR6 | -                       | 1.2             | ●      | ●      | ●      |        | ●      | ●      |        |
| SNGX 120608-MM4  | 0.8                     | -               | ●      | ●      | ●      |        | ●      | ●      |        |
| SNGX 120612-MM4  | 1.2                     | -               | ●      |        |        |        |        |        |        |
| SNMX 1206ENN-MM4 | -                       | 1.2             |        |        | ●      |        |        |        |        |
| SNMX 120608-MM4  | 0.8                     | -               | ●      | ●      | ●      |        | ●      | ●      |        |
| SNMX 120612-MM3  | 1.2                     | -               | ●      | ●      | ●      |        | ●      | ●      |        |
| SNMX 120612-MM4  | 1.2                     | -               | ●      | ●      | ●      |        | ●      | ●      |        |
| SNMX 120612-MR6  | 1.2                     | -               | ●      | ●      | ●      |        | ●      | ●      |        |
| SNMX 120612-RR2  | 1.2                     | -               | ●      | ●      | ●      |        | ●      | ●      |        |
| SNMX 120620-MM4  | 2.0                     | -               | ●      | ●      | ●      |        | ●      | ●      |        |
| SNMX 120620-RR2  | 2.0                     | -               | ●      | ●      | ●      |        | ●      | ●      |        |

Marked: ● Stock available ○ Non-stocked standard

| Materials |   |                                       |               | Cutting depth and feed |          |      |      |      |      |      |      |      |      |  |
|-----------|---|---------------------------------------|---------------|------------------------|----------|------|------|------|------|------|------|------|------|--|
| ISO       | Material classification                 | Tensile strength (N/mm <sup>2</sup> ) | Hardness (HB) | SN..1206..             |          |      |      |      |      |      |      |      |      |  |
|           |   |                                       |               | ap                     | Geometry |      |      |      | fz   |      |      |      |      |  |
|           |   |                                       |               |                        | MM3      |      | MM4  |      | MR6  |      | RR2  |      |      |  |
|           |   |                                       |               |                        | (mm)     |      |      |      |      |      |      |      |      |  |
| min       | max                                     | min                                   | max           | min                    | max      | min  | max  | min  | max  |      |      |      |      |  |
| P         | Unalloyed steel                         | <600                                  | <180          | 0.20                   | 8.00     | 0.12 | 0.32 | 0.19 | 0.35 | 0.15 | 0.38 | 0.18 | 0.40 |  |
|           |   | <950                                  | <280          |                        |          |      |      |      |      |      |      |      |      |  |
|           | Alloyed steel                           | 700-950                               | 200-280       |                        |          | 0.10 | 0.30 | 0.12 | 0.32 | 0.10 | 0.35 | 0.15 | 0.35 |  |
|           |   | 950-1200                              | 280-355       |                        |          |      |      |      |      |      |      |      |      |  |
|           | 1200-1400                               | 355-415                               |               |                        |          |      |      |      |      |      |      |      |      |  |
| M         | Duplex stainless steel                  | 778                                   | 230           |                        |          |      |      |      |      |      |      |      |      |  |
|           | Austenitic stainless steel              | 675                                   | 200           |                        |          | 0.10 | 0.28 | 0.10 | 0.30 | -    | -    | -    | -    |  |
|           | Precipitation-hardening stainless steel | 1013                                  | 300           |                        |          |      |      |      |      |      |      |      |      |  |
| K         | Grey cast iron                          | 700                                   | 220           |                        |          |      |      |      |      |      |      |      |      |  |
|           | Nodular cast iron                       | 880                                   | 260           |                        |          | 0.12 | 0.32 | 0.15 | 0.35 | 0.12 | 0.35 | 0.18 | 0.40 |  |
|           | Malleable cast iron                     | 800                                   | 250           |                        |          |      |      |      |      |      |      |      |      |  |
| S         | Fe-based alloy                          | 943                                   | 280           |                        |          |      |      |      |      |      |      |      |      |  |
|           | Co-based alloy                          | 1076                                  | 320           |                        |          |      |      |      |      |      |      |      |      |  |
|           | Ni-based alloy                          | 1177                                  | 350           | 0.10                   | 0.22     | 0.10 | 0.25 | -    | -    | -    | -    |      |      |  |
|           | Ti-alloy                                | 1262                                  | 370           |                        |          |      |      |      |      |      |      |      |      |  |
| N         | Aluminum                                | 260                                   | 75            |                        |          |      |      |      |      |      |      |      |      |  |
|           | Aluminum alloy                          | 447                                   | 130           |                        |          |      |      |      |      |      |      |      |      |  |
| H         | Hardened steel                          | -                                     | 50-60HRC      |                        |          |      |      |      |      |      |      |      |      |  |
|           | Chilled cast iron                       | -                                     | 55HRC         |                        |          |      |      |      |      |      |      |      |      |  |

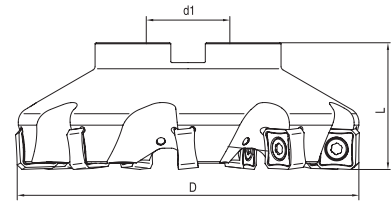
\*The recommended cutting conditions always refer to general conditions. These cutting conditions should be adjusted according to the practical machine rigidity, tools, workpiece clamping and coolants.  $f_z = \frac{h_m}{\sqrt{\frac{a_e}{D_c}}}$ , (calculate for  $\frac{a_e}{D_c} < 30\%$ )



Milling cutters

AFM88-SN12

88° Approach angle face milling cutter



| Product code                | D   | d1 | L  | apmax | Internal coolant | Z  | Inserts                     |
|-----------------------------|-----|----|----|-------|------------------|----|-----------------------------|
| AFM88-050-Z04-A22R-SN12-N-C | 50  | 22 | 40 | 10.0  |                  | 4  | SNGX1206ZNN<br>SN □ X1206.. |
| AFM88-063-Z04-A22R-SN12-N-C | 63  | 22 | 40 | 10.0  |                  | 4  |                             |
| AFM88-063-Z06-A22R-SN12-N-C | 63  | 22 | 40 | 10.0  |                  | 6  |                             |
| AFM88-080-Z04-A27R-SN12-N-C | 80  | 27 | 50 | 10.0  |                  | 4  |                             |
| AFM88-080-Z07-A27R-SN12-N-C | 80  | 27 | 50 | 10.0  |                  | 7  |                             |
| AFM88-100-Z08-A32R-SN12-N-C | 100 | 32 | 50 | 10.0  |                  | 8  |                             |
| AFM88-100-Z11-A32R-SN12-N-C | 100 | 32 | 50 | 10.0  |                  | 11 |                             |
| AFM88-125-Z10-A40R-SN12-N-C | 125 | 40 | 63 | 10.0  |                  | 10 |                             |
| AFM88-125-Z13-A40R-SN12-N-C | 125 | 40 | 63 | 10.0  |                  | 13 |                             |
| AFM88-160-Z12-A40R-SN12-N   | 160 | 40 | 63 | 10.0  |                  | 12 |                             |
| AFM88-200-Z14-A60R-SN12-N   | 200 | 60 | 63 | 10.0  |                  | 14 |                             |

| Dimension(mm)   | Spare parts |         |        |
|-----------------|-------------|---------|--------|
| Cutter diameter | Screw       | Wrench  | Torque |
| φ50-200         |             |         | 5.0Nm  |
|                 | SP050120    | DT-TP20 |        |

Note: With internal coolant  
 Without internal coolant



| Product code     | Dimension(mm)           |                 | Grades |        |        |        |        |        |        |
|------------------|-------------------------|-----------------|--------|--------|--------|--------|--------|--------|--------|
|                  | Insert corner radius mm | Wiper length mm | AP301U | AP351U | AC301P | AP401U | AC301K | AP351K | AW100K |
| SNGX 1206ZNN-MM3 | -                       | 1.2             | ●      | ●      | ●      |        | ●      | ●      |        |
| SNGX 1206ZNN-MM4 | -                       | 1.2             | ●      | ●      | ●      |        | ●      | ●      |        |
| SNGX 1206ZNN-MR6 | -                       | 1.2             | ●      | ●      | ●      |        | ●      | ●      |        |
| SNGX 120608-MM4  | 0.8                     | -               | ●      | ●      | ●      |        | ●      | ●      |        |
| SNGX 120612-MM4  | 1.2                     | -               | ●      |        |        |        |        |        |        |
| SNMX 120608-MM4  | 0.8                     | -               | ●      | ●      | ●      |        | ●      | ●      |        |
| SNMX 120612-MM3  | 1.2                     | -               | ●      | ●      | ●      |        | ●      | ●      |        |
| SNMX 120612-MM4  | 1.2                     | -               | ●      | ●      | ●      |        | ●      | ●      |        |
| SNMX 120612-MR6  | 1.2                     | -               | ●      | ●      | ●      |        | ●      | ●      |        |
| SNMX 120612-RR2  | 1.2                     | -               | ●      | ●      | ●      |        | ●      | ●      |        |
| SNMX 120620-MM4  | 2.0                     | -               | ●      | ●      | ●      |        | ●      | ●      |        |
| SNMX 120620-RR2  | 2.0                     | -               | ●      | ●      | ●      |        | ●      | ●      |        |
| SNHX 1206ZNN-FM2 | -                       | 1.2             |        |        |        |        |        |        | ●      |
| SNHX 1206ZNN-W   | 1.0                     | 4.4             | ●      |        |        |        | ●      |        |        |

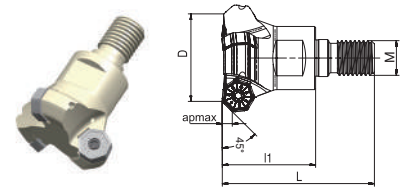
Marked: ● Stock available ○ Non-stocked standard

| Materials |   |                                       |               | Cutting depth and feed |          |      |      |      |      |      |      |      |      |   |   |  |
|-----------|---|---------------------------------------|---------------|------------------------|----------|------|------|------|------|------|------|------|------|---|---|--|
| ISO       | Material classification                 | Tensile strength (N/mm <sup>2</sup> ) | Hardness (HB) | SN..1206..             |          |      |      |      |      |      |      |      |      |   |   |  |
|           |   |                                       |               | ap                     | Geometry |      |      |      |      | fz   |      |      |      |   |   |  |
|           |   |                                       |               |                        | MM3      | MM4  | MR6  | RR2  | FM2  |      |      |      |      |   |   |  |
|           |   |                                       |               | (mm)                   |          |      |      |      |      |      |      |      |      |   |   |  |
| min       | max                                     | min                                   | max           | min                    | max      | min  | max  | min  | max  | min  | max  | min  | max  |   |   |  |
| P         | Unalloyed steel                         | <600                                  | <180          | 0.20                   | 10.00    | 0.12 | 0.32 | 0.19 | 0.35 | 0.15 | 0.38 | 0.18 | 0.40 | - | - |  |
|           |   | <950                                  | <280          |                        |          |      |      |      |      |      |      |      |      |   |   |  |
|           | Alloyed steel                           | 700-950                               | 200-280       |                        |          | 0.10 | 0.30 | 0.12 | 0.32 | 0.10 | 0.35 | 0.15 | 0.35 | - | - |  |
|           |   | 950-1200                              | 280-355       |                        |          |      |      |      |      |      |      |      |      |   |   |  |
|           | 1200-1400                               | 355-415                               |               |                        |          |      |      |      |      |      |      |      |      |   |   |  |
| M         | Duplex stainless steel                  | 778                                   | 230           |                        |          |      |      |      |      |      |      |      |      |   |   |  |
|           | Austenitic stainless steel              | 675                                   | 200           |                        |          | 0.10 | 0.28 | 0.10 | 0.30 | -    | -    | -    | -    | - | - |  |
|           | Precipitation-hardening stainless steel | 1013                                  | 300           |                        |          |      |      |      |      |      |      |      |      |   |   |  |
| K         | Grey cast iron                          | 700                                   | 220           |                        |          |      |      |      |      |      |      |      |      |   |   |  |
|           | Nodular cast iron                       | 880                                   | 260           |                        |          | 0.12 | 0.32 | 0.15 | 0.35 | 0.12 | 0.35 | 0.18 | 0.40 | - | - |  |
|           | Malleable cast iron                     | 800                                   | 250           |                        |          |      |      |      |      |      |      |      |      |   |   |  |
| S         | Fe-based alloy                          | 943                                   | 280           |                        |          |      |      |      |      |      |      |      |      |   |   |  |
|           | Co-based alloy                          | 1076                                  | 320           |                        |          |      |      |      |      |      |      |      |      |   |   |  |
|           | Ni-based alloy                          | 1177                                  | 350           | 0.10                   | 0.22     | 0.10 | 0.25 | -    | -    | -    | -    | -    | -    |   |   |  |
|           | Ti-alloy                                | 1262                                  | 370           |                        |          |      |      |      |      |      |      |      |      |   |   |  |
| N         | Aluminum                                | 260                                   | 75            |                        |          |      |      |      |      |      |      |      |      |   |   |  |
|           | Aluminum alloy                          | 447                                   | 130           | -                      | -        | -    | -    | -    | -    | -    | -    | 0.12 | 0.32 |   |   |  |
| H         | Hardened steel                          | -                                     | 50-60HRC      |                        |          |      |      |      |      |      |      |      |      |   |   |  |
|           | Chilled cast iron                       | -                                     | 55HRC         | -                      | -        | -    | -    | -    | -    | -    | -    | -    | -    |   |   |  |

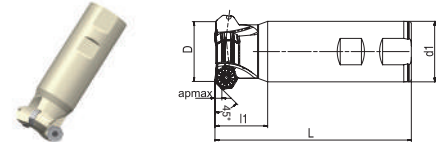
\*The recommended cutting conditions always refer to general conditions. These cutting conditions should be adjusted according to the practical machine rigidity, tools, workpiece clamping and coolants.  $f_z = \frac{h_m}{\sqrt{\frac{a_e}{D_c}}}$ , (calculate for  $\frac{a_e}{D_c} < 30\%$ )



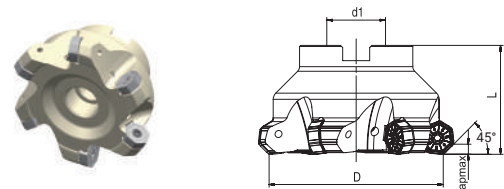
**AFM45-XN07**  
45° Approach angle face milling cutter



| Product code              | D  | M  | L  | l1 | apmax | Internal coolant | Z | Inserts    |
|---------------------------|----|----|----|----|-------|------------------|---|------------|
| AFM45-040-Z03-M16R-XN07-C | 40 | 16 | 70 | 43 | 4.4   |                  | 3 | XN..U 0705 |



| Product code              | D  | d1 | L   | l1 | apmax | Internal coolant | Z | Inserts    |
|---------------------------|----|----|-----|----|-------|------------------|---|------------|
| AFM45-040-Z03-W40R-XN07-C | 40 | 40 | 130 | 35 | 4.4   |                  | 3 | XN..U 0705 |



| Product code              | D   | d1 | L  | l1 | apmax | Internal coolant | Z  | Inserts    |
|---------------------------|-----|----|----|----|-------|------------------|----|------------|
| AFM45-040-Z03-A16R-XN07-C | 40  | 16 | 40 | -  | 4.4   |                  | 3  | XN..U 0705 |
| AFM45-050-Z04-A22R-XN07-C | 50  | 22 | 40 | -  | 4.4   |                  | 4  |            |
| AFM45-050-Z05-A22R-XN07-C | 50  | 22 | 40 | -  | 4.4   |                  | 5  |            |
| AFM45-063-Z05-A22R-XN07-C | 63  | 22 | 40 | -  | 4.4   |                  | 5  |            |
| AFM45-063-Z06-A22R-XN07-C | 63  | 22 | 40 | -  | 4.4   |                  | 6  |            |
| AFM45-080-Z06-A27R-XN07-C | 80  | 27 | 50 | -  | 4.4   |                  | 6  |            |
| AFM45-080-Z07-A27R-XN07-C | 80  | 27 | 50 | -  | 4.4   |                  | 7  |            |
| AFM45-100-Z07-A32R-XN07-C | 100 | 32 | 50 | -  | 4.4   |                  | 7  |            |
| AFM45-100-Z08-A32R-XN07-C | 100 | 32 | 50 | -  | 4.4   |                  | 8  |            |
| AFM45-125-Z08-A40R-XN07-C | 125 | 40 | 63 | -  | 4.4   |                  | 8  |            |
| AFM45-125-Z10-A40R-XN07-C | 125 | 40 | 63 | -  | 4.4   |                  | 10 |            |
| AFM45-160-Z09-A40R-XN07   | 160 | 40 | 63 | -  | 4.4   |                  | 9  |            |
| AFM45-160-Z12-A40R-XN07   | 160 | 40 | 63 | -  | 4.4   |                  | 12 |            |

| Dimension(mm) | Spare parts |         |        |
|---------------|-------------|---------|--------|
|               | Screw       | Wrench  | Torque |
| φ40-160       |             |         | 3.5Nm  |
|               | SP035120H   | DT-TP15 |        |

Note: With internal coolant  
 Without internal coolant



| Product code     | Dimension(mm)           |                 | Grades |        |        |        |        |        |        |
|------------------|-------------------------|-----------------|--------|--------|--------|--------|--------|--------|--------|
|                  | Insert corner radius mm | Wiper length mm | AP301U | AP351U | AC301P | AP401U | AC301K | AP351K | AW100K |
| XNGU 0705ANN-MM3 | 0.8                     | 1.1             | ●      | ●      |        |        | ●      |        |        |
| XNGU 0705ANN-MM4 | 0.8                     | 1.1             | ●      |        |        |        | ●      |        |        |
| XNMU 0705ANN-MM4 | 0.8                     | 1.1             | ●      | ●      | ●      | ●      | ●      | ●      |        |
| XNMU 0705ANN-MR6 | 0.8                     | 1.1             | ●      | ●      |        |        | ●      | ●      |        |
| XNMU 070508-MM4  | 0.8                     | -               |        | ●      |        | ●      | ●      | ●      |        |
| XNGX 0705ANN-W   | 1.0                     | 6               | ●      |        |        |        | ●      |        |        |
|                  |                         |                 |        |        |        |        |        |        |        |
|                  |                         |                 |        |        |        |        |        |        |        |
|                  |                         |                 |        |        |        |        |        |        |        |
|                  |                         |                 |        |        |        |        |        |        |        |
|                  |                         |                 |        |        |        |        |        |        |        |
|                  |                         |                 |        |        |        |        |        |        |        |

Marked: ● Stock available ○ Non-stocked standard

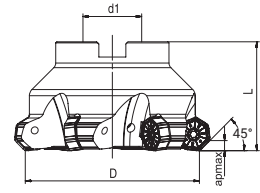
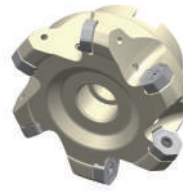
| Materials |   |                                       |               | Cutting depth and feed |          |      |      |      |      |      |      |  |
|-----------|---|---------------------------------------|---------------|------------------------|----------|------|------|------|------|------|------|--|
| ISO       | Material classification                 | Tensile strength (N/mm <sup>2</sup> ) | Hardness (HB) | XN.. 0705..            |          |      |      |      |      |      |      |  |
|           |   |                                       |               | ap                     | Geometry |      |      |      |      |      |      |  |
|           |   |                                       |               |                        | MM3      |      | MM4  |      | MR6  |      |      |  |
|           |   |                                       |               | fz                     |          |      |      |      |      |      |      |  |
| (mm)      |   |                                       |               |                        |          |      |      |      |      |      |      |  |
| min       | max                                     | min                                   | max           | min                    | max      | min  | max  |      |      |      |      |  |
| P         | Unalloyed steel                         | <600                                  | <180          | 0.20                   | 4.40     | 0.15 | 0.35 | 0.18 | 0.38 | 0.18 | 0.40 |  |
|           |   | <950                                  | <280          |                        |          |      |      |      |      |      |      |  |
|           | Alloyed steel                           | 700-950                               | 200-280       |                        |          | 0.12 | 0.32 | 0.15 | 0.35 | 0.15 | 0.38 |  |
|           |   | 950-1200                              | 280-355       |                        |          |      |      |      |      |      |      |  |
|           | 1200-1400                               | 355-415                               |               |                        |          |      |      |      |      |      |      |  |
| M         | Duplex stainless steel                  | 778                                   | 230           |                        |          |      |      |      |      |      |      |  |
|           | Austenitic stainless steel              | 675                                   | 200           |                        |          | 0.12 | 0.30 | 0.12 | 0.32 | -    | -    |  |
|           | Precipitation-hardening stainless steel | 1013                                  | 300           |                        |          |      |      |      |      |      |      |  |
| K         | Grey cast iron                          | 700                                   | 220           |                        |          |      |      |      |      |      |      |  |
|           | Nodular cast iron                       | 880                                   | 260           |                        |          | 0.15 | 0.35 | 0.18 | 0.38 | 0.18 | 0.40 |  |
|           | Malleable cast iron                     | 800                                   | 250           |                        |          |      |      |      |      |      |      |  |
| S         | Fe-based alloy                          | 943                                   | 280           |                        |          |      |      |      |      |      |      |  |
|           | Co-based alloy                          | 1076                                  | 320           |                        |          |      |      |      |      |      |      |  |
|           | Ni-based alloy                          | 1177                                  | 350           | 0.10                   | 0.25     | 0.12 | 0.28 | -    | -    |      |      |  |
|           | Ti-alloy                                | 1262                                  | 370           |                        |          |      |      |      |      |      |      |  |
| N         | Aluminum                                | 260                                   | 75            |                        |          |      |      |      |      |      |      |  |
|           | Aluminum alloy                          | 447                                   | 130           | -                      | -        | -    | -    | -    | -    |      |      |  |
| H         | Hardened steel                          | -                                     | 50-60HRC      |                        |          |      |      |      |      |      |      |  |
|           | Chilled cast iron                       | -                                     | 55HRC         | -                      | -        | -    | -    | -    | -    |      |      |  |

\*The recommended cutting conditions always refer to general conditions. These cutting conditions should be adjusted according to the practical machine rigidity, tools, workpiece clamping and coolants.  $f_z = \frac{h_m}{\sqrt{\frac{a_e}{D_c}}}$ , (calculate for  $\frac{a_e}{D_c} < 30\%$ )



Milling cutters

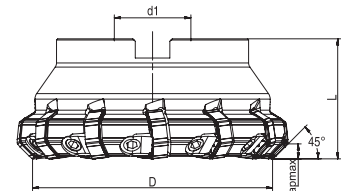
**AFM45-XN09**  
45° Approach angle face milling cutter



| Product code              | D   | d1 | L  | l1 | apmax | Internal coolant | Z  | Inserts    |
|---------------------------|-----|----|----|----|-------|------------------|----|------------|
| AFM45-063-Z05-A22R-XN09-C | 63  | 22 | 40 | -  | 6.0   |                  | 5  | XN..U 0906 |
| AFM45-080-Z06-A27R-XN09-C | 80  | 27 | 50 | -  | 6.0   |                  | 6  |            |
| AFM45-100-Z07-A32R-XN09-C | 100 | 32 | 50 | -  | 6.0   |                  | 7  |            |
| AFM45-100-Z08-A32R-XN09-C | 100 | 32 | 50 | -  | 6.0   |                  | 8  |            |
| AFM45-125-Z08-A40R-XN09-C | 125 | 40 | 63 | -  | 6.0   |                  | 8  |            |
| AFM45-125-Z10-A40R-XN09-C | 125 | 40 | 63 | -  | 6.0   |                  | 10 |            |
| AFM45-160-Z09-A40R-XN09   | 160 | 40 | 63 | -  | 6.0   |                  | 9  |            |
| AFM45-160-Z11-A40R-XN09   | 160 | 40 | 63 | -  | 6.0   |                  | 11 |            |
| AFM45-200-Z12-A60R-XN09   | 200 | 60 | 63 | -  | 6.0   |                  | 12 |            |

| Dimension(mm)   | Spare parts |         |        |
|-----------------|-------------|---------|--------|
| Cutter diameter | Screw       | Wrench  | Torque |
| φ63-200         |             |         | 5.0Nm  |
|                 | SP050130    | DT-TP20 |        |

**AFM45-XN09-W**  
45° Approach angle face milling cutter with wedge clamping



| Product code              | D   | d1 | L  | l1 | apmax | Internal coolant | Z  | Inserts    |
|---------------------------|-----|----|----|----|-------|------------------|----|------------|
| AFM45-080-Z09-A27R-XN09-W | 80  | 27 | 50 | -  | 6.0   |                  | 9  | XN..U 0906 |
| AFM45-100-Z12-A32R-XN09-W | 100 | 32 | 50 | -  | 6.0   |                  | 12 |            |
| AFM45-125-Z16-A40R-XN09-W | 125 | 40 | 63 | -  | 6.0   |                  | 16 |            |
| AFM45-125-Z16-A40L-XN09-W | 125 | 40 | 63 | -  | 6.0   |                  | 16 |            |
| AFM45-160-Z20-A40R-XN09-W | 160 | 40 | 63 | -  | 6.0   |                  | 20 |            |
| AFM45-160-Z20-A40L-XN09-W | 160 | 40 | 63 | -  | 6.0   |                  | 20 |            |
| AFM45-200-Z26-A60R-XN09-W | 200 | 60 | 63 | -  | 6.0   |                  | 26 |            |
| AFM45-200-Z26-A60L-XN09-W | 200 | 60 | 63 | -  | 6.0   |                  | 26 |            |

| Dimension(mm)   | Spare parts |         |        |
|-----------------|-------------|---------|--------|
| Cutter diameter | Screw       | Wrench  | Torque |
| φ80-200         |             |         | 7.0Nm  |
|                 | AWG-8H      | AWS830F |        |

Note: With internal coolant  
 Without internal coolant

| Product code     | Dimension(mm)           |                 | Grades |        |        |        |        |        |        |
|------------------|-------------------------|-----------------|--------|--------|--------|--------|--------|--------|--------|
|                  | Insert corner radius mm | Wiper length mm | AP301U | AP351U | AC301P | AP401U | AC301K | AP351K | AW100K |
| XNGU 0906ANN-MM3 | 0.8                     | 1.4             | ●      | ●      | ●      |        | ●      |        |        |
| XNGU 0906ANN-MM4 | 0.8                     | 1.4             | ●      | ●      | ●      |        | ●      |        |        |
| XNMU 0906ANN-MR6 | 0.8                     | 1.4             | ●      |        |        |        | ●      | ●      |        |
| XNMU 090612-MM4  | 1.2                     | -               | ●      | ●      |        | ●      | ●      | ●      |        |
| XNGX 0906ANN-W   | 1.0                     | 7.5             | ●      |        |        |        | ●      |        |        |
|                  |                         |                 |        |        |        |        |        |        |        |
|                  |                         |                 |        |        |        |        |        |        |        |
|                  |                         |                 |        |        |        |        |        |        |        |
|                  |                         |                 |        |        |        |        |        |        |        |
|                  |                         |                 |        |        |        |        |        |        |        |
|                  |                         |                 |        |        |        |        |        |        |        |
|                  |                         |                 |        |        |        |        |        |        |        |

Marked: ● Stock available ○ Non-stocked standard

| Materials |   |                                       |               | Cutting depth and feed |          |      |      |      |      |      |      |  |
|-----------|---|---------------------------------------|---------------|------------------------|----------|------|------|------|------|------|------|--|
| ISO       | Material classification                 | Tensile strength (N/mm <sup>2</sup> ) | Hardness (HB) | XN..0906..             |          |      |      |      |      |      |      |  |
|           |   |                                       |               | ap                     | Geometry |      |      |      |      |      |      |  |
|           |   |                                       |               |                        | MM3      |      | MM4  |      | MR6  |      |      |  |
|           |   |                                       |               |                        | fz       |      |      |      |      |      |      |  |
| (mm)      |   |                                       |               |                        |          |      |      |      |      |      |      |  |
| min       |   | max                                   |               | min                    |          | max  |      | min  |      | max  |      |  |
| P         | Unalloyed steel                         | <600                                  | <180          | 0.20                   | 6.00     | 0.15 | 0.35 | 0.18 | 0.38 | 0.18 | 0.40 |  |
|           |   | <950                                  | <280          |                        |          |      |      |      |      |      |      |  |
|           | Alloyed steel                           | 700-950                               | 200-280       |                        |          | 0.12 | 0.32 | 0.15 | 0.35 | 0.15 | 0.38 |  |
|           |   | 950-1200                              | 280-355       |                        |          |      |      |      |      |      |      |  |
|           | 1200-1400                               | 355-415                               |               |                        |          |      |      |      |      |      |      |  |
| M         | Duplex stainless steel                  | 778                                   | 230           |                        |          |      |      |      |      |      |      |  |
|           | Austenitic stainless steel              | 675                                   | 200           |                        |          | 0.12 | 0.30 | 0.12 | 0.32 | -    | -    |  |
|           | Precipitation-hardening stainless steel | 1013                                  | 300           |                        |          |      |      |      |      |      |      |  |
| K         | Grey cast iron                          | 700                                   | 220           |                        |          |      |      |      |      |      |      |  |
|           | Nodular cast iron                       | 880                                   | 260           |                        |          | 0.15 | 0.35 | 0.18 | 0.38 | 0.18 | 0.40 |  |
|           | Malleable cast iron                     | 800                                   | 250           |                        |          |      |      |      |      |      |      |  |
| S         | Fe-based alloy                          | 943                                   | 280           |                        |          |      |      |      |      |      |      |  |
|           | Co-based alloy                          | 1076                                  | 320           |                        |          |      |      |      |      |      |      |  |
|           | Ni-based alloy                          | 1177                                  | 350           | 0.10                   | 0.25     | 0.12 | 0.28 | -    | -    |      |      |  |
|           | Ti-alloy                                | 1262                                  | 370           |                        |          |      |      |      |      |      |      |  |
| N         | Aluminum                                | 260                                   | 75            |                        |          |      |      |      |      |      |      |  |
|           | Aluminum alloy                          | 447                                   | 130           | -                      | -        | -    | -    | -    | -    |      |      |  |
| H         | Hardened steel                          | -                                     | 50-60HRC      |                        |          |      |      |      |      |      |      |  |
|           | Chilled cast iron                       | -                                     | 55HRC         | -                      | -        | -    | -    | -    | -    |      |      |  |

\*The recommended cutting conditions always refer to general conditions. These cutting conditions should be adjusted according to the practical machine rigidity, tools, workpiece clamping and coolants.  $f_z = \frac{h_m}{\sqrt{\frac{a_e}{D_c}}}$ , (calculate for  $\frac{a_e}{D_c} < 30\%$ )

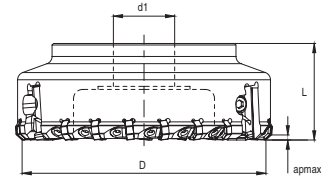


Milling cutters



**AFF40-LN12/LN15**

**Cast iron finishing milling cutter**



| Product code            | D   | d1 | L  | apmax | Internal coolant | *Z   | Cutting edge for finishing machining | Inserts                            |
|-------------------------|-----|----|----|-------|------------------|------|--------------------------------------|------------------------------------|
| AFF40-080-Z08-A27R-LN12 | 80  | 27 | 50 | 0.5   |                  | 8+2  | 2                                    | ONHF 050408-MM3<br>LNHQ 120408FN-W |
| AFF40-100-Z10-A32R-LN12 | 100 | 32 | 50 | 0.5   |                  | 10+2 | 2                                    |                                    |
| AFF40-125-Z15-A40R-LN15 | 125 | 40 | 63 | 0.5   |                  | 15+3 | 3                                    |                                    |
| AFF40-160-Z18-A40R-LN15 | 160 | 40 | 63 | 0.5   |                  | 18+3 | 3                                    |                                    |
| AFF40-200-Z24-A60R-LN15 | 200 | 60 | 63 | 0.5   |                  | 24+3 | 3                                    | ONHF 050408-MM3<br>LNHQ 150416FN-W |
| AFF40-250-Z30-A60R-LN15 | 250 | 60 | 63 | 0.5   |                  | 30+3 | 3                                    |                                    |

| Dimension       | Spare parts |                     |                            |                              |                               |
|-----------------|-------------|---------------------|----------------------------|------------------------------|-------------------------------|
| Cutter diameter | wedge type  | wedge locking screw | wiper insert locking screw | wiper insert adjusting screw | wiper cartridge locking screw |
| φ80-250         |             |                     |                            |                              |                               |
|                 | AWG-6H-13B  | WD060200            | SP040085H                  | AH050100F                    | SH060250                      |

| Dimension       | Spare parts        |                           |                                     |   |                 |
|-----------------|--------------------|---------------------------|-------------------------------------|---|-----------------|
| Cutter diameter | wedge screw wrench | wiper insert screw wrench | wiper insert adjusting screw wrench | wiper insert cartridge locking screw wrench | wiper cartridge |
| φ80-250         |                    |                           |                                     |   |                 |
|                 | LT-H3              | DT-TP10                   | LT-H2.5                             | LT-H5                                       | D80-100         |
|                 |                    |                           |                                     |   | D125-250        |
|                 |                    |                           |                                     |   | C-LN1235-2545   |
|                 |                    |                           |                                     |   | C-LN1535-2545   |


Note: With internal coolant  
 Without internal coolant



| Product code    | Dimension(mm)           |                 | Grades  |
|-----------------|-------------------------|-----------------|---------|
|                 | Insert corner radius mm | Wiper length mm | APT151H |
| ONHF 050408-MM3 | 0.8                     | -               | ●       |
| LNHQ 120408FN-W | 0.8                     | -               | ●       |
| LNHQ 150416FN-W | 1.6                     | -               | ●       |
|                 |                         |                 |         |
|                 |                         |                 |         |
|                 |                         |                 |         |
|                 |                         |                 |         |
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|                 |                         |                 |         |
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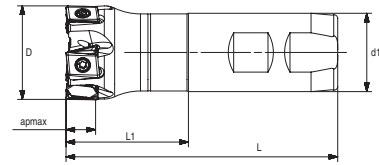
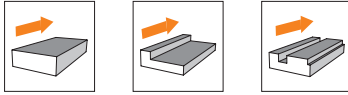
Marked: ● Stock available ○ Non-stocked standard

Milling cutters

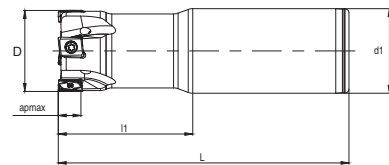
| Materials   |                         |                                       |               | Cutting depth and feed |          |      |      |
|---|-------------------------|---------------------------------------|---------------|------------------------|----------|------|------|
| ISO   | Material classification | Tensile strength (N/mm <sup>2</sup> ) | Hardness (HB) | ONHF.05 + LNHQ 12/15   |          |      |      |
|   |                         |                                       |               | ap                     | Geometry |      |      |
|   |                         |                                       |               |                        | MM3 + W  |      |      |
|   |                         |                                       |               | (mm)                   |          |      |      |
| min   | max                     | min                                   | max           | min                    | max      |      |      |
|  | Grey cast iron          | 700                                   | 220           | 0.20                   | 0.50     | 0.08 | 0.25 |
|   | Nodular cast iron       | 880                                   | 260           |                        |          |      |      |
|   | Malleable cast iron     | 800                                   | 250           |                        |          |      |      |

\*The recommended cutting conditions always refer to general conditions. These cutting conditions should be adjusted according to the practical machine rigidity, tools, workpiece clamping and coolants.  $f_z = \frac{h_m}{\sqrt{\frac{a_e}{D_c}}}$ , (calculate for  $\frac{a_e}{D_c} < 30\%$ )

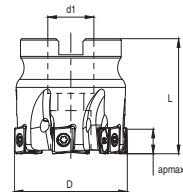
ASM90-LN09-C  
90° Shoulder milling cutter



| Product code              | D  | d1 | L   | l1 | apmax | Internal coolant | Z | Inserts   |
|---------------------------|----|----|-----|----|-------|------------------|---|-----------|
| ASM90-025-Z03-W25R-LN09-C | 25 | 25 | 100 | 45 | 8     |                  | 3 | LNHU 0904 |
| ASM90-025-Z04-W25R-LN09-C | 25 | 25 | 100 | 45 | 8     |                  | 4 |           |
| ASM90-032-Z04-W32R-LN09-C | 32 | 32 | 110 | 50 | 8     |                  | 4 |           |
| ASM90-032-Z05-W32R-LN09-C | 32 | 32 | 110 | 50 | 8     |                  | 5 |           |
| ASM90-040-Z04-W32R-LN09-C | 40 | 32 | 110 | 25 | 8     |                  | 4 |           |
| ASM90-040-Z06-W32R-LN09-C | 40 | 32 | 110 | 25 | 8     |                  | 6 |           |




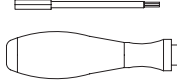
| Product code                   | D  | d1 | L   | l1 | apmax | Internal coolant | Z | Inserts   |
|--------------------------------|----|----|-----|----|-------|------------------|---|-----------|
| ASM90-020-Z02-C20R-LN09-L110   | 20 | 20 | 110 | 31 | 8     |                  | 2 | LNHU 0904 |
| ASM90-020-Z03-C20R-LN09-L110   | 20 | 20 | 110 | 31 | 8     |                  | 3 |           |
| ASM90-025-Z03-C25R-LN09-L200-C | 25 | 25 | 200 | 40 | 8     |                  | 3 |           |
| ASM90-025-Z04-C25R-LN09-L200-C | 25 | 25 | 200 | 40 | 8     |                  | 4 |           |
| ASM90-032-Z04-C32R-LN09-L250-C | 32 | 32 | 250 | 50 | 8     |                  | 4 |           |
| ASM90-032-Z05-C32R-LN09-L250-C | 32 | 32 | 250 | 50 | 8     |                  | 5 |           |



| Product code              | D  | d1 | L  | ISO | apmax | Internal coolant | Z  | Inserts   |
|---------------------------|----|----|----|-----|-------|------------------|----|-----------|
| ASM90-040-Z04-A16R-LN09-C | 40 | 16 | 40 | A   | 8     |                  | 4  | LNHU 0904 |
| ASM90-040-Z06-A16R-LN09-C | 40 | 16 | 40 | A   | 8     |                  | 6  |           |
| ASM90-050-Z05-A22R-LN09-C | 50 | 22 | 40 | A   | 8     |                  | 5  |           |
| ASM90-050-Z07-A22R-LN09-C | 50 | 22 | 40 | A   | 8     |                  | 7  |           |
| ASM90-063-Z07-A22R-LN09-C | 63 | 22 | 40 | A   | 8     |                  | 7  |           |
| ASM90-063-Z10-A22R-LN09-C | 63 | 22 | 40 | A   | 8     |                  | 10 |           |
| ASM90-080-Z09-A27R-LN09-C | 80 | 27 | 50 | A   | 8     |                  | 9  |           |
| ASM90-080-Z13-A27R-LN09-C | 80 | 27 | 50 | A   | 8     |                  | 13 |           |

Note: With internal coolant  
 Without internal coolant



| Dimension(mm)   | Spare parts   |  |        |
|-----------------|---|--|--------|
| Cutter diameter | Screw   | Wrench   | Torque |
| φ20-80          |  |  | 1.8Nm  |
|                 | SP030083  | DT-TP09  |        |

| Product code      | Dimension(mm)           |                 | Grade  |        |        |        |        |        |        |
|-------------------|-------------------------|-----------------|--------|--------|--------|--------|--------|--------|--------|
|                   | Insert corner radius mm | Wiper length mm | AP301U | AC301P | AP351U | AP403M | AC301K | AP351K | AW100K |
| LNHU 090404ER-FM2 | 0.4                     | 1.85            |        |        |        |        |        |        | ●      |
| LNHU 090404ER-MM3 | 0.4                     | 1.85            |        |        | ●      | ●      |        |        |        |
| LNHU 090404ER-MR2 | 0.4                     | 1.85            | ●      |        | ●      | ●      | ●      | ●      |        |
| LNHU 090408ER-MR2 | 0.8                     | 1.3             | ●      |        | ●      | ●      | ●      | ●      |        |
| LNHU 090412ER-MR2 | 1.2                     | 1.0             | ●      |        |        | ●      | ●      |        |        |
| LNHU 090416ER-MR2 | 1.6                     | 0.65            | ●      |        |        | ●      | ●      |        |        |
| LNHU 090420ER-MR2 | 2.0                     | 0.65            | ●      |        |        | ●      | ●      |        |        |
| LNHU 0904PDER-W   | 0.4                     | 3.6             | ●      |        |        |        | ●      |        |        |

Marked: ● Stock available ○ Non-stocked standard

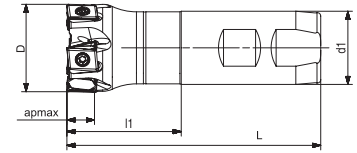
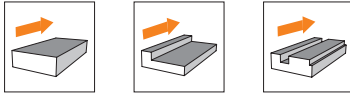
| Materials |   |                                       |               | Cutting depth and feed |          |      |      |      |      |   |    |  |
|-----------|---|---------------------------------------|---------------|------------------------|----------|------|------|------|------|---|----|--|
| ISO       | Material classification                 | Tensile strength (N/mm <sup>2</sup> ) | Hardness (HB) | LNHU 0904..            |          |      |      |      |      |   |    |  |
|           |   |                                       |               | ap                     | Geometry |      |      |      |      |   | fz |  |
|           |   |                                       |               |                        | MR2      |      | MM3  |      | FM2  |   |    |  |
|           |   |                                       |               |                        | (mm)     |      |      |      |      |   |    |  |
| min       | max                                     | min                                   | max           | min                    | max      | min  | max  |      |      |   |    |  |
| P         | Unalloyed steel                         | <600                                  | <180          | 0.20                   | 8.00     | 0.08 | 0.28 | 0.08 | 0.25 | - | -  |  |
|           |   | <950                                  | <280          |                        |          |      |      |      |      |   |    |  |
|           | Alloyed steel                           | 700-950                               | 200-280       |                        |          | 0.06 | 0.22 | 0.06 | 0.20 | - | -  |  |
|           |   | 950-1200                              | 280-355       |                        |          |      |      |      |      |   |    |  |
|           | 1200-1400                               | 355-415                               |               |                        |          |      |      |      |      |   |    |  |
| M         | Duplex stainless steel                  | 778                                   | 230           |                        |          |      |      |      |      |   |    |  |
|           | Austenitic stainless steel              | 675                                   | 200           |                        |          | 0.06 | 0.22 | 0.06 | 0.20 | - | -  |  |
|           | Precipitation-hardening stainless steel | 1013                                  | 300           |                        |          |      |      |      |      |   |    |  |
| K         | Grey cast iron                          | 700                                   | 220           |                        |          |      |      |      |      |   |    |  |
|           | Nodular cast iron                       | 880                                   | 260           |                        |          | 0.08 | 0.30 | 0.08 | 0.28 | - | -  |  |
|           | Malleable cast iron                     | 800                                   | 250           |                        |          |      |      |      |      |   |    |  |
| S         | Fe-based alloy                          | 943                                   | 280           |                        |          |      |      |      |      |   |    |  |
|           | Co-based alloy                          | 1076                                  | 320           |                        |          |      |      |      |      |   |    |  |
|           | Ni-based alloy                          | 1177                                  | 350           | -                      | -        | 0.08 | 0.15 | -    | -    |   |    |  |
|           | Ti-alloy                                | 1262                                  | 370           |                        |          |      |      |      |      |   |    |  |
| N         | Aluminum                                | 260                                   | 75            |                        |          |      |      |      |      |   |    |  |
|           | Aluminum alloy                          | 447                                   | 130           | -                      | -        | -    | -    | 0.06 | 0.25 |   |    |  |
| H         | Hardened steel                          | -                                     | 50-60HRC      |                        |          |      |      |      |      |   |    |  |
|           | Chilled cast iron                       | -                                     | 55HRC         | -                      | -        | -    | -    | -    | -    |   |    |  |

\*The recommended cutting conditions always refer to general conditions. These cutting conditions should be adjusted according to the practical machine rigidity, tools, workpiece clamping and coolants.  $f_z = \frac{h_m}{\sqrt{\frac{a_e}{D_c}}}$ , (calculate for  $\frac{a_e}{D_c} < 30\%$ )

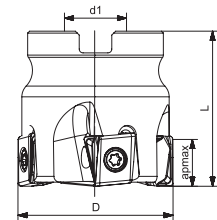


Milling cutters

**ASM90-LN13-C**  
90° Shoulder milling cutter



| Product code              | D  | d1 | L   | l1 | apmax | Internal coolant | Z | Inserts   |
|---------------------------|----|----|-----|----|-------|------------------|---|-----------|
| ASM90-040-Z05-W32R-LN13-C | 40 | 32 | 120 | 50 | 12    |                  | 5 | LNHU 1306 |



| Product code              | D   | d1 | L  | l1 | apmax | Internal coolant | Z  | Inserts   |
|---------------------------|-----|----|----|----|-------|------------------|----|-----------|
| ASM90-040-Z04-A16R-LN13-C | 40  | 16 | 40 | -  | 12.0  |                  | 4  | LNHU 1306 |
| ASM90-040-Z05-A16R-LN13-C | 40  | 16 | 40 | -  | 12.0  |                  | 5  |           |
| ASM90-050-Z05-A22R-LN13-C | 50  | 22 | 40 | -  | 12.0  |                  | 5  |           |
| ASM90-050-Z06-A22R-LN13-C | 50  | 22 | 40 | -  | 12.0  |                  | 6  |           |
| ASM90-063-Z04-A22R-LN13-C | 63  | 22 | 40 | -  | 12.0  |                  | 4  |           |
| ASM90-063-Z06-A22R-LN13-C | 63  | 22 | 40 | -  | 12.0  |                  | 6  |           |
| ASM90-063-Z08-A22R-LN13-C | 63  | 22 | 40 | -  | 12.0  |                  | 8  |           |
| ASM90-080-Z05-A27R-LN13-C | 80  | 27 | 50 | -  | 12.0  |                  | 5  |           |
| ASM90-080-Z07-A27R-LN13-C | 80  | 27 | 50 | -  | 12.0  |                  | 7  |           |
| ASM90-080-Z10-A27R-LN13-C | 80  | 27 | 50 | -  | 12.0  |                  | 10 |           |
| ASM90-100-Z07-A32R-LN13-C | 100 | 32 | 50 | -  | 12.0  |                  | 7  |           |
| ASM90-100-Z09-A32R-LN13-C | 100 | 32 | 50 | -  | 12.0  |                  | 9  |           |
| ASM90-100-Z13-A32R-LN13-C | 100 | 32 | 50 | -  | 12.0  |                  | 13 |           |
| ASM90-125-Z09-A40R-LN13-C | 125 | 40 | 63 | -  | 12.0  |                  | 9  |           |
| ASM90-125-Z11-A40R-LN13-C | 125 | 40 | 63 | -  | 12.0  |                  | 11 |           |
| ASM90-125-Z16-A40R-LN13-C | 125 | 40 | 63 | -  | 12.0  |                  | 16 |           |
| ASM90-160-Z09-A40R-LN13   | 160 | 40 | 63 | -  | 12.0  |                  | 9  |           |
| ASM90-160-Z13-A40R-LN13   | 160 | 40 | 63 | -  | 12.0  |                  | 13 |           |

| Dimension(mm)   | Spare parts |         |        |
|-----------------|-------------|---------|--------|
| Cutter diameter | Screw       | Wrench  | Torque |
| φ40-160         |             |         | 3.5Nm  |
|                 | SP040115    | DT-TP15 |        |

Note: With internal coolant  
 Without internal coolant



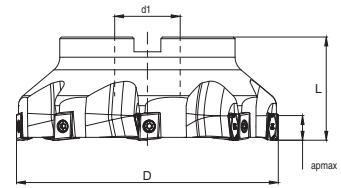
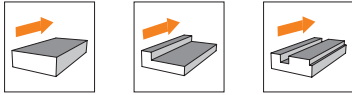
| Product code      | Dimension(mm)           |                 | Grade  |        |        |        |        |        |        |
|-------------------|-------------------------|-----------------|--------|--------|--------|--------|--------|--------|--------|
|                   | Insert corner radius mm | Wiper length mm | AP301U | AC301P | AP351U | AP401U | AC301K | AP351K | AW100K |
| LNHU 130608ER-FM2 | 0.8                     | 2.7             |        |        |        |        |        |        | ●      |
| LNHU 130608ER-MM3 | 0.8                     | 2.7             |        |        |        | ●      |        |        |        |
| LNHU 130608ER-MR2 | 0.8                     | 2.7             | ●      | ●      | ●      | ●      | ●      | ●      |        |
| LNHU 130612ER-MR2 | 1.2                     | 2.3             |        |        | ●      | ●      | ●      |        |        |
| LNHU 130616ER-MR2 | 1.6                     | 1.9             |        |        | ●      | ●      | ●      |        |        |
| LNHU 130620ER-MR2 | 2.0                     | 1.5             |        |        | ●      | ●      |        |        |        |
| LNHU 130624ER-MR2 | 2.4                     | 1.0             |        |        | ●      | ●      |        |        |        |
| LNHU 130631ER-MR2 | 3.1                     | 0.4             |        |        | ●      | ●      | ●      |        |        |
| LNHU 1306PDER-W   | 0.8                     | 5.6             | ●      |        |        |        | ●      |        |        |
|                   |                         |                 |        |        |        |        |        |        |        |
|                   |                         |                 |        |        |        |        |        |        |        |
|                   |                         |                 |        |        |        |        |        |        |        |

Marked: ● Stock available ○ Non-stocked standard

| Materials |   |                                       |               | Cutting depth and feed |          |      |      |      |      |      |      |  |  |
|-----------|---|---------------------------------------|---------------|------------------------|----------|------|------|------|------|------|------|--|--|
| ISO       | Material classification                 | Tensile strength (N/mm <sup>2</sup> ) | Hardness (HB) | LNHU..1306..           |          |      |      |      |      |      |      |  |  |
|           |   |                                       |               | ap                     | Geometry |      |      |      |      |      |      |  |  |
|           |   |                                       |               |                        | MM3      |      | MR2  |      |      |      |      |  |  |
|           |   |                                       |               |                        | fz       |      |      |      |      |      |      |  |  |
| (mm)      |   |                                       |               |                        |          |      |      |      |      |      |      |  |  |
| min       |   | max                                   |               | min                    |          | max  |      | min  |      | max  |      |  |  |
| P         | Unalloyed steel                         | <600                                  | <180          | 0.20                   | 12.00    | 0.10 | 0.30 | 0.12 | 0.35 |      |      |  |  |
|           |   | <950                                  | <280          |                        |          |      |      |      |      |      |      |  |  |
|           | Alloyed steel                           | 700-950                               | 200-280       |                        |          | 0.08 | 0.25 | 0.10 | 0.30 |      |      |  |  |
|           |   | 950-1200                              | 280-355       |                        |          |      |      |      |      |      |      |  |  |
| 1200-1400 | 355-415                                 |                                       |               |                        |          |      |      |      |      |      |      |  |  |
| M         | Duplex stainless steel                  | 778                                   | 230           |                        |          |      |      |      |      |      |      |  |  |
|           | Austenitic stainless steel              | 675                                   | 200           |                        |          | 0.06 | 0.20 | 0.08 | 0.25 |      |      |  |  |
|           | Precipitation-hardening stainless steel | 1013                                  | 300           |                        |          |      |      |      |      |      |      |  |  |
| K         | Grey cast iron                          | 700                                   | 220           |                        |          |      |      | -    | -    | 0.12 | 0.35 |  |  |
|           | Nodular cast iron                       | 880                                   | 260           |                        |          |      |      |      |      |      |      |  |  |
|           | Malleable cast iron                     | 800                                   | 250           |                        |          |      |      |      |      |      |      |  |  |
| S         | Fe-based alloy                          | 943                                   | 280           |                        |          |      |      |      |      |      |      |  |  |
|           | Co-based alloy                          | 1076                                  | 320           |                        |          |      |      |      |      |      |      |  |  |
|           | Ni-based alloy                          | 1177                                  | 350           | 0.06                   | 0.18     | 0.08 | 0.22 |      |      |      |      |  |  |
|           | Ti-alloy                                | 1262                                  | 370           |                        |          |      |      |      |      |      |      |  |  |
| N         | Aluminum                                | 260                                   | 75            |                        |          | -    | -    | -    | -    |      |      |  |  |
|           | Aluminum alloy                          | 447                                   | 130           |                        |          |      |      |      |      |      |      |  |  |
| H         | Hardened steel                          | -                                     | 50-60HRC      |                        |          | -    | -    | 0.08 | 0.20 |      |      |  |  |
|           | Chilled cast iron                       | -                                     | 55HRC         |                        |          |      |      |      |      |      |      |  |  |

\*The recommended cutting conditions always refer to general conditions. These cutting conditions should be adjusted according to the practical machine rigidity, tools, workpiece clamping and coolants.  $f_z = \frac{h_m}{\sqrt{\frac{a_e}{D_c}}}$ , (calculate for  $\frac{a_e}{D_c} < 30\%$ )

**ASM90-LN16-C**  
90° Shoulder milling cutter



| Product code              | D   | d1 | L  | ISO | apmax | Internal coolant | Z | Inserts   |
|---------------------------|-----|----|----|-----|-------|------------------|---|-----------|
| ASM90-063-Z04-A22R-LN16-C | 63  | 22 | 40 | A   | 15    |                  | 4 | LNHU 1607 |
| ASM90-080-Z05-A27R-LN16-C | 80  | 27 | 50 | A   | 15    |                  | 5 |           |
| ASM90-100-Z06-A32R-LN16-C | 100 | 32 | 50 | A   | 15    |                  | 6 |           |
| ASM90-125-Z07-A40R-LN16-C | 125 | 40 | 63 | A   | 15    |                  | 7 |           |
| ASM90-160-Z08-A40R-LN16   | 160 | 40 | 63 | A   | 15    |                  | 8 |           |

| Dimension(mm) | Spare parts |         |        |
|---------------|-------------|---------|--------|
|               | Screw       | Wrench  | Torque |
| φ63-160       |             |         | 5Nm    |
|               | SP05013063  | DT-TP20 |        |

Note: With internal coolant  
 Without internal coolant



| Product code      | Dimension(mm)           |                 | Grade  |        |        |        |        |        |        |
|-------------------|-------------------------|-----------------|--------|--------|--------|--------|--------|--------|--------|
|                   | Insert corner radius mm | Wiper length mm | AP301U | AC301P | AP351U | AP401U | AC301K | AP351K | AW100K |
| LNHU 160708ER-MR2 | 0.8                     | 1.97            | ●      |        | ●      |        |        | ●      | ●      |
| LNHU 160716ER-MR2 | 1.6                     | 1.5             | ●      |        |        |        |        | ●      |        |
|                   |                         |                 |        |        |        |        |        |        |        |
|                   |                         |                 |        |        |        |        |        |        |        |
|                   |                         |                 |        |        |        |        |        |        |        |
|                   |                         |                 |        |        |        |        |        |        |        |
|                   |                         |                 |        |        |        |        |        |        |        |
|                   |                         |                 |        |        |        |        |        |        |        |
|                   |                         |                 |        |        |        |        |        |        |        |
|                   |                         |                 |        |        |        |        |        |        |        |
|                   |                         |                 |        |        |        |        |        |        |        |
|                   |                         |                 |        |        |        |        |        |        |        |
|                   |                         |                 |        |        |        |        |        |        |        |
|                   |                         |                 |        |        |        |        |        |        |        |
|                   |                         |                 |        |        |        |        |        |        |        |
|                   |                         |                 |        |        |        |        |        |        |        |
|                   |                         |                 |        |        |        |        |        |        |        |
|                   |                         |                 |        |        |        |        |        |        |        |
|                   |                         |                 |        |        |        |        |        |        |        |

Marked: ● Stock available ○ Non-stocked standard

Milling cutters

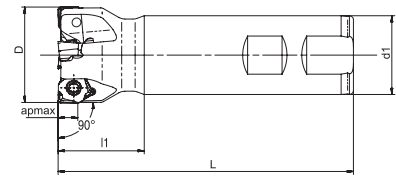
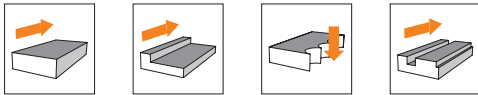
| Materials |   |                                       |               | Cutting depth and feed |          |      |      |      |      |
|-----------|---|---------------------------------------|---------------|------------------------|----------|------|------|------|------|
| ISO       | Material classification                 | Tensile strength (N/mm <sup>2</sup> ) | Hardness (HB) | LNHU 1607..            |          |      |      |      |      |
|           |   |                                       |               | ap                     | Geometry |      |      |      |      |
|           |   |                                       |               |                        | MR2      |      |      |      |      |
|           |   |                                       |               |                        | fz       |      |      |      |      |
| (mm)      |   |                                       |               | min                    | max      | min  | max  |      |      |
| P         | Unalloyed steel                         | <600                                  | <180          | 0.20                   | 15.00    | 0.10 | 0.30 |      |      |
|           |   | <950                                  | <280          |                        |          |      |      |      |      |
|           | Alloyed steel                           | 700-950                               | 200-280       |                        |          |      |      | 0.08 | 0.28 |
|           |   | 950-1200                              | 280-355       |                        |          |      |      |      |      |
| M         | Duplex stainless steel                  | 778                                   | 230           |                        |          | 0.08 | 0.25 |      |      |
|           | Austenitic stainless steel              | 675                                   | 200           |                        |          |      |      |      |      |
|           | Precipitation-hardening stainless steel | 1013                                  | 300           |                        |          |      |      |      |      |
| K         | Grey cast iron                          | 700                                   | 220           |                        |          | 0.10 | 0.30 |      |      |
|           | Nodular cast iron                       | 880                                   | 260           |                        |          |      |      |      |      |
|           | Malleable cast iron                     | 800                                   | 250           |                        |          |      |      |      |      |
| S         | Fe-based alloy                          | 943                                   | 280           | -                      | -        |      |      |      |      |
|           | Co-based alloy                          | 1076                                  | 320           |                        |          |      |      |      |      |
|           | Ni-based alloy                          | 1177                                  | 350           |                        |          |      |      |      |      |
|           | Ti-alloy                                | 1262                                  | 370           |                        |          |      |      |      |      |
| N         | Aluminum                                | 260                                   | 75            | -                      | -        |      |      |      |      |
|           | Aluminum alloy                          | 447                                   | 130           |                        |          |      |      |      |      |
| H         | Hardened steel                          | -                                     | 50-60HRC      | -                      | -        |      |      |      |      |
|           | Chilled cast iron                       | -                                     | 55HRC         |                        |          |      |      |      |      |

\*The recommended cutting conditions always refer to general conditions. These cutting conditions should be adjusted according to the practical machine rigidity, tools, workpiece clamping and coolants.  $f_z = \frac{h_m}{\sqrt{\frac{a_e}{D_c}}}$ , (calculate for  $\frac{a_e}{D_c} < 30\%$ )

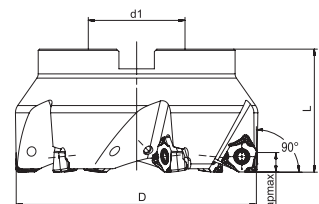
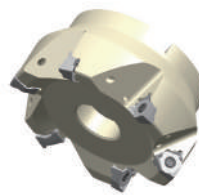




**ASM90-WN08-C**  
90° Shoulder milling cutter



| Product code              | D  | d1 | L   | l1 | apmax | Internal coolant | Z | Inserts   |
|---------------------------|----|----|-----|----|-------|------------------|---|-----------|
| ASM90-040-Z03-W32R-WN08-C | 40 | 32 | 120 | 35 | 7.0   |                  | 3 | WN.U 0806 |
| ASM90-040-Z04-W32R-WN08-C | 40 | 32 | 120 | 35 | 7.0   |                  | 4 |           |



| Product code              | D   | d1 | L  | l1 | apmax | Internal coolant | Z  | Inserts   |
|---------------------------|-----|----|----|----|-------|------------------|----|-----------|
| ASM90-050-Z04-A22R-WN08-C | 50  | 22 | 40 | -  | 7     |                  | 4  | WN.U 0806 |
| ASM90-050-Z05-A22R-WN08-C | 50  | 22 | 40 | -  | 7     |                  | 5  |           |
| ASM90-063-Z04-A22R-WN08-C | 63  | 22 | 40 | -  | 7     |                  | 4  |           |
| ASM90-063-Z06-A22R-WN08-C | 63  | 22 | 40 | -  | 7     |                  | 6  |           |
| ASM90-063-Z07-A22R-WN08-C | 63  | 22 | 40 | -  | 7     |                  | 7  |           |
| ASM90-080-Z05-A27R-WN08-C | 80  | 27 | 50 | -  | 7     |                  | 5  |           |
| ASM90-080-Z07-A27R-WN08-C | 80  | 27 | 50 | -  | 7     |                  | 7  |           |
| ASM90-080-Z09-A27R-WN08-C | 80  | 27 | 50 | -  | 7     |                  | 9  |           |
| ASM90-100-Z06-A32R-WN08-C | 100 | 32 | 50 | -  | 7     |                  | 6  |           |
| ASM90-100-Z08-A32R-WN08-C | 100 | 32 | 50 | -  | 7     |                  | 8  |           |
| ASM90-100-Z11-A32R-WN08-C | 100 | 32 | 50 | -  | 7     |                  | 11 |           |
| ASM90-125-Z07-A40R-WN08-C | 125 | 40 | 63 | -  | 7     |                  | 7  |           |
| ASM90-125-Z11-A40R-WN08-C | 125 | 40 | 63 | -  | 7     |                  | 11 |           |
| ASM90-125-Z13-A40R-WN08-C | 125 | 40 | 63 | -  | 7     |                  | 13 |           |
| ASM90-160-Z08-A40R-WN08   | 160 | 40 | 63 | -  | 7     |                  | 8  |           |
| ASM90-160-Z12-A40R-WN08   | 160 | 40 | 63 | -  | 7     |                  | 12 |           |
| ASM90-200-Z14-A60R-WN08   | 200 | 60 | 63 | -  | 7     |                  | 14 |           |
| ASM90-250-Z16-A60R-WN08   | 250 | 60 | 63 | -  | 7     |                  | 16 |           |

| Dimension(mm) | Spare parts |         |        |
|---------------|-------------|---------|--------|
|               | Screw       | Wrench  | Torque |
| φ40-250       |             |         | 3.5Nm  |
|               | SP040090    | DT-TP15 |        |

Note: With internal coolant  
 Without internal coolant



| Product code     | Dimension(mm)           |                 | Grade  |        |        |        |        |        |        |        |
|------------------|-------------------------|-----------------|--------|--------|--------|--------|--------|--------|--------|--------|
|                  | Insert corner radius mm | Wiper length mm | AP301U | AC301P | AP351U | AP401U | AC301K | AP351K | AW100K | AP151H |
| WNHU 080608R-FM2 | 0.8                     | 2.0             |        |        |        |        |        |        | ●      |        |
| WNGU 080604R-MM3 | 0.4                     | 2.2             |        |        | ●      | ●      |        |        |        |        |
| WNGU 080608R-MM3 | 0.8                     | 2.0             | ●      |        | ●      | ●      |        |        |        |        |
| WNGU 080604R-MM4 | 0.4                     | 2.2             | ●      |        | ●      | ●      |        | ●      |        |        |
| WNGU 080608R-MM4 | 0.8                     | 2.0             | ●      | ●      | ●      | ●      | ●      | ●      |        | ●      |
| WNGU 080612R-MM4 | 1.2                     | 1.6             | ●      |        | ●      | ●      |        |        |        |        |
| WNGU 080616R-MM4 | 1.6                     | 1.2             | ●      |        | ●      | ●      |        |        |        |        |
| WNGU 080608R-MR2 | 0.8                     | 2.0             | ●      |        |        |        |        | ●      |        |        |
| WNGU 080612R-MR2 | 1.2                     | 1.6             | ●      |        |        |        |        | ●      |        |        |
| WNGU 080616R-MR2 | 1.6                     | 1.2             | ●      |        |        |        |        | ●      |        |        |
| WNHX 0806ZZR-W   | 1.0                     | 4.8             | ●      |        |        |        | ●      |        |        |        |

Marked: ● Stock available ○ Non-stocked standard

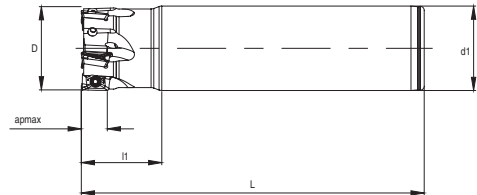
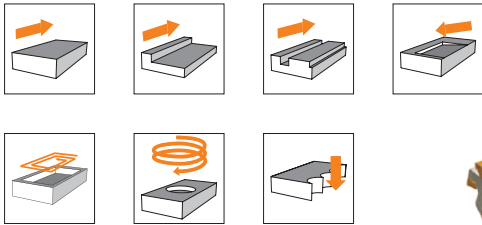
| Materials |   |                                       |               | Cutting depth and feed |          |      |      |      |      |      |      |      |      |      |      |      |      |
|-----------|---|---------------------------------------|---------------|------------------------|----------|------|------|------|------|------|------|------|------|------|------|------|------|
| ISO       | Material classification                 | Tensile strength (N/mm <sup>2</sup> ) | Hardness (HB) | WNGU..0806..           |          |      |      |      |      |      |      |      |      |      |      |      |      |
|           |   |                                       |               | ap                     | Geometry |      |      |      | fz   |      |      |      |      |      |      |      |      |
|           |   |                                       |               |                        | FM2      | MM3  | MM4  | MR2  |      |      |      |      |      |      |      |      |      |
|           |   |                                       |               |                        | (mm)     |      |      |      |      |      |      |      |      |      |      |      |      |
| min       | max                                     | min                                   | max           | min                    | max      | min  | max  | min  | max  |      |      |      |      |      |      |      |      |
| P         | Unalloyed steel                         | <600                                  | <180          | 0.20                   | 7.00     |      |      | 0.12 | 0.25 | 0.12 | 0.28 | 0.12 | 0.30 |      |      |      |      |
|           |   | <950                                  | <280          |                        |          |      |      |      |      |      |      |      |      |      |      |      |      |
|           | Alloyed steel                           | 700-950                               | 200-280       |                        |          |      |      | 0.10 | 0.20 | 0.10 | 0.25 | 0.10 | 0.28 |      |      |      |      |
|           |   | 950-1200                              | 280-355       |                        |          |      |      |      |      |      |      |      |      |      |      |      |      |
|           | 1200-1400                               | 355-415                               |               |                        |          |      |      |      |      |      |      |      |      |      |      |      |      |
| M         | Duplex stainless steel                  | 778                                   | 230           |                        |          |      |      |      |      |      |      |      |      |      |      |      |      |
|           | Austenitic stainless steel              | 675                                   | 200           |                        |          |      |      |      |      |      |      | 0.08 | 0.18 | 0.08 | 0.18 | -    | -    |
|           | Precipitation-hardening stainless steel | 1013                                  | 300           |                        |          |      |      |      |      |      |      |      |      |      |      |      |      |
| K         | Grey cast iron                          | 700                                   | 220           |                        |          |      |      |      |      |      |      |      |      |      |      |      |      |
|           | Nodular cast iron                       | 880                                   | 260           |                        |          |      |      |      |      |      |      | 0.12 | 0.20 | 0.10 | 0.28 | 0.15 | 0.30 |
|           | Malleable cast iron                     | 800                                   | 250           |                        |          |      |      |      |      |      |      |      |      |      |      |      |      |
| S         | Fe-based alloy                          | 943                                   | 280           |                        |          |      |      |      |      |      |      |      |      |      |      |      |      |
|           | Co-based alloy                          | 1076                                  | 320           |                        |          |      |      |      |      |      |      |      |      |      |      |      |      |
|           | Ni-based alloy                          | 1177                                  | 350           |                        |          |      |      | 0.12 | 0.13 | 0.10 | 0.15 | -    | -    |      |      |      |      |
|           | Ti-alloy                                | 1262                                  | 370           |                        |          |      |      |      |      |      |      |      |      |      |      |      |      |
| N         | Aluminum                                | 260                                   | 75            |                        |          | 0.10 | 0.24 | -    | -    | -    | -    | -    | -    |      |      |      |      |
|           | Aluminum alloy                          | 447                                   | 130           |                        |          |      |      |      |      |      |      |      |      |      |      |      |      |
| H         | Hardened steel                          | -                                     | 50-60HRC      |                        |          |      |      |      |      |      |      |      |      |      |      |      |      |
|           | Chilled cast iron                       | -                                     | 55HRC         |                        |          |      |      |      |      |      |      |      |      |      |      |      |      |

\*The recommended cutting conditions always refer to general conditions. These cutting conditions should be adjusted according to the practical machine rigidity, tools, workpiece clamping and coolants.  $f_z = \frac{h_m}{\sqrt{\frac{a_e}{D_c}}}$ , (calculate for  $\frac{a_e}{D_c} < 30\%$ )

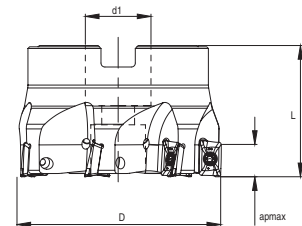


Milling cutters

**ASM90-AP10-C**  
90° Shoulder milling cutter



| Product code                   | D  | d1 | L   | l1 | apmax | Internal coolant | Z | Inserts   |
|--------------------------------|----|----|-----|----|-------|------------------|---|-----------|
| ASM90-016-Z02-C16R-AP10-L90-C  | 16 | 16 | 90  | 26 | 8     |                  | 2 | APKT 1003 |
| ASM90-020-Z03-C20R-AP10-L110-C | 20 | 20 | 110 | 28 | 8     |                  | 3 |           |
| ASM90-025-Z04-C25R-AP10-L120-C | 25 | 25 | 120 | 30 | 8     |                  | 4 |           |
| ASM90-032-Z05-C32R-AP10-L130-C | 32 | 32 | 130 | 26 | 8     |                  | 5 |           |



| Product code              | D  | d1 | L  | l1 | apmax | Internal coolant | Z | Inserts   |
|---------------------------|----|----|----|----|-------|------------------|---|-----------|
| ASM90-063-Z07-A22R-AP10-C | 63 | 22 | 40 | A  | 8     |                  | 7 | APKT 1003 |

| Dimension(mm) | Spare parts |         |        |
|---------------|-------------|---------|--------|
|               | Screw       | Wrench  | Torque |
| φ16-63        |             |         | 1.0Nm  |
|               | SP02506450H | DT-TP08 |        |

Note: With internal coolant  
 Without internal coolant



| Product code            | Dimension(mm)           |                 | Grade  |        |        |        |        |        |        |
|-------------------------|-------------------------|-----------------|--------|--------|--------|--------|--------|--------|--------|
|                         | Insert corner radius mm | Wiper length mm | AP301U | AC301P | AP351U | AP401U | AC301K | AP351K | AP403S |
| <b>APKT 1003PDER-IT</b> | 0.8                     | 1.09            | ●      |        | ●      | ●      |        |        | ●      |
|                         |                         |                 |        |        |        |        |        |        |        |
|                         |                         |                 |        |        |        |        |        |        |        |
|                         |                         |                 |        |        |        |        |        |        |        |
|                         |                         |                 |        |        |        |        |        |        |        |
|                         |                         |                 |        |        |        |        |        |        |        |
|                         |                         |                 |        |        |        |        |        |        |        |
|                         |                         |                 |        |        |        |        |        |        |        |
|                         |                         |                 |        |        |        |        |        |        |        |
|                         |                         |                 |        |        |        |        |        |        |        |
|                         |                         |                 |        |        |        |        |        |        |        |
|                         |                         |                 |        |        |        |        |        |        |        |
|                         |                         |                 |        |        |        |        |        |        |        |
|                         |                         |                 |        |        |        |        |        |        |        |
|                         |                         |                 |        |        |        |        |        |        |        |

Marked: ● Stock available ○ Non-stocked standard

| Materials |   |                                       |               | Cutting depth and feed |      |          |      |      |      |
|-----------|---|---------------------------------------|---------------|------------------------|------|----------|------|------|------|
| ISO       | Material classification                 | Tensile strength (N/mm <sup>2</sup> ) | Hardness (HB) | APKT..1003..           |      |          |      |      |      |
|           |   |                                       |               | ap                     |      | Geometry |      |      |      |
|           |   |                                       |               |                        |      | IT       |      |      |      |
|           |   |                                       |               |                        |      | fz       |      |      |      |
|           |   |                                       |               | (mm)                   |      |          |      |      |      |
|           |   |                                       |               | min                    | max  | min      | max  |      |      |
| <b>P</b>  | Unalloyed steel                         | <600                                  | <180          | 0.20                   | 8.00 | 0.05     | 0.22 |      |      |
|           |   | <950                                  | <280          |                        |      |          |      |      |      |
|           | Alloyed steel                           | 700-950                               | 200-280       |                        |      |          |      | 0.05 | 0.18 |
|           |   | 950-1200                              | 280-355       |                        |      |          |      |      |      |
| <b>M</b>  | Duplex stainless steel                  | 1200-1400                             | 355-415       |                        |      | 0.05     | 0.15 |      |      |
|           |   | 778                                   | 230           |                        |      |          |      |      |      |
|           |   | Austenitic stainless steel            | 675           |                        |      |          |      | 200  |      |
| <b>K</b>  | Precipitation-hardening stainless steel | 1013                                  | 300           |                        |      | -        | -    |      |      |
|           | Grey cast iron                          | 700                                   | 220           |                        |      |          |      |      |      |
|           | Nodular cast iron                       | 880                                   | 260           |                        |      |          |      |      |      |
| <b>S</b>  | Malleable cast iron                     | 800                                   | 250           | 0.05                   | 0.15 |          |      |      |      |
|           | Fe-based alloy                          | 943                                   | 280           |                        |      |          |      |      |      |
|           | Co-based alloy                          | 1076                                  | 320           |                        |      |          |      |      |      |
|           | Ni-based alloy                          | 1177                                  | 350           |                        |      |          |      |      |      |
| <b>N</b>  | Ti-alloy                                | 1262                                  | 370           | 0.05                   | 0.25 |          |      |      |      |
|           | Aluminum                                | 260                                   | 75            |                        |      |          |      |      |      |
| <b>H</b>  | Aluminum alloy                          | 447                                   | 130           | -                      | -    |          |      |      |      |
|           | Hardened steel                          | -                                     | 50-60HRC      |                        |      |          |      |      |      |
|           | Chilled cast iron                       | -                                     | 55HRC         |                        |      |          |      |      |      |

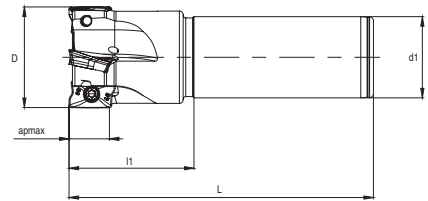
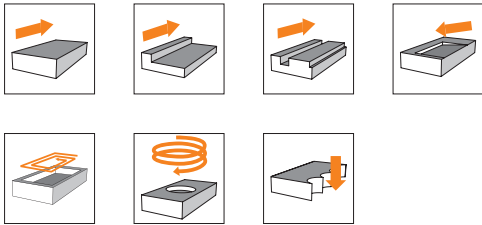
\*The recommended cutting conditions always refer to general conditions. These cutting conditions should be adjusted according to the practical machine rigidity, tools, workpiece clamping and coolants.  $f_z = \frac{h_m}{\sqrt{\frac{a_e}{D_c}}}$ , (calculate for  $\frac{a_e}{D_c} < 30\%$ )



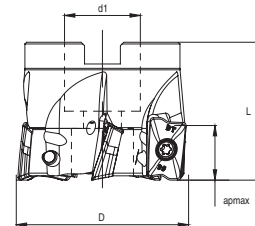
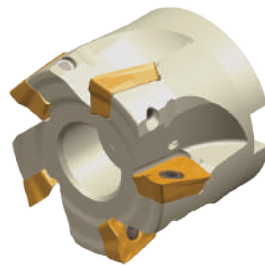
P248

Milling cutters

**ASM90-AP17-C**  
90° Shoulder milling cutter



| Product code                   | D  | d1 | L   | l1 | apmax | Internal coolant | Z | Inserts   |
|--------------------------------|----|----|-----|----|-------|------------------|---|-----------|
| ASM90-025-Z02-C25R-AP17-L100-C | 25 | 25 | 100 | 39 | 16    |                  | 2 | APKT 1705 |
| ASM90-032-Z03-C32R-AP17-L110-C | 32 | 32 | 110 | 40 | 16    |                  | 3 |           |
| ASM90-040-Z04-C32R-AP17-L120-C | 40 | 32 | 120 | 45 | 16    |                  | 4 |           |



| Product code              | D  | d1 | L  | l1 | apmax | Internal coolant | Z | Inserts   |
|---------------------------|----|----|----|----|-------|------------------|---|-----------|
| ASM90-050-Z05-A22R-AP17-C | 50 | 22 | 40 | -  | 16    |                  | 5 | APKT 1705 |
| ASM90-063-Z06-A22R-AP17-C | 63 | 22 | 40 | -  | 16    |                  | 6 |           |

| Dimension(mm)   | Spare parts               |             |        |
|-----------------|---------------------------|-------------|--------|
| Cutter diameter | Screw                     | Wrench      | Torque |
| φ25<br>φ32-63   | <br>SP040084<br>SP040100H | <br>DT-TP15 | 3.5Nm  |

Note: With internal coolant  
 Without internal coolant



| Product code    | Dimension(mm)           |                 | Grade  |        |        |        |        |        |        |
|-----------------|-------------------------|-----------------|--------|--------|--------|--------|--------|--------|--------|
|                 | Insert corner radius mm | Wiper length mm | AP301U | AC301P | AP351U | AP401U | AC301K | AP351K | AW100K |
| APKT 1705PER-DT | 0.8                     | 2.16            | ●      | ●      | ●      | ●      |        | ●      | ●      |
| APKT 170516R-DT | 1.6                     | 1.7             | ●      |        |        | ●      |        | ●      |        |
|                 |                         |                 |        |        |        |        |        |        |        |
|                 |                         |                 |        |        |        |        |        |        |        |
|                 |                         |                 |        |        |        |        |        |        |        |
|                 |                         |                 |        |        |        |        |        |        |        |
|                 |                         |                 |        |        |        |        |        |        |        |
|                 |                         |                 |        |        |        |        |        |        |        |
|                 |                         |                 |        |        |        |        |        |        |        |
|                 |                         |                 |        |        |        |        |        |        |        |
|                 |                         |                 |        |        |        |        |        |        |        |
|                 |                         |                 |        |        |        |        |        |        |        |
|                 |                         |                 |        |        |        |        |        |        |        |
|                 |                         |                 |        |        |        |        |        |        |        |
|                 |                         |                 |        |        |        |        |        |        |        |
|                 |                         |                 |        |        |        |        |        |        |        |

Marked: ● Stock available ○ Non-stocked standard

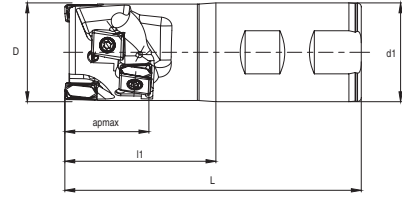
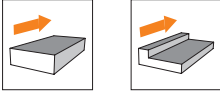
| Materials |   |                                       |               | Cutting depth and feed |          |      |       |      |       |      |       |
|-----------|---|---------------------------------------|---------------|------------------------|----------|------|-------|------|-------|------|-------|
| ISO       | Material classification                 | Tensile strength (N/mm <sup>2</sup> ) | Hardness (HB) | APKT..1705..           |          |      |       |      |       |      |       |
|           |   |                                       |               | ap                     | Geometry |      |       |      |       |      |       |
|           |   |                                       |               |                        | DT       |      |       |      |       |      |       |
|           |   |                                       |               |                        | fz       |      |       |      |       |      |       |
| (mm)      |   |                                       |               | min                    | max      | min  | max   |      |       |      |       |
| P         | Unalloyed steel                         | <600                                  | <180          | 0.20                   | 16.00    | 0.08 | 0.25  |      |       |      |       |
|           |   | <950                                  | <280          |                        |          |      |       |      |       |      |       |
|           | Alloyed steel                           | 700-950                               | 200-280       |                        |          |      |       | 0.06 | 0.22  |      |       |
|           |   | 950-1200                              | 280-355       |                        |          |      |       |      |       |      |       |
| M         | Duplex stainless steel                  | 778                                   | 230           |                        |          | 0.20 | 16.00 | 0.06 | 0.20  |      |       |
|           | Austenitic stainless steel              | 675                                   | 200           |                        |          |      |       |      |       |      |       |
|           | Precipitation-hardening stainless steel | 1013                                  | 300           |                        |          |      |       |      |       |      |       |
| K         | Grey cast iron                          | 700                                   | 220           |                        |          |      |       | 0.20 | 16.00 | 0.08 | 0.25  |
|           | Nodular cast iron                       | 880                                   | 260           |                        |          |      |       |      |       |      |       |
|           | Malleable cast iron                     | 800                                   | 250           |                        |          |      |       |      |       |      |       |
| S         | Fe-based alloy                          | 943                                   | 280           | 0.20                   | 16.00    |      |       |      |       | 0.06 | 0.18  |
|           | Co-based alloy                          | 1076                                  | 320           |                        |          |      |       |      |       |      |       |
|           | Ni-based alloy                          | 1177                                  | 350           |                        |          |      |       |      |       |      |       |
|           | Ti-alloy                                | 1262                                  | 370           |                        |          |      |       |      |       |      |       |
| N         | Aluminum                                | 260                                   | 75            |                        |          | 0.20 | 16.00 |      |       | 0.06 | 0.30  |
|           | Aluminum alloy                          | 447                                   | 130           |                        |          |      |       |      |       |      |       |
| H         | Hardened steel                          | -                                     | 50-60HRC      |                        |          |      |       |      |       | 0.20 | 16.00 |
|           | Chilled cast iron                       | -                                     | 55HRC         |                        |          |      |       |      |       |      |       |

\*The recommended cutting conditions always refer to general conditions. These cutting conditions should be adjusted according to the practical machine rigidity, tools, workpiece clamping and coolants.  $f_z = \frac{h_m}{\sqrt{\frac{a_e}{D_c}}}$ , (calculate for  $\frac{a_e}{D_c} < 30\%$ )

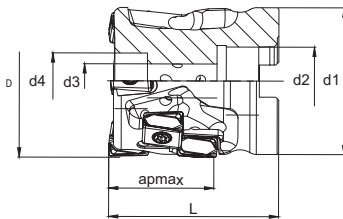


Milling cutters

**APE90-LN09**  
90° Procupine milling cutter

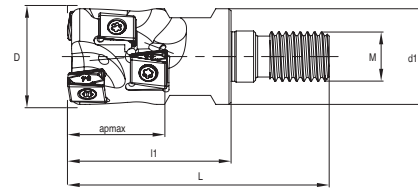


| Product code                    | D  | d1 | L   | L1 | d2 | d3 | d4 | apmax | Internal coolant | clamping screw | Z | row | Insert number | Inserts   |
|---------------------------------|----|----|-----|----|----|----|----|-------|------------------|----------------|---|-----|---------------|-----------|
| APE90-025-Z02-W25R-LN09-L32-F-C | 25 | 25 | 100 | 43 | -  | -  | -  | 32    |                  | -              | 2 | 4   | 8             | LNHU 0904 |
| APE90-032-Z02-W32R-LN09-L32-F-C | 32 | 32 | 105 | 44 | -  | -  | -  | 32    |                  | -              | 2 | 4   | 8             |           |
| APE90-032-Z02-W32R-LN09-L40-F-C | 32 | 32 | 110 | 50 | -  | -  | -  | 40    |                  | -              | 2 | 5   | 10            |           |
| APE90-040-Z03-W40R-LN09-L40-F-C | 40 | 40 | 125 | 55 | -  | -  | -  | 40    |                  | -              | 3 | 5   | 15            |           |
| APE90-040-Z03-W40R-LN09-L48-F-C | 40 | 40 | 130 | 59 | -  | -  | -  | 48    |                  | -              | 3 | 6   | 18            |           |



| Product code                    | D  | d1   | L  | L1 | d2 | d3 | d4 | apmax | Internal coolant | clamping screw | Z | row | Insert number | Inserts   |
|---------------------------------|----|------|----|----|----|----|----|-------|------------------|----------------|---|-----|---------------|-----------|
| APE90-040-Z03-A16R-LN09-L32-F-C | 40 | 38   | 55 | -  | 16 | 9  | 15 | 32    |                  | SH080400       | 3 | 4   | 12            | LNHU 0904 |
| APE90-040-Z03-A16R-LN09-L40-F-C | 40 | 38   | 65 | -  | 16 | 9  | 15 | 40    |                  | SH080500       | 3 | 5   | 15            |           |
| APE90-050-Z04-A22R-LN09-L48-F-C | 50 | 47.5 | 75 | -  | 22 | 11 | 18 | 48    |                  | SH100550       | 4 | 6   | 24            |           |

| clamping screw | Designation | screw type | clamping torque |
|----------------|-------------|------------|-----------------|
|                | SH080400    | M8*40      | 41Nm            |
|                | SH080500    | M8*50      | 41Nm            |
|                | SH100550    | M10*55     | 81Nm            |



| Product code                    | D  | d1   | L  | L1 | d2 | M  | d4 | apmax | Internal coolant | clamping screw | Z | row | Insert number | Inserts   |
|---------------------------------|----|------|----|----|----|----|----|-------|------------------|----------------|---|-----|---------------|-----------|
| APE90-025-Z02-M12R-LN09-L24-F-C | 25 | 23.4 | 64 | 40 | 12 | 12 | -  | 24    |                  | -              | 2 | 3   | 6             | LNHU 0904 |
| APE90-032-Z02-M16R-LN09-L24-F-C | 32 | 30   | 67 | 40 | 16 | 16 | -  | 24    |                  | -              | 2 | 3   | 6             |           |
| APE90-032-Z02-M16R-LN09-L32-F-C | 32 | 30   | 77 | 50 | 16 | 16 | -  | 32    |                  | -              | 2 | 4   | 8             |           |

Notice of inserts mounting:  
For APE90-LN09 series: end insert must use corner radius  $R \leq 0.8$ , all side inserts must use corner radius  $R = 0.4$  to have right cutting edge overlapping.

| Dimension(mm)   | Spare parts |          |         |        |
|-----------------|-------------|----------|---------|--------|
| Cutter diameter | wrench      | Screw    | wrench  | Torque |
| φ25-50          |             |          |         | 1.8Nm  |
|                 | AFW-15/24   | SP030083 | DT-TP09 |        |



Note: With internal coolant  
 Without internal coolant

| Product code      | Dimension(mm)           |                 | Grade  |        |        |        |        |        |        |
|-------------------|-------------------------|-----------------|--------|--------|--------|--------|--------|--------|--------|
|                   | Insert corner radius mm | Wiper length mm | AP301U | AC301P | AP351U | AP403M | AC301K | AP351K | AW100K |
| LNHU 090404ER-FM2 | 0.4                     | 1.85            |        |        |        |        |        |        | ●      |
| LNHU 090404ER-MM3 | 0.4                     | 1.85            |        |        | ●      | ●      |        |        |        |
| LNHU 090404ER-MR2 | 0.4                     | 1.85            | ●      |        | ●      | ●      | ●      | ●      |        |
| LNHU 090408ER-MR2 | 0.8                     | 1.3             | ●      |        | ●      | ●      | ●      | ●      |        |
| LNHU 090412ER-MR2 | 1.2                     | 1.0             | ●      |        |        | ●      | ●      |        |        |
| LNHU 090416ER-MR2 | 1.6                     | 0.65            | ●      |        |        | ●      | ●      |        |        |
| LNHU 090420ER-MR2 | 2.0                     | 0.65            | ●      |        |        | ●      | ●      |        |        |
| LNHU 0904PDER-W   | 0.4                     | 3.6             | ●      |        |        |        | ●      |        |        |
|                   |                         |                 |        |        |        |        |        |        |        |
|                   |                         |                 |        |        |        |        |        |        |        |
|                   |                         |                 |        |        |        |        |        |        |        |
|                   |                         |                 |        |        |        |        |        |        |        |

Marked: ● Stock available ○ Non-stocked standard

| Materials |   |                                       |               | Cutting depth and feed |          |      |      |      |      |      |      |   |   |
|-----------|---|---------------------------------------|---------------|------------------------|----------|------|------|------|------|------|------|---|---|
| ISO       | Material classification                 | Tensile strength (N/mm <sup>2</sup> ) | Hardness (HB) | LNHU..0904..           |          |      |      |      |      |      |      |   |   |
|           |   |                                       |               | ap                     | Geometry |      |      |      |      |      |      |   |   |
|           |   |                                       |               |                        | MM3      |      | MR2  |      | FM2  |      |      |   |   |
|           |   |                                       |               | fz                     |          |      |      |      |      |      |      |   |   |
| (mm)      |   |                                       |               |                        |          |      |      |      |      |      |      |   |   |
| min       |   | max                                   |               | min                    |          | max  |      | min  |      | max  |      |   |   |
| P         | Unalloyed steel                         | <600                                  | <180          | 0.20                   | 48.00    | 0.06 | 0.22 | 0.08 | 0.25 | -    | -    |   |   |
|           |   | <950                                  | <280          |                        |          |      |      |      |      |      |      |   |   |
|           | Alloyed steel                           | 700-950                               | 200-280       |                        |          | 0.05 | 0.18 | 0.06 | 0.20 | -    | -    |   |   |
|           |   | 950-1200                              | 280-355       |                        |          |      |      |      |      |      |      |   |   |
|           | 1200-1400                               | 355-415                               |               |                        |          |      |      |      |      |      |      |   |   |
| M         | Duplex stainless steel                  | 778                                   | 230           |                        |          |      |      | 0.05 | 0.18 | 0.06 | 0.18 | - | - |
|           | Austenitic stainless steel              | 675                                   | 200           |                        |          |      |      |      |      |      |      |   |   |
|           | Precipitation-hardening stainless steel | 1013                                  | 300           |                        |          |      |      |      |      |      |      |   |   |
| K         | Grey cast iron                          | 700                                   | 220           |                        |          |      |      | 0.05 | 0.22 | 0.08 | 0.25 | - | - |
|           | Nodular cast iron                       | 880                                   | 260           |                        |          |      |      |      |      |      |      |   |   |
|           | Malleable cast iron                     | 800                                   | 250           |                        |          |      |      |      |      |      |      |   |   |
| S         | Fe-based alloy                          | 943                                   | 280           |                        |          | 0.05 | 0.15 | -    | -    | -    | -    |   |   |
|           | Co-based alloy                          | 1076                                  | 320           |                        |          |      |      |      |      |      |      |   |   |
|           | Ni-based alloy                          | 1177                                  | 350           |                        |          |      |      |      |      |      |      |   |   |
|           | Ti-alloy                                | 1262                                  | 370           |                        |          |      |      |      |      |      |      |   |   |
| N         | Aluminum                                | 260                                   | 75            |                        |          | -    | -    | -    | -    | 0.06 | 0.25 |   |   |
|           | Aluminum alloy                          | 447                                   | 130           |                        |          |      |      |      |      |      |      |   |   |
| H         | Hardened steel                          | -                                     | 50-60HRC      |                        |          | -    | -    | 0.05 | 0.12 | -    | -    |   |   |
|           | Chilled cast iron                       | -                                     | 55HRC         |                        |          |      |      |      |      |      |      |   |   |

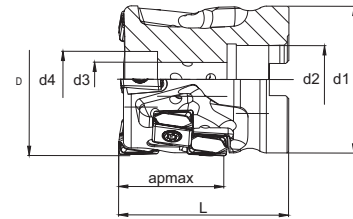
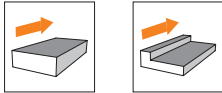
\*The recommended cutting conditions always refer to general conditions. These cutting conditions should be adjusted according to the practical machine rigidity, tools, workpiece clamping and coolants.  $f_z = \frac{h_m}{\sqrt{\frac{a_e}{D_c}}}$ , (calculate for  $\frac{a_e}{D_c} < 30\%$ )



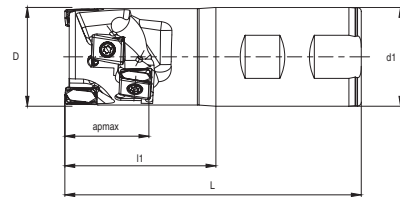
Milling cutters



**APE90-LN13**  
90° Porcupine milling cutter



| Product code                    | D  | d1   | L  | L1 | d2 | d3 | d4 | apmax | Internal coolant | Mounting bolts | Z | Row | Insert number | Inserts   |
|---------------------------------|----|------|----|----|----|----|----|-------|------------------|----------------|---|-----|---------------|-----------|
| APE90-040-Z02-A16R-LN13-L34-F-C | 40 | 39   | 55 | -  | 16 | 9  | 15 | 34    |                  | SH100400       | 2 | 3   | 6             | LNHU 1306 |
| APE90-040-Z02-A16R-LN13-L45-F-C | 40 | 39   | 65 | -  | 16 | 9  | 15 | 45    |                  | SH100450       | 2 | 4   | 8             |           |
| APE90-050-Z03-A22R-LN13-L34-F-C | 50 | 47.5 | 55 | -  | 22 | 11 | 18 | 34    |                  | SH100400       | 3 | 3   | 9             |           |
| APE90-050-Z03-A22R-LN13-L45-F-C | 50 | 47.5 | 65 | -  | 22 | 11 | 18 | 45    |                  | SH100450       | 3 | 4   | 12            |           |
| APE90-063-Z04-A27R-LN13-L56-F-C | 63 | 59.5 | 80 | -  | 27 | 14 | 20 | 56    |                  | SH120600       | 4 | 5   | 20            |           |
| APE90-063-Z04-A27R-LN13-L45-F-C | 63 | 59.5 | 70 | -  | 27 | 14 | 20 | 45    |                  | SH120500       | 4 | 4   | 16            |           |
| APE90-080-Z05-A32R-LN13-L56-F-C | 80 | 75.6 | 85 | -  | 32 | 18 | 26 | 56    |                  | SH160650       | 5 | 5   | 25            |           |



| Product code                    | D  | d1 | L   | L1 | d2 | d3 | d4 | apmax | Internal coolant | Z | Row | Insert number | Inserts   |
|---------------------------------|----|----|-----|----|----|----|----|-------|------------------|---|-----|---------------|-----------|
| APE90-040-Z02-W40R-LN13-L34-F-C | 40 | 40 | 120 | 54 | -  | -  | -  | 34    |                  | 2 | 3   | 6             | LNHU 1306 |
| APE90-040-Z02-W40R-LN13-L45-F-C | 40 | 40 | 135 | 64 | -  | -  | -  | 45    |                  | 2 | 4   | 8             |           |

Notice of inserts mounting:  
APE90-LN13 series: end insert must use corner radius Rs2.4, all side inserts must use corner radius R=0.8 to have right cutting edge overlapping

| Dimension(mm)   | Spare parts |         |        |
|-----------------|-------------|---------|--------|
| Cutter diameter | Screw       | Wrench  | Torque |
| φ40-80          |             |         | 3.5Nm  |
|                 | SP040115    | DT-TP15 |        |

| Mounting bolts | Model    | Bolt specification | Torque |
|----------------|----------|--------------------|--------|
|                | SH080400 | M8*40              | 41Nm   |
|                | SH080500 | M8*50              | 41Nm   |
|                | SH100550 | M10*55             | 81Nm   |
|                | SH100400 | M10*40             | 81Nm   |
|                | SH100450 | M10*45             | 81Nm   |
|                | SH120500 | M12*50             | 142Nm  |
|                | SH120600 | M12*60             | 142Nm  |
|                | SH160650 | M16*65             | 350Nm  |

Note: With internal coolant  
 Without internal coolant



| Product code      | Dimension(mm)           |                 | Grade  |        |        |        |        |        |        |
|-------------------|-------------------------|-----------------|--------|--------|--------|--------|--------|--------|--------|
|                   | Insert corner radius mm | Wiper length mm | AP301U | AC301P | AP351U | AP401U | AC301K | AP351K | AW100K |
| LNHU 130608ER-FM2 | 0.8                     | 2.7             |        |        |        |        |        |        | ●      |
| LNHU 130608ER-MM3 | 0.8                     | 2.7             |        |        |        | ●      |        |        |        |
| LNHU 130608ER-MR2 | 0.8                     | 2.7             | ●      | ●      | ●      | ●      | ●      | ●      |        |
| LNHU 130612ER-MR2 | 1.2                     | 2.3             |        |        | ●      | ●      | ●      |        |        |
| LNHU 130616ER-MR2 | 1.6                     | 1.9             |        |        | ●      | ●      | ●      |        |        |
| LNHU 130620ER-MR2 | 2.0                     | 1.5             |        |        | ●      | ●      |        |        |        |
| LNHU 130624ER-MR2 | 2.4                     | 1.0             |        |        | ●      | ●      |        |        |        |
| LNHU 130631ER-MR2 | 3.1                     | 0.4             |        |        | ●      | ●      | ●      |        |        |
| LNHU 1306PDER-W   | 0.8                     | 5.6             | ●      |        |        |        | ●      |        |        |

Marked: ● Stock available ○ Non-stocked standard

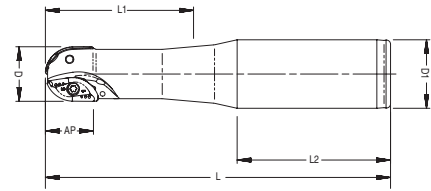
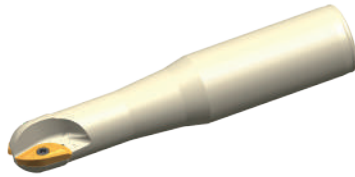
| Materials |   |                                       |               | Cutting depth and feed |          |      |      |      |      |     |   |  |
|-----------|---|---------------------------------------|---------------|------------------------|----------|------|------|------|------|-----|---|--|
| ISO       | Material classification                 | Tensile strength (N/mm <sup>2</sup> ) | Hardness (HB) | LNHU..1306..           |          |      |      |      |      |     |   |  |
|           |   |                                       |               | ap                     | Geometry |      |      |      |      |     |   |  |
|           |   |                                       |               |                        | MM3      |      | MR2  |      | FM2  |     |   |  |
|           |   |                                       |               |                        | fz       |      |      |      |      |     |   |  |
| (mm)      |   |                                       |               |                        |          |      |      |      |      |     |   |  |
| min       |   | max                                   |               | min                    |          | max  |      | min  |      | max |   |  |
| P         | Unalloyed steel                         | <600                                  | <180          | 0.20                   | 56       | 0.10 | 0.28 | 0.10 | 0.30 | -   | - |  |
|           |   | <950                                  | <280          |                        |          |      |      |      |      |     |   |  |
|           | Alloyed steel                           | 700-950                               | 200-280       |                        |          | 0.08 | 0.25 | 0.08 | 0.28 | -   | - |  |
|           |   | 950-1200                              | 280-355       |                        |          |      |      |      |      |     |   |  |
| M         | Duplex stainless steel                  | 778                                   | 230           |                        |          |      |      |      |      |     |   |  |
|           | Austenitic stainless steel              | 675                                   | 200           |                        |          | 0.08 | 0.22 | 0.08 | 0.25 | -   | - |  |
|           | Precipitation-hardening stainless steel | 1013                                  | 300           |                        |          |      |      |      |      |     |   |  |
| K         | Grey cast iron                          | 700                                   | 220           |                        |          |      |      |      |      |     |   |  |
|           | Nodular cast iron                       | 880                                   | 260           |                        |          | -    | -    | 0.10 | 0.32 | -   | - |  |
|           | Malleable cast iron                     | 800                                   | 250           |                        |          |      |      |      |      |     |   |  |
| S         | Fe-based alloy                          | 943                                   | 280           |                        |          |      |      |      |      |     |   |  |
|           | Co-based alloy                          | 1076                                  | 320           |                        |          |      |      |      |      |     |   |  |
|           | Ni-based alloy                          | 1177                                  | 350           | 0.08                   | 0.2      | -    | -    | -    | -    |     |   |  |
|           | Ti-alloy                                | 1262                                  | 370           |                        |          |      |      |      |      |     |   |  |
| N         | Aluminum                                | 260                                   | 75            |                        |          |      |      |      |      |     |   |  |
|           | Aluminum alloy                          | 447                                   | 130           | -                      | -        | -    | -    | 0.08 | 0.30 |     |   |  |
| H         | Hardened steel                          | -                                     | 50-60HRC      |                        |          |      |      |      |      |     |   |  |
|           | Chilled cast iron                       | -                                     | 55HRC         | -                      | -        | 0.06 | 0.15 | -    | -    |     |   |  |

\*The recommended cutting conditions always refer to general conditions. These cutting conditions should be adjusted according to the practical machine rigidity, tools, workpiece clamping and coolants.  $f_z = \frac{h_m}{\sqrt{\frac{a_e}{D_c}}}$ , (calculate for  $\frac{a_e}{D_c} < 30\%$ )

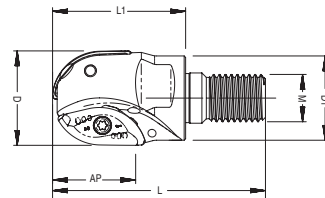


Milling cutters

**APM00-RP**  
Ballnose milling cutter



| Product code                    | D  | d1 | L   | l1 | l2  | apmax | Internal coolant | Z | Inserts       |
|---------------------------------|----|----|-----|----|-----|-------|------------------|---|---------------|
| APM00-016-Z02-C20R-RP080-L120-C | 16 | 20 | 120 | 50 | 70  | 14    |                  | 2 | RPM 080ER-MM4 |
| APM00-020-Z02-C25R-RP100-L126-C | 20 | 25 | 126 | 43 | 64  | 18    |                  | 2 | RPM 100ER-MM4 |
| APM00-020-Z02-C25R-RP100-L176-C | 20 | 25 | 176 | 43 | 106 | 18    |                  | 2 |               |



| Product code               | D  | d1 | L  | l1 | M  | apmax | M   | Internal coolant | Z | Inserts       |
|----------------------------|----|----|----|----|----|-------|-----|------------------|---|---------------|
| APM00-016-Z02-M10R-RP080-C | 16 | 18 | 49 | 28 | 10 | 14    | M10 |                  | 2 | RPM 080ER-MM4 |
| APM00-020-Z02-M10R-RP100-C | 20 | 18 | 51 | 30 | 10 | 18    | M10 |                  | 2 | RPM 100ER-MM4 |

| Dimension(mm) | Spare parts |             |         |        |
|---------------|-------------|-------------|---------|--------|
|               | Screw       | Wrench      | wrench  | Torque |
|               |             |             |         |        |
| φ16           | AFW-15      | SP02506450H | DT-TP08 | 1.2Nm  |
| φ20           | AFW-15      | SP030072H   | DT-TP09 | 2.0Nm  |

Note: With internal coolant  
 Without internal coolant



| Product code  | Dimension(mm)           |                 | Grade  |        |        |        |        |        |        |
|---------------|-------------------------|-----------------|--------|--------|--------|--------|--------|--------|--------|
|               | Insert corner radius mm | Wiper length mm | AP301U | AC301P | AP351U | AP401U | AP351M | AP351K | AP403S |
| RPM 080ER-MM4 | 8                       | -               | ●      |        |        | ●      | ●      |        | ●      |
| RPM 100ER-MM4 | 10                      | -               | ●      |        |        | ●      | ●      |        | ●      |
|               |                         |                 |        |        |        |        |        |        |        |
|               |                         |                 |        |        |        |        |        |        |        |
|               |                         |                 |        |        |        |        |        |        |        |
|               |                         |                 |        |        |        |        |        |        |        |
|               |                         |                 |        |        |        |        |        |        |        |
|               |                         |                 |        |        |        |        |        |        |        |
|               |                         |                 |        |        |        |        |        |        |        |
|               |                         |                 |        |        |        |        |        |        |        |
|               |                         |                 |        |        |        |        |        |        |        |
|               |                         |                 |        |        |        |        |        |        |        |
|               |                         |                 |        |        |        |        |        |        |        |
|               |                         |                 |        |        |        |        |        |        |        |
|               |                         |                 |        |        |        |        |        |        |        |
|               |                         |                 |        |        |        |        |        |        |        |
|               |                         |                 |        |        |        |        |        |        |        |
|               |                         |                 |        |        |        |        |        |        |        |
|               |                         |                 |        |        |        |        |        |        |        |
|               |                         |                 |        |        |        |        |        |        |        |

Marked: ● Stock available ○ Non-stocked standard

Milling cutters

| Materials |   |                                       |               | Cutting depth and feed |       |          |       |      |       |      |       |
|-----------|---|---------------------------------------|---------------|------------------------|-------|----------|-------|------|-------|------|-------|
| ISO       | Material classification                 | Tensile strength (N/mm <sup>2</sup> ) | Hardness (HB) | RPM....                |       |          |       |      |       |      |       |
|           |   |                                       |               | ap                     |       | Geometry |       |      |       |      |       |
|           |   |                                       |               |                        |       | MM4      |       |      |       |      |       |
|           |   |                                       |               | (mm)                   |       | fz       |       |      |       |      |       |
| min       | max                                     | min                                   | max           |                        |       |          |       |      |       |      |       |
| P         | Unalloyed steel                         | <600                                  | <180          | 0.20                   | 15.00 | 0.10     | 0.20  |      |       |      |       |
|           |   | <950                                  | <280          |                        |       |          |       |      |       |      |       |
|           | Alloyed steel                           | 700-950                               | 200-280       |                        |       |          |       | 0.10 | 0.18  |      |       |
|           |   | 950-1200                              | 280-355       |                        |       |          |       |      |       |      |       |
| M         | Duplex stainless steel                  | 778                                   | 230           |                        |       | 0.20     | 15.00 | 0.10 | 0.18  |      |       |
|           | Austenitic stainless steel              | 675                                   | 200           |                        |       |          |       |      |       |      |       |
|           | Precipitation-hardening stainless steel | 1013                                  | 300           |                        |       |          |       |      |       |      |       |
| K         | Grey cast iron                          | 700                                   | 220           |                        |       |          |       | 0.20 | 15.00 | -    | -     |
|           | Nodular cast iron                       | 880                                   | 260           |                        |       |          |       |      |       |      |       |
|           | Malleable cast iron                     | 800                                   | 250           |                        |       |          |       |      |       |      |       |
| S         | Fe-based alloy                          | 943                                   | 280           | 0.20                   | 15.00 |          |       |      |       | 0.06 | 0.12  |
|           | Co-based alloy                          | 1076                                  | 320           |                        |       |          |       |      |       |      |       |
|           | Ni-based alloy                          | 1177                                  | 350           |                        |       |          |       |      |       |      |       |
|           | Ti-alloy                                | 1262                                  | 370           |                        |       |          |       |      |       |      |       |
| N         | Aluminum                                | 260                                   | 75            |                        |       | 0.20     | 15.00 |      |       | -    | -     |
|           | Aluminum alloy                          | 447                                   | 130           |                        |       |          |       |      |       |      |       |
| H         | Hardened steel                          | -                                     | 50-60HRC      |                        |       |          |       |      |       | 0.20 | 15.00 |
|           | Chilled cast iron                       | -                                     | 55HRC         |                        |       |          |       |      |       |      |       |

\*The recommended cutting conditions always refer to general conditions. These cutting conditions should be adjusted according to the practical machine rigidity, tools, workpiece clamping and coolants.  $f_z = \frac{h_m}{\sqrt{\frac{a_e}{D_c}}}$ , (calculate for  $\frac{a_e}{D_c} < 30\%$ )



**APM00-RO08**  
Profile milling cutter



| Product code                   | D  | d1 | L   | l1 | apmax | Internal coolant | Z | Inserts |
|--------------------------------|----|----|-----|----|-------|------------------|---|---------|
| APM00-016-Z02-W16R-RO08-L100   | 16 | 16 | 100 | 76 | 4     |                  | 2 | RO 0803 |
| APM00-025-Z04-C25R-RO08-L116-C | 25 | 25 | 116 | 60 | 4     |                  | 4 |         |

| Dimension(mm)   | Spare parts |         |        |
|-----------------|-------------|---------|--------|
| Cutter diameter | Screw       | Wrench  | Torque |
| φ16-25          |             |         | 2.0Nm  |
|                 | SP030072H   | DT-TP09 |        |

Note: With internal coolant  
 Without internal coolant

| Product code            | Dimension(mm) |      | Grade  |        |        |        |        |        |        |
|-------------------------|---------------|------|--------|--------|--------|--------|--------|--------|--------|
|                         | IC            | S    | AP301U | AC301P | AP351U | AP401U | AP403M | AP351K | AP403S |
| <b>ROHT 0803M0E-MM3</b> | 8             | 3.18 |        |        |        |        | ●      |        | ●      |
|                         |               |      |        |        |        |        |        |        |        |
|                         |               |      |        |        |        |        |        |        |        |
|                         |               |      |        |        |        |        |        |        |        |
|                         |               |      |        |        |        |        |        |        |        |
|                         |               |      |        |        |        |        |        |        |        |
|                         |               |      |        |        |        |        |        |        |        |
|                         |               |      |        |        |        |        |        |        |        |
|                         |               |      |        |        |        |        |        |        |        |
|                         |               |      |        |        |        |        |        |        |        |
|                         |               |      |        |        |        |        |        |        |        |
|                         |               |      |        |        |        |        |        |        |        |
|                         |               |      |        |        |        |        |        |        |        |
|                         |               |      |        |        |        |        |        |        |        |
|                         |               |      |        |        |        |        |        |        |        |
|                         |               |      |        |        |        |        |        |        |        |
|                         |               |      |        |        |        |        |        |        |        |
|                         |               |      |        |        |        |        |        |        |        |
|                         |               |      |        |        |        |        |        |        |        |

Marked: ● Stock available ○ Non-stocked standard

| Materials    |   |                                       |               | Cutting depth and feed |          |      |      |      |      |     |     |     |     |      |      |      |      |
|--------------|---|---------------------------------------|---------------|------------------------|----------|------|------|------|------|-----|-----|-----|-----|------|------|------|------|
| ISO          | Material classification                 | Tensile strength (N/mm <sup>2</sup> ) | Hardness (HB) | ROHT..0803..           |          |      |      |      |      |     |     |     |     |      |      |      |      |
|              |   |                                       |               | ap                     | Geometry |      |      |      |      |     |     |     |     |      |      |      |      |
|              |   |                                       |               |                        | MM3      |      |      |      |      |     |     |     |     |      |      |      |      |
|              |   |                                       |               |                        | fz       |      |      |      |      |     |     |     |     |      |      |      |      |
| 0.1 < ap ≤ 1 |   | 0.1 < ap ≤ 4                          |               |                        |          |      |      |      |      |     |     |     |     |      |      |      |      |
| (mm)         |   |                                       |               |                        |          |      |      | min  | max  | min | max | min | max |      |      |      |      |
| P            | Unalloyed steel                         | <600                                  | <180          | 0.20                   | 4.00     | 0.15 | 0.50 | 0.08 | 0.30 |     |     |     |     |      |      |      |      |
|              |   | <950                                  | <280          |                        |          |      |      |      |      |     |     |     |     |      |      |      |      |
|              | Alloyed steel                           | 700-950                               | 200-280       |                        |          |      |      |      |      |     |     |     |     | 0.12 | 0.45 | 0.06 | 0.28 |
|              |   | 950-1200                              | 280-355       |                        |          |      |      |      |      |     |     |     |     |      |      |      |      |
| 1200-1400    |   | 355-415                               |               |                        |          |      |      |      |      |     |     |     |     |      |      |      |      |
| M            | Duplex stainless steel                  | 778                                   | 230           |                        |          | 0.10 | 0.40 | 0.06 | 0.25 |     |     |     |     |      |      |      |      |
|              | Austenitic stainless steel              | 675                                   | 200           |                        |          |      |      |      |      |     |     |     |     |      |      |      |      |
|              | Precipitation-hardening stainless steel | 1013                                  | 300           |                        |          |      |      |      |      |     |     |     |     |      |      |      |      |
| K            | Grey cast iron                          | 700                                   | 220           |                        |          |      |      |      |      |     |     |     |     |      |      |      |      |
|              | Nodular cast iron                       | 880                                   | 260           |                        |          |      |      |      |      |     |     |     |     |      |      |      |      |
|              | Malleable cast iron                     | 800                                   | 250           |                        |          |      |      |      |      |     |     |     |     |      |      |      |      |
| S            | Fe-based alloy                          | 943                                   | 280           | 0.10                   | 0.35     | 0.06 | 0.25 |      |      |     |     |     |     |      |      |      |      |
|              | Co-based alloy                          | 1076                                  | 320           |                        |          |      |      |      |      |     |     |     |     |      |      |      |      |
|              | Ni-based alloy                          | 1177                                  | 350           |                        |          |      |      |      |      |     |     |     |     |      |      |      |      |
|              | Ti-alloy                                | 1262                                  | 370           |                        |          |      |      |      |      |     |     |     |     |      |      |      |      |
| N            | Aluminum                                | 260                                   | 75            |                        |          |      |      |      |      |     |     |     |     |      |      |      |      |
|              | Aluminum alloy                          | 447                                   | 130           |                        |          |      |      |      |      |     |     |     |     |      |      |      |      |
| H            | Hardened steel                          | -                                     | 50-60HRC      |                        |          |      |      |      |      |     |     |     |     |      |      |      |      |
|              | Chilled cast iron                       | -                                     | 55HRC         |                        |          |      |      |      |      |     |     |     |     |      |      |      |      |

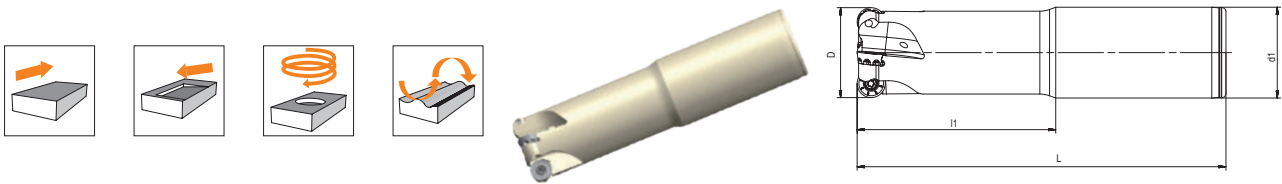
\*The recommended cutting conditions always refer to general conditions. These cutting conditions should be adjusted according to the practical machine rigidity, tools, workpiece clamping and coolants.  $f_z = \frac{h_m}{\sqrt{\frac{a_e}{D_c}}}$ , (calculate for  $\frac{a_e}{D_c} < 30\%$ )



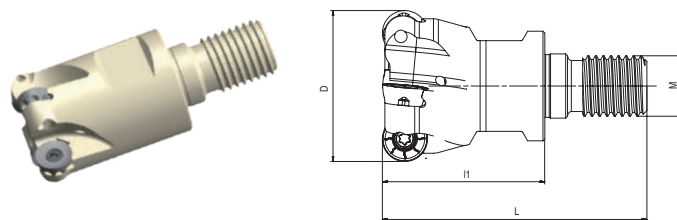
P248

Milling cutters

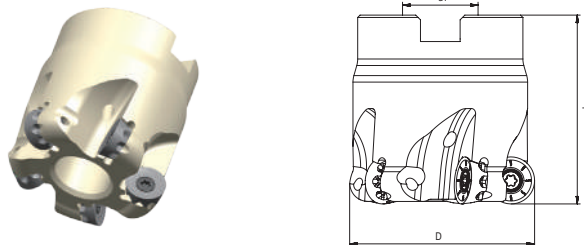
**APM00-RO10**  
Profile milling cutter



| Product code                   | D  | d1 | L   | l1 | apmax | Internal coolant | Z | Inserts |
|--------------------------------|----|----|-----|----|-------|------------------|---|---------|
| APM00-025-Z03-C25R-RO10-L225-C | 25 | 25 | 225 | 60 | 5     |                  | 3 | RO 10T3 |
| APM00-032-Z04-C32R-RO10-L130-C | 32 | 32 | 130 | 70 | 5     |                  | 4 |         |



| Product code              | D  | M   | L  | l1 | apmax | Internal coolant | Z | Inserts |
|---------------------------|----|-----|----|----|-------|------------------|---|---------|
| APM00-025-Z03-M12R-RO10-C | 25 | M12 | 59 | 35 | 5     |                  | 3 | RO 10T3 |
| APM00-032-Z04-M16R-RO10-C | 32 | M16 | 70 | 43 | 5     |                  | 4 |         |



| Product code              | D  | d1 | L  | l1 | apmax | Internal coolant | Z | Inserts |
|---------------------------|----|----|----|----|-------|------------------|---|---------|
| APM00-040-Z05-A16R-RO10-C | 40 | 16 | 40 | -  | 5     |                  | 5 | RO 10T3 |
| APM00-050-Z06-A22R-RO10-C | 50 | 22 | 40 | -  | 5     |                  | 6 |         |

| Dimension(mm)   | Spare parts |         |        |
|-----------------|-------------|---------|--------|
| Cutter diameter | Screw       | Wrench  | Torque |
| φ25-50          |             |         | 2.0Nm  |
|                 | SP030072H   | DT-TP09 |        |

Note: With internal coolant  
 Without internal coolant



| Product code     | Dimension(mm) |      | Grade  |        |        |        |        |        |        |
|------------------|---------------|------|--------|--------|--------|--------|--------|--------|--------|
|                  | IC            | S    | AP301U | AC301P | AP351U | AP401U | AP403M | AP351K | AP403S |
| ROHT 10T3M8E-MM3 | 10            | 3.97 |        |        |        |        | ●      |        | ●      |
| ROMT 10T3M4E-MR6 | 10            | 3.97 |        |        |        |        | ●      |        | ●      |
|                  |               |      |        |        |        |        |        |        |        |
|                  |               |      |        |        |        |        |        |        |        |
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|                  |               |      |        |        |        |        |        |        |        |
|                  |               |      |        |        |        |        |        |        |        |

Marked: ● Stock available ○ Non-stocked standard

Milling cutters

| Materials |   |                                       |               | Cutting depth and feed |              |                |              |      |      |      |      |      |      |   |
|-----------|---|---------------------------------------|---------------|------------------------|--------------|----------------|--------------|------|------|------|------|------|------|---|
| ISO       | Material classification                 | Tensile strength (N/mm <sup>2</sup> ) | Hardness (HB) | RO..10T3..             |              |                |              |      |      |      |      |      |      |   |
|           |   |                                       |               | ap                     | Geometry     |                |              |      |      |      |      |      |      |   |
|           |   |                                       |               |                        | MM3          |                | MR6          |      |      |      |      |      |      |   |
|           |   |                                       |               |                        | fz           |                |              |      |      |      |      |      |      |   |
|           |   |                                       |               | 0.1 < ap ≤ 1.2         | 1.2 < ap ≤ 5 | 0.1 < ap ≤ 1.2 | 1.2 < ap ≤ 5 |      |      |      |      |      |      |   |
|           |   |                                       |               | (mm)                   |              |                |              |      |      |      |      |      |      |   |
|           |   |                                       |               | min                    | max          | min            | max          | min  | max  | min  | max  | min  | max  |   |
| P         | Unalloyed steel                         | <600                                  | <180          | 0.20                   | 5.00         | 0.15           | 0.55         | 0.10 | 0.30 | 0.15 | 0.60 | 0.10 | 0.32 |   |
|           |   | <950                                  | <280          |                        |              | 0.12           | 0.50         | 0.08 | 0.28 | 0.12 | 0.55 | 0.08 | 0.30 |   |
|           | Alloyed steel                           | 700-950                               | 200-280       |                        |              | 0.10           | 0.45         | 0.08 | 0.25 | 0.10 | 0.50 | 0.08 | 0.28 |   |
|           |   | 950-1200                              | 280-355       |                        |              | -              | -            | -    | -    | -    | -    | -    | -    | - |
| M         | Duplex stainless steel                  | 778                                   | 230           |                        |              | -              | -            | -    | -    | -    | -    | -    | -    | - |
|           | Austenitic stainless steel              | 675                                   | 200           |                        |              | 0.10           | 0.40         | 0.08 | 0.25 | -    | -    | -    | -    | - |
|           | Precipitation-hardening stainless steel | 1013                                  | 300           |                        |              | -              | -            | -    | -    | -    | -    | -    | -    | - |
| K         | Grey cast iron                          | 700                                   | 220           |                        |              | -              | -            | -    | -    | -    | -    | -    | -    | - |
|           | Nodular cast iron                       | 880                                   | 260           |                        |              | -              | -            | -    | -    | -    | -    | -    | -    | - |
|           | Malleable cast iron                     | 800                                   | 250           |                        |              | -              | -            | -    | -    | -    | -    | -    | -    | - |
| S         | Fe-based alloy                          | 943                                   | 280           |                        |              | 0.10           | 0.40         | 0.08 | 0.25 | -    | -    | -    | -    | - |
|           | Co-based alloy                          | 1076                                  | 320           |                        |              | -              | -            | -    | -    | -    | -    | -    | -    | - |
|           | Ni-based alloy                          | 1177                                  | 350           | -                      | -            | -              | -            | -    | -    | -    | -    | -    |      |   |
|           | Ti-alloy                                | 1262                                  | 370           | -                      | -            | -              | -            | -    | -    | -    | -    | -    |      |   |
| N         | Aluminum                                | 260                                   | 75            | -                      | -            | -              | -            | -    | -    | -    | -    | -    |      |   |
|           | Aluminum alloy                          | 447                                   | 130           | -                      | -            | -              | -            | -    | -    | -    | -    | -    |      |   |
| H         | Hardened steel                          | -                                     | 50-60HRC      | -                      | -            | -              | -            | -    | -    | -    | -    | -    |      |   |
|           | Chilled cast iron                       | -                                     | 55HRC         | -                      | -            | -              | -            | -    | -    | -    | -    | -    |      |   |

\*The recommended cutting conditions always refer to general conditions. These cutting conditions should be adjusted according to the practical machine rigidity, tools, workpiece clamping and coolants.  $f_z = \frac{h_m}{\sqrt{\frac{a_e}{D_c}}}$ , (calculate for  $\frac{a_e}{D_c} < 30\%$ )

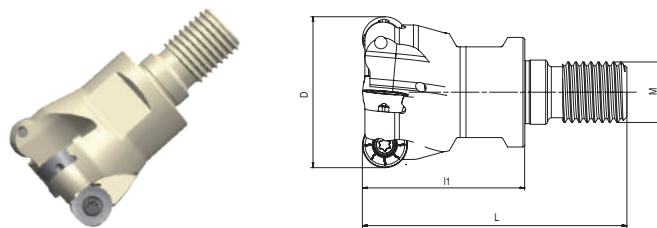




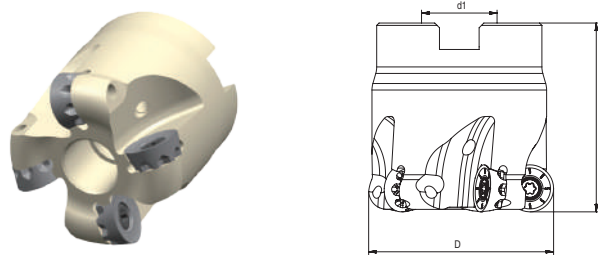
**APM00-RO12**  
Profile milling cutter



| Product code                   | D  | d1 | L   | l1 | apmax | Internal coolant | Z | Inserts |
|--------------------------------|----|----|-----|----|-------|------------------|---|---------|
| APM00-032-Z03-C32R-RO12-L120-C | 32 | 32 | 120 | 40 | 6     |                  | 3 | RO 1204 |



| Product code              | D  | M   | L  | l1 | apmax | Internal coolant | Z | Inserts |
|---------------------------|----|-----|----|----|-------|------------------|---|---------|
| APM00-040-Z04-M16R-RO12-C | 40 | M16 | 70 | 43 | 6     |                  | 4 | RO 1204 |



| Product code              | D  | d1 | L  | l1 | apmax | Internal coolant | Z | Inserts |
|---------------------------|----|----|----|----|-------|------------------|---|---------|
| APM00-040-Z04-A16R-RO12-C | 40 | 16 | 40 | -  | 6     |                  | 4 | RO 1204 |
| APM00-050-Z05-A22R-RO12-C | 50 | 22 | 40 | -  | 6     |                  | 5 |         |
| APM00-063-Z06-A22R-RO12-C | 63 | 22 | 40 | -  | 6     |                  | 6 |         |
| APM00-080-Z07-A27R-RO12-C | 80 | 27 | 50 | -  | 6     |                  | 7 |         |

| Dimension(mm)   | Spare parts |         |        |
|-----------------|-------------|---------|--------|
| Cutter diameter | Screw       | Wrench  | Torque |
| φ32-80          |             |         | 4.0Nm  |
|                 | SP040085H   | DT-TP10 |        |

Note: With internal coolant  
 Without internal coolant



| Product code     | Dimension(mm) |      | Grade  |        |        |        |        |        |        |
|------------------|---------------|------|--------|--------|--------|--------|--------|--------|--------|
|                  | IC            | S    | AP301U | AC301P | AP351U | AP401U | AP403M | AP351K | AP403S |
| ROHT 1204M4E-MM3 | 12            | 4.76 |        |        |        |        | ●      |        | ●      |
| ROHT 1204M6E-MM3 | 12            | 4.76 |        |        |        |        | ●      |        | ●      |
| ROMT 1204M6E-MR6 | 12            | 4.76 |        |        |        |        | ●      |        | ●      |
|                  |               |      |        |        |        |        |        |        |        |
|                  |               |      |        |        |        |        |        |        |        |
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|                  |               |      |        |        |        |        |        |        |        |
|                  |               |      |        |        |        |        |        |        |        |

Marked: ● Stock available ○ Non-stocked standard

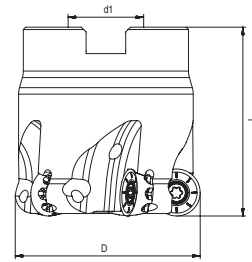
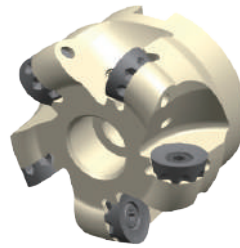
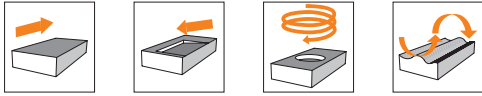
| Materials |   |                                       |               | Cutting depth and feed |                |      |              |      |                |      |              |      |      |     |  |
|-----------|---|---------------------------------------|---------------|------------------------|----------------|------|--------------|------|----------------|------|--------------|------|------|-----|--|
| ISO       | Material classification                 | Tensile strength (N/mm <sup>2</sup> ) | Hardness (HB) | RO..1204..             |                |      |              |      |                |      |              |      |      |     |  |
|           |   |                                       |               | ap                     | Geometry       |      |              |      |                |      |              |      | MR6  |     |  |
|           |   |                                       |               |                        | MM3            |      |              |      | MR6            |      |              |      |      |     |  |
|           |   |                                       |               |                        | fz             |      |              |      |                |      |              |      |      |     |  |
|           |   |                                       |               |                        | 0.1 < ap ≤ 1.5 |      | 1.5 < ap ≤ 6 |      | 0.1 < ap ≤ 1.5 |      | 1.5 < ap ≤ 6 |      |      |     |  |
| (mm)      |   |                                       |               |                        |                |      |              |      |                |      |              |      |      |     |  |
| min       |   | max                                   |               | min                    |                | max  |              | min  |                | max  |              | min  |      | max |  |
| P         | Unalloyed steel                         | <600                                  | <180          | 0.20                   | 6.00           | 0.18 | 0.60         | 0.12 | 0.32           | 0.18 | 0.65         | 0.12 | 0.35 |     |  |
|           |   | <950                                  | <280          |                        |                | 0.15 | 0.55         | 0.10 | 0.30           | 0.15 | 0.60         | 0.10 | 0.32 |     |  |
|           | Alloyed steel                           | 700-950                               | 200-280       |                        |                | 0.12 | 0.50         | 0.10 | 0.28           | 0.12 | 0.55         | 0.10 | 0.30 |     |  |
|           |   | 950-1200                              | 280-355       |                        |                | -    | -            | -    | -              | -    | -            | -    | -    | -   |  |
| 1200-1400 | 355-415                                 | -                                     | -             |                        |                | -    | -            | -    | -              | -    | -            | -    |      |     |  |
| M         | Duplex stainless steel                  | 778                                   | 230           |                        |                | -    | -            | -    | -              | -    | -            | -    | -    | -   |  |
|           | Austenitic stainless steel              | 675                                   | 200           |                        |                | -    | -            | -    | -              | -    | -            | -    | -    | -   |  |
|           | Precipitation-hardening stainless steel | 1013                                  | 300           |                        |                | -    | -            | -    | -              | -    | -            | -    | -    | -   |  |
| K         | Grey cast iron                          | 700                                   | 220           |                        |                | -    | -            | -    | -              | -    | -            | -    | -    | -   |  |
|           | Nodular cast iron                       | 880                                   | 260           |                        |                | -    | -            | -    | -              | -    | -            | -    | -    | -   |  |
|           | Malleable cast iron                     | 800                                   | 250           |                        |                | -    | -            | -    | -              | -    | -            | -    | -    | -   |  |
| S         | Fe-based alloy                          | 943                                   | 280           |                        |                | 0.12 | 0.45         | 0.10 | 0.28           | -    | -            | -    | -    | -   |  |
|           | Co-based alloy                          | 1076                                  | 320           | -                      | -              | -    | -            | -    | -              | -    | -            | -    |      |     |  |
|           | Ni-based alloy                          | 1177                                  | 350           | -                      | -              | -    | -            | -    | -              | -    | -            | -    |      |     |  |
|           | Ti-alloy                                | 1262                                  | 370           | -                      | -              | -    | -            | -    | -              | -    | -            | -    |      |     |  |
| N         | Aluminum                                | 260                                   | 75            | -                      | -              | -    | -            | -    | -              | -    | -            | -    |      |     |  |
|           | Aluminum alloy                          | 447                                   | 130           | -                      | -              | -    | -            | -    | -              | -    | -            | -    |      |     |  |
| H         | Hardened steel                          | -                                     | 50-60HRC      | -                      | -              | -    | -            | -    | -              | -    | -            | -    |      |     |  |
|           | Chilled cast iron                       | -                                     | 55HRC         | -                      | -              | -    | -            | -    | -              | -    | -            | -    |      |     |  |

\*The recommended cutting conditions always refer to general conditions. These cutting conditions should be adjusted according to the practical machine rigidity, tools, workpiece clamping and coolants.  $f_z = \frac{h_m}{\sqrt{\frac{a_e}{D_c}}}$ , (calculate for  $\frac{a_e}{D_c} < 30\%$ )



Milling cutters

**APM00-RO16**  
Profile milling cutter



| Product code              | D   | d1 | L  | l1 | apmax | Internal coolant | Z | Inserts |
|---------------------------|-----|----|----|----|-------|------------------|---|---------|
| APM00-063-Z05-A22R-RO16-C | 63  | 22 | 40 | -  | 8     |                  | 5 | RO 1605 |
| APM00-080-Z06-A27R-RO16-C | 80  | 27 | 50 | -  | 8     |                  | 6 |         |
| APM00-100-Z07-A32R-RO16-C | 100 | 32 | 50 | -  | 8     |                  | 7 |         |

| Dimension(mm) | Spare parts |         |        |
|---------------|-------------|---------|--------|
|               | Screw       | Wrench  | Torque |
| φ63-100       |             |         | 5.0Nm  |
|               | SP050120    | DT-TP20 |        |

Note: With internal coolant  
 Without internal coolant



| Product code     | Dimension(mm) |      | Grade  |        |        |        |        |        |        |
|------------------|---------------|------|--------|--------|--------|--------|--------|--------|--------|
|                  | IC            | S    | AP301U | AC301P | AP351U | AP401U | AP403M | AP351K | AP403S |
| ROHT 1605M8E-MM3 | 16            | 5.56 |        |        |        |        | ●      |        | ●      |
| ROMT 1605M6E-MR6 | 16            | 5.56 |        |        |        |        | ●      |        | ●      |
|                  |               |      |        |        |        |        |        |        |        |
|                  |               |      |        |        |        |        |        |        |        |
|                  |               |      |        |        |        |        |        |        |        |
|                  |               |      |        |        |        |        |        |        |        |
|                  |               |      |        |        |        |        |        |        |        |
|                  |               |      |        |        |        |        |        |        |        |
|                  |               |      |        |        |        |        |        |        |        |
|                  |               |      |        |        |        |        |        |        |        |
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|                  |               |      |        |        |        |        |        |        |        |
|                  |               |      |        |        |        |        |        |        |        |

Marked: ● Stock available ○ Non-stocked standard

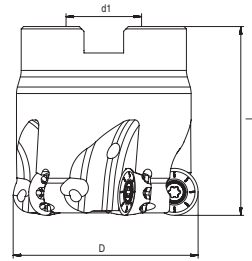
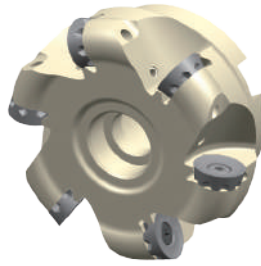
| Materials |   |                                       |               | Cutting depth and feed |                |      |              |      |                |      |              |      |      |   |
|-----------|---|---------------------------------------|---------------|------------------------|----------------|------|--------------|------|----------------|------|--------------|------|------|---|
| ISO       | Material classification                 | Tensile strength (N/mm <sup>2</sup> ) | Hardness (HB) | RO..1605..             |                |      |              |      |                |      |              |      |      |   |
|           |   |                                       |               | ap                     | Geometry       |      |              |      |                |      |              |      |      |   |
|           |   |                                       |               |                        | MM3            |      |              |      | MR6            |      |              |      |      |   |
|           |   |                                       |               |                        | fz             |      |              |      |                |      |              |      |      |   |
|           |   |                                       |               |                        | 0.1 < ap ≤ 1.5 |      | 1.5 < ap ≤ 8 |      | 0.1 < ap ≤ 1.5 |      | 1.5 < ap ≤ 8 |      |      |   |
| (mm)      |   |                                       |               |                        |                |      |              |      |                |      |              |      |      |   |
| min       |   | max                                   |               | min                    |                | max  |              | min  |                | max  |              |      |      |   |
| P         | Unalloyed steel                         | <600                                  | <180          | 0.20                   | 8.00           | 0.20 | 0.65         | 0.12 | 0.35           | 0.20 | 0.68         | 0.12 | 0.38 |   |
|           |   | <950                                  | <280          |                        |                | 0.18 | 0.60         | 0.10 | 0.32           | 0.18 | 0.65         | 0.10 | 0.35 |   |
|           | Alloyed steel                           | 700-950                               | 200-280       |                        |                | 0.15 | 0.55         | 0.10 | 0.30           | 0.15 | 0.58         | 0.10 | 0.32 |   |
|           |   | 950-1200                              | 280-355       |                        |                | -    | -            | -    | -              | -    | -            | -    | -    | - |
| M         | Duplex stainless steel                  | 778                                   | 230           |                        |                | 0.15 | 0.50         | 0.10 | 0.30           | -    | -            | -    | -    |   |
|           | Austenitic stainless steel              | 675                                   | 200           |                        |                | -    | -            | -    | -              | -    | -            | -    | -    |   |
|           | Precipitation-hardening stainless steel | 1013                                  | 300           |                        |                | -    | -            | -    | -              | -    | -            | -    | -    |   |
| K         | Grey cast iron                          | 700                                   | 220           |                        |                | -    | -            | -    | -              | -    | -            | -    | -    |   |
|           | Nodular cast iron                       | 880                                   | 260           |                        |                | -    | -            | -    | -              | -    | -            | -    | -    |   |
|           | Malleable cast iron                     | 800                                   | 250           |                        |                | -    | -            | -    | -              | -    | -            | -    | -    |   |
| S         | Fe-based alloy                          | 943                                   | 280           | 0.15                   | 0.50           | 0.10 | 0.30         | -    | -              | -    | -            |      |      |   |
|           | Co-based alloy                          | 1076                                  | 320           | -                      | -              | -    | -            | -    | -              | -    | -            |      |      |   |
|           | Ni-based alloy                          | 1177                                  | 350           | -                      | -              | -    | -            | -    | -              | -    | -            |      |      |   |
|           | Ti-alloy                                | 1262                                  | 370           | -                      | -              | -    | -            | -    | -              | -    | -            |      |      |   |
| N         | Aluminum                                | 260                                   | 75            | -                      | -              | -    | -            | -    | -              | -    | -            |      |      |   |
|           | Aluminum alloy                          | 447                                   | 130           | -                      | -              | -    | -            | -    | -              | -    | -            |      |      |   |
| H         | Hardened steel                          | -                                     | 50-60HRC      | -                      | -              | -    | -            | -    | -              | -    | -            |      |      |   |
|           | Chilled cast iron                       | -                                     | 55HRC         | -                      | -              | -    | -            | -    | -              | -    | -            |      |      |   |

\*The recommended cutting conditions always refer to general conditions. These cutting conditions should be adjusted according to the practical machine rigidity, tools, workpiece clamping and coolants.  $f_z = \frac{h_m}{\sqrt{\frac{a_e}{D_c}}}$ , (calculate for  $\frac{a_e}{D_c} < 30\%$ )



Milling cutters

**APM00-RO20**  
Profile milling cutter



| Product code              | D   | d1 | L  | l1 | apmax | Internal coolant | Z | Inserts |
|---------------------------|-----|----|----|----|-------|------------------|---|---------|
| APM00-100-Z06-A32R-RO20-C | 100 | 32 | 50 | -  | 10    |                  | 6 | RO 2006 |
| APM00-125-Z07-A40R-RO20-C | 125 | 40 | 63 | -  | 10    |                  | 7 |         |
| APM00-160-Z08-A40R-RO20   | 160 | 40 | 6  | -  | 10    |                  | 8 |         |

| Dimension(mm) | Spare parts |         |        |
|---------------|-------------|---------|--------|
|               | Screw       | Wrench  | Torque |
| φ100-160      |             |         | 7.0Nm  |
|               | SP060121    | DT-TP25 |        |

Note: With internal coolant  
 Without internal coolant



| Product code     | Dimension(mm) |      | Grade  |        |        |        |        |        |        |
|------------------|---------------|------|--------|--------|--------|--------|--------|--------|--------|
|                  | IC            | S    | AP301U | AC301P | AP351U | AP401U | AP403M | AP351K | AP403S |
| ROHT 2006M8E-MM3 | 20            | 6.35 |        |        |        |        | ●      |        | ●      |
| ROMT 2006M8E-MR6 | 20            | 6.35 |        |        |        |        | ●      |        | ●      |
|                  |               |      |        |        |        |        |        |        |        |
|                  |               |      |        |        |        |        |        |        |        |
|                  |               |      |        |        |        |        |        |        |        |
|                  |               |      |        |        |        |        |        |        |        |
|                  |               |      |        |        |        |        |        |        |        |
|                  |               |      |        |        |        |        |        |        |        |
|                  |               |      |        |        |        |        |        |        |        |
|                  |               |      |        |        |        |        |        |        |        |
|                  |               |      |        |        |        |        |        |        |        |
|                  |               |      |        |        |        |        |        |        |        |
|                  |               |      |        |        |        |        |        |        |        |
|                  |               |      |        |        |        |        |        |        |        |
|                  |               |      |        |        |        |        |        |        |        |
|                  |               |      |        |        |        |        |        |        |        |
|                  |               |      |        |        |        |        |        |        |        |
|                  |               |      |        |        |        |        |        |        |        |
|                  |               |      |        |        |        |        |        |        |        |
|                  |               |      |        |        |        |        |        |        |        |

Marked: ● Stock available ○ Non-stocked standard

| Materials |   |                                       |               | Cutting depth and feed |                |      |               |      |                |      |               |      |      |     |  |
|-----------|---|---------------------------------------|---------------|------------------------|----------------|------|---------------|------|----------------|------|---------------|------|------|-----|--|
| ISO       | Material classification                 | Tensile strength (N/mm <sup>2</sup> ) | Hardness (HB) | RO..2006..             |                |      |               |      |                |      |               |      |      |     |  |
|           |   |                                       |               | ap                     | Geometry       |      |               |      |                |      |               |      |      |     |  |
|           |   |                                       |               |                        | MM3            |      |               |      | MR6            |      |               |      |      |     |  |
|           |   |                                       |               |                        | fz             |      |               |      |                |      |               |      |      |     |  |
|           |   |                                       |               |                        | 0.1 < ap ≤ 2.5 |      | 2.5 < ap ≤ 10 |      | 0.1 < ap ≤ 2.5 |      | 2.5 < ap ≤ 10 |      |      |     |  |
| (mm)      |   |                                       |               |                        |                |      |               |      |                |      |               |      |      |     |  |
| min       |   | max                                   |               | min                    |                | max  |               | min  |                | max  |               | min  |      | max |  |
| P         | Unalloyed steel                         | <600                                  | <180          | 0.20                   | 10.00          | 0.20 | 0.70          | 0.15 | 0.38           | 0.20 | 0.80          | 0.15 | 0.40 |     |  |
|           |   | <950                                  | <280          |                        |                | 0.18 | 0.65          | 0.12 | 0.35           | 0.18 | 0.70          | 0.12 | 0.38 |     |  |
|           | Alloyed steel                           | 700-950                               | 200-280       |                        |                | 0.15 | 0.60          | 0.12 | 0.32           | 0.15 | 0.65          | 0.12 | 0.35 |     |  |
|           |   | 950-1200                              | 280-355       |                        |                | -    | -             | -    | -              | -    | -             | -    | -    | -   |  |
| 1200-1400 | 355-415                                 | 0.15                                  | 0.55          |                        |                | 0.12 | 0.32          | -    | -              | -    | -             | -    | -    |     |  |
| M         | Duplex stainless steel                  | 778                                   | 230           |                        |                | -    | -             | -    | -              | -    | -             | -    | -    | -   |  |
|           | Austenitic stainless steel              | 675                                   | 200           |                        |                | -    | -             | -    | -              | -    | -             | -    | -    | -   |  |
|           | Precipitation-hardening stainless steel | 1013                                  | 300           |                        |                | -    | -             | -    | -              | -    | -             | -    | -    | -   |  |
| K         | Grey cast iron                          | 700                                   | 220           |                        |                | -    | -             | -    | -              | -    | -             | -    | -    | -   |  |
|           | Nodular cast iron                       | 880                                   | 260           |                        |                | -    | -             | -    | -              | -    | -             | -    | -    | -   |  |
|           | Malleable cast iron                     | 800                                   | 250           | -                      | -              | -    | -             | -    | -              | -    | -             | -    |      |     |  |
| S         | Fe-based alloy                          | 943                                   | 280           | -                      | -              | -    | -             | -    | -              | -    | -             | -    |      |     |  |
|           | Co-based alloy                          | 1076                                  | 320           | -                      | -              | -    | -             | -    | -              | -    | -             | -    |      |     |  |
|           | Ni-based alloy                          | 1177                                  | 350           | -                      | -              | -    | -             | -    | -              | -    | -             | -    |      |     |  |
|           | Ti-alloy                                | 1262                                  | 370           | -                      | -              | -    | -             | -    | -              | -    | -             | -    |      |     |  |
| N         | Aluminum                                | 260                                   | 75            | -                      | -              | -    | -             | -    | -              | -    | -             | -    |      |     |  |
|           | Aluminum alloy                          | 447                                   | 130           | -                      | -              | -    | -             | -    | -              | -    | -             | -    |      |     |  |
| H         | Hardened steel                          | -                                     | 50-60HRC      | -                      | -              | -    | -             | -    | -              | -    | -             | -    |      |     |  |
|           | Chilled cast iron                       | -                                     | 55HRC         | -                      | -              | -    | -             | -    | -              | -    | -             | -    |      |     |  |

\*The recommended cutting conditions always refer to general conditions. These cutting conditions should be adjusted according to the practical machine rigidity, tools, workpiece clamping and coolants.  $f_z = \frac{h_m}{\sqrt{\frac{a_e}{D_c}}}$ , (calculate for  $\frac{a_e}{D_c} < 30\%$ )

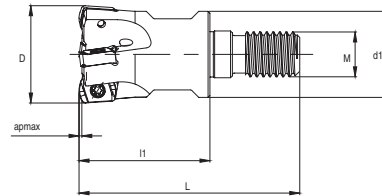
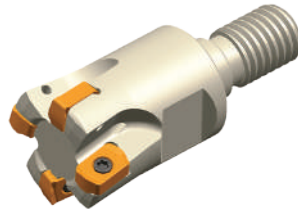
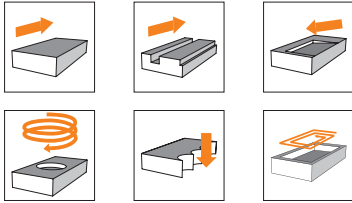


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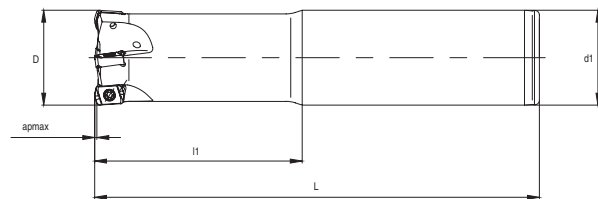
Milling cutters

**AHM20-LN06**

**20° Approach angle high feed milling cutter**



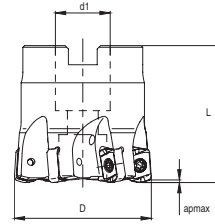
| Product code              | D  | d1   | L  | L1 | M   | apmax | Internal coolant | Z | Inserts  |
|---------------------------|----|------|----|----|-----|-------|------------------|---|----------|
| AHM20-016-Z02-M08R-LN06-C | 16 | 14.5 | 42 | 25 | M8  | 0.8   |                  | 2 | LN..0604 |
| AHM20-017-Z02-M08R-LN06-C | 17 | 14.5 | 42 | 25 | M8  | 0.8   |                  | 2 |          |
| AHM20-020-Z03-M10R-LN06-C | 20 | 18   | 51 | 30 | M10 | 0.8   |                  | 3 |          |
| AHM20-021-Z03-M10R-LN06-C | 21 | 18   | 51 | 30 | M10 | 0.8   |                  | 3 |          |
| AHM20-025-Z04-M12R-LN06-C | 25 | 23   | 59 | 35 | M12 | 0.8   |                  | 4 |          |
| AHM20-026-Z03-M12R-LN06-C | 26 | 23   | 59 | 35 | M12 | 0.8   |                  | 3 |          |
| AHM20-026-Z04-M12R-LN06-C | 26 | 23   | 59 | 35 | M12 | 0.8   |                  | 4 |          |
| AHM20-032-Z04-M16R-LN06-C | 32 | 29   | 70 | 43 | M16 | 0.8   |                  | 4 |          |
| AHM20-032-Z05-M16R-LN06-C | 32 | 29   | 70 | 43 | M16 | 0.8   |                  | 5 |          |
| AHM20-033-Z05-M16R-LN06-C | 33 | 29   | 70 | 43 | M16 | 0.8   |                  | 5 |          |
| AHM20-035-Z05-M16R-LN06-C | 35 | 29   | 70 | 43 | M16 | 0.8   |                  | 5 |          |
| AHM20-040-Z06-M16R-LN06-C | 40 | 29   | 70 | 43 | M16 | 0.8   |                  | 6 |          |



| Product code                   | D  | d1 | L   | L1 | d2 | apmax | Internal coolant | Z | Inserts  |
|--------------------------------|----|----|-----|----|----|-------|------------------|---|----------|
| AHM20-016-Z02-C16R-LN06-L100-C | 16 | 16 | 100 | 30 | -  | 0.8   |                  | 2 | LN..0604 |
| AHM20-017-Z02-C16R-LN06-L150-C | 17 | 16 | 150 | 25 | -  | 0.8   |                  | 2 |          |
| AHM20-020-Z03-C20R-LN06-L130-C | 20 | 20 | 130 | 50 | -  | 0.8   |                  | 3 |          |
| AHM20-021-Z03-C20R-LN06-L160-C | 21 | 20 | 160 | 30 | -  | 0.8   |                  | 3 |          |
| AHM20-025-Z03-C25R-LN06-L140-C | 25 | 25 | 140 | 60 | -  | 0.8   |                  | 3 |          |
| AHM20-026-Z03-C25R-LN06-L180-C | 26 | 25 | 180 | 35 | -  | 0.8   |                  | 3 |          |
| AHM20-032-Z04-C32R-LN06-L150-C | 32 | 32 | 150 | 70 | -  | 0.8   |                  | 4 |          |
| AHM20-033-Z04-C32R-LN06-L200-C | 33 | 32 | 200 | 35 | -  | 0.8   |                  | 4 |          |
| AHM20-035-Z05-C32R-LN06-L200-C | 35 | 32 | 200 | 35 | -  | 0.8   |                  | 5 |          |

Note: With internal coolant  
 Without internal coolant





| Product code              | D  | d1 | L  | L1 | d2 | apmax | Internal coolant | Z | Inserts  |
|---------------------------|----|----|----|----|----|-------|------------------|---|----------|
| AHM20-040-Z06-A16R-LN06-C | 40 | 16 | 40 | -  | -  | 0.8   |                  | 6 | LN..0604 |
| AHM20-050-Z07-A22R-LN06-C | 50 | 22 | 40 | -  | -  | 0.8   |                  | 7 |          |
| AHM20-052-Z07-A22R-LN06-C | 52 | 22 | 40 | -  | -  | 0.8   |                  | 7 |          |
| AHM20-063-Z08-A22R-LN06-C | 63 | 22 | 40 | -  | -  | 0.8   |                  | 8 |          |

| Dimension(mm)   | Spare parts |         |        |
|-----------------|-------------|---------|--------|
| Cutter diameter | Screw       | Wrench  | Torque |
| φ16-63          |             |         | 1.0Nm  |
|                 | SP02506450H | DT-TP08 |        |

| Product code     | Dimension(mm)           |                 | Grades |        |        |        |        |        |        |        |        |        |
|------------------|-------------------------|-----------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
|                  | Insert corner radius mm | Wiper length mm | AC301P | AP301U | AP351U | AP401U | AP403M | AC301K | AP351K | AW100K | AP403S | AP151H |
| LNMX 060410R-MM3 | 1.0                     | -               |        | ●      | ●      |        | ●      |        |        |        | ●      |        |
| LNMX 060410R-MM4 | 1.0                     | -               |        | ●      | ●      |        | ●      |        |        |        | ●      | ●      |

Marked: ● Stock available ○ Non-stocked standard

| Materials |   |                                       |               | Cutting depth and feed |      |      |                  |      |   |      |      |      |      |      |      |
|-----------|---|---------------------------------------|---------------|------------------------|------|------|------------------|------|---|------|------|------|------|------|------|
| ISO       | Material classification                 | Tensile strength (N/mm <sup>2</sup> ) | Hardness (HB) | LNMX..0604..           |      |      |                  |      |   |      |      |      |      |      |      |
|           |   |                                       |               | High feed Milling      |      |      | Plunging Milling |      |   |      |      |      |      |      |      |
|           |   |                                       |               | ap                     |      | fz   |                  | ae   |   | fz   |      |      |      |      |      |
|           |   |                                       |               | (mm)                   |      |      |                  |      |   |      |      |      |      |      |      |
| min       |   | max                                   |               | min                    |      | max  |                  | min  |   | max  |      |      |      |      |      |
| P         | Unalloyed steel                         | <600                                  | <180          | 0.30                   | 0.8  | 0.30 | 1.00             | 0.50 | 4 | 0.08 | 0.15 |      |      |      |      |
|           |   | <950                                  | <280          |                        |      |      |                  |      |   |      |      |      |      |      |      |
|           | Alloyed steel                           | 700-950                               | 200-280       |                        |      |      |                  |      |   |      |      | 0.30 | 1.00 | 0.06 | 0.12 |
|           |   | 950-1200                              | 280-355       |                        |      |      |                  |      |   |      |      |      |      |      |      |
| M         | Duplex stainless steel                  | 778                                   | 230           |                        |      | 0.25 | 0.80             |      |   | 0.06 | 0.12 |      |      |      |      |
|           | Austenitic stainless steel              | 675                                   | 200           |                        |      |      |                  |      |   |      |      |      |      |      |      |
|           | Precipitation-hardening stainless steel | 1013                                  | 300           |                        |      |      |                  |      |   |      |      |      |      |      |      |
| K         | Grey cast iron                          | 700                                   | 220           |                        |      | 0.30 | 1.00             |      |   | 0.08 | 0.15 |      |      |      |      |
|           | Nodular cast iron                       | 880                                   | 260           |                        |      |      |                  |      |   |      |      |      |      |      |      |
|           | Malleable cast iron                     | 800                                   | 250           |                        |      |      |                  |      |   |      |      |      |      |      |      |
| S         | Fe-based alloy                          | 943                                   | 280           | 0.25                   | 0.60 | 0.06 | 0.10             |      |   |      |      |      |      |      |      |
|           | Co-based alloy                          | 1076                                  | 320           |                        |      |      |                  |      |   |      |      |      |      |      |      |
|           | Ni-based alloy                          | 1177                                  | 350           |                        |      |      |                  |      |   |      |      |      |      |      |      |
|           | Ti-alloy                                | 1262                                  | 370           |                        |      |      |                  |      |   |      |      |      |      |      |      |
| N         | Aluminum                                | 260                                   | 75            | -                      | -    | -    | -                |      |   |      |      |      |      |      |      |
|           | Aluminum alloy                          | 447                                   | 130           |                        |      |      |                  |      |   |      |      |      |      |      |      |
| H         | Hardened steel                          | -                                     | 50-60HRC      | 0.25                   | 0.60 | 0.06 | 0.10             |      |   |      |      |      |      |      |      |
|           | Chilled cast iron                       | -                                     | 55HRC         |                        |      |      |                  |      |   |      |      |      |      |      |      |

Note: Please refer to P330 for programming information of high feed milling cutter

\*The recommended cutting conditions always refer to general conditions. These cutting conditions should be adjusted according to the practical machine rigidity, tools, workpiece clamping and coolants.  $f_z = \frac{h_m}{\sqrt{\frac{a_e}{D_c}}}$ , (calculate for  $\frac{a_e}{D_c} < 30\%$ )

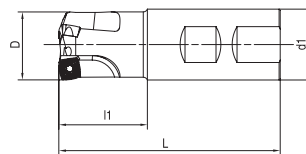
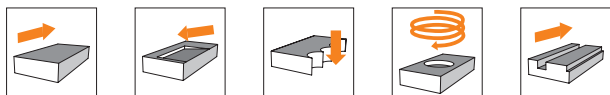
$$f_z = \frac{h_m}{\sqrt{\frac{a_e}{D_c}}}$$

Milling cutters



AHM15-XD09

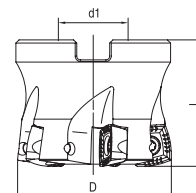
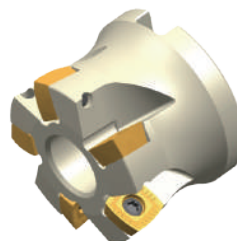
15° Approach angle high feed milling cutter



| Product code              | D  | d1 | L   | l1 | apmax | Internal coolant | Z | Inserts  |
|---------------------------|----|----|-----|----|-------|------------------|---|----------|
| AHM15-025-Z02-W25R-XD09-C | 25 | 25 | 96  | 40 | 1.5   |                  | 2 | XD..0904 |
| AHM15-032-Z03-W32R-XD09-C | 32 | 32 | 100 | 40 | 1.5   |                  | 3 |          |



| Product code                   | D  | d1 | L   | l1 | apmax | Internal coolant | Z | Inserts  |
|--------------------------------|----|----|-----|----|-------|------------------|---|----------|
| AHM15-025-Z02-C25R-XD09-C      | 25 | 25 | 200 | 50 | 1.5   |                  | 2 | XD..0904 |
| AHM15-026-Z02-C25R-XD09-L180-C | 26 | 25 | 180 | 30 | 1.5   |                  | 2 |          |
| AHM15-032-Z03-C32R-XD09-C      | 32 | 32 | 250 | 70 | 1.5   |                  | 3 |          |



| Product code              | D  | d1 | L  | l1 | apmax | Internal coolant | Z | Inserts  |
|---------------------------|----|----|----|----|-------|------------------|---|----------|
| AHM15-040-Z03-A16R-XD09-C | 40 | 16 | 32 | -  | 1.5   |                  | 3 | XD..0904 |
| AHM15-040-Z04-A16R-XD09-C | 40 | 16 | 32 | -  | 1.5   |                  | 4 |          |
| AHM15-040-Z05-A16R-XD09-C | 40 | 16 | 32 | -  | 1.5   |                  | 5 |          |
| AHM15-050-Z05-A22R-XD09-C | 50 | 22 | 40 | -  | 1.5   |                  | 5 |          |
| AHM15-050-Z06-A22R-XD09-C | 50 | 22 | 40 | -  | 1.5   |                  | 6 |          |

| Dimension(mm)   | Spare parts |         |        |
|-----------------|-------------|---------|--------|
| Cutter diameter | Screw       | Wrench  | Torque |
| φ25-50          |             |         | 3.0Nm  |
|                 | SP035084    | DT-TP10 |        |

Note: Please refer to P330 for programming information of high feed milling cutter

Note: With internal coolant  
 Without internal coolant



| Product code      | Dimension(mm)           |                 | Grades |        |        |        |        |        |        |
|-------------------|-------------------------|-----------------|--------|--------|--------|--------|--------|--------|--------|
|                   | Insert corner radius mm | Wiper length mm | AC301P | AP301U | AP351U | AP401U | AC301K | AP351K | AW100K |
| XDLT 090408ER-MM3 | 0.8                     | 1.3             |        | ●      |        |        |        |        |        |
| XDMW 090408ER-HR2 | 0.8                     | 1.3             |        |        |        |        | ●      |        |        |
|                   |                         |                 |        |        |        |        |        |        |        |
|                   |                         |                 |        |        |        |        |        |        |        |
|                   |                         |                 |        |        |        |        |        |        |        |
|                   |                         |                 |        |        |        |        |        |        |        |
|                   |                         |                 |        |        |        |        |        |        |        |
|                   |                         |                 |        |        |        |        |        |        |        |
|                   |                         |                 |        |        |        |        |        |        |        |
|                   |                         |                 |        |        |        |        |        |        |        |
|                   |                         |                 |        |        |        |        |        |        |        |
|                   |                         |                 |        |        |        |        |        |        |        |
|                   |                         |                 |        |        |        |        |        |        |        |
|                   |                         |                 |        |        |        |        |        |        |        |
|                   |                         |                 |        |        |        |        |        |        |        |

Marked: ● Stock available ○ Non-stocked standard

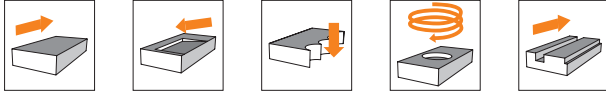
| Materials |   |                                       |               | Cutting depth and feed |      |      |      |                  |      |      |      |      |      |      |      |
|-----------|---|---------------------------------------|---------------|------------------------|------|------|------|------------------|------|------|------|------|------|------|------|
| ISO       | Material classification                 | Tensile strength (N/mm <sup>2</sup> ) | Hardness (HB) | XD..0904..             |      |      |      |                  |      |      |      |      |      |      |      |
|           |   |                                       |               | High feed Milling      |      |      |      | Plunging Milling |      |      |      |      |      |      |      |
|           |   |                                       |               | ap                     |      | fz   |      | ae               |      | fz   |      |      |      |      |      |
|           |   |                                       |               | (mm)                   |      |      |      |                  |      |      |      |      |      |      |      |
|           |   |                                       |               | min                    | max  | min  | max  | min              | max  | min  | max  |      |      |      |      |
| P         | Unalloyed steel                         | <600                                  | <180          | 0.20                   | 1.50 | 0.30 | 1.50 | 0.00             | 7    | 0.05 | 0.15 |      |      |      |      |
|           |   | <950                                  | <280          |                        |      |      |      |                  |      |      |      | 0.30 | 1.50 | 0.05 | 0.12 |
|           | Alloyed steel                           | 700-950                               | 200-280       |                        |      |      |      |                  |      |      |      |      |      |      |      |
|           |   | 950-1200                              | 280-355       |                        |      |      |      |                  |      |      |      | 0.10 | 0.40 | 0.05 | 0.08 |
| M         | Duplex stainless steel                  | 778                                   | 230           |                        |      | 0.30 | 1.50 |                  |      | 0.05 | 0.15 |      |      |      |      |
|           | Austenitic stainless steel              | 675                                   | 200           |                        |      |      |      |                  |      |      |      | 0.10 | 0.40 | 0.05 | 0.08 |
|           | Precipitation-hardening stainless steel | 1013                                  | 300           |                        |      |      |      |                  |      |      |      |      |      |      |      |
| K         | Grey cast iron                          | 700                                   | 220           |                        |      | 0.10 | 0.50 |                  |      | 0.05 | 0.10 |      |      |      |      |
|           | Nodular cast iron                       | 880                                   | 260           |                        |      |      |      |                  |      |      |      | -    | -    | -    | -    |
|           | Malleable cast iron                     | 800                                   | 250           |                        |      |      |      |                  |      |      |      |      |      |      |      |
| S         | Fe-based alloy                          | 943                                   | 280           |                        |      | -    | -    |                  |      | -    | -    |      |      |      |      |
|           | Co-based alloy                          | 1076                                  | 320           |                        |      |      |      |                  |      |      |      | 0.30 | 1.00 | 0.05 | 0.10 |
|           | Ni-based alloy                          | 1177                                  | 350           | -                      | -    |      |      | -                | -    |      |      |      |      |      |      |
|           | Ti-alloy                                | 1262                                  | 370           |                        |      |      |      |                  |      |      |      |      |      |      |      |
| N         | Aluminum                                | 260                                   | 75            |                        |      | -    | -    |                  |      | -    | -    |      |      |      |      |
|           | Aluminum alloy                          | 447                                   | 130           |                        |      |      |      |                  |      |      |      | 0.30 | 1.00 | 0.05 | 0.10 |
| H         | Hardened steel                          | -                                     | 50-60HRC      | -                      | -    | -    | -    |                  |      |      |      |      |      |      |      |
|           | Chilled cast iron                       | -                                     | 55HRC         |                        |      |      |      | 0.30             | 1.00 | 0.05 | 0.10 |      |      |      |      |

\*The recommended cutting conditions always refer to general conditions. These cutting conditions should be adjusted according to the practical machine rigidity, tools, workpiece clamping and coolants.  $f_z = \frac{h_m}{\sqrt{\frac{a_e}{D_c}}}$ , (calculate for  $\frac{a_e}{D_c} < 30\%$ )

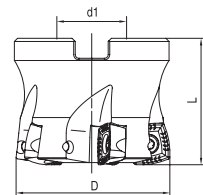
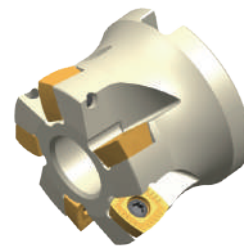


AHM15-XD12

15° Approach angle high feed milling cutter




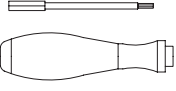
| Product code              | D  | d1 | L   | l1 | apmax | Internal coolant | Z | Inserts  |
|---------------------------|----|----|-----|----|-------|------------------|---|----------|
| AHM15-032-Z02-C32R-XD12-C | 32 | 32 | 250 | 70 | 2.5   |                  | 2 | XD..1205 |



| Product code                 | D   | d1 | L  | l1 | apmax | Internal coolant | Z  | Inserts  |
|------------------------------|-----|----|----|----|-------|------------------|----|----------|
| AHM15-052-Z03-A22R-XD12-C    | 52  | 22 | 40 | -  | 2.5   |                  | 3  | XD..1205 |
| AHM15-052-Z04-A22R-XD12-C    | 52  | 22 | 40 | -  | 2.5   |                  | 4  |          |
| AHM15-052-Z05-A22R-XD12-C    | 52  | 22 | 40 | -  | 2.5   |                  | 5  |          |
| AHM15-063-Z04-A22R-XD12-C    | 63  | 22 | 40 | -  | 2.5   |                  | 4  |          |
| AHM15-063-Z05-A22R-XD12-C    | 63  | 22 | 40 | -  | 2.5   |                  | 5  |          |
| AHM15-063-Z04-60A22R-XD12-C  | 63  | 22 | 40 | -  | 2.5   |                  | 4  |          |
| AHM15-063-Z05-60A22R-XD12-C  | 63  | 22 | 40 | -  | 2.5   |                  | 5  |          |
| AHM15-066-Z04-A27R-XD12-C    | 66  | 27 | 45 | -  | 2.5   |                  | 4  |          |
| AHM15-066-Z05-A27R-XD12-C    | 66  | 27 | 45 | -  | 2.5   |                  | 5  |          |
| AHM15-066-Z04-63A27R-XD12-C  | 66  | 27 | 45 | -  | 2.5   |                  | 4  |          |
| AHM15-066-Z05-63A27R-XD12-C  | 66  | 27 | 45 | -  | 2.5   |                  | 5  |          |
| AHM15-080-Z05-A27R-XD12-C    | 80  | 27 | 50 | -  | 2.5   |                  | 5  |          |
| AHM15-080-Z08-A27R-XD12-C    | 80  | 27 | 50 | -  | 2.5   |                  | 8  |          |
| AHM15-080-Z05-76A27R-XD12-C  | 80  | 27 | 50 | -  | 2.5   |                  | 5  |          |
| AHM15-080-Z08-76A27R-XD12-C  | 80  | 27 | 50 | -  | 2.5   |                  | 8  |          |
| AHM15-100-Z06-A32R-XD12-C    | 100 | 32 | 50 | -  | 2.5   |                  | 6  |          |
| AHM15-100-Z09-A32R-XD12-C    | 100 | 32 | 50 | -  | 2.5   |                  | 9  |          |
| AHM15-100-Z06-96A32R-XD12-C  | 100 | 32 | 50 | -  | 2.5   |                  | 6  |          |
| AHM15-100-Z09-96A32R-XD12-C  | 100 | 32 | 50 | -  | 2.5   |                  | 9  |          |
| AHM15-125-Z08-A40R-XD12-C    | 125 | 40 | 63 | -  | 2.5   |                  | 8  |          |
| AHM15-125-Z11-A40R-XD12-C    | 125 | 40 | 63 | -  | 2.5   |                  | 11 |          |
| AHM15-125-Z08-100A40R-XD12-C | 125 | 40 | 63 | -  | 2.5   |                  | 8  |          |
| AHM15-125-Z11-100A40R-XD12-C | 125 | 40 | 63 | -  | 2.5   |                  | 11 |          |

Note: With internal coolant  
 Without internal coolant



| Dimension(mm)   | Spare parts   |  |        |
|-----------------|---|--|--------|
| Cutter diameter | Screw   | Wrench   | Torque |
| φ32-125         |  |  | 3.5Nm  |
|                 | SP040112  | DT-TP15  |        |

Note: Please refer to P330 for programming information of high feed milling cutter

| Product code             | Dimension(mm)           |                 | Grades |        |        |        |        |        |        |
|--------------------------|-------------------------|-----------------|--------|--------|--------|--------|--------|--------|--------|
|                          | Insert corner radius mm | Wiper length mm | AC301P | AP301U | AP351U | AP401U | AC301K | AP351K | AW100K |
| <b>XDLT 120508ER-MM3</b> | 0.8                     | 2.2             | ●      | ●      | ●      |        | ●      | ●      |        |
| <b>XDLT 120512ER-MM3</b> | 1.2                     | 2.2             | ●      | ●      | ●      |        | ●      | ●      |        |
| <b>XDMW 120508ER-HR2</b> | 0.8                     | 2.2             |        | ●      |        |        | ●      |        |        |

Marked: ● Stock available ○ Non-stocked standard

| Materials |   |                                       |               | Cutting depth and feed |      |      |      |                  |    |      |      |      |      |      |      |
|-----------|---|---------------------------------------|---------------|------------------------|------|------|------|------------------|----|------|------|------|------|------|------|
| ISO       | Material classification                 | Tensile strength (N/mm <sup>2</sup> ) | Hardness (HB) | XD..1205..             |      |      |      |                  |    |      |      |      |      |      |      |
|           |   |                                       |               | High feed Milling      |      |      |      | Plunging Milling |    |      |      |      |      |      |      |
|           |   |                                       |               | ap                     |      | fz   |      | ae               |    | fz   |      |      |      |      |      |
|           |   |                                       |               | (mm)                   |      |      |      |                  |    |      |      |      |      |      |      |
| min       |   | max                                   |               | min                    |      | max  |      | min              |    | max  |      |      |      |      |      |
| <b>P</b>  | Unalloyed steel                         | <600                                  | <180          | 0.50                   | 2.50 | 0.30 | 2.00 | 0.00             | 10 | 0.06 | 0.18 |      |      |      |      |
|           |   | <950                                  | <280          |                        |      |      |      |                  |    |      |      |      |      |      |      |
|           | Alloyed steel                           | 700-950                               | 200-280       |                        |      |      |      |                  |    |      |      | 0.30 | 2.00 | 0.06 | 0.15 |
|           |   | 950-1200                              | 280-355       |                        |      |      |      |                  |    |      |      |      |      |      |      |
|           | 1200-1400                               | 355-415                               |               |                        |      |      |      |                  |    |      |      |      |      |      |      |
| <b>M</b>  | Duplex stainless steel                  | 778                                   | 230           |                        |      |      |      |                  |    |      |      | 0.20 | 1.00 | 0.06 | 0.12 |
|           | Austenitic stainless steel              | 675                                   | 200           |                        |      |      |      |                  |    |      |      | 0.10 | 0.60 | 0.05 | 0.10 |
|           | Precipitation-hardening stainless steel | 1013                                  | 300           |                        |      |      |      |                  |    |      |      |      |      |      |      |
| <b>K</b>  | Grey cast iron                          | 700                                   | 220           |                        |      |      |      |                  |    |      |      |      |      |      |      |
|           | Nodular cast iron                       | 880                                   | 260           |                        |      |      |      |                  |    |      |      |      |      |      |      |
|           | Malleable cast iron                     | 800                                   | 250           |                        |      |      |      |                  |    |      |      |      |      |      |      |
| <b>S</b>  | Fe-based alloy                          | 943                                   | 280           |                        |      |      |      |                  |    |      |      |      |      |      |      |
|           | Co-based alloy                          | 1076                                  | 320           | 0.30                   | 2.00 | 0.05 | 0.12 |                  |    |      |      |      |      |      |      |
|           | Ni-based alloy                          | 1177                                  | 350           |                        |      |      |      |                  |    |      |      |      |      |      |      |
|           | Ti-alloy                                | 1262                                  | 370           |                        |      |      |      |                  |    |      |      |      |      |      |      |
| <b>N</b>  | Aluminum                                | 260                                   | 75            | -                      | -    | -    | -    |                  |    |      |      |      |      |      |      |
|           | Aluminum alloy                          | 447                                   | 130           |                        |      |      |      |                  |    |      |      |      |      |      |      |
| <b>H</b>  | Hardened steel                          | -                                     | 50-60HRC      | 0.30                   | 1.00 | 0.05 | 0.12 |                  |    |      |      |      |      |      |      |
|           | Chilled cast iron                       | -                                     | 55HRC         |                        |      |      |      |                  |    |      |      |      |      |      |      |

\*The recommended cutting conditions always refer to general conditions. These cutting conditions should be adjusted according to the practical machine rigidity, tools, workpiece clamping and coolants.  $f_z = \frac{h_m}{\sqrt{\frac{a_e}{D_c}}}$ , (calculate for  $\frac{a_e}{D_c} < 30\%$ )



P248









Milling cutters

Milling Insert Denomination System

**A**  
1

**P**  
2








**1- Shape/code**

|   |   |   |   |   |
|---|---|---|---|---|
| <b>A</b>  | <b>H</b>  | <b>M</b>  | <b>O</b>  | <b>R</b>  |
|  |  |  |  |  |
| <b>S</b>  | <b>T</b>  | <b>Z</b>  | <b>X</b>  | Special   |
|  |  |  |   |   |

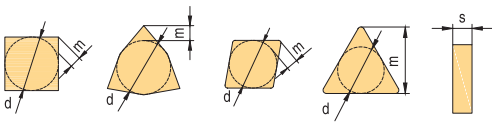
**F**  
3

**W**  
4

**2- Clearance angle**

|   |   |   |   |
|---|---|---|---|
| <b>C</b>  | <b>D</b>  | <b>E</b>  | <b>F</b>  |
|  |  |  |  |
| <b>G</b>  | <b>N</b>  | <b>P</b>  | <b>O</b>  |
|  |  |  | Other clearance angle   |

**3- Tolerance**

















| Class | Unit | In.Circle dimension d | Nose height m | Thickness s |
|-------|------|-----------------------|---------------|-------------|
| A     | mm   | ± 0,025               | ± 0,005       | ± 0,025     |
| C     | mm   | ± 0,025               | ± 0,013       | ± 0,025     |
| E     | mm   | ± 0,025               | ± 0,025       | ± 0,025     |
| F     | mm   | ± 0,013               | ± 0,005       | ± 0,025     |
| G     | mm   | ± 0,025               | ± 0,025       | ± 0,13      |
| H     | mm   | ± 0,013               | ± 0,013       | ± 0,025     |
| J     | mm   | *                     | ± 0,005       | ± 0,025     |
| K     | mm   | *                     | ± 0,013       | ± 0,025     |
| L     | mm   | *                     | ± 0,025       | ± 0,025     |
| M     | mm   | *                     | *             | ± 0,127     |
| U     | mm   | *                     | *             | ± 0,127     |
| N     | mm   | *                     | *             | ± 0,025     |

\* For details refer to right and below tables

| IC     | Shape : C, E, H, M, O, P, S, T, R, W |        |        |        |
|--------|--------------------------------------|--------|--------|--------|
|        | d                                    |        | m      |        |
|        | J,K,L,M,N                            | U      | M, N   | U      |
| 4.76   | ± 0,05                               | ± 0,08 | ± 0,08 | ± 0,13 |
| 5.56   | ± 0,05                               | ± 0,08 | ± 0,08 | ± 0,13 |
| 6      | ± 0,05                               | ± 0,08 | ± 0,08 | ± 0,13 |
| 6.35   | ± 0,05                               | ± 0,08 | ± 0,08 | ± 0,13 |
| 7.94   | ± 0,05                               | ± 0,08 | ± 0,08 | ± 0,13 |
| 8      | ± 0,05                               | ± 0,08 | ± 0,08 | ± 0,13 |
| 9.525  | ± 0,05                               | ± 0,08 | ± 0,08 | ± 0,13 |
| 10     | ± 0,05                               | ± 0,08 | ± 0,08 | ± 0,13 |
| 12     | ± 0,08                               | ± 0,13 | ± 0,13 | ± 0,2  |
| 12.7   | ± 0,08                               | ± 0,13 | ± 0,13 | ± 0,2  |
| 15.875 | ± 0,1                                | ± 0,18 | ± 0,15 | ± 0,27 |
| 16     | ± 0,1                                | ± 0,18 | ± 0,15 | ± 0,27 |
| 19.05  | ± 0,1                                | ± 0,18 | ± 0,15 | ± 0,27 |
| 20     | ± 0,1                                | ± 0,18 | ± 0,15 | ± 0,27 |
| 25     | ± 0,13                               | ± 0,25 | ± 0,18 | ± 0,38 |
| 25.4   | ± 0,13                               | ± 0,25 | ± 0,18 | ± 0,38 |
| 31.75  | ± 0,15                               | ± 0,25 | ± 0,2  | ± 0,38 |
| 32     | ± 0,15                               | ± 0,25 | ± 0,2  | ± 0,38 |

| M&N shape | D shape |        | V shape |        |
|-----------|---------|--------|---------|--------|
| IC        | d       | m      | d       | m      |
| 5.56      | ± 0,05  | ± 0,11 |         |        |
| 6.35      | ± 0,05  | ± 0,11 | ± 0,05  | ± 0,16 |
| 7.94      | ± 0,05  | ± 0,11 | ± 0,05  | ± 0,16 |
| 9.525     | ± 0,05  | ± 0,11 | ± 0,05  | ± 0,16 |
| 12.7      | ± 0,08  | ± 0,15 | ± 0,08  | ± 0,2  |
| 15.875    | ± 0,10  | ± 0,18 | ± 0,10  | ± 0,27 |
| 19.05     | ± 0,10  | ± 0,18 | ± 0,10  | ± 0,27 |

**4- Clamping type**

|   |   |   |   |   |
|---|---|---|---|---|
| <b>A</b>  | <b>B</b>  | <b>C</b>  | <b>F</b>  | <b>G</b>  |
|  |  |  |  |  |
| <b>H</b>  | <b>J</b>  | <b>M</b>  | <b>N</b>  | <b>Q</b>  |
|  |  |  |  |  |
| <b>R</b>  | <b>T</b>  | <b>U</b>  | <b>W</b>  | <b>X</b>  |
|  |  |  |  | Special   |

| 16<br>5                       | 04<br>6 | PD<br>7 | S<br>8 | R<br>9 | -<br>- | FM2<br>10 |   |
|-------------------------------|---------|---------|--------|--------|--------|-----------|---|
| <b>5- Cutting edge length</b> |         |         |        |        |        |           |   |
| In. Circle dimension (mm)     | H       | M       | O      | R      | S      | T         | Z |
|                               |         |         |        |        |        |           |   |
| 3.180                         |         |         |        |        |        | 05        |   |
| 3.970                         |         |         |        |        |        | 06        |   |
| 5.000                         |         |         | 05     |        |        |           |   |
| 5.560                         |         |         |        |        |        | 09        |   |
| 6.000                         |         |         | 06     |        |        |           |   |
| 6.350                         |         |         |        |        |        | 11        |   |
| 7.940                         |         |         |        |        |        | 13        |   |
| 8.000                         |         |         | 08     |        |        |           |   |
| 9.525                         |         |         | 09     | 09     | 16     |           |   |
| 10.000                        |         |         | 10     |        |        |           |   |
| 12.000                        |         |         | 12     |        |        |           |   |
| 12.700                        |         | 04      | 12     | 12     | 22     |           |   |
| 15.875                        |         |         | 15     | 15     | 27     |           |   |
| 16.000                        |         | 06      | 16     |        |        |           |   |
| 19.050                        |         |         | 19     | 19     | 33     |           |   |
| 20.000                        |         |         | 20     |        |        |           |   |
| 25.000                        |         |         | 25     | 25     |        |           |   |
| 25.400                        |         |         | 25     |        |        |           |   |
| 31.750                        |         |         | 31     |        |        |           |   |
| 32.000                        |         |         | 32     |        |        |           |   |

| <b>7-Corner radius and wiper edge</b>  |   |            |          |          |          |          |          |          |          |          |          |          |          |          |          |          |            |
|--|---|------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|------------|
|  | <table border="0"> <tr><td>00 = sharp</td><td>24 = 2.4</td></tr> <tr><td>01 = 0.1</td><td>28 = 2.8</td></tr> <tr><td>02 = 0.2</td><td>32 = 3.2</td></tr> <tr><td>04 = 0.4</td><td>40 = 4.0</td></tr> <tr><td>08 = 0.8</td><td>48 = 4.8</td></tr> <tr><td>12 = 1.2</td><td>56 = 5.6</td></tr> <tr><td>16 = 1.6</td><td>64 = 6.4</td></tr> <tr><td>20 = 2.0</td><td>X = others</td></tr> </table> | 00 = sharp | 24 = 2.4 | 01 = 0.1 | 28 = 2.8 | 02 = 0.2 | 32 = 3.2 | 04 = 0.4 | 40 = 4.0 | 08 = 0.8 | 48 = 4.8 | 12 = 1.2 | 56 = 5.6 | 16 = 1.6 | 64 = 6.4 | 20 = 2.0 | X = others |
| 00 = sharp   | 24 = 2.4  |            |          |          |          |          |          |          |          |          |          |          |          |          |          |          |            |
| 01 = 0.1   | 28 = 2.8  |            |          |          |          |          |          |          |          |          |          |          |          |          |          |          |            |
| 02 = 0.2   | 32 = 3.2  |            |          |          |          |          |          |          |          |          |          |          |          |          |          |          |            |
| 04 = 0.4   | 40 = 4.0  |            |          |          |          |          |          |          |          |          |          |          |          |          |          |          |            |
| 08 = 0.8   | 48 = 4.8  |            |          |          |          |          |          |          |          |          |          |          |          |          |          |          |            |
| 12 = 1.2   | 56 = 5.6  |            |          |          |          |          |          |          |          |          |          |          |          |          |          |          |            |
| 16 = 1.6   | 64 = 6.4  |            |          |          |          |          |          |          |          |          |          |          |          |          |          |          |            |
| 20 = 2.0   | X = others  |            |          |          |          |          |          |          |          |          |          |          |          |          |          |          |            |
|  | Round insert:MO refers to metric dia. size  |            |          |          |          |          |          |          |          |          |          |          |          |          |          |          |            |
| <p>1 </p> <p>2 </p>  | <p>2 Clearance angle of wiper edge</p> <p>(n)</p> <p>A = 3°</p> <p>B = 5°</p> <p>C = 7°</p> <p>D = 15°</p> <p>E = 20°</p> <p>F = 25°</p> <p>G = 30°</p> <p>N = 0°</p> <p>P = 11°</p> <p>Z = Others</p>  |            |          |          |          |          |          |          |          |          |          |          |          |          |          |          |            |
| <p>1 Approach angle(Entering angle)</p> <p>(kr)</p> <p>A = 45°</p> <p>D = 60°</p> <p>E = 75°</p> <p>F = 85°</p> <p>P = 90°</p> <p>Z = Others</p> |   |            |          |          |          |          |          |          |          |          |          |          |          |          |          |          |            |

| S<br>8                     | R<br>9 | -<br>- | FM2<br>10 |
|----------------------------|--------|--------|-----------|
| <b>6- Insert thickness</b> |        |        |           |
|                            |        |        | 01=1.59mm |
|                            |        |        | T1=1.98mm |
|                            |        |        | 02=2.38mm |
|                            |        |        | T2=2.78mm |
|                            |        |        | 03=3.18mm |
|                            |        |        | T3=3.97mm |
|                            |        |        | 04=4.76mm |
|                            |        |        | 05=5.56mm |
|                            |        |        | 06=6.35mm |
|                            |        |        | 07=7.94mm |
|                            |        |        | 09=9.52mm |

| <b>8- Edge preparation</b> |                      |                             |
|----------------------------|----------------------|-----------------------------|
| <b>F</b><br>               | <b>E</b><br>         | <b>T</b><br>                |
| Sharp cutting edge         | Honed cutting edge   | Negative land               |
| <b>K</b><br>               | <b>S</b><br>         | <b>P</b><br>                |
| Double negative land       | Negative land +honed | Double negative land +honed |

| <b>9-Hand of tool</b>                       |              |              |
|---|--------------|--------------|
| <b>R</b><br>                                | <b>L</b><br> | <b>N</b><br> |
| Right hand                                  | Left hand    | Neutral      |
| <b>10-Chip breakers refers to page P258</b> |              |              |

Marked: if it has corner radius, the information needs to put between thickness and wipers.  
Example: APET 160408PDFR-FM2

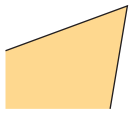
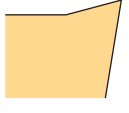

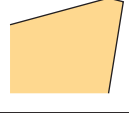



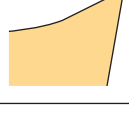

Milling inserts

Geometry Application Guide

| Materials |   |                                       |               | Milling geometry application table     |                         |                 |                  |                    |                          |                    |
|-----------|---|---------------------------------------|---------------|--|-------------------------|-----------------|------------------|--------------------|--------------------------|--------------------|
|           |   |                                       |               | FM2                                    | MM3                     | MM4             | MR2              | MR6                | RR2                      | HR2                |
| ISO       | Material classification                 | Tensile strength (N/mm <sup>2</sup> ) | Hardness (HB) | Suitable for machining aluminium alloy | Light cutting machining | General purpose | Medium machining | Roughing machining | Heavy roughing machining | Roughing machining |
| <b>P</b>  | Unalloyed steel                         | <600                                  | <180          | -                                      | ●                       | ●               | ●                | ●                  | -                        | -                  |
|           |   | <950                                  | <280          | -                                      | ●                       | ●               | ●                | ●                  | -                        | -                  |
|           | Alloyed steel                           | 700-950                               | 200-280       | -                                      | ●                       | ●               | ●                | ●                  | -                        | -                  |
|           |   | 950-1200                              | 280-355       | -                                      | ●                       | ●               | ●                | ●                  | -                        | -                  |
|           |   | 1200-1400                             | 355-415       | -                                      | ●                       | ●               | ●                | ●                  | -                        | -                  |
| <b>M</b>  | Duplex stainless steel                  | 778                                   | 230           | -                                      | ●                       | ●               | ●                | -                  | -                        | -                  |
|           | Austenitic stainless steel              | 675                                   | 200           | -                                      | ●                       | ●               | ●                | -                  | -                        | -                  |
|           | Precipitation-hardening stainless steel | 1013                                  | 300           | -                                      | ●                       | ●               | ●                | -                  | -                        | -                  |
| <b>K</b>  | Grey cast iron                          | 700                                   | 220           | -                                      | -                       | ●               | ●                | ●                  | ●                        | ●                  |
|           | Nodular cast iron                       | 880                                   | 260           | -                                      | -                       | ●               | ●                | ●                  | ●                        | ●                  |
|           | Malleable cast iron                     | 800                                   | 250           | -                                      | -                       | ●               | ●                | ●                  | ●                        | ●                  |
| <b>S</b>  | Fe-based alloy                          | 943                                   | 280           | -                                      | ●                       | ●               | ●                | -                  | -                        | -                  |
|           | Co-based alloy                          | 1076                                  | 320           | -                                      | ●                       | ●               | ●                | -                  | -                        | -                  |
|           | Ni-based alloy                          | 1177                                  | 350           | -                                      | ●                       | ●               | ●                | -                  | -                        | -                  |
|           | Ti-alloy                                | 1262                                  | 370           | -                                      | ●                       | ●               | ●                | -                  | -                        | -                  |
| <b>N</b>  | Aluminum                                | 260                                   | 75            | ●                                      | -                       | -               | -                | -                  | -                        | -                  |
|           | Aluminum alloy                          | 447                                   | 130           | ●                                      | -                       | -               | -                | -                  | -                        | -                  |
| <b>H</b>  | Hardened steel                          | -                                     | 50-60HRC      | -                                      | -                       | ●               | ●                | -                  | -                        | -                  |
|           | Chilled cast iron                       | -                                     | 55HRC         | -                                      | -                       | ●               | ●                | -                  | -                        | -                  |

- Best choice
- 2nd choice
- Inapplicable

## Milling Geometry Introduction

| Insert geometry | Edge shape  | Application   |
|-----------------|---|---|
| FM2             |    | <ul style="list-style-type: none"> <li>▪ Low cutting force, for weak machining condition</li> <li>▪ Sharp geometry</li> <li>▪ For aluminium material machining</li> </ul>                               |
| MM3             |    | <ul style="list-style-type: none"> <li>▪ Low cutting force, for weak machining condition</li> <li>▪ Sharp geometry</li> <li>▪ For steel, stainless-steel and heat resistant alloy machining.</li> </ul> |
| MM4             |    | <ul style="list-style-type: none"> <li>▪ For medium machining condition</li> <li>▪ Universal geometry</li> <li>▪ For machining most materials</li> </ul>  |
| MR2             |    | <ul style="list-style-type: none"> <li>▪ For medium or better machining condition</li> <li>▪ Universal geometry</li> <li>▪ For machining most materials</li> </ul>                                      |
| MR6             |   | <ul style="list-style-type: none"> <li>▪ For stable machining condition</li> <li>▪ Roughing geometry</li> <li>▪ For machining most materials</li> </ul>   |
| HR2             |  | <ul style="list-style-type: none"> <li>▪ For stable machining condition</li> <li>▪ Roughing geometry</li> <li>▪ Mainly for cast iron machining</li> </ul>   |
| RR2             |  | <ul style="list-style-type: none"> <li>▪ For stable machining condition</li> <li>▪ Heavy roughing geometry</li> <li>▪ Mainly for cast iron and steel machining</li> </ul>                               |
| IT              |  | <ul style="list-style-type: none"> <li>▪ Sharp geometry, for specified product</li> </ul>   |
| DT              |  | <ul style="list-style-type: none"> <li>▪ Universal geometry, for specified product</li> </ul>   |



Grade Application Guide

| Milling grade ISO group |                                    |     |        |        |        |        |        |        |        |        |        |        |                    |     |     |     |
|-------------------------|------------------------------------|-----|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------------------|-----|-----|-----|
| Material Group          | Materials                          | ISO | PVD    | PVD    | PVD    | PVD    | PVD    | PVD    | CVD    | CVD    | PVD    | PVD    | Uncoated<br>AW100K | ISO |     |     |
|                         |                                    |     | AP301U | AP351U | AP351M | AP401U | AP403S | AP403M | AC301P | AC301K | AP351K | AP151H |                    |     |     |     |
| <b>P</b>                | Unalloyed steels / Alloyed steels  | P01 |        |        |        |        |        |        |        |        |        |        |                    | P01 |     |     |
|                         |                                    | P05 |        |        |        |        |        |        |        |        |        |        |                    |     | P05 |     |
|                         |                                    | P10 |        |        |        |        |        |        |        |        |        |        |                    |     | P10 |     |
|                         |                                    | P15 |        |        |        |        |        |        |        |        |        |        |                    |     | P15 |     |
|                         |                                    | P20 |        |        |        |        |        |        |        |        |        |        |                    |     | P20 |     |
|                         |                                    | P25 | AP301U |        |        |        |        |        |        |        |        |        |                    |     | P25 |     |
|                         |                                    | P30 |        |        |        |        |        |        |        |        |        |        |                    |     | P30 |     |
|                         |                                    | P35 |        | AP351U | AP351M |        |        |        |        | AC301P |        |        |                    |     |     | P35 |
|                         |                                    | P40 |        |        | AP351U | AP351M | AP401U |        |        |        |        |        |                    |     |     | P40 |
|                         |                                    | P45 |        |        |        |        |        |        | AP403M |        |        |        |                    |     |     | P45 |
| P50                     |                                    |     |        |        |        |        |        |        |        |        |        |        |                    | P50 |     |     |
| <b>M</b>                | Stainless steels                   | M01 |        |        |        |        |        |        |        |        |        |        |                    | M01 |     |     |
|                         |                                    | M05 |        |        |        |        |        |        |        |        |        |        |                    | M05 |     |     |
|                         |                                    | M10 |        |        |        |        |        |        |        |        |        |        |                    | M10 |     |     |
|                         |                                    | M15 |        |        |        |        |        |        |        |        |        |        |                    | M15 |     |     |
|                         |                                    | M20 |        |        |        |        |        |        |        |        |        |        |                    | M20 |     |     |
|                         |                                    | M25 | AP301U |        |        |        |        |        |        |        |        |        |                    |     | M25 |     |
|                         |                                    | M30 |        |        |        |        |        |        |        |        | AC301P |        |                    |     | M30 |     |
|                         |                                    | M35 |        | AP351U | AP351M |        |        |        |        |        |        |        |                    |     | M35 |     |
|                         |                                    | M40 |        |        |        | AP401U |        |        |        |        |        |        |                    |     | M40 |     |
|                         |                                    | M45 |        |        |        |        | AP403S | AP403M |        |        |        |        |                    |     | M45 |     |
| M50                     |                                    |     |        |        |        |        |        |        |        |        |        |        | M50                |     |     |     |
| <b>K</b>                | Cast iron                          | K01 |        |        |        |        |        |        |        |        |        |        |                    | K01 |     |     |
|                         |                                    | K05 |        |        |        |        |        |        |        |        |        |        |                    | K05 |     |     |
|                         |                                    | K10 |        |        |        |        |        |        |        |        |        |        |                    | K10 |     |     |
|                         |                                    | K15 |        |        |        |        |        |        |        |        |        | AP151H |                    | K15 |     |     |
|                         |                                    | K20 |        |        |        |        |        |        |        | AC301K |        |        |                    | K20 |     |     |
|                         |                                    | K25 |        |        |        |        |        |        |        |        | AP351K |        |                    | K25 |     |     |
|                         |                                    | K30 |        |        |        |        |        |        |        |        |        |        |                    | K30 |     |     |
|                         |                                    | K35 |        |        |        |        |        |        |        |        |        |        |                    | K35 |     |     |
|                         |                                    | K40 |        |        |        |        |        |        |        |        |        |        |                    | K40 |     |     |
|                         |                                    | K45 |        |        |        |        |        |        |        |        |        |        |                    | K45 |     |     |
| K50                     |                                    |     |        |        |        |        |        |        |        |        |        | K50    |                    |     |     |     |
| <b>S</b>                | Heat resistant alloys              | S01 |        |        |        |        |        |        |        |        |        |        |                    | S01 |     |     |
|                         |                                    | S05 |        |        |        |        |        |        |        |        |        |        |                    | S05 |     |     |
|                         |                                    | S10 |        |        |        |        |        |        |        |        |        |        |                    | S10 |     |     |
|                         |                                    | S15 |        |        |        |        |        |        |        |        |        |        |                    | S15 |     |     |
|                         |                                    | S20 |        |        |        |        |        |        |        |        |        |        |                    | S20 |     |     |
|                         |                                    | S25 |        |        |        |        |        |        |        |        |        |        |                    | S25 |     |     |
|                         |                                    | S30 |        |        |        |        |        |        |        |        |        |        |                    | S30 |     |     |
|                         |                                    | S35 |        | AP351U | AP351M |        |        |        |        |        |        |        |                    |     | S35 |     |
|                         |                                    | S40 |        |        |        | AP401U |        |        | AP403S | AP403M |        |        |                    |     | S40 |     |
|                         |                                    | S45 |        |        |        |        |        |        |        |        |        |        |                    |     | S45 |     |
| S50                     |                                    |     |        |        |        |        |        |        |        |        |        |        | S50                |     |     |     |
| <b>N</b>                | Aluminum/ Aluminum alloys          | N01 |        |        |        |        |        |        |        |        |        |        |                    | N01 |     |     |
|                         |                                    | N05 |        |        |        |        |        |        |        |        |        |        |                    | N05 |     |     |
|                         |                                    | N10 |        |        |        |        |        |        |        |        |        |        |                    | N10 |     |     |
|                         |                                    | N15 |        |        |        |        |        |        |        |        |        |        | AW100K             | N15 |     |     |
|                         |                                    | N20 |        |        |        |        |        |        |        |        |        |        |                    | N20 |     |     |
|                         |                                    | N25 |        |        |        |        |        |        |        |        |        |        |                    | N25 |     |     |
| N30                     |                                    |     |        |        |        |        |        |        |        |        |        | N30    |                    |     |     |     |
| <b>H</b>                | Hardened steels/ Chilled cast iron | H01 |        |        |        |        |        |        |        |        |        |        |                    | H01 |     |     |
|                         |                                    | H05 |        |        |        |        |        |        |        |        |        |        |                    | H05 |     |     |
|                         |                                    | H10 |        |        |        |        |        |        |        |        |        |        |                    | H10 |     |     |
|                         |                                    | H15 |        |        |        |        |        |        |        |        |        | AP151H |                    | H15 |     |     |
|                         |                                    | H20 |        |        |        |        |        |        |        |        |        |        |                    | H20 |     |     |
|                         |                                    | H25 |        |        |        |        |        |        |        |        |        |        |                    | H25 |     |     |
|                         |                                    | H30 |        |        |        |        |        |        |        |        |        |        |                    | H30 |     |     |

## Grade Application Guide

| Materials |   |                                       |               | Milling grade application |        |        |        |        |        |            |        |            |        |          |
|-----------|---|---------------------------------------|---------------|---------------------------|--------|--------|--------|--------|--------|------------|--------|------------|--------|----------|
|           |   |                                       |               | PVD coated                |        |        |        |        |        | CVD coated |        | PVD coated |        | Uncoated |
| ISO       | Material classification                 | Tensile strength (N/mm <sup>2</sup> ) | Hardness (HB) | AP301U                    | AP351U | AP351M | AP401U | AP403S | AP403M | AC301P     | AC301K | AP351K     | AP151H | AW100K   |
| <b>P</b>  | Unalloyed steel                         | <600                                  | <180          | ●                         | ●      | ●      | ●      | ●      | ●      | ●          | ●      | -          | -      | -        |
|           |   | <950                                  | <280          | ●                         | ●      | ●      | ●      | ●      | ●      | ●          | ●      | -          | -      | -        |
|           | Alloyed steel                           | 700-950                               | 200-280       | ●                         | ●      | ●      | ●      | ●      | ●      | ●          | ●      | -          | -      | -        |
|           |   | 950-1200                              | 280-355       | ●                         | ●      | ●      | ●      | ●      | ●      | ●          | ●      | -          | -      | -        |
|           |   | 1200-1400                             | 355-415       | ●                         | ●      | ●      | ●      | ●      | ●      | ●          | ●      | -          | -      | -        |
| <b>M</b>  | Duplex stainless steel                  | 778                                   | 230           | ●                         | ●      | ●      | ●      | ●      | ●      | ●          | -      | -          | -      | -        |
|           | Austenitic stainless steel              | 675                                   | 200           | ●                         | ●      | ●      | ●      | ●      | ●      | ●          | -      | -          | -      | -        |
|           | Precipitation-hardening stainless steel | 1013                                  | 300           | ●                         | ●      | ●      | ●      | ●      | ●      | ●          | -      | -          | -      | -        |
| <b>K</b>  | Grey cast iron                          | 700                                   | 220           | -                         | -      | -      | -      | -      | -      | -          | ●      | ●          | ●      | -        |
|           | Nodular cast iron                       | 880                                   | 260           | -                         | -      | -      | -      | -      | -      | -          | ●      | ●          | ●      | -        |
|           | Malleable cast iron                     | 800                                   | 250           | -                         | -      | -      | -      | -      | -      | -          | ●      | ●          | ●      | -        |
| <b>S</b>  | Fe-based alloy                          | 943                                   | 280           | -                         | ●      | ●      | -      | ●      | ●      | -          | -      | -          | -      | -        |
|           | Co-based alloy                          | 1076                                  | 320           | -                         | ●      | ●      | -      | ●      | ●      | -          | -      | -          | -      | -        |
|           | Ni-based alloy                          | 1177                                  | 350           | -                         | ●      | ●      | -      | ●      | ●      | -          | -      | -          | -      | -        |
|           | Ti-alloy                                | 1262                                  | 370           | -                         | ●      | ●      | -      | ●      | ●      | -          | -      | -          | -      | ●        |
| <b>N</b>  | Aluminum                                | 260                                   | 75            | -                         | -      | -      | -      | -      | -      | -          | -      | -          | -      | ●        |
|           | Aluminum alloy                          | 447                                   | 130           | -                         | -      | -      | -      | -      | -      | -          | -      | -          | -      | ●        |
| <b>H</b>  | Hardened steel                          | -                                     | 50-60HRC      | -                         | -      | -      | -      | -      | -      | -          | -      | -          | ●      | -        |
|           | Chilled cast iron                       | -                                     | 55HRC         | -                         | -      | -      | -      | -      | -      | -          | -      | -          | ●      | -        |

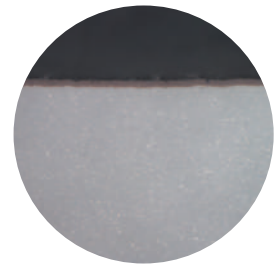
- Best choice
- 2nd choice
- Inapplicable

Milling Grade Description

AP301U

Coating: PVD coating

Suitable for steel, stainless steel and high-temp alloy milling. High strength and wear resistance. Ultra fine carbide substrate with nanostructured PVD coating in controllable layer, high coating adhesion, wear-resistance and strength.



| Application range  |    |    |    |        |    |    |    |    |    |    |    |  |
|--------------------|----|----|----|--------|----|----|----|----|----|----|----|--|
| ISO Classification | 01 | 05 | 10 | 15     | 20 | 25 | 30 | 35 | 40 | 45 | 50 |  |
| P                  |    |    |    | AP301U |    |    |    |    |    |    |    |  |
| M                  |    |    |    | AP301U |    |    |    |    |    |    |    |  |
| K                  |    |    |    |        |    |    |    |    |    |    |    |  |
| S                  |    |    |    |        |    |    |    |    |    |    |    |  |
| N                  |    |    |    |        |    |    |    |    |    |    |    |  |
| H                  |    |    |    |        |    |    |    |    |    |    |    |  |

Remark:  Best choice  
 2nd choice

AP351U

Coating: PVD coating

Suitable for steel, stainless steel and high-temp alloy semi-finishing and roughing milling. High strength carbide substrate with nanostructured PVD coating in controllable layer, high coating adhesion, wear-resistance and strength.



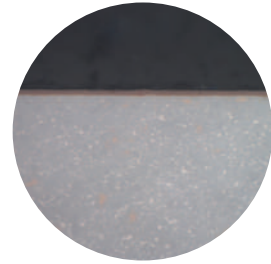
| Application range  |    |    |    |    |    |    |        |    |    |    |    |  |
|--------------------|----|----|----|----|----|----|--------|----|----|----|----|--|
| ISO Classification | 01 | 05 | 10 | 15 | 20 | 25 | 30     | 35 | 40 | 45 | 50 |  |
| P                  |    |    |    |    |    |    | AP351U |    |    |    |    |  |
| M                  |    |    |    |    |    |    | AP351U |    |    |    |    |  |
| K                  |    |    |    |    |    |    |        |    |    |    |    |  |
| S                  |    |    |    |    |    |    | AP351U |    |    |    |    |  |
| N                  |    |    |    |    |    |    |        |    |    |    |    |  |
| H                  |    |    |    |    |    |    |        |    |    |    |    |  |

Remark:  Best choice  
 2nd choice

**AP401U**

Coating: PVD coating

Suitable for steel, stainless steel and high-temp alloy rough milling. Ultra high strength carbide substrate with nanostructured PVD coating in controllable layer, high coating adhesion, wear-resistance and strength.



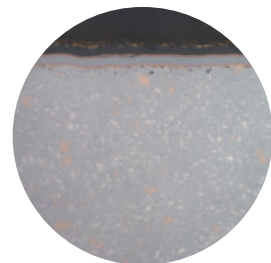
| Application range  |    |    |    |    |    |    |        |    |    |    |    |  |
|--------------------|----|----|----|----|----|----|--------|----|----|----|----|--|
| ISO Classification | 01 | 05 | 10 | 15 | 20 | 25 | 30     | 35 | 40 | 45 | 50 |  |
| P                  |    |    |    |    |    |    | AP401U |    |    |    |    |  |
| M                  |    |    |    |    |    |    | AP401U |    |    |    |    |  |
| K                  |    |    |    |    |    |    |        |    |    |    |    |  |
| S                  |    |    |    |    |    |    | AP401U |    |    |    |    |  |
| N                  |    |    |    |    |    |    |        |    |    |    |    |  |
| H                  |    |    |    |    |    |    |        |    |    |    |    |  |

Remark:  Best choice  
 2nd choice

**AC301P**

Coating: CVD coating

Suitable for steel and stainless steel semi-finish milling. High strength carbide substrate with multi-layer CVD coating, high coating adhesion, wear resistance and surface finish quality.



| Application range  |    |    |    |    |    |        |    |    |    |    |    |
|--------------------|----|----|----|----|----|--------|----|----|----|----|----|
| ISO Classification | 01 | 05 | 10 | 15 | 20 | 25     | 30 | 35 | 40 | 45 | 50 |
| P                  |    |    |    |    |    | AC301P |    |    |    |    |    |
| M                  |    |    |    |    |    | AC301P |    |    |    |    |    |
| K                  |    |    |    |    |    |        |    |    |    |    |    |
| S                  |    |    |    |    |    |        |    |    |    |    |    |
| N                  |    |    |    |    |    |        |    |    |    |    |    |
| H                  |    |    |    |    |    |        |    |    |    |    |    |

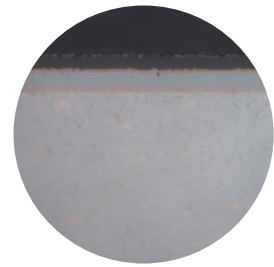
Remark:  Best choice  
 2nd choice

Milling inserts

**AC301K**

Coating: CVD coating

Suitable for gray and nodular cast iron finish, semi-finish and rough milling. High strength and wear resistance carbide substrate with multi-layer CVD coating, controllable coating layer structure and high adhesive strength.



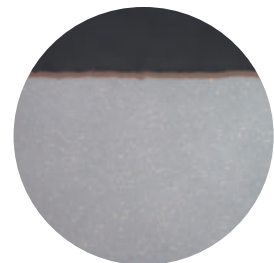
| Application range  |    |    |        |    |    |    |    |    |    |    |    |
|--------------------|----|----|--------|----|----|----|----|----|----|----|----|
| ISO Classification | 01 | 05 | 10     | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 |
| P                  |    |    |        |    |    |    |    |    |    |    |    |
| M                  |    |    |        |    |    |    |    |    |    |    |    |
| K                  |    |    | AC301K |    |    |    |    |    |    |    |    |
| S                  |    |    |        |    |    |    |    |    |    |    |    |
| N                  |    |    |        |    |    |    |    |    |    |    |    |
| H                  |    |    |        |    |    |    |    |    |    |    |    |

Remark:  Best choice

**AP351K**

Coating: PVD coating

Suitable for nodular cast iron, finish, semi-finish and rough milling. High strength and wear resistance carbide substrate with nanostructured PVD coating in controllable layer, high coating adhesion, wear resistance and oxidation resistance.



| Application range  |    |    |        |    |    |    |    |    |    |    |    |
|--------------------|----|----|--------|----|----|----|----|----|----|----|----|
| ISO Classification | 01 | 05 | 10     | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 |
| P                  |    |    |        |    |    |    |    |    |    |    |    |
| M                  |    |    |        |    |    |    |    |    |    |    |    |
| K                  |    |    | AP351K |    |    |    |    |    |    |    |    |
| S                  |    |    |        |    |    |    |    |    |    |    |    |
| N                  |    |    |        |    |    |    |    |    |    |    |    |
| H                  |    |    |        |    |    |    |    |    |    |    |    |

Remark:  Best choice

**AW100K**

Coating: Uncoated

Uncoated fine grain carbide substrate with special treated cutting edge. Suitable for nonferrous metal milling under various cutting conditions.



| Application range  |    |    |        |    |    |    |    |    |    |    |    |
|--------------------|----|----|--------|----|----|----|----|----|----|----|----|
| ISO Classification | 01 | 05 | 10     | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 |
| P                  |    |    |        |    |    |    |    |    |    |    |    |
| M                  |    |    |        |    |    |    |    |    |    |    |    |
| K                  |    |    |        |    |    |    |    |    |    |    |    |
| S                  |    |    |        |    |    |    |    |    |    |    |    |
| N                  |    |    | AW100K |    |    |    |    |    |    |    |    |
| H                  |    |    |        |    |    |    |    |    |    |    |    |

Remark:  Best choice

**AP351M**

Coating: PVD Coating

Suitable for steel, stainless-steel and heat resistant alloy milling, with excellent thermal-stability and wear-resistant, good thermal-crack resistance and high coating adhesion.



| Application range  |    |    |    |    |    |        |    |    |    |    |    |
|--------------------|----|----|----|----|----|--------|----|----|----|----|----|
| ISO Classification | 01 | 05 | 10 | 15 | 20 | 25     | 30 | 35 | 40 | 45 | 50 |
| P                  |    |    |    |    |    | AP351M |    |    |    |    |    |
| M                  |    |    |    |    |    | AP351M |    |    |    |    |    |
| K                  |    |    |    |    |    |        |    |    |    |    |    |
| S                  |    |    |    |    |    | AP351M |    |    |    |    |    |
| N                  |    |    |    |    |    |        |    |    |    |    |    |
| H                  |    |    |    |    |    |        |    |    |    |    |    |

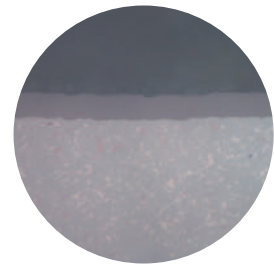
Remark:  Best choice

Milling inserts

**AP403M**

Coating: PVD Coating

Suitable for steel, stainless-steel and heat resistant alloy milling, with good wear-resistance, heat-resistance and high coating adhesion, very smooth coating surface.



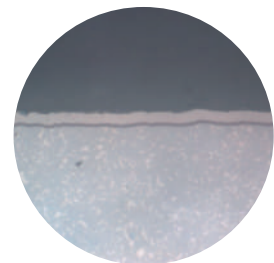
| Application range  |    |    |    |    |    |    |    |        |    |    |    |  |
|--------------------|----|----|----|----|----|----|----|--------|----|----|----|--|
| ISO Classification | 01 | 05 | 10 | 15 | 20 | 25 | 30 | 35     | 40 | 45 | 50 |  |
| P                  |    |    |    |    |    |    |    | AP403M |    |    |    |  |
| M                  |    |    |    |    |    |    |    | AP403M |    |    |    |  |
| K                  |    |    |    |    |    |    |    |        |    |    |    |  |
| S                  |    |    |    |    |    |    |    | AP403M |    |    |    |  |
| N                  |    |    |    |    |    |    |    |        |    |    |    |  |
| H                  |    |    |    |    |    |    |    |        |    |    |    |  |

Remark:  Best choice

**AP403S**

Coating: PVD Coating

Suitable for stainless-steel and heat resistant alloy milling, with new substrate and coating combination, new substrate with high toughness, excellent hot hardness. New generation of PVD coating, with high hardness, high wear-resistance, good performance on heat-conductivity, thermal-stability, smooth surface good for reducing built-up edge.



| Application range  |    |    |    |    |    |    |    |        |    |    |    |  |
|--------------------|----|----|----|----|----|----|----|--------|----|----|----|--|
| ISO Classification | 01 | 05 | 10 | 15 | 20 | 25 | 30 | 35     | 40 | 45 | 50 |  |
| P                  |    |    |    |    |    |    |    |        |    |    |    |  |
| M                  |    |    |    |    |    |    |    | AP403S |    |    |    |  |
| K                  |    |    |    |    |    |    |    |        |    |    |    |  |
| S                  |    |    |    |    |    |    |    | AP403S |    |    |    |  |
| N                  |    |    |    |    |    |    |    |        |    |    |    |  |
| H                  |    |    |    |    |    |    |    |        |    |    |    |  |

Remark:  Best choice

### AP151H

Coating: PVD Coating

Suitable for hardened steel milling and cast iron finish milling. Ultra fine carbide substrate with high hardness and wear-resistance. Extremely hard PVD coating with good oxidation resistance, wear resistance, and thermal crack resistance.



| Application range  |    |    |        |    |    |    |    |    |    |    |    |
|--------------------|----|----|--------|----|----|----|----|----|----|----|----|
| ISO Classification | 01 | 05 | 10     | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 |
| P                  |    |    |        |    |    |    |    |    |    |    |    |
| M                  |    |    |        |    |    |    |    |    |    |    |    |
| K                  |    |    |        |    |    |    |    |    |    |    |    |
| S                  |    |    |        |    |    |    |    |    |    |    |    |
| N                  |    |    |        |    |    |    |    |    |    |    |    |
| H                  |    |    | AP151H |    |    |    |    |    |    |    |    |

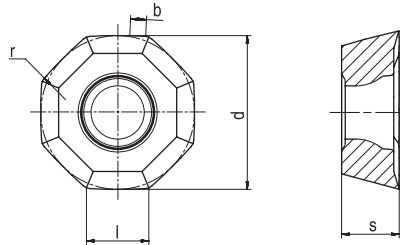
Remark:  Best choice



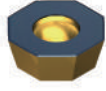
Milling inserts



OD..04/06

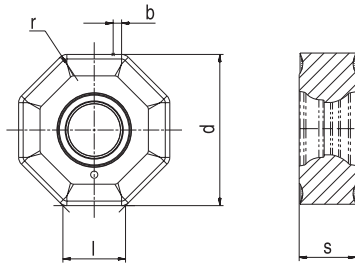
Positive octagonal milling inserts






| Inserts   | Product code      | Dimension(mm) |      |      |     |     | Grades |        |        |        |        |        |        |
|---|-------------------|---------------|------|------|-----|-----|--------|--------|--------|--------|--------|--------|--------|
|   |                   | l             | d    | s    | r   | b   | AP301U | AP351U | AC301P | AP401U | AC301K | AP351K | AW100K |
|    | ODET 0404APFN-FM2 | 4             | 12.7 | 4.76 | -   | 1.2 |        |        |        |        |        |        | ●      |
|   | ODET 0605APFN-FM2 | 6             | 16   | 5.56 | -   | 1.6 |        |        |        |        |        |        | ●      |
|   | ODHT 0404APEN-MM3 | 4             | 12.7 | 4.76 | -   | 1.2 | ●      | ●      |        | ●      | ●      | ●      |        |
|   | ODMT 040408EN-MM3 | 4             | 12.7 | 4.76 | 0.8 | -   |        | ●      |        | ●      |        |        |        |
|   | ODMT 060508EN-MM3 | 6             | 16   | 5.56 | 0.8 | -   | ●      | ●      | ●      | ●      | ●      | ●      |        |
|   | ODMT 060512EN-MM3 | 6             | 16   | 5.56 | 1.2 | -   | ●      |        |        |        |        |        |        |
|   | ODHT 0605APEN-MM3 | 6             | 16   | 5.56 | -   | 1.6 | ●      | ●      |        | ●      | ●      | ●      |        |
|  | ODEW 0404APSR-HR2 | 4             | 12.7 | 4.76 | -   | 1.2 | ●      |        |        |        | ●      | ●      |        |
|   | ODEW 0605APSR-HR2 | 6             | 16   | 5.56 | -   | 1.6 |        |        |        |        | ●      | ●      |        |
|   | ODEW 0605APSN-HR2 | 6             | 16   | 5.56 | -   | 1.6 |        |        |        |        | ●      |        |        |
|   | ODMW 040408EN-HR2 | 4             | 12.7 | 4.76 | 0.8 | -   | ●      |        |        |        | ●      |        |        |
|   | ODMW 060512EN-HR2 | 6             | 16   | 5.56 | 1.2 | -   |        |        |        |        | ●      | ●      |        |

Marked: ● Stock available ○ Non-stocked standard

**ON..05**  
**Negative octagonal milling inserts**



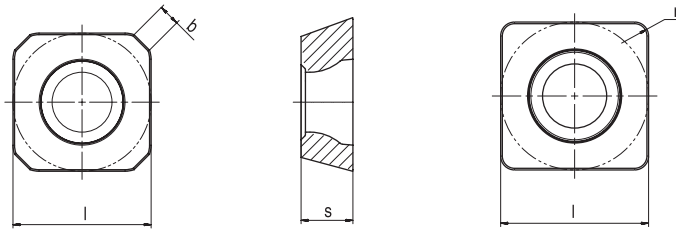
| Inserts   | Product code              | Dimension(mm) |       |      |     |     | Grades |        |        |        |        |        |        |
|---|---------------------------|---------------|-------|------|-----|-----|--------|--------|--------|--------|--------|--------|--------|
|   |                           | l             | d     | s    | r   | b   | AP301U | AP351U | AC301P | AP401U | AC301K | AP351K | AW100K |
|    | <b>ONHU 050408-MM3</b>    | 4.00          | 12.70 | 4.76 | 0.8 | -   | ●      |        |        |        |        |        |        |
|   | <b>ONMU 050408-MM4</b>    | 4.00          | 12.70 | 4.76 | 0.8 | -   | ●      | ●      |        | ●      | ●      | ●      |        |
|   | <b>ONHU 050408AEN-MM3</b> | 4.00          | 12.70 | 4.76 | 0.8 | 0.7 | ●      | ●      |        |        |        | ●      |        |
|   | <b>ONHU 050408AEN-MM4</b> | 4.00          | 12.70 | 4.76 | 0.8 | 0.7 |        | ●      |        |        | ●      | ●      |        |
|  | <b>ONHU 0504ZNR-MM3</b>   | 4.00          | 12.70 | 4.76 | 0.8 | 1.4 | ●      |        |        |        |        |        |        |

Marked: ● Stock available ○ Non-stocked standard

Milling inserts

SC..09/12

Positive square milling inserts

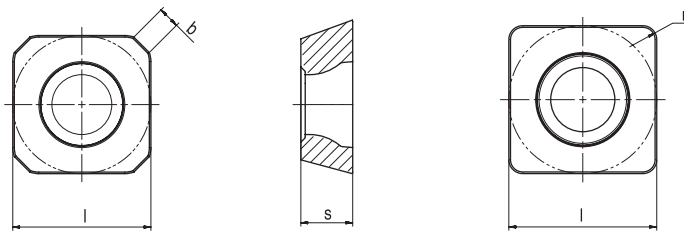



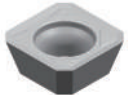

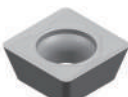
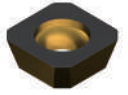
| Inserts | Product code      | Dimension(mm) |      |     |     | Grades |        |        |        |        |        |        |
|---------|-------------------|---------------|------|-----|-----|--------|--------|--------|--------|--------|--------|--------|
|         |                   | l             | s    | r   | b   | AP301U | AP351U | AC301P | AP401U | AC301K | AP351K | AW100K |
|         | SCMT 09T304EN-MM3 | 9.525         | 3.97 | 0.4 | -   | ●      | ●      |        | ●      |        |        |        |
|         | SCMT 120412EN-MM3 | 12.7          | 4.76 | 1.2 | -   |        | ●      |        | ●      |        |        |        |
|         | SCMT 12M512EN-MM3 | 12.7          | 5    | 1.2 | -   |        | ●      |        | ●      |        |        |        |
|         | SCHT 1204ACEN-MR6 | 12.7          | 4.76 | -   | 1.5 |        |        |        | ●      |        | ●      |        |
|         | SCHT 12M5ACEN-MR6 | 12.7          | 5    | -   | 1.5 |        |        |        | ●      |        | ●      |        |
|         | SCMW 12M512EN-HR2 | 12.7          | 5    | 1.2 | -   |        | ●      |        |        |        | ●      |        |
|         |                   |               |      |     |     |        |        |        |        |        |        |        |
|         |                   |               |      |     |     |        |        |        |        |        |        |        |

Marked: ● Stock available ○ Non-stocked standard

## SD..09/12

## Positive square milling inserts

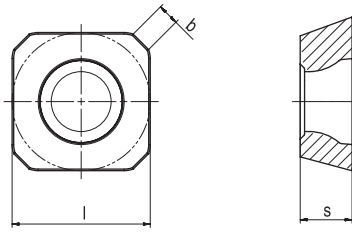


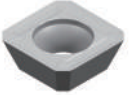
| Inserts   | Product code      | Dimension(mm) |      |     |     | Grades |        |        |        |        |        |        |
|---|-------------------|---------------|------|-----|-----|--------|--------|--------|--------|--------|--------|--------|
|   |                   | l             | s    | r   | b   | AP301U | AP351U | AC301P | AP401U | AC301K | AP351K | AW100K |
|    | SDMT 09T304EN-MM3 | 9.525         | 3.97 | 0.4 | -   | ●      | ●      | ●      |        | ●      |        |        |
|   | SDMT 09T308EN-MM3 | 9.525         | 3.97 | 0.8 | -   | ●      | ●      | ●      |        | ●      |        |        |
|   | SDMT 09T320-MM4   | 9.525         | 3.97 | 2.0 | -   |        |        |        | ●      |        |        |        |
|   | SDMT 120408EN-MM4 | 12.7          | 4.76 | 0.8 | -   | ●      | ●      |        |        | ●      | ●      |        |
|   | SDMT 120412EN-MM3 | 12.7          | 4.76 | 1.2 | -   | ●      |        | ●      |        | ●      |        |        |
|  | SDGT 09T3AEEN-MM4 | 9.525         | 3.97 | -   | 1.5 | ●      | ●      |        |        | ●      | ●      |        |
|  | SDKT 1204AEEN-MR2 | 12.7          | 4.76 | -   | 2.0 | ●      | ●      | ●      |        | ●      | ●      |        |
|  | SDGT 09T3PDER-MR6 | 9.525         | 3.97 | 0.8 | 1.2 | ●      | ●      |        |        | ●      | ●      |        |
|   | SDGT 1204PDER-MR6 | 12.7          | 4.76 | 0.8 | 1.6 | ●      | ●      |        |        | ●      | ●      |        |
|   | SDHT 1204AEEN-MR6 | 12.7          | 4.76 | 0.8 | 2.0 | ●      | ●      |        |        | ●      | ●      |        |
|  | SDMW 09T308EN-HR2 | 9.525         | 3.97 | 0.8 | -   | ●      |        |        |        | ●      |        |        |
|   | SDHW 09T3AESN-HR2 | 9.525         | 3.97 | -   | 1.5 | ●      |        |        |        | ●      | ●      |        |
|   | SDMW 120412EN-HR2 | 12.7          | 4.76 | 1.2 | -   | ●      |        |        |        | ●      | ●      |        |
|   | SDHW 1204AESN-HR2 | 12.7          | 4.76 | -   | 2.0 | ●      |        |        |        | ●      | ●      |        |

Marked: ● Stock available ○ Non-stocked standard

SE..12

Positive square milling inserts

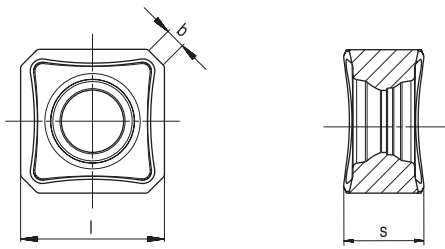


| Inserts   | Product code      | Dimension(mm) |      |     |     | Grades |        |        |        |        |        |        |
|---|-------------------|---------------|------|-----|-----|--------|--------|--------|--------|--------|--------|--------|
|   |                   | l             | s    | r   | b   | AP301U | AP351U | AC301P | AP401U | AC301K | AP351K | AW100K |
|  | SEKT 1204AFER-MR2 | 12.7          | 4.91 | 1.2 | 1.8 | ●      | ●      | ●      |        | ●      | ●      |        |
|   |                   |               |      |     |     |        |        |        |        |        |        |        |
|   |                   |               |      |     |     |        |        |        |        |        |        |        |
|   |                   |               |      |     |     |        |        |        |        |        |        |        |
|   |                   |               |      |     |     |        |        |        |        |        |        |        |
|   |                   |               |      |     |     |        |        |        |        |        |        |        |
|   |                   |               |      |     |     |        |        |        |        |        |        |        |

Marked: ● Stock available ○ Non-stocked standard

**SNGX12/19**

Negative short wiper milling inserts(applicable to AFM45-SN12/SN19 milling cutter)

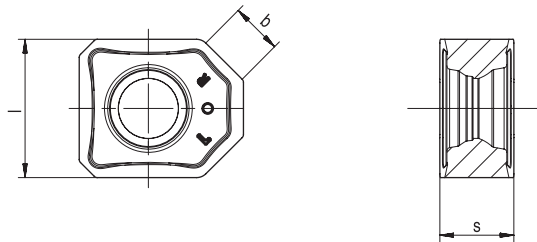


| Inserts          | Product code     | Dimension(mm) |      |     | Grades |        |        |        |        |        |        |
|------------------|------------------|---------------|------|-----|--------|--------|--------|--------|--------|--------|--------|
|                  |                  | l             | s    | b   | AP301U | AP351U | AC301P | AP401U | AC301K | AP351K | AW100K |
|                  | SNHX 1206ANN-FM2 | 12.7          | 6.98 | 1.8 |        |        |        |        |        |        | ●      |
|                  | SNGX 1206ANN-MM3 | 12.7          | 6.98 | 1.8 | ●      | ●      | ●      |        | ●      | ●      |        |
|                  | SNGX 1206ANN-MM4 | 12.7          | 6.98 | 1.8 | ●      | ●      | ●      |        | ●      | ●      |        |
|                  | SNGX 1206ANN-MR6 | 12.7          | 6.98 | 1.8 | ●      | ●      | ●      |        | ●      | ●      |        |
|                  | SNGX 1206ANN-RR2 | 12.7          | 6.98 | 1.8 | ●      | ●      | ●      |        | ●      | ●      |        |
|                  | SNMX 1206ANN-MM3 | 12.7          | 6.98 | 1.8 | ●      | ●      | ●      |        | ●      | ●      |        |
|                  | SNMX 1206ANN-MM4 | 12.7          | 6.98 | 1.8 | ●      | ●      | ●      |        | ●      | ●      |        |
|                  | SNMX 1206ANN-MR6 | 12.7          | 6.98 | 1.8 | ●      | ●      | ●      |        | ●      | ●      |        |
|                  | SNGX 1909ANN-MM3 | 19.05         | 9.52 | 2.9 |        | ●      |        |        |        |        |        |
| SNGX 1909ANN-MR6 | 19.05            | 9.52          | 2.9  |     | ●      |        |        |        |        |        |        |

Milling inserts

**SNHX12**

Negative long wiper milling inserts(applicable to AFM45-SN12 milling cutter)



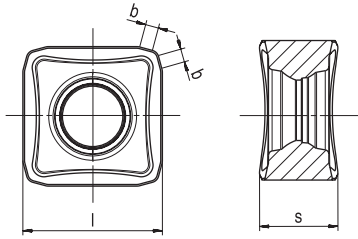
| Inserts | Product code   | Dimension(mm) |      |     | Grades |        |        |        |        |        |        |
|---------|----------------|---------------|------|-----|--------|--------|--------|--------|--------|--------|--------|
|         |                | l             | s    | b   | AP301U | AP351U | AC301P | AP401U | AC301K | AP351K | AW100K |
|         | SNHX 1206ANN-W | 12.7          | 6.98 | 6.7 | ●      |        |        |        | ●      |        |        |


Marked: ● Stock available ○ Non-stocked standard



**SNGX12**

Negative short wiper milling inserts(applicable to AFM75-SN12 milling cutter)

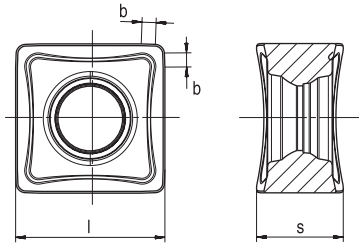


| Inserts   | Product code     | Dimension(mm) |      |     | Grades |        |        |        |        |        |        |
|---|------------------|---------------|------|-----|--------|--------|--------|--------|--------|--------|--------|
|   |                  | l             | s    | b   | AP301U | AP351U | AC301P | AP401U | AC301K | AP351K | AW100K |
|  | SNGX 1206ENN-MM3 | 12.7          | 6.98 | 1.2 | ●      | ●      | ●      |        | ●      | ●      |        |
|   | SNGX 1206ENN-MM4 | 12.7          | 6.98 | 1.2 | ●      | ●      | ●      |        | ●      | ●      |        |
|   | SNGX 1206ENN-MR6 | 12.7          | 6.98 | 1.2 | ●      | ●      | ●      |        | ●      | ●      |        |
|   | SNMX 1206ENN-MM4 | 12.7          | 6.98 | 1.2 |        |        | ●      |        |        |        |        |
|   |                  |               |      |     |        |        |        |        |        |        |        |
|   |                  |               |      |     |        |        |        |        |        |        |        |
|   |                  |               |      |     |        |        |        |        |        |        |        |
|   |                  |               |      |     |        |        |        |        |        |        |        |

Marked: ● Stock available ○ Non-stocked standard

**SNGX12**

Negative short wiper milling inserts(applicable to AFM88-SN12 milling cutter)

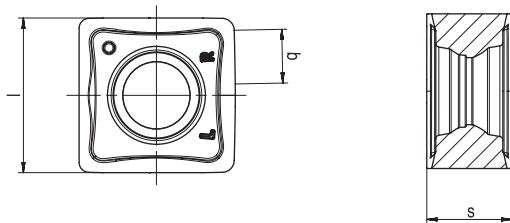


| Inserts | Product code     | Dimension(mm) |      |     | Grades |        |        |        |        |        |        |
|---------|------------------|---------------|------|-----|--------|--------|--------|--------|--------|--------|--------|
|         |                  | l             | s    | b   | AP301U | AP351U | AC301P | AP401U | AC301K | AP351K | AW100K |
|         | SNHX 1206ZNN-FM2 | 12.7          | 7.63 | 0.8 |        |        |        |        |        |        | ●      |
|         | SNGX 1206ZNN-MM4 | 12.7          | 6.98 | 1.2 | ●      | ●      | ●      |        | ●      | ●      |        |
|         | SNGX 1206ZNN-MR6 | 12.7          | 6.98 | 1.2 | ●      | ●      | ●      |        | ●      | ●      |        |
|         | SNGX 1206ZNN-MM3 | 12.7          | 6.98 | 1.2 | ●      | ●      | ●      |        | ●      | ●      |        |

Milling inserts

**SNHX12**

Negative long wiper milling inserts(applicable to AFM88-SN12 milling cutter)



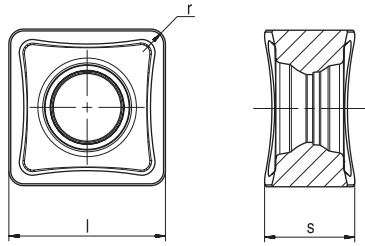
| Inserts | Product code   | Dimension(mm) |      |     | Grades |        |        |        |        |        |        |
|---------|----------------|---------------|------|-----|--------|--------|--------|--------|--------|--------|--------|
|         |                | l             | s    | b   | AP301U | AP351U | AC301P | AP401U | AC301K | AP351K | AW100K |
|         | SNHX 1206ZNN-W | 12.7          | 6.98 | 4.4 | ●      |        |        |        | ●      |        |        |
|         |                |               |      |     |        |        |        |        |        |        |        |
|         |                |               |      |     |        |        |        |        |        |        |        |

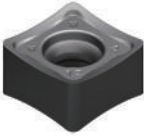
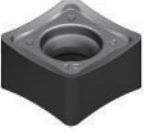
Marked: ● Stock available ○ Non-stocked standard



SN.X12

Negative square milling inserts with corner radius

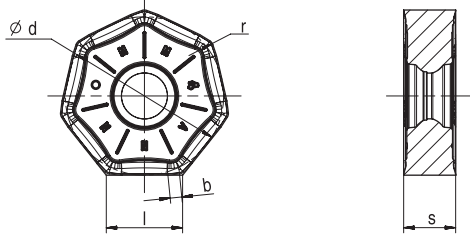








| Inserts   | Product code    | Dimension(mm) |      |     |   | Grades |        |        |        |        |        |        |
|---|-----------------|---------------|------|-----|---|--------|--------|--------|--------|--------|--------|--------|
|   |                 | l             | s    | r   | b | AP301U | AP351U | AC301P | AP401U | AC301K | AP351K | AW100K |
|    | SNGX 120608-MM4 | 12.7          | 6.98 | 0.8 | - | ●      | ●      | ●      |        | ●      | ●      |        |
|   | SNGX 120612-MM4 | 12.7          | 6.98 | 1.2 | - | ●      |        |        |        |        |        |        |
|   |                 |               |      |     |   |        |        |        |        |        |        |        |
|  | SNMX 120608-MM4 | 12.7          | 6.98 | 0.8 | - | ●      | ●      | ●      |        | ●      | ●      |        |
|   | SNMX 120612-MM3 | 12.7          | 6.98 | 1.2 | - | ●      | ●      | ●      |        | ●      | ●      |        |
|   | SNMX 120612-MM4 | 12.7          | 6.98 | 1.2 | - | ●      | ●      | ●      |        | ●      | ●      |        |
|   | SNMX 120612-MR6 | 12.7          | 6.98 | 1.2 | - | ●      | ●      | ●      |        | ●      | ●      |        |
|   | SNMX 120612-RR2 | 12.7          | 6.98 | 1.2 | - | ●      | ●      | ●      |        | ●      | ●      |        |
|   | SNMX 120620-MM4 | 12.7          | 6.98 | 2.0 | - | ●      | ●      | ●      |        | ●      | ●      |        |
|   | SNMX 120620-RR2 | 12.7          | 6.98 | 2.0 | - | ●      | ●      | ●      |        | ●      | ●      |        |
|   |                 |               |      |     |   |        |        |        |        |        |        |        |
|   |                 |               |      |     |   |        |        |        |        |        |        |        |

Marked: ● Stock available ○ Non-stocked standard

## XN.U07/09ANN

### Negative heptagonal milling inserts with short wiper

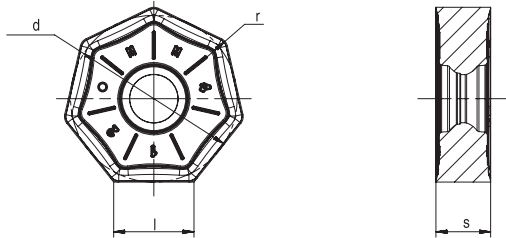


| Inserts   | Product code     | Dimension(mm) |      |      |     |     | Grades |        |        |        |        |        |        |
|---|------------------|---------------|------|------|-----|-----|--------|--------|--------|--------|--------|--------|--------|
|   |                  | l             | d    | s    | r   | b   | AP301U | AP351U | AC301P | AP401U | AC301K | AP351K | AW100K |
|    | XNGU 0705ANN-MM3 | 7.0           | 14.5 | 5.4  | 0.8 | 1.1 | ●      | ●      |        |        | ●      |        |        |
|   | XNGU 0705ANN-MM4 | 7.0           | 14.5 | 5.4  | 0.8 | 1.1 | ●      |        |        |        | ●      |        |        |
|   | XNMU 0705ANN-MM4 | 7.0           | 14.5 | 5.4  | 0.8 | 1.1 | ●      | ●      | ●      | ●      | ●      | ●      |        |
|  | XNMU 0705ANN-MR6 | 7.0           | 14.5 | 5.4  | 0.8 | 1.1 | ●      | ●      |        |        | ●      | ●      |        |
|  | XNGU 0906ANN-MM3 | 9.2           | 19.0 | 6.25 | 0.8 | 1.4 | ●      | ●      | ●      |        | ●      |        |        |
|  | XNGU 0906ANN-MM4 | 9.2           | 19.0 | 6.25 | 0.8 | 1.4 | ●      | ●      | ●      |        | ●      |        |        |
|  | XNMU 0906ANN-MR6 | 9.2           | 19.0 | 6.25 | 0.8 | 1.4 | ●      |        |        |        | ●      | ●      |        |

Marked: ● Stock available ○ Non-stocked standard

**XN.U 07/09**

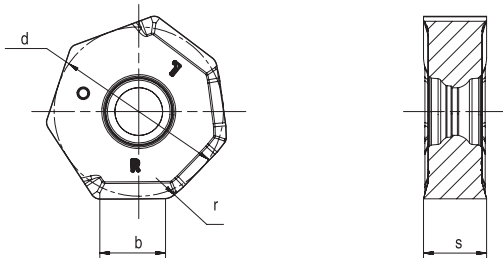
**Negative heptagonal milling inserts with corner radius**



| Inserts | Product code    | Dimension(mm) |      |      |     |   | Grades |        |        |        |        |        |        |  |
|---------|-----------------|---------------|------|------|-----|---|--------|--------|--------|--------|--------|--------|--------|--|
|         |                 | l             | d    | s    | r   | b | AP301U | AP351U | AC301P | AP401U | AC301K | AP351K | AW100K |  |
|         | XNMU 070508-MM4 | 7.0           | 14.5 | 5.40 | 0.8 | - |        | ●      |        |        | ●      | ●      | ●      |  |
|         | XNMU 090612-MM4 | 9.2           | 19.0 | 6.25 | 1.2 | - | ●      | ●      |        |        | ●      | ●      | ●      |  |

**XNGX 07/09ANN-W**

**Negative milling inserts with long wiper**

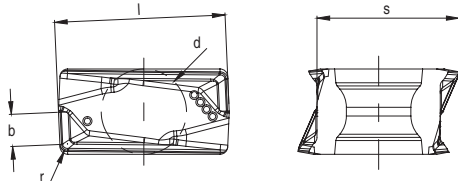


| Inserts | Product code   | Dimension(mm) |       |     |     |     | Grades |        |        |        |        |        |        |  |
|---------|----------------|---------------|-------|-----|-----|-----|--------|--------|--------|--------|--------|--------|--------|--|
|         |                | l             | d     | s   | r   | b   | AP301U | AP351U | AC301P | AP401U | AC301K | AP351K | AW100K |  |
|         | XNGX 0705ANN-W | -             | 15    | 5.4 | 1.0 | 6   | ●      |        |        |        |        | ●      |        |  |
|         | XNGX 0906ANN-W | -             | 19.05 | 6.2 | 1.0 | 7.5 | ●      |        |        |        |        | ●      |        |  |

Marked: ● Stock available ○ Non-stocked standard

**LNHU 0904**

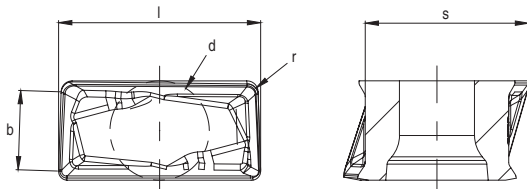
**Negative shoulder milling insert**



| Inserts | Product code      | Dimension(mm) |     |      |     |   | Grades |        |        |        |        |        |        |
|---------|-------------------|---------------|-----|------|-----|---|--------|--------|--------|--------|--------|--------|--------|
|         |                   | l             | d   | s    | r   | b | AP301U | AC301P | AP351U | AP403M | AC301K | AP351K | AW100K |
|         | LNHU 090404ER-FM2 | 9             | 4.5 | 7.5  | 0.4 | - |        |        |        |        |        |        | ●      |
|         | LNHU 090404ER-MM3 | 9             | 4.5 | 7.5  | 0.4 | - |        |        | ●      | ●      |        |        |        |
|         | LNHU 090404ER-MR2 | 9             | 4.5 | 7.5  | 0.4 | - | ●      |        | ●      | ●      | ●      | ●      |        |
|         | LNHU 090408ER-MR2 | 9             | 4.5 | 7.45 | 0.8 | - | ●      |        | ●      | ●      | ●      | ●      |        |
|         | LNHU 090412ER-MR2 | 9             | 4.5 | 7.4  | 1.2 | - | ●      |        |        | ●      | ●      |        |        |
|         | LNHU 090416ER-MR2 | 9             | 4.5 | 7.35 | 1.6 | - | ●      |        |        | ●      | ●      |        |        |
|         | LNHU 090420ER-MR2 | 9             | 4.5 | 7.31 | 2   | - | ●      |        |        | ●      | ●      |        |        |

Milling inserts

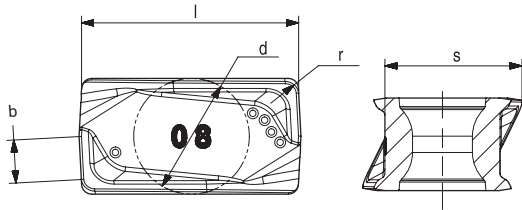
**Wiper insert type**



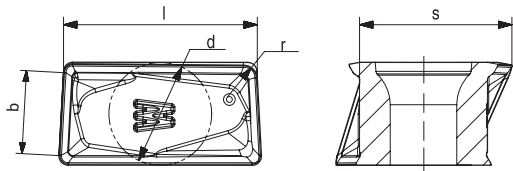
| Inserts | Product code   | Dimension(mm) |     |     |     |     | Grades |        |        |        |        |        |        |
|---------|----------------|---------------|-----|-----|-----|-----|--------|--------|--------|--------|--------|--------|--------|
|         |                | l             | d   | s   | r   | b   | AP301U | AC301P | AP351U | AP403M | AC301K | AP351K | AW100K |
|         | LNHU0904PDER-W | 9.24          | 4.5 | 7.4 | 0.4 | 3.6 | ●      |        |        |        |        | ●      |        |
|         |                |               |     |     |     |     |        |        |        |        |        |        |        |
|         |                |               |     |     |     |     |        |        |        |        |        |        |        |

Marked: ● Stock available ○ Non-stocked standard

**LNHU 1306...**  
Negative shoulder milling insert



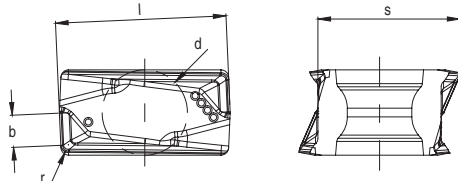
| Inserts | Product code      | Dimension(mm) |     |       |     |   | Grades |        |        |        |        |        |        |
|---------|-------------------|---------------|-----|-------|-----|---|--------|--------|--------|--------|--------|--------|--------|
|         |                   | l             | d   | s     | r   | b | AP301U | AC301P | AP351U | AP401U | AC301K | AP351K | AW100K |
|         | LNHU 130608ER-FM2 | 13.02         | 6.8 | 10.11 | 0.8 | - |        |        |        |        |        |        | ●      |
|         | LNHU 130608ER-MM3 | 13.02         | 6.8 | 10.19 | 0.8 | - |        |        |        | ●      |        |        |        |
|         | LNHU 130608ER-MR2 | 13.02         | 6.8 | 10.15 | 0.8 | - | ●      | ●      | ●      | ●      | ●      | ●      |        |
|         | LNHU 130612ER-MR2 | 13.02         | 6.8 | 10.09 | 1.2 | - |        |        | ●      | ●      | ●      |        |        |
|         | LNHU 130616ER-MR2 | 13.02         | 6.8 | 10.03 | 1.6 | - |        |        | ●      | ●      | ●      |        |        |
|         | LNHU 130620ER-MR2 | 13.02         | 6.8 | 9.99  | 2.0 | - |        |        | ●      | ●      |        |        |        |
|         | LNHU 130624ER-MR2 | 13.02         | 6.8 | 9.92  | 2.4 | - |        |        | ●      | ●      |        |        |        |
|         | LNHU 130631ER-MR2 | 13.02         | 6.8 | 9.83  | 3.1 | - |        |        | ●      | ●      | ●      |        |        |




| Inserts | Product code    | Dimension(mm) |     |       |     |     | Grades |        |        |        |        |        |        |
|---------|-----------------|---------------|-----|-------|-----|-----|--------|--------|--------|--------|--------|--------|--------|
|         |                 | l             | d   | s     | r   | b   | AP301U | AC301P | AP351U | AP401U | AC301K | AP351K | AW100K |
|         | LNHU 1306PDER-W | 13.39         | 6.8 | 10.02 | 0.8 | 5.6 | ●      |        |        |        |        | ●      |        |
|         |                 |               |     |       |     |     |        |        |        |        |        |        |        |
|         |                 |               |     |       |     |     |        |        |        |        |        |        |        |

Marked: ● Stock available ○ Non-stocked standard

**LNHU 1607..**  
**Negative shoulder milling insert**

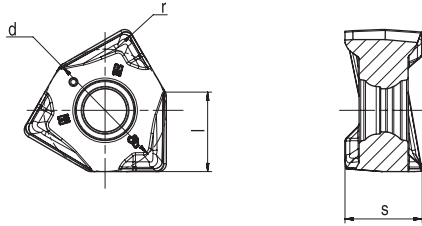


| Inserts   | Product code      | Dimension(mm) |     |    |     | Grades |        |        |        |        |        |        |
|---|-------------------|---------------|-----|----|-----|--------|--------|--------|--------|--------|--------|--------|
|   |                   | l             | d   | s  | r   | AP301U | AC301P | AP351U | AP403M | AC301K | AP351K | AW100K |
|  | LNHU 160708ER-MR2 | 16            | 7.2 | 13 | 0.8 | ●      |        | ●      |        | ●      | ●      |        |
|   | LNHU 160716ER-MR2 | 16            | 7.2 | 13 | 1.6 | ●      |        |        |        | ●      |        |        |
|   |                   |               |     |    |     |        |        |        |        |        |        |        |
|   |                   |               |     |    |     |        |        |        |        |        |        |        |
|   |                   |               |     |    |     |        |        |        |        |        |        |        |
|   |                   |               |     |    |     |        |        |        |        |        |        |        |
|   |                   |               |     |    |     |        |        |        |        |        |        |        |

Marked: ● Stock available ○ Non-stocked standard

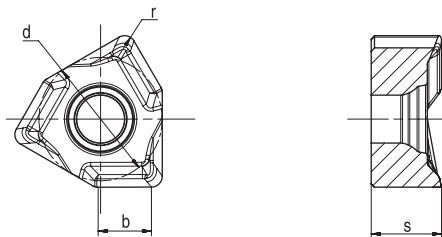
Milling inserts

**WN..08**  
Negative milling insert



| Inserts | Product code     | Dimension(mm) |      |      |     | Grades |        |        |        |        |        |        |        |
|---------|------------------|---------------|------|------|-----|--------|--------|--------|--------|--------|--------|--------|--------|
|         |                  | l             | d    | s    | r   | AP301U | AC301P | AP351U | AP401U | AC301K | AP351K | AW100K | AP151H |
|         | WNHU 080608R-FM2 | 8             | 12.5 | 7.88 | 0.8 |        |        |        |        |        |        | ●      |        |
|         | WNGU 080604R-MM3 | 8             | 12.5 | 7.88 | 0.4 |        |        | ●      | ●      |        |        |        |        |
|         | WNGU 080608R-MM3 | 8             | 12.5 | 7.88 | 0.8 | ●      |        | ●      | ●      |        |        |        |        |
|         | WNGU 080604R-MM4 | 8             | 12.5 | 7.88 | 0.4 | ●      |        | ●      | ●      |        | ●      |        |        |
|         | WNGU 080608R-MM4 | 8             | 12.5 | 7.88 | 0.8 | ●      | ●      | ●      | ●      | ●      | ●      |        | ●      |
|         | WNGU 080612R-MM4 | 8             | 12.5 | 7.88 | 1.2 | ●      |        | ●      | ●      |        |        |        |        |
|         | WNGU 080616R-MM4 | 8             | 12.5 | 7.88 | 1.6 | ●      |        | ●      | ●      |        |        |        |        |
|         | WNGU 080608R-MR2 | 8             | 12.5 | 7.88 | 0.8 | ●      |        |        |        |        | ●      |        |        |
|         | WNGU 080612R-MR2 | 8             | 12.5 | 7.88 | 1.2 | ●      |        |        |        |        | ●      |        |        |
|         | WNGU 080616R-MR2 | 8             | 12.5 | 7.88 | 1.6 | ●      |        |        |        |        | ●      |        |        |

**WNGU 08**  
Negative wiper milling insert

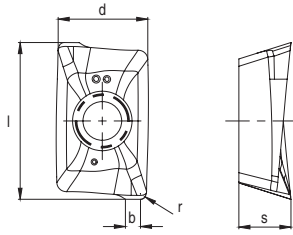



| Inserts | Product code   | Dimension(mm) |     |      |   | Grades |        |        |        |        |        |        |
|---------|----------------|---------------|-----|------|---|--------|--------|--------|--------|--------|--------|--------|
|         |                | d             | b   | s    | r | AP301U | AC301P | AP351U | AP401U | AC301K | AP351K | AW100K |
|         | WNHX 0806ZZR-W | 12.5          | 4.8 | 6.47 | 1 | ●      |        |        |        | ●      |        |        |

Marked: ● Stock available ○ Non-stocked standard



**APKT 1003PDER-IT..**  
**Positive shoulder milling insert**



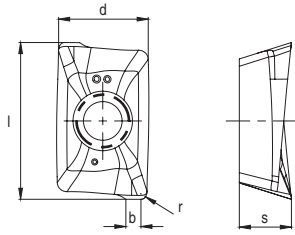
| Inserts   | Product code            | Dimension(mm) |      |      |     |      | Grades |        |        |        |        |        |        |
|---|-------------------------|---------------|------|------|-----|------|--------|--------|--------|--------|--------|--------|--------|
|   |                         | l             | d    | s    | r   | b    | AP301U | AC301P | AP351U | AP401U | AC301K | AP351K | AP403S |
|  | <b>APKT 1003PDER-IT</b> | 11.35         | 6.66 | 3.77 | 0.8 | 1.08 | ●      |        | ●      | ●      |        |        | ●      |
|   |                         |               |      |      |     |      |        |        |        |        |        |        |        |
|   |                         |               |      |      |     |      |        |        |        |        |        |        |        |
|   |                         |               |      |      |     |      |        |        |        |        |        |        |        |
|   |                         |               |      |      |     |      |        |        |        |        |        |        |        |


Marked: ● Stock available ○ Non-stocked standard

Milling inserts



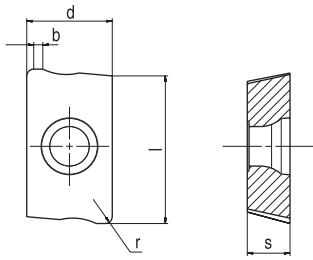
**APKT 1705...-DT..**  
**Positive shoulder milling insert**





| Inserts   | Product code    | Dimension(mm) |       |      |     |      | Grades |        |        |        |        |        |        |
|---|-----------------|---------------|-------|------|-----|------|--------|--------|--------|--------|--------|--------|--------|
|   |                 | l             | d     | s    | r   | b    | AP301U | AC301P | AP351U | AP401U | AC301K | AP351K | AP403S |
|  | APKT 1705PER-DT | 18.40         | 10.76 | 5.56 | 0.8 | 2.16 | ●      | ●      | ●      | ●      |        | ●      | ●      |
|   | APKT 170516R-DT | 18.62         | 10.76 | 5.56 | 1.6 | 1.7  | ●      |        |        | ●      |        | ●      |        |
|   |                 |               |       |      |     |      |        |        |        |        |        |        |        |
|   |                 |               |       |      |     |      |        |        |        |        |        |        |        |
|   |                 |               |       |      |     |      |        |        |        |        |        |        |        |

Marked: ● Stock available ○ Non-stocked standard

**APMT..**  
**Positive shoulder milling inserta**

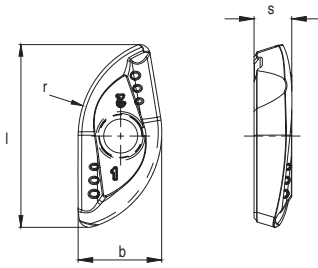



| Inserts   | Product code  | Dimension(mm) |      |      |     |      | Grades |        |        |        |        |        |        |
|---|---------------|---------------|------|------|-----|------|--------|--------|--------|--------|--------|--------|--------|
|   |               | l             | d    | s    | r   | b    | AP301U | AC301P | AP351U | AP401U | AC301K | AP351K | AP151H |
|    | APMT 1135PDER | 11.31         | 6.26 | 3.5  | 0.8 | 1.25 | ●      |        | ●      |        |        |        | ●      |
|   |               |               |      |      |     |      |        |        |        |        |        |        |        |
|   |               |               |      |      |     |      |        |        |        |        |        |        |        |
|   |               |               |      |      |     |      |        |        |        |        |        |        |        |
|  | APMT 1604PDER | 17.32         | 9.37 | 5.17 | 0.8 | 1.54 | ●      |        | ●      |        |        |        | ●      |
|   |               |               |      |      |     |      |        |        |        |        |        |        |        |
|   |               |               |      |      |     |      |        |        |        |        |        |        |        |
|   |               |               |      |      |     |      |        |        |        |        |        |        |        |

Marked: ● Stock available ○ Non-stocked standard

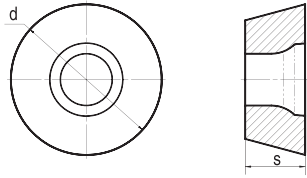
Milling inserts

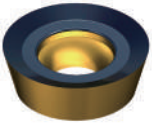
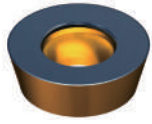
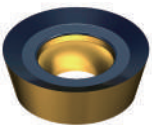
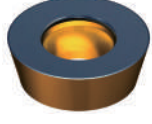
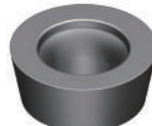

RPM ...MM4  
Copy milling insert



| Inserts   | Product code  | Dimension(mm) |      |      |     | Grades |        |        |        |        |        |        |        |
|---|---------------|---------------|------|------|-----|--------|--------|--------|--------|--------|--------|--------|--------|
|   |               | l             | b    | s    | r   | AP301U | AC301P | AP351U | AP401U | AP351M | AC301K | AP351K | AP403S |
|  | RPM 080ER-MM4 | 14.76         | 6.89 | 3.21 | 8.0 | ●      |        |        | ●      | ●      |        |        | ●      |
|   | RPM 100ER-MM4 | 18.85         | 8.62 | 3.89 | 10  | ●      |        |        | ●      | ●      |        |        | ●      |
|   |               |               |      |      |     |        |        |        |        |        |        |        |        |
|   |               |               |      |      |     |        |        |        |        |        |        |        |        |
|   |               |               |      |      |     |        |        |        |        |        |        |        |        |
|   |               |               |      |      |     |        |        |        |        |        |        |        |        |
|   |               |               |      |      |     |        |        |        |        |        |        |        |        |

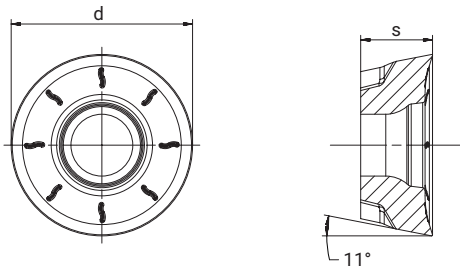
Marked: ● Stock available ○ Non-stocked standard

**RD/RP**  
**Round inserts**


| Inserts   | Product code     | Dimension(mm) |      | Grades |        |        |        |        |        |        |
|---|------------------|---------------|------|--------|--------|--------|--------|--------|--------|--------|
|   |                  | d             | s    | AP301U | AC301P | AP351U | AP401U | AC301K | AP351K | AP151H |
|    | RDHT 0702MOE-MM3 | 7             | 2.38 | ●      |        |        |        |        |        |        |
|   | RDHT 1003MOE-MM3 | 10            | 3.18 | ●      |        |        |        |        |        |        |
|   | RDHT 12T3MOE-MM3 | 12            | 3.97 | ●      | ●      | ●      |        |        |        |        |
|   | RDHT 1606MOE-MM3 | 16            | 6.35 | ●      | ●      | ●      |        |        |        |        |
|   | RDHT 1604MOE-MM3 | 16            | 4.76 | ●      |        | ●      |        |        |        |        |
|  | RDHW 0702MOS-HR2 | 7             | 2.38 | ●      | ●      | ●      |        | ●      | ●      |        |
|   | RDHW 1003MOS-HR2 | 10            | 3.18 | ●      | ●      | ●      |        | ●      | ●      |        |
|   | RDHW 12T3MOS-HR2 | 12            | 3.97 | ●      | ●      | ●      |        | ●      | ●      |        |
|   | RDHW 1606MOS-HR2 | 16            | 6.35 | ●      |        |        |        |        | ●      |        |
|  | RDMT 0702MOE-MM3 | 7             | 2.38 | ●      | ●      |        |        |        |        |        |
|   | RDMT 1003MOE-MM3 | 10            | 3.18 | ●      | ●      | ●      |        |        |        |        |
|   | RDMT 12T3MOE-MM3 | 12            | 3.97 | ●      | ●      |        |        |        |        |        |
|   | RDMT 1606MOE-MM3 | 16            | 6.35 | ●      | ●      |        |        |        |        |        |
|   | RDMT 1604MOE-MM3 | 16            | 4.76 |        | ●      |        |        |        |        |        |
|  | RDMW 1204MOE-HR2 | 12            | 4.76 | ●      |        | ●      |        |        |        |        |
|   | RDMW 1606MOE-HR2 | 16            | 6.35 |        |        |        |        | ●      |        |        |
|  | RPMW 1003MOE-HR2 | 10            | 3.18 | ●      |        | ●      |        |        |        | ●      |
|   | RPMW 10T3MOE-HR2 | 10            | 3.97 | ●      |        | ●      |        |        |        | ●      |
|  | RPMT 1204MOE     | 12            | 4.76 | ●      |        | ●      |        |        |        | ●      |

Marked: ● Stock available ○ Non-stocked standard

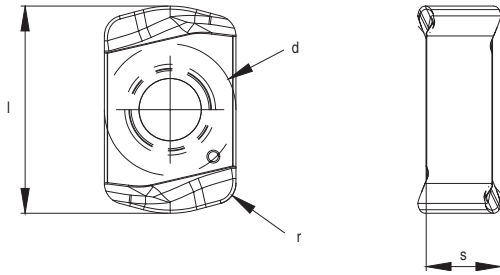
RO..T  
Round inserts





| Inserts | Product code     | Dimension(mm) |      | Grades |        |        |        |        |        |        |
|---------|------------------|---------------|------|--------|--------|--------|--------|--------|--------|--------|
|         |                  | d             | s    | AP301U | AC301P | AP351U | AP403M | AC301K | AP351K | AP403S |
|         | ROHT 0803M0E-MM3 | 8             | 3.18 |        |        |        | ●      |        |        | ●      |
|         | ROHT 10T3M8E-MM3 | 10            | 3.97 |        |        |        | ●      |        |        | ●      |
|         | ROHT 1204M4E-MM3 | 12            | 4.76 |        |        |        | ●      |        |        | ●      |
|         | ROHT 1204M6E-MM3 | 12            | 4.76 |        |        |        | ●      |        |        | ●      |
|         | ROHT 1605M8E-MM3 | 16            | 5.56 |        |        |        | ●      |        |        | ●      |
|         | ROHT 2006M8E-MM3 | 20            | 6.35 |        |        |        | ●      |        |        | ●      |
|         | ROMT 10T3M4E-MR6 | 10            | 3.97 |        |        |        | ●      |        |        | ●      |
|         | ROMT 1204M6E-MR6 | 12            | 4.76 |        |        |        | ●      |        |        | ●      |
|         | ROMT 1605M6E-MR6 | 16            | 5.56 |        |        |        | ●      |        |        | ●      |
|         | ROMT 2006M8E-MR6 | 20            | 6.35 |        |        |        | ●      |        |        | ●      |

Marked: ● Stock available ○ Non-stocked standard

**LN..06**  
**High feed milling inserts**



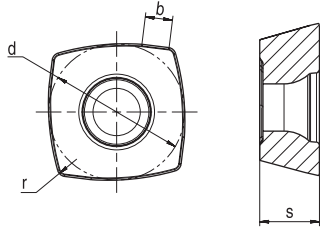
| Inserts  | Product code             | Dimension(mm) |      |     |     | Grades |        |        |        |        |        |        |        |        |        |
|--|--------------------------|---------------|------|-----|-----|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
|  |                          | l             | d    | s   | r   | AC301P | AP301U | AP351U | AP401U | AP403M | AC301K | AP351K | AW100K | AP403S | AP151H |
|   | <b>LNMX 060410R-MM3</b>  | 10            | 6.35 | 3.6 | 1.0 |        | ●      | ●      |        | ●      |        |        |        | ●      |        |
|  | <b>LNMX 060410R-MM4N</b> | 10            | 6.35 | 3.6 | 1.0 |        | ●      | ●      |        | ●      |        |        |        | ●      | ●      |

Marked: ● Stock available ○ Non-stocked standard

Milling inserts

**XD..09/12**

**High feed milling inserts**

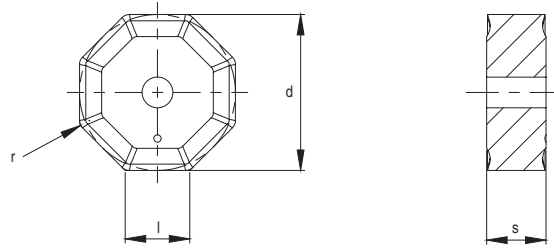


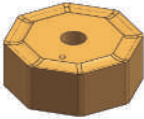
| Inserts | Product code      | Dimension(mm) |      |     |     | Grades |        |        |        |        |        |        |
|---------|-------------------|---------------|------|-----|-----|--------|--------|--------|--------|--------|--------|--------|
|         |                   | d             | s    | r   | b   | AC301P | AP301U | AP351U | AP401U | AC301K | AP351K | AW100K |
|         | XDLT 090408ER-MM3 | 9.525         | 4.76 | 0.8 | 1.3 |        | ●      |        |        |        |        |        |
|         | XDLT 120508ER-MM3 | 12.7          | 5.56 | 0.8 | 2.2 | ●      | ●      | ●      |        | ●      | ●      |        |
|         | XDLT 120512ER-MM3 | 12.7          | 5.56 | 1.2 | 2.2 | ●      | ●      | ●      |        | ●      | ●      |        |
|         | XDMW 090408ER-HR2 | 9.525         | 4.76 | 0.8 | 1.3 |        |        |        |        | ●      |        |        |
|         | XDMW 120508ER-HR2 | 12.7          | 5.56 | 0.8 | 2.2 |        | ●      |        |        | ●      |        |        |
|         |                   |               |      |     |     |        |        |        |        |        |        |        |
|         |                   |               |      |     |     |        |        |        |        |        |        |        |
|         |                   |               |      |     |     |        |        |        |        |        |        |        |

Marked: ● Stock available ○ Non-stocked standard

**ON05/LN12/LN15**

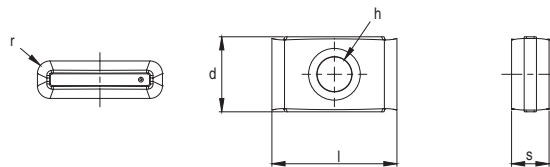
**Cast iron finishing machining inserts**

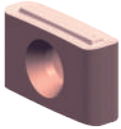


| Inserts   | Product code           | Dimension(mm) |      |      |     | Grades |
|---|------------------------|---------------|------|------|-----|--------|
|   |                        | l             | d    | s    | r   | AP151H |
|  | <b>ONHF 050408-MM3</b> | 5.3           | 12.7 | 4.76 | 0.8 | ●      |

**LN12**

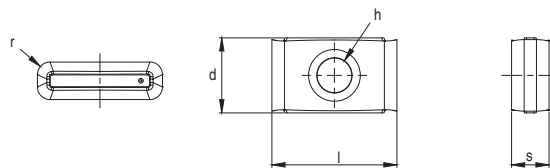
**Cast iron finishing wiper insert**

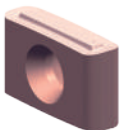


| Inserts   | Product code           | Dimension(mm) |       |      |     |     | Grades |
|---|------------------------|---------------|-------|------|-----|-----|--------|
|   |                        | l             | d     | s    | r   | h   | AP151H |
|  | <b>LNHQ 120408FN-W</b> | 12.7          | 9.525 | 4.76 | 0.8 | 4.2 | ●      |

**LN15**

**Cast iron finishing wiper insert**



| Inserts   | Product code           | Dimension(mm) |       |      |     |     | Grades |
|---|------------------------|---------------|-------|------|-----|-----|--------|
|   |                        | l             | d     | s    | r   | h   | AP151H |
|  | <b>LNHQ 150416FN-W</b> | 15.875        | 9.525 | 4.76 | 1.6 | 4.2 | ●      |

Marked: ● Stock available ○ Non-stocked standard



Milling inserts



Cutting Parameter Recommendation Table

| Materials                                      |                                 |   |                       |   |         |     |     |        |     |     |         |     |     |         |     |     |     |    |  |
|--|---------------------------------|---|-----------------------|---|---------|-----|-----|--------|-----|-----|---------|-----|-----|---------|-----|-----|-----|----|--|
| ISO  | Material classification         |   | Brinell hardness (HB) | Tensile strength Rm(N/mm <sup>2</sup> ) | AP301U  |     |     | AC301P |     |     | AP351U  |     |     | AP351M  |     |     |     |    |  |
|  |                                 |   |                       |   | PVD     |     |     | CVD    |     |     | PVD     |     |     | PVD     |     |     |     |    |  |
|  |                                 |   |                       |   | P15-P35 |     |     | P25-40 |     |     | P30-P45 |     |     | P25-P45 |     |     |     |    |  |
|  |                                 |   |                       |   | M15-M35 |     |     | -      |     |     | M30-M45 |     |     | M25-M45 |     |     |     |    |  |
|  |                                 |   |                       |   | -       |     |     | -      |     |     | S30-S45 |     |     | -       |     |     |     |    |  |
|  |                                 |   |                       |   | -       |     |     | -      |     |     | -       |     |     | S25-S45 |     |     |     |    |  |
|  |                                 |   |                       |   | -       |     |     | -      |     |     | -       |     |     | -       |     |     |     |    |  |
|  |                                 |   |                       |   | 1/10    | 1/5 | 1/1 | 1/10   | 1/5 | 1/1 | 1/10    | 1/5 | 1/1 | 1/10    | 1/5 | 1/1 |     |    |  |
| P  | Unalloyed steel                 | C ≤ 0.25%                               | Annealed              | 125                                     | 428     | 320 | 280 | 240    | 380 | 300 | 260     | 280 | 240 | 200     |     |     |     |    |  |
|  |                                 | 0.25 < C ≤ 0.55%                        | Annealed              | 190                                     | 639     | 290 | 240 | 200    | 350 | 250 | 220     | 250 | 210 | 170     |     |     |     |    |  |
|  |                                 | 0.25 < C ≤ 0.55%                        | Heat-treated          | 210                                     | 708     | 260 | 210 | 170    | 310 | 220 | 190     | 230 | 180 | 140     |     |     |     |    |  |
|  |                                 | C > 0.55%                               | Annealed              | 190                                     | 639     | 290 | 240 | 200    | 350 | 250 | 220     | 250 | 210 | 170     |     |     |     |    |  |
|  |                                 | C > 0.55%                               | Heat-treated          | 300                                     | 1013    | 210 | 170 | 130    | 250 | 170 | 150     | 160 | 130 | 100     |     |     |     |    |  |
|  | Free cutting steel (short-chip) | Annealed                                | 220                   | 745                                     | 250     | 200 | 160 | 300    | 210 | 180 | 220     | 170 | 130 |         |     |     |     |    |  |
|  | Low-alloyed steel               | Annealed                                |                       | 175                                     | 591     | 290 | 250 | 200    | 340 | 300 | 250     | 270 | 230 | 180     |     |     |     |    |  |
|  |                                 | Heat-treated                            |                       | 300                                     | 1013    | 250 | 210 | 160    | 290 | 250 | 200     | 230 | 190 | 140     |     |     |     |    |  |
|  |                                 | Heat-treated                            |                       | 380                                     | 1282    | 230 | 190 | 140    | 250 | 210 | 160     | 210 | 170 | 120     |     |     |     |    |  |
|  |                                 | Heat-treated                            |                       | 430                                     | 1477    | 190 | 150 | 110    | 210 | 170 | 130     | 170 | 130 | 90      |     |     |     |    |  |
| High-alloyed steel and high-alloyed tool steel | Annealed                        |   | 200                   | 675                                     | 220     | 190 | 160 | 240    | 210 | 180 | 200     | 170 | 140 |         |     |     |     |    |  |
|  | Hardened and tempered           |   | 300                   | 1013                                    | 170     | 140 | 110 | 190    | 160 | 130 | 150     | 130 | 90  |         |     |     |     |    |  |
|  | Hardened and tempered           |   | 400                   | 1361                                    | 150     | 120 | 90  | 160    | 130 | 100 | 130     | 100 | 70  |         |     |     |     |    |  |
| Stainless steel                                | Ferritic/martensitic, annealed  |   | 200                   | 675                                     | 190     | 160 | 130 | 200    | 170 | 140 | 160     | 140 | 110 | 180     | 150 | 120 |     |    |  |
|  | Martensitic, heat-treated       |   | 330                   | 1114                                    | 160     | 120 | 90  | 170    | 140 | 110 | 140     | 110 | 80  | 150     | 120 | 90  |     |    |  |
| M  | Stainless steel                 | Austenitic, quench hardened             |                       | 200                                     | 675     | 180 | 150 | 120    |     |     |         | 170 | 140 | 110     | 170 | 150 | 120 |    |  |
|  |                                 | Austenitic, precipitation hardened (PH) |                       | 300                                     | 1013    | 160 | 130 | 100    |     |     |         | 150 | 120 | 90      | 150 | 130 | 100 |    |  |
|  |                                 | Austenitic/ferritic, duplex             |                       | 230                                     | 778     | 170 | 140 | 110    |     |     |         | 160 | 130 | 100     | 160 | 140 | 110 |    |  |
| K  | Malleable cast iron             | Ferritic                                |                       | 200                                     | 400     |     |     |        |     |     |         |     |     |         |     |     |     |    |  |
|  |                                 | Pearlitic                               |                       | 260                                     | 700     |     |     |        |     |     |         |     |     |         |     |     |     |    |  |
|  | Grey cast iron                  | Low tensile strength                    |                       | 180                                     | 200     |     |     |        |     |     |         |     |     |         |     |     |     |    |  |
|  |                                 | High tensile strength/austenitic        |                       | 245                                     | 350     |     |     |        |     |     |         |     |     |         |     |     |     |    |  |
|  | Nodular cast iron               | Ferritic                                |                       | 155                                     | 400     |     |     |        |     |     |         |     |     |         |     |     |     |    |  |
|  |                                 | Pearlitic                               |                       | 265                                     | 700     |     |     |        |     |     |         |     |     |         |     |     |     |    |  |
| GGV(CGI)                                       |                                 |   |                       | 230                                     | 400     |     |     |        |     |     |         |     |     |         |     |     |     |    |  |
| N  | Wrought aluminium alloys        | Non-aging                               |                       | 30                                      | -       |     |     |        |     |     |         |     |     |         |     |     |     |    |  |
|  |                                 | Aged                                    |                       | 100                                     | 340     |     |     |        |     |     |         |     |     |         |     |     |     |    |  |
|  | Cast aluminium alloys           | ≤ 12% Si, non-aging                     |                       | 75                                      | 260     |     |     |        |     |     |         |     |     |         |     |     |     |    |  |
|  |                                 | ≤ 12% Si, aged                          |                       | 90                                      | 310     |     |     |        |     |     |         |     |     |         |     |     |     |    |  |
|  | > 12% Si, non-aging             |   | 130                   | 450                                     |         |     |     |        |     |     |         |     |     |         |     |     |     |    |  |
|  | Magnesium alloys                |   | 70                    | 250                                     |         |     |     |        |     |     |         |     |     |         |     |     |     |    |  |
|  | Copper and copper alloys        | Unalloyed, electrolytic copper          |                       | 100                                     | 340     |     |     |        |     |     |         |     |     |         |     |     |     |    |  |
| Brass, bronze, red brass                       |                                 | 90                                      | 310                   |   |         |     |     |        |     |     |         |     |     |         |     |     |     |    |  |
| Cu alloys, short-chipping                      |                                 | 110                                     | 380                   |   |         |     |     |        |     |     |         |     |     |         |     |     |     |    |  |
| High-tensile, Ampco alloy                      |                                 | 300                                     | 1010                  |   |         |     |     |        |     |     |         |     |     |         |     |     |     |    |  |
| S  | Heat-resistant alloys           | Fe-based                                | Annealed              | 200                                     | 680     |     |     |        |     |     |         | 90  | 80  | 70      | 100 | 90  | 80  |    |  |
|  |                                 |   | Hardened              | 280                                     | 940     |     |     |        |     |     |         | 75  | 60  | 50      | 80  | 70  | 60  |    |  |
|  |                                 | Ni or Co based                          | Annealed              | 250                                     | 840     |     |     |        |     |     |         |     | 80  | 55      | 45  | 70  | 60  | 50 |  |
|  |                                 |   | Hardened              | 350                                     | 1180    |     |     |        |     |     |         |     | 60  | 50      | 35  | 60  | 50  | 40 |  |
|  | Cast                            |   | 320                   | 1080                                    |         |     |     |        |     |     |         | 60  | 55  | 40      | 65  | 55  | 45  |    |  |
|  | Titanium alloys                 | Pure titanium                           |                       | 200                                     | 680     |     |     |        |     |     |         |     | 110 | 90      | 80  | 120 | 100 | 90 |  |
|  |                                 | α and β alloys, hardened                |                       | 375                                     | 1260    |     |     |        |     |     |         |     | 50  | 40      | 30  | 55  | 45  | 35 |  |
|  |                                 | β alloys                                |                       | 410                                     | 1400    |     |     |        |     |     |         |     | 50  | 40      | 30  | 55  | 45  | 35 |  |
| Tungsten alloys                                |                                 | 1177                                    | 300                   | 1010                                    |         |     |     |        |     |     |         | 65  | 60  | 50      | 70  | 65  | 55  |    |  |
| Molybdenum alloys                              |                                 | 1262                                    | 300                   | 1010                                    |         |     |     |        |     |     |         | 65  | 60  | 50      | 70  | 65  | 55  |    |  |
| H  | Hardened steel                  | Hardened and tempered                   |                       | 50HRC                                   |         |     |     |        |     |     |         |     |     |         |     |     |     |    |  |
|  |                                 | Hardened and tempered                   |                       | 55HRC                                   |         |     |     |        |     |     |         |     |     |         |     |     |     |    |  |
|  |                                 | Hardened and tempered                   |                       | 60HRC                                   |         |     |     |        |     |     |         |     |     |         |     |     |     |    |  |
|  | Hardened cast steel             | Hardened and tempered                   |                       | 50HRC                                   |         |     |     |        |     |     |         |     |     |         |     |     |     |    |  |



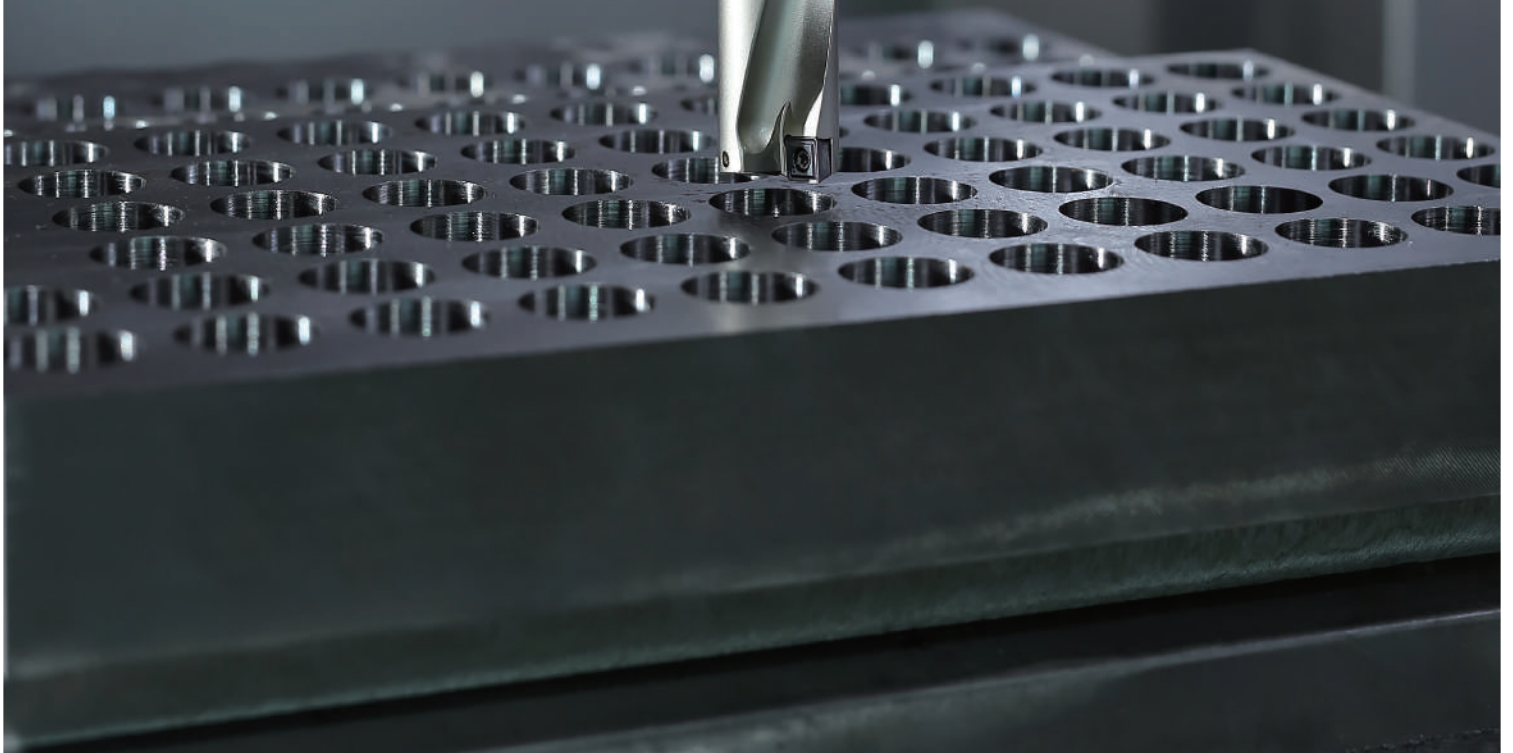
# ACHTTECK

КОРУН  
CORUN

[www.co-run.ru](http://www.co-run.ru)

[www.achtecktool.com](http://www.achtecktool.com)

ACHTTECK  
HP-3D220-S32-S07



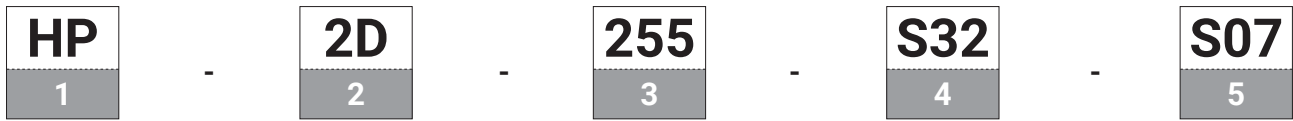
## CUTTING TOOL CATALOGUE

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|  |            |
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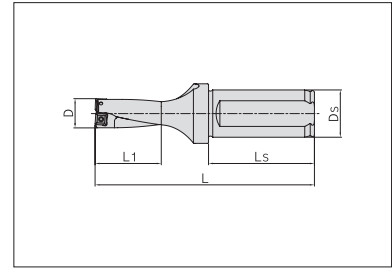
**Drilling Holder Denomination System**



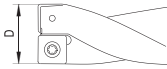


|   |     |                               |  |          |          |          |
|---|-----|-------------------------------|--|----------|----------|----------|
| 1 | HP  | Machining method              | Represent for high productivity machining  |          |          |          |
| 2 | 2D  | Length-diameter ratio         | 2D, 3D, 4D,  |          |          |          |
| 3 | 255 | Tool diameter                 | 255-25.5mm, 500-50mm   |          |          |          |
| 4 | S32 | Shank diameter                | S20=20mm   | S25=25mm | S32=32mm | S40=40mm |
| 5 | S07 | Inserts shape and edge length | If the insert shape is "S", it means the cutting edge length is 7mm, if the insert shape is "W", the code is "W07" |          |          |          |

DP Series Drilling Holder

Length-diameter ratio : 2D

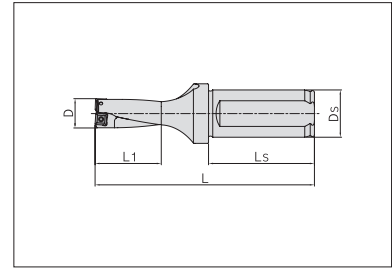


| Product code     | Dimension(mm) |                |     |                |                | Inserts        |
|------------------|---------------|----------------|-----|----------------|----------------|----------------|
|                  | D             | L <sub>1</sub> | L   | D <sub>s</sub> | L <sub>s</sub> |                |
| HP-2D130-S20-S05 | 13.0          | 29             | 99  | 20             | 50             | SPMT050204E-DP |
| HP-2D135-S20-S05 | 13.5          | 30             | 100 | 20             | 50             |                |
| HP-2D140-S20-S05 | 14.0          | 31             | 101 | 20             | 50             |                |
| HP-2D145-S20-S05 | 14.5          | 32             | 102 | 20             | 50             |                |
| HP-2D150-S20-S05 | 15.0          | 33             | 103 | 20             | 50             |                |
| HP-2D155-S25-S06 | 15.5          | 34             | 115 | 25             | 56             | SPMT060204E-DP |
| HP-2D160-S25-S06 | 16.0          | 35             | 116 | 25             | 56             |                |
| HP-2D165-S25-S06 | 16.5          | 36             | 117 | 25             | 56             |                |
| HP-2D170-S25-S06 | 17.0          | 37             | 118 | 25             | 56             |                |
| HP-2D175-S25-S06 | 17.5          | 38             | 119 | 25             | 56             |                |
| HP-2D180-S25-S06 | 18.0          | 39             | 120 | 25             | 56             |                |
| HP-2D185-S25-S06 | 18.5          | 40             | 121 | 25             | 56             |                |
| HP-2D190-S25-S06 | 19.0          | 41             | 122 | 25             | 56             |                |
| HP-2D195-S25-S06 | 19.5          | 42             | 123 | 25             | 56             |                |
| HP-2D200-S25-S06 | 20.0          | 43             | 124 | 25             | 56             |                |
| HP-2D205-S25-S06 | 20.5          | 44             | 125 | 25             | 56             |                |
| HP-2D210-S25-S06 | 21.0          | 45             | 126 | 25             | 56             |                |
| HP-2D215-S25-S06 | 21.5          | 46             | 127 | 25             | 56             |                |
| HP-2D220-S32-S07 | 22.0          | 47             | 137 | 32             | 60             | SPMT07T308E-DP |
| HP-2D225-S32-S07 | 22.5          | 48             | 138 | 32             | 60             |                |
| HP-2D230-S32-S07 | 23.0          | 49             | 139 | 32             | 60             |                |
| HP-2D235-S32-S07 | 23.5          | 50             | 140 | 32             | 60             |                |
| HP-2D240-S32-S07 | 24.0          | 51             | 141 | 32             | 60             |                |
| HP-2D245-S32-S07 | 24.5          | 52             | 142 | 32             | 60             |                |
| HP-2D250-S32-S07 | 25.0          | 53             | 143 | 32             | 60             |                |
| HP-2D255-S32-S07 | 25.5          | 54             | 144 | 32             | 60             |                |
| HP-2D260-S32-S07 | 26.0          | 55             | 145 | 32             | 60             |                |
| HP-2D265-S32-S07 | 26.5          | 56             | 146 | 32             | 60             |                |
| HP-2D270-S32-S07 | 27.0          | 57             | 147 | 32             | 60             |                |
| HP-2D275-S32-S07 | 27.5          | 58             | 148 | 32             | 60             |                |

| Dimensions (mm)   | Spare parts   |   |
|---|---|---|
| Holder diameter   | Screw   | Wrench  |
|  |  |  |
| 13-15   | AST2043-60  | AWF-T06   |
| 15.5-21.5   | AST2255-60  | AWF-T06   |
| 22-27.5   | AST25065-60S  | AWF-T08   |

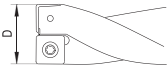


**DP Series Drilling Holder**

Length-diameter ratio : 2D



| Product code     | Dimension(mm) |                |     |                |                | Inserts        |
|------------------|---------------|----------------|-----|----------------|----------------|----------------|
|                  | D             | L <sub>1</sub> | L   | D <sub>s</sub> | L <sub>s</sub> |                |
| HP-2D280-S32-S09 | 28.0          | 59             | 149 | 32             | 60             | SPMT090408E-DP |
| HP-2D285-S32-S09 | 28.5          | 60             | 150 | 32             | 60             |                |
| HP-2D290-S32-S09 | 29.0          | 61             | 151 | 32             | 60             |                |
| HP-2D295-S32-S09 | 29.5          | 63             | 153 | 32             | 60             |                |
| HP-2D300-S32-S09 | 30.0          | 65             | 155 | 32             | 60             |                |
| HP-2D310-S32-S09 | 31.0          | 67             | 157 | 32             | 60             |                |
| HP-2D320-S32-S09 | 32.0          | 69             | 159 | 32             | 60             |                |
| HP-2D330-S32-S09 | 33.0          | 71             | 161 | 32             | 60             |                |
| HP-2D340-S40-S11 | 34.0          | 73             | 178 | 40             | 70             | SPMT110408E-DP |
| HP-2D350-S40-S11 | 35.0          | 75             | 180 | 40             | 70             |                |
| HP-2D360-S40-S11 | 36.0          | 77             | 182 | 40             | 70             |                |
| HP-2D370-S40-S11 | 37.0          | 79             | 184 | 40             | 70             |                |
| HP-2D380-S40-S11 | 38.0          | 81             | 186 | 40             | 70             |                |
| HP-2D390-S40-S11 | 39.0          | 83             | 188 | 40             | 70             |                |
| HP-2D400-S40-S11 | 40.0          | 85             | 190 | 40             | 70             |                |
| HP-2D410-S40-S11 | 41.0          | 87             | 192 | 40             | 70             |                |
| HP-2D420-S40-S14 | 42.0          | 89             | 194 | 40             | 70             | SPMT140512E-DP |
| HP-2D430-S40-S14 | 43.0          | 91             | 196 | 40             | 70             |                |
| HP-2D440-S40-S14 | 44.0          | 93             | 198 | 40             | 70             |                |
| HP-2D450-S40-S14 | 45.0          | 95             | 200 | 40             | 70             |                |
| HP-2D460-S40-S14 | 46.0          | 97             | 202 | 40             | 70             |                |
| HP-2D470-S40-S14 | 47.0          | 99             | 204 | 40             | 70             |                |
| HP-2D480-S40-S14 | 48.0          | 101            | 206 | 40             | 70             |                |
| HP-2D490-S40-S14 | 49.0          | 103            | 208 | 40             | 70             |                |
| HP-2D500-S40-S14 | 50.0          | 105            | 210 | 40             | 70             |                |

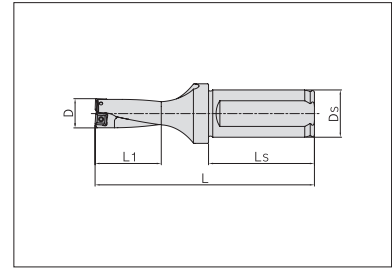
Drilling holders

| Dimensions (mm)   | Spare parts   |   |
|---|---|---|
| Holder diameter   | Screw   | Wrench  |
|  |  |  |
| 28-33   | AST35084-60H  | AWF-T15   |
| 34-41   | AST410-60H  | AWF-T15   |
| 42-50   | AST5126-60  | AWF-T20   |



DP Series Drilling Holder

Length-diameter ratio : 3D

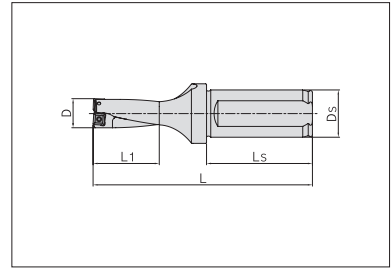


| Product code     | Dimension(mm) |                |     |                |                | Inserts        |
|------------------|---------------|----------------|-----|----------------|----------------|----------------|
|                  | D             | L <sub>1</sub> | L   | D <sub>s</sub> | L <sub>s</sub> |                |
| HP-3D130-S20-S05 | 13.0          | 42             | 112 | 20             | 50             | SPMT050204E-DP |
| HP-3D135-S20-S05 | 13.5          | 44             | 114 | 20             | 50             |                |
| HP-3D140-S20-S05 | 14.0          | 45             | 115 | 20             | 50             |                |
| HP-3D145-S20-S05 | 14.5          | 47             | 117 | 20             | 50             |                |
| HP-3D150-S20-S05 | 15.0          | 48             | 118 | 20             | 50             |                |
| HP-3D155-S25-S06 | 15.5          | 50             | 131 | 25             | 56             | SPMT060204E-DP |
| HP-3D160-S25-S06 | 16.0          | 51             | 132 | 25             | 56             |                |
| HP-3D165-S25-S06 | 16.5          | 53             | 134 | 25             | 56             |                |
| HP-3D170-S25-S06 | 17.0          | 54             | 135 | 25             | 56             |                |
| HP-3D175-S25-S06 | 17.5          | 56             | 137 | 25             | 56             |                |
| HP-3D180-S25-S06 | 18.0          | 57             | 138 | 25             | 56             |                |
| HP-3D185-S25-S06 | 18.5          | 59             | 140 | 25             | 56             |                |
| HP-3D190-S25-S06 | 19.0          | 60             | 141 | 25             | 56             |                |
| HP-3D195-S25-S06 | 19.5          | 62             | 143 | 25             | 56             |                |
| HP-3D200-S25-S06 | 20.0          | 63             | 144 | 25             | 56             |                |
| HP-3D205-S25-S06 | 20.5          | 65             | 146 | 25             | 56             |                |
| HP-3D210-S25-S06 | 21.0          | 66             | 147 | 25             | 56             |                |
| HP-3D215-S25-S06 | 21.5          | 68             | 149 | 25             | 56             |                |
| HP-3D220-S32-S07 | 22.0          | 69             | 159 | 32             | 60             | SPMT07T308E-DP |
| HP-3D225-S32-S07 | 22.5          | 71             | 161 | 32             | 60             |                |
| HP-3D230-S32-S07 | 23.0          | 72             | 162 | 32             | 60             |                |
| HP-3D235-S32-S07 | 23.5          | 74             | 164 | 32             | 60             |                |
| HP-3D240-S32-S07 | 24.0          | 75             | 165 | 32             | 60             |                |
| HP-3D245-S32-S07 | 24.5          | 77             | 167 | 32             | 60             |                |
| HP-3D250-S32-S07 | 25.0          | 78             | 168 | 32             | 60             |                |
| HP-3D255-S32-S07 | 25.5          | 80             | 170 | 32             | 60             |                |
| HP-3D260-S32-S07 | 26.0          | 81             | 171 | 32             | 60             |                |
| HP-3D265-S32-S07 | 26.5          | 83             | 173 | 32             | 60             |                |
| HP-3D270-S32-S07 | 27.0          | 84             | 174 | 32             | 60             |                |
| HP-3D275-S32-S07 | 27.5          | 86             | 176 | 32             | 60             |                |

| Dimensions (mm) | Spare parts  |         |
|-----------------|--------------|---------|
|                 | Screw        | Wrench  |
| Holder diameter |              |         |
|                 |              |         |
| 13-15           | AST2043-60   | AWF-T06 |
| 15.5-21.5       | AST2255-60   | AWF-T06 |
| 22-27.5         | AST25065-60S | AWF-T08 |

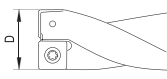


**DP Series Drilling Holder**

Length-diameter ratio : 3D



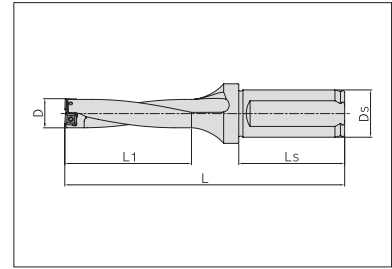
| Product code     | Dimension(mm) |                |     |                |                | Inserts        |
|------------------|---------------|----------------|-----|----------------|----------------|----------------|
|                  | D             | L <sub>1</sub> | L   | D <sub>s</sub> | L <sub>s</sub> |                |
| HP-3D280-S32-S09 | 28.0          | 87             | 177 | 32             | 60             | SPMT090408E-DP |
| HP-3D285-S32-S09 | 28.5          | 89             | 179 | 32             | 60             |                |
| HP-3D290-S32-S09 | 29.0          | 90             | 180 | 32             | 60             |                |
| HP-3D295-S32-S09 | 29.5          | 93             | 183 | 32             | 60             |                |
| HP-3D300-S32-S09 | 30.0          | 95             | 185 | 32             | 60             |                |
| HP-3D310-S32-S09 | 31.0          | 98             | 188 | 32             | 60             |                |
| HP-3D320-S32-S09 | 32.0          | 101            | 191 | 32             | 60             |                |
| HP-3D330-S32-S09 | 33.0          | 104            | 194 | 32             | 60             |                |
| HP-3D340-S40-S11 | 34.0          | 107            | 212 | 40             | 70             | SPMT110408E-DP |
| HP-3D350-S40-S11 | 35.0          | 110            | 215 | 40             | 70             |                |
| HP-3D360-S40-S11 | 36.0          | 113            | 218 | 40             | 70             |                |
| HP-3D370-S40-S11 | 37.0          | 116            | 221 | 40             | 70             |                |
| HP-3D380-S40-S11 | 38.0          | 119            | 224 | 40             | 70             |                |
| HP-3D390-S40-S11 | 39.0          | 122            | 227 | 40             | 70             |                |
| HP-3D400-S40-S11 | 40.0          | 125            | 230 | 40             | 70             |                |
| HP-3D410-S40-S11 | 41.0          | 128            | 233 | 40             | 70             |                |
| HP-3D420-S40-S14 | 42.0          | 131            | 236 | 40             | 70             | SPMT140512E-DP |
| HP-3D430-S40-S14 | 43.0          | 134            | 239 | 40             | 70             |                |
| HP-3D440-S40-S14 | 44.0          | 137            | 242 | 40             | 70             |                |
| HP-3D450-S40-S14 | 45.0          | 140            | 245 | 40             | 70             |                |
| HP-3D460-S40-S14 | 46.0          | 143            | 248 | 40             | 70             |                |
| HP-3D470-S40-S14 | 47.0          | 146            | 251 | 40             | 70             |                |
| HP-3D480-S40-S14 | 48.0          | 149            | 254 | 40             | 70             |                |
| HP-3D490-S40-S14 | 49.0          | 152            | 257 | 40             | 70             |                |
| HP-3D500-S40-S14 | 50.0          | 155            | 260 | 40             | 70             |                |

Drilling holders

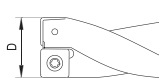


| Dimensions (mm)   | Spare parts   |   |
|---|---|---|
| Holder diameter   | Screw   | Wrench  |
|  |  |  |
| 28-33   | AST35084-60H  | AWF-T15   |
| 34-41   | AST410-60H  | AWF-T15   |
| 42-50   | AST5126-60  | AWF-T20   |

DP Series Drilling holder

Length-diameter ratio : 4D

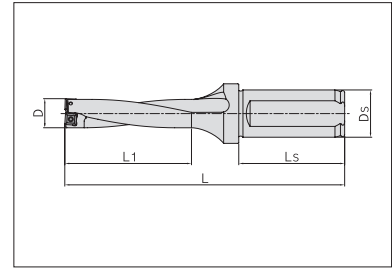


| Product code     | Dimension(mm) |                |     |                |                | Inserts        |
|------------------|---------------|----------------|-----|----------------|----------------|----------------|
|                  | D             | L <sub>1</sub> | L   | D <sub>s</sub> | L <sub>s</sub> |                |
| HP-4D130-S20-S05 | 13.0          | 55             | 125 | 20             | 50             | SPMT050204E-DP |
| HP-4D135-S20-S05 | 13.5          | 57             | 127 | 20             | 50             |                |
| HP-4D140-S20-S05 | 14.0          | 59             | 129 | 20             | 50             |                |
| HP-4D145-S20-S05 | 14.5          | 61             | 131 | 20             | 50             |                |
| HP-4D150-S20-S05 | 15.0          | 63             | 133 | 20             | 50             |                |
| HP-4D155-S25-S06 | 15.5          | 65             | 146 | 25             | 56             | SPMT060204E-DP |
| HP-4D160-S25-S06 | 16.0          | 67             | 148 | 25             | 56             |                |
| HP-4D165-S25-S06 | 16.5          | 69             | 150 | 25             | 56             |                |
| HP-4D170-S25-S06 | 17.0          | 71             | 152 | 25             | 56             |                |
| HP-4D175-S25-S06 | 17.5          | 73             | 154 | 25             | 56             |                |
| HP-4D180-S25-S06 | 18.0          | 75             | 156 | 25             | 56             |                |
| HP-4D185-S25-S06 | 18.5          | 77             | 158 | 25             | 56             |                |
| HP-4D190-S25-S06 | 19.0          | 79             | 160 | 25             | 56             |                |
| HP-4D195-S25-S06 | 19.5          | 81             | 162 | 25             | 56             |                |
| HP-4D200-S25-S06 | 20.0          | 83             | 164 | 25             | 56             |                |
| HP-4D205-S25-S06 | 20.5          | 85             | 166 | 25             | 56             |                |
| HP-4D210-S25-S06 | 21.0          | 87             | 168 | 25             | 56             |                |
| HP-4D215-S25-S06 | 21.5          | 89             | 170 | 25             | 56             |                |
| HP-4D220-S32-S07 | 22.0          | 91             | 181 | 32             | 60             | SPMT07T308E-DP |
| HP-4D225-S32-S07 | 22.5          | 93             | 183 | 32             | 60             |                |
| HP-4D230-S32-S07 | 23.0          | 95             | 185 | 32             | 60             |                |
| HP-4D235-S32-S07 | 23.5          | 97             | 187 | 32             | 60             |                |
| HP-4D240-S32-S07 | 24.0          | 99             | 189 | 32             | 60             |                |
| HP-4D245-S32-S07 | 24.5          | 101            | 191 | 32             | 60             |                |
| HP-4D250-S32-S07 | 25.0          | 103            | 193 | 32             | 60             |                |
| HP-4D255-S32-S07 | 25.5          | 105            | 195 | 32             | 60             |                |
| HP-4D260-S32-S07 | 26.0          | 107            | 197 | 32             | 60             |                |
| HP-4D265-S32-S07 | 26.5          | 109            | 199 | 32             | 60             |                |
| HP-4D270-S32-S07 | 27.0          | 111            | 201 | 32             | 60             |                |
| HP-4D275-S32-S07 | 27.5          | 113            | 203 | 32             | 60             |                |

| Dimensions (mm)   | Spare parts   |   |
|---|---|---|
| Holder diameter   | Screw   | Wrench  |
|  |  |  |
| 13-15   | AST2043-60  | AWF-T06   |
| 15.5-21.5   | AST2255-60  | AWF-T06   |
| 22-27.5   | AST25065-60S  | AWF-T08   |

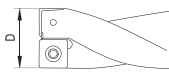


**DP Series Drilling holder**

Length-diameter ratio : 4D



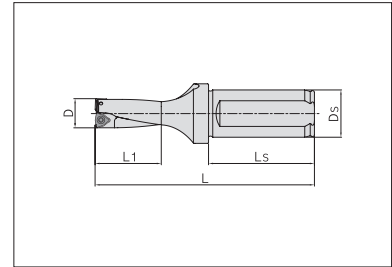
| Product code     | Dimension(mm) |                |     |                |                | Inserts        |
|------------------|---------------|----------------|-----|----------------|----------------|----------------|
|                  | D             | L <sub>1</sub> | L   | D <sub>s</sub> | L <sub>s</sub> |                |
| HP-4D280-S32-S09 | 28.0          | 115            | 205 | 32             | 60             | SPMT090408E-DP |
| HP-4D285-S32-S09 | 28.5          | 117            | 207 | 32             | 60             |                |
| HP-4D290-S32-S09 | 29.0          | 120            | 210 | 32             | 60             |                |
| HP-4D295-S32-S09 | 29.5          | 123            | 213 | 32             | 60             |                |
| HP-4D300-S32-S09 | 30.0          | 125            | 215 | 32             | 60             |                |
| HP-4D310-S32-S09 | 31.0          | 129            | 219 | 32             | 60             |                |
| HP-4D320-S32-S09 | 32.0          | 133            | 223 | 32             | 60             |                |
| HP-4D330-S32-S09 | 33.0          | 137            | 227 | 32             | 60             |                |
| HP-4D340-S40-S11 | 34.0          | 141            | 246 | 40             | 70             | SPMT110408E-DP |
| HP-4D350-S40-S11 | 35.0          | 145            | 250 | 40             | 70             |                |
| HP-4D360-S40-S11 | 36.0          | 149            | 254 | 40             | 70             |                |
| HP-4D370-S40-S11 | 37.0          | 153            | 258 | 40             | 70             |                |
| HP-4D380-S40-S11 | 38.0          | 157            | 262 | 40             | 70             |                |
| HP-4D390-S40-S11 | 39.0          | 161            | 266 | 40             | 70             |                |
| HP-4D400-S40-S11 | 40.0          | 165            | 270 | 40             | 70             |                |
| HP-4D410-S40-S11 | 41.0          | 169            | 274 | 40             | 70             |                |
| HP-4D420-S40-S14 | 42.0          | 173            | 278 | 40             | 70             | SPMT140512E-DP |
| HP-4D430-S40-S14 | 43.0          | 177            | 282 | 40             | 70             |                |
| HP-4D440-S40-S14 | 44.0          | 181            | 286 | 40             | 70             |                |
| HP-4D450-S40-S14 | 45.0          | 185            | 290 | 40             | 70             |                |
| HP-4D460-S40-S14 | 46.0          | 189            | 294 | 40             | 70             |                |
| HP-4D470-S40-S14 | 47.0          | 193            | 298 | 40             | 70             |                |
| HP-4D480-S40-S14 | 48.0          | 197            | 302 | 40             | 70             |                |
| HP-4D490-S40-S14 | 49.0          | 201            | 306 | 40             | 70             |                |
| HP-4D500-S40-S14 | 50.0          | 205            | 310 | 40             | 70             |                |

Drilling holders

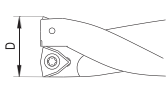


| Dimensions (mm)   | Spare parts   |   |
|---|---|---|
| Holder diameter   | Screw   | Wrench  |
|  |  |  |
| 28-33   | AST35084-60H  | AWF-T15   |
| 34-41   | AST410-60H  | AWF-T15   |
| 42-50   | AST5126-60  | AWF-T20   |

DG Series Drilling holder

Length-diameter ratio : 2D



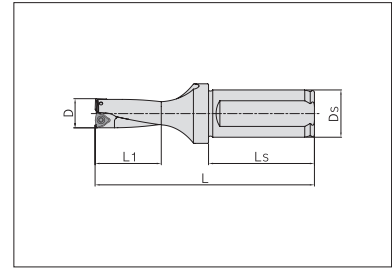
| Product code     | Dimension(mm) |                |     |                |                | Inserts         |
|------------------|---------------|----------------|-----|----------------|----------------|-----------------|
|                  | D             | L <sub>1</sub> | L   | D <sub>s</sub> | L <sub>s</sub> |                 |
| HP-2D160-S25-W03 | 16.0          | 35             | 116 | 25             | 56             | WCMT 030204E-DG |
| HP-2D165-S25-W03 | 16.5          | 36             | 117 | 25             | 56             |                 |
| HP-2D170-S25-W03 | 17.0          | 37             | 118 | 25             | 56             |                 |
| HP-2D175-S25-W03 | 17.5          | 38             | 119 | 25             | 56             |                 |
| HP-2D180-S25-W03 | 18.0          | 39             | 120 | 25             | 56             |                 |
| HP-2D185-S25-W03 | 18.5          | 40             | 121 | 25             | 56             |                 |
| HP-2D190-S25-W03 | 19.0          | 41             | 122 | 25             | 56             |                 |
| HP-2D195-S25-W03 | 19.5          | 42             | 123 | 25             | 56             |                 |
| HP-2D200-S25-W03 | 20.0          | 43             | 124 | 25             | 56             |                 |
| HP-2D205-S25-W04 | 20.5          | 44             | 125 | 25             | 56             | WCMT 040204E-DG |
| HP-2D210-S25-W04 | 21.0          | 45             | 126 | 25             | 56             |                 |
| HP-2D215-S25-W04 | 21.5          | 46             | 127 | 25             | 56             |                 |
| HP-2D220-S25-W04 | 22.0          | 47             | 128 | 25             | 56             |                 |
| HP-2D225-S25-W04 | 22.5          | 48             | 129 | 25             | 56             |                 |
| HP-2D230-S25-W04 | 23.0          | 49             | 130 | 25             | 56             |                 |
| HP-2D235-S25-W04 | 23.5          | 50             | 131 | 25             | 56             |                 |
| HP-2D240-S25-W04 | 24.0          | 51             | 132 | 25             | 56             |                 |
| HP-2D245-S25-W04 | 24.5          | 52             | 133 | 25             | 56             |                 |
| HP-2D250-S25-W04 | 25.0          | 53             | 134 | 25             | 56             |                 |
| HP-2D255-S32-W05 | 25.5          | 54             | 144 | 32             | 60             | WCMT 050308E-DG |
| HP-2D260-S32-W05 | 26.0          | 55             | 145 | 32             | 60             |                 |
| HP-2D265-S32-W05 | 26.5          | 56             | 146 | 32             | 60             |                 |
| HP-2D270-S32-W05 | 27.0          | 57             | 147 | 32             | 60             |                 |
| HP-2D275-S32-W05 | 27.5          | 58             | 148 | 32             | 60             |                 |
| HP-2D280-S32-W05 | 28.0          | 59             | 149 | 32             | 60             |                 |
| HP-2D285-S32-W05 | 28.5          | 60             | 150 | 32             | 60             |                 |
| HP-2D290-S32-W05 | 29.0          | 61             | 151 | 32             | 60             |                 |
| HP-2D295-S32-W05 | 29.5          | 62             | 152 | 32             | 60             |                 |
| HP-2D300-S32-W05 | 30.0          | 63             | 153 | 32             | 60             |                 |

| Dimensions (mm)   | Spare parts   |   |
|---|---|---|
| Holder diameter   | Screw   | Wrench  |
|  |  |  |
| 16-20   | AST22045-55   | AWF-T06   |
| 20.5-25   | AST25055-50   | AWF-T08   |
| 25.5-30   | AST307-55   | AWF-T08   |



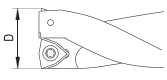


**DG Series Drilling holder**

Length-diameter ratio : 2D



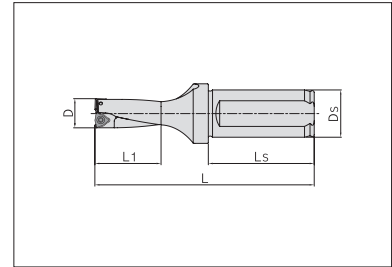
| Product code     | Dimension(mm) |                |     |                |                | Inserts         |
|------------------|---------------|----------------|-----|----------------|----------------|-----------------|
|                  | D             | L <sub>1</sub> | L   | D <sub>s</sub> | L <sub>s</sub> |                 |
| HP-2D310-S32-W06 | 31.0          | 65             | 155 | 32             | 60             | WCMT 06T308E-DG |
| HP-2D320-S32-W06 | 32.0          | 67             | 157 | 32             | 60             |                 |
| HP-2D330-S32-W06 | 33.0          | 69             | 159 | 32             | 60             |                 |
| HP-2D340-S32-W06 | 34.0          | 71             | 161 | 32             | 60             |                 |
| HP-2D350-S32-W06 | 35.0          | 73             | 163 | 32             | 60             |                 |
| HP-2D360-S32-W06 | 36.0          | 75             | 165 | 32             | 60             |                 |
| HP-2D370-S32-W06 | 37.0          | 77             | 167 | 32             | 60             |                 |
| HP-2D380-S32-W06 | 38.0          | 79             | 169 | 32             | 60             |                 |
| HP-2D390-S32-W06 | 39.0          | 81             | 171 | 32             | 60             |                 |
| HP-2D400-S32-W06 | 40.0          | 83             | 173 | 32             | 60             |                 |
| HP-2D410-S32-W06 | 41.0          | 85             | 175 | 32             | 60             |                 |
| HP-2D420-S40-W08 | 42.0          | 87             | 192 | 40             | 70             | WCMT 080408E-DG |
| HP-2D430-S40-W08 | 43.0          | 89             | 194 | 40             | 70             |                 |
| HP-2D440-S40-W08 | 44.0          | 91             | 196 | 40             | 70             |                 |
| HP-2D450-S40-W08 | 45.0          | 93             | 198 | 40             | 70             |                 |
| HP-2D460-S40-W08 | 46.0          | 95             | 200 | 40             | 70             |                 |
| HP-2D470-S40-W08 | 47.0          | 97             | 202 | 40             | 70             |                 |
| HP-2D480-S40-W08 | 48.0          | 99             | 204 | 40             | 70             |                 |
| HP-2D490-S40-W08 | 49.0          | 101            | 206 | 40             | 70             |                 |
| HP-2D500-S40-W08 | 50.0          | 103            | 208 | 40             | 70             |                 |
| HP-2D510-S40-W08 | 51.0          | 105            | 210 | 40             | 70             |                 |
| HP-2D520-S40-W08 | 52.0          | 107            | 212 | 40             | 70             |                 |
| HP-2D530-S40-W08 | 53.0          | 109            | 214 | 40             | 70             |                 |
| HP-2D540-S40-W08 | 54.0          | 111            | 216 | 40             | 70             |                 |
| HP-2D550-S40-W08 | 55.0          | 113            | 218 | 40             | 70             |                 |
| HP-2D560-S40-W08 | 56.0          | 115            | 220 | 40             | 70             |                 |
| HP-2D570-S40-W08 | 57.0          | 117            | 222 | 40             | 70             |                 |
| HP-2D580-S40-W08 | 58.0          | 119            | 224 | 40             | 70             |                 |

Drilling holders

| Dimensions (mm)   | Spare parts   |   |
|---|---|---|
| Holder diameter   | Screw   | Wrench  |
|  |  |  |
| 31-41   | AST3509-55  | AWF-T15   |
| 42-58   | AST411-60W-M  | AWF-T15   |

DG Series Drilling holder

Length-diameter ratio : 3D



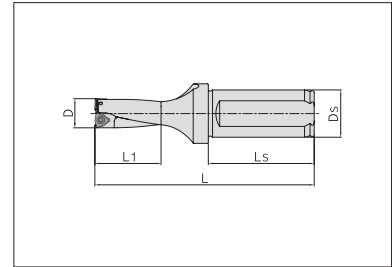
| Product code     | Dimension(mm) |                |     |                |                | Inserts         |
|------------------|---------------|----------------|-----|----------------|----------------|-----------------|
|                  | D             | L <sub>1</sub> | L   | D <sub>s</sub> | L <sub>s</sub> |                 |
| HP-3D160-S25-W03 | 16.0          | 51             | 132 | 25             | 56             | WCMT 030204E-DG |
| HP-3D165-S25-W03 | 16.5          | 53             | 134 | 25             | 56             |                 |
| HP-3D170-S25-W03 | 17.0          | 54             | 135 | 25             | 56             |                 |
| HP-3D175-S25-W03 | 17.5          | 56             | 137 | 25             | 56             |                 |
| HP-3D180-S25-W03 | 18.0          | 57             | 138 | 25             | 56             |                 |
| HP-3D185-S25-W03 | 18.5          | 59             | 140 | 25             | 56             |                 |
| HP-3D190-S25-W03 | 19.0          | 60             | 141 | 25             | 56             |                 |
| HP-3D195-S25-W03 | 19.5          | 62             | 143 | 25             | 56             |                 |
| HP-3D200-S25-W03 | 20.0          | 63             | 144 | 25             | 56             |                 |
| HP-3D205-S25-W04 | 20.5          | 65             | 146 | 25             | 56             | WCMT 040204E-DG |
| HP-3D210-S25-W04 | 21.0          | 66             | 147 | 25             | 56             |                 |
| HP-3D215-S25-W04 | 21.5          | 68             | 149 | 25             | 56             |                 |
| HP-3D220-S25-W04 | 22.0          | 69             | 150 | 25             | 56             |                 |
| HP-3D225-S25-W04 | 22.5          | 71             | 152 | 25             | 56             |                 |
| HP-3D230-S25-W04 | 23.0          | 72             | 153 | 25             | 56             |                 |
| HP-3D235-S25-W04 | 23.5          | 74             | 155 | 25             | 56             |                 |
| HP-3D240-S25-W04 | 24.0          | 75             | 156 | 25             | 56             |                 |
| HP-3D245-S25-W04 | 24.5          | 77             | 158 | 25             | 56             |                 |
| HP-3D250-S25-W04 | 25.0          | 78             | 159 | 25             | 56             |                 |
| HP-3D255-S32-W05 | 25.5          | 80             | 170 | 32             | 60             | WCMT 050308E-DG |
| HP-3D260-S32-W05 | 26.0          | 81             | 171 | 32             | 60             |                 |
| HP-3D265-S32-W05 | 26.5          | 83             | 173 | 32             | 60             |                 |
| HP-3D270-S32-W05 | 27.0          | 84             | 174 | 32             | 60             |                 |
| HP-3D275-S32-W05 | 27.5          | 86             | 176 | 32             | 60             |                 |
| HP-3D280-S32-W05 | 28.0          | 87             | 177 | 32             | 60             |                 |
| HP-3D285-S32-W05 | 28.5          | 89             | 179 | 32             | 60             |                 |
| HP-3D290-S32-W05 | 29.0          | 90             | 180 | 32             | 60             |                 |
| HP-3D295-S32-W05 | 29.5          | 92             | 182 | 32             | 60             |                 |
| HP-3D300-S32-W05 | 30.0          | 93             | 183 | 32             | 60             |                 |

| Dimensions (mm) | Spare parts |         |
|-----------------|-------------|---------|
|                 | Screw       | Wrench  |
| Holder diameter |             |         |
|                 |             |         |
| 16-20           | AST22045-55 | AWF-T06 |
| 20.5-25         | AST25055-50 | AWF-T08 |
| 25.5-30         | AST307-55   | AWF-T08 |



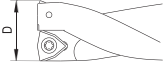


**DG Series Drilling holder**

Length-diameter ratio : 3D



| Product code     | Dimension(mm) |                |     |                |                | Inserts         |
|------------------|---------------|----------------|-----|----------------|----------------|-----------------|
|                  | D             | L <sub>1</sub> | L   | D <sub>s</sub> | L <sub>s</sub> |                 |
| HP-3D310-S32-W06 | 31.0          | 96             | 186 | 32             | 60             | WCMT 06T308E-DG |
| HP-3D320-S32-W06 | 32.0          | 99             | 189 | 32             | 60             |                 |
| HP-3D330-S32-W06 | 33.0          | 102            | 192 | 32             | 60             |                 |
| HP-3D340-S32-W06 | 34.0          | 105            | 195 | 32             | 60             |                 |
| HP-3D350-S32-W06 | 35.0          | 108            | 198 | 32             | 60             |                 |
| HP-3D360-S32-W06 | 36.0          | 111            | 201 | 32             | 60             |                 |
| HP-3D370-S32-W06 | 37.0          | 114            | 204 | 32             | 60             |                 |
| HP-3D380-S32-W06 | 38.0          | 117            | 207 | 32             | 60             |                 |
| HP-3D390-S32-W06 | 39.0          | 120            | 210 | 32             | 60             |                 |
| HP-3D400-S32-W06 | 40.0          | 123            | 213 | 32             | 60             |                 |
| HP-3D410-S32-W06 | 41.0          | 126            | 216 | 32             | 60             |                 |
| HP-3D420-S40-W08 | 42.0          | 129            | 234 | 40             | 70             | WCMT 080408E-DG |
| HP-3D430-S40-W08 | 43.0          | 132            | 237 | 40             | 70             |                 |
| HP-3D440-S40-W08 | 44.0          | 135            | 240 | 40             | 70             |                 |
| HP-3D450-S40-W08 | 45.0          | 138            | 243 | 40             | 70             |                 |
| HP-3D460-S40-W08 | 46.0          | 141            | 246 | 40             | 70             |                 |
| HP-3D470-S40-W08 | 47.0          | 144            | 249 | 40             | 70             |                 |
| HP-3D480-S40-W08 | 48.0          | 147            | 252 | 40             | 70             |                 |
| HP-3D490-S40-W08 | 49.0          | 150            | 255 | 40             | 70             |                 |
| HP-3D500-S40-W08 | 50.0          | 153            | 258 | 40             | 70             |                 |
| HP-3D510-S40-W08 | 51.0          | 156            | 261 | 40             | 70             |                 |
| HP-3D520-S40-W08 | 52.0          | 159            | 264 | 40             | 70             |                 |
| HP-3D530-S40-W08 | 53.0          | 162            | 267 | 40             | 70             |                 |
| HP-3D540-S40-W08 | 54.0          | 165            | 270 | 40             | 70             |                 |
| HP-3D550-S40-W08 | 55.0          | 168            | 273 | 40             | 70             |                 |
| HP-3D560-S40-W08 | 56.0          | 171            | 276 | 40             | 70             |                 |
| HP-3D570-S40-W08 | 57.0          | 174            | 279 | 40             | 70             |                 |
| HP-3D580-S40-W08 | 58.0          | 177            | 282 | 40             | 70             |                 |

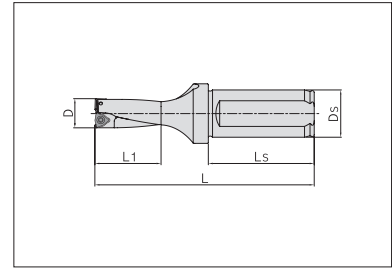
Drilling holders

| Dimensions (mm)   | Spare parts   |   |
|---|---|---|
| Holder diameter   | Screw   | Wrench  |
|  |  |  |
| 31-41   | AST3509-55  | AWF-T15   |
| 42-58   | AST411-60W-M  | AWF-T15   |



DG Series Drilling holder

Length-diameter ratio : 4D



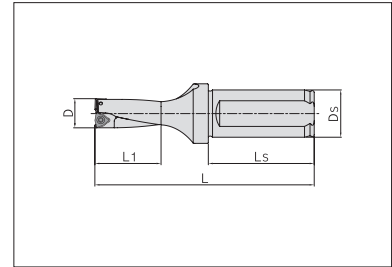
| Product code     | Dimension(mm) |                |     |                |                | Inserts         |
|------------------|---------------|----------------|-----|----------------|----------------|-----------------|
|                  | D             | L <sub>1</sub> | L   | D <sub>s</sub> | L <sub>s</sub> |                 |
| HP-4D160-S25-W03 | 16.0          | 67             | 148 | 25             | 56             | WCMT 030204E-DG |
| HP-4D165-S25-W03 | 16.5          | 69             | 150 | 25             | 56             |                 |
| HP-4D170-S25-W03 | 17.0          | 71             | 152 | 25             | 56             |                 |
| HP-4D175-S25-W03 | 17.5          | 73             | 154 | 25             | 56             |                 |
| HP-4D180-S25-W03 | 18.0          | 75             | 156 | 25             | 56             |                 |
| HP-4D185-S25-W03 | 18.5          | 77             | 158 | 25             | 56             |                 |
| HP-4D190-S25-W03 | 19.0          | 79             | 160 | 25             | 56             |                 |
| HP-4D195-S25-W03 | 19.5          | 81             | 162 | 25             | 56             |                 |
| HP-4D200-S25-W03 | 20.0          | 83             | 164 | 25             | 56             |                 |
| HP-4D205-S25-W04 | 20.5          | 85             | 166 | 25             | 56             | WCMT 040204E-DG |
| HP-4D210-S25-W04 | 21.0          | 87             | 168 | 25             | 56             |                 |
| HP-4D215-S25-W04 | 21.5          | 89             | 170 | 25             | 56             |                 |
| HP-4D220-S25-W04 | 22.0          | 91             | 172 | 25             | 56             |                 |
| HP-4D225-S25-W04 | 22.5          | 93             | 174 | 25             | 56             |                 |
| HP-4D230-S25-W04 | 23.0          | 95             | 176 | 25             | 56             |                 |
| HP-4D235-S25-W04 | 23.5          | 97             | 178 | 25             | 56             |                 |
| HP-4D240-S25-W04 | 24.0          | 99             | 180 | 25             | 56             |                 |
| HP-4D245-S25-W04 | 24.5          | 101            | 182 | 25             | 56             |                 |
| HP-4D250-S25-W04 | 25.0          | 103            | 184 | 25             | 56             |                 |
| HP-4D255-S32-W05 | 25.5          | 105            | 195 | 32             | 60             | WCMT 050308E-DG |
| HP-4D260-S32-W05 | 26.0          | 107            | 197 | 32             | 60             |                 |
| HP-4D265-S32-W05 | 26.5          | 109            | 199 | 32             | 60             |                 |
| HP-4D270-S32-W05 | 27.0          | 111            | 201 | 32             | 60             |                 |
| HP-4D275-S32-W05 | 27.5          | 113            | 203 | 32             | 60             |                 |
| HP-4D280-S32-W05 | 28.0          | 115            | 205 | 32             | 60             |                 |
| HP-4D285-S32-W05 | 28.5          | 117            | 207 | 32             | 60             |                 |
| HP-4D290-S32-W05 | 29.0          | 119            | 209 | 32             | 60             |                 |
| HP-4D295-S32-W05 | 29.5          | 121            | 211 | 32             | 60             |                 |
| HP-4D300-S32-W05 | 30.0          | 123            | 213 | 32             | 60             |                 |

| Dimensions (mm) | Spare parts |         |
|-----------------|-------------|---------|
|                 | Screw       | Wrench  |
| Holder diameter |             |         |
|                 |             |         |
| 16-20           | AST22045-55 | AWF-T06 |
| 20.5-25         | AST25055-50 | AWF-T08 |
| 25.5-30         | AST307-55   | AWF-T08 |



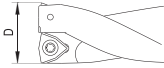


**DG Series Drilling holder**

Length-diameter ratio : 4D



| Product code     | Dimension(mm) |                |     |                |                | Inserts         |
|------------------|---------------|----------------|-----|----------------|----------------|-----------------|
|                  | D             | L <sub>1</sub> | L   | D <sub>s</sub> | L <sub>s</sub> |                 |
| HP-4D310-S32-W06 | 31.0          | 127            | 217 | 32             | 60             | WCMT 06T308E-DG |
| HP-4D320-S32-W06 | 32.0          | 131            | 221 | 32             | 60             |                 |
| HP-4D330-S32-W06 | 33.0          | 135            | 225 | 32             | 60             |                 |
| HP-4D340-S32-W06 | 34.0          | 139            | 229 | 32             | 60             |                 |
| HP-4D350-S32-W06 | 35.0          | 143            | 233 | 32             | 60             |                 |
| HP-4D360-S32-W06 | 36.0          | 147            | 237 | 32             | 60             |                 |
| HP-4D370-S32-W06 | 37.0          | 151            | 241 | 32             | 60             |                 |
| HP-4D380-S32-W06 | 38.0          | 155            | 245 | 32             | 60             |                 |
| HP-4D390-S32-W06 | 39.0          | 159            | 249 | 32             | 60             |                 |
| HP-4D400-S32-W06 | 40.0          | 163            | 253 | 32             | 60             |                 |
| HP-4D410-S32-W06 | 41.0          | 167            | 257 | 32             | 60             |                 |
| HP-4D420-S40-W08 | 42.0          | 171            | 276 | 40             | 70             | WCMT 080408E-DG |
| HP-4D430-S40-W08 | 43.0          | 175            | 280 | 40             | 70             |                 |
| HP-4D440-S40-W08 | 44.0          | 179            | 284 | 40             | 70             |                 |
| HP-4D450-S40-W08 | 45.0          | 183            | 288 | 40             | 70             |                 |
| HP-4D460-S40-W08 | 46.0          | 187            | 292 | 40             | 70             |                 |
| HP-4D470-S40-W08 | 47.0          | 191            | 296 | 40             | 70             |                 |
| HP-4D480-S40-W08 | 48.0          | 195            | 300 | 40             | 70             |                 |
| HP-4D490-S40-W08 | 49.0          | 199            | 304 | 40             | 70             |                 |
| HP-4D500-S40-W08 | 50.0          | 203            | 308 | 40             | 70             |                 |
| HP-4D510-S40-W08 | 51.0          | 207            | 312 | 40             | 70             |                 |
| HP-4D520-S40-W08 | 52.0          | 211            | 316 | 40             | 70             |                 |
| HP-4D530-S40-W08 | 53.0          | 215            | 320 | 40             | 70             |                 |
| HP-4D540-S40-W08 | 54.0          | 219            | 324 | 40             | 70             |                 |
| HP-4D550-S40-W08 | 55.0          | 223            | 328 | 40             | 70             |                 |
| HP-4D560-S40-W08 | 56.0          | 227            | 332 | 40             | 70             |                 |
| HP-4D570-S40-W08 | 57.0          | 231            | 336 | 40             | 70             |                 |
| HP-4D580-S40-W08 | 58.0          | 235            | 340 | 40             | 70             |                 |

Drilling holders

| Dimensions (mm)   | Spare parts   |   |
|---|---|---|
| Holder diameter   | Screw   | Wrench  |
|  |  |  |
| 31-41   | AST3509-55  | AWF-T15   |
| 42-58   | AST411-60W-M  | AWF-T15   |


Drilling Insert Denomination System

**S**  
1


**P**  
2

1- Shape/Code

**S**












**W**



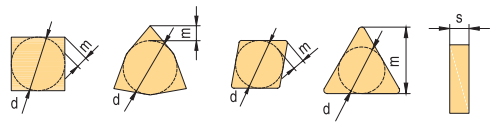
**M**  
3

**T**  
4

2- Clearance angle

|   |   |   |   |   |
|---|---|---|---|---|
| <b>A</b>  | <b>B</b>  | <b>C</b>  | <b>D</b>  | <b>E</b>  |
|  |  |  |  |  |
| <b>F</b>  | <b>G</b>  | <b>N</b>  | <b>P</b>  | <b>O</b>  |
|  |  |  |  | Other clearance angle   |

3- Tolerance

















| Class | Unit | In.Circle dimension d | Nose height m | Thickness |
|-------|------|-----------------------|---------------|-----------|
| A     | mm   | ± 0,025               | ± 0,005       | ± 0,025   |
| C     | mm   | ± 0,025               | ± 0,013       | ± 0,025   |
| E     | mm   | ± 0,025               | ± 0,025       | ± 0,025   |
| F     | mm   | ± 0,013               | ± 0,005       | ± 0,025   |
| G     | mm   | ± 0,025               | ± 0,025       | ± 0,13    |
| H     | mm   | ± 0,013               | ± 0,013       | ± 0,025   |
| J     | mm   | *                     | ± 0,005       | ± 0,025   |
| K     | mm   | *                     | ± 0,013       | ± 0,025   |
| L     | mm   | *                     | ± 0,025       | ± 0,025   |
| M     | mm   | *                     | *             | ± 0,127   |
| U     | mm   | *                     | *             | ± 0,127   |
| N     | mm   | *                     | *             | ± 0,025   |

\* For details refer to right and below tables

| IC     | Shape: C, E, H, M, O, P, S, T, R, W |        |        |        |
|--------|-------------------------------------|--------|--------|--------|
|        | d                                   |        | m      |        |
|        | J,K,L,M,N                           | U      | M, N   | U      |
| 4.76   | ± 0,05                              | ± 0,08 | ± 0,08 | ± 0,13 |
| 5.56   | ± 0,05                              | ± 0,08 | ± 0,08 | ± 0,13 |
| 6      | ± 0,05                              | ± 0,08 | ± 0,08 | ± 0,13 |
| 6.35   | ± 0,05                              | ± 0,08 | ± 0,08 | ± 0,13 |
| 7.94   | ± 0,05                              | ± 0,08 | ± 0,08 | ± 0,13 |
| 8      | ± 0,05                              | ± 0,08 | ± 0,08 | ± 0,13 |
| 9.525  | ± 0,05                              | ± 0,08 | ± 0,08 | ± 0,13 |
| 10     | ± 0,05                              | ± 0,08 | ± 0,08 | ± 0,13 |
| 12     | ± 0,08                              | ± 0,13 | ± 0,13 | ± 0,2  |
| 12.7   | ± 0,08                              | ± 0,13 | ± 0,13 | ± 0,2  |
| 15.875 | ± 0,1                               | ± 0,18 | ± 0,15 | ± 0,27 |
| 16     | ± 0,1                               | ± 0,18 | ± 0,15 | ± 0,27 |
| 19.05  | ± 0,1                               | ± 0,18 | ± 0,15 | ± 0,27 |
| 20     | ± 0,1                               | ± 0,18 | ± 0,15 | ± 0,27 |
| 25     | ± 0,13                              | ± 0,25 | ± 0,18 | ± 0,38 |
| 25.4   | ± 0,13                              | ± 0,25 | ± 0,18 | ± 0,38 |
| 31.75  | ± 0,15                              | ± 0,25 | ± 0,2  | ± 0,38 |
| 32     | ± 0,15                              | ± 0,25 | ± 0,2  | ± 0,38 |

| M&N shape | D shape |        | V shape |        |
|-----------|---------|--------|---------|--------|
|           | d       | m      | d       | m      |
| 5.56      | ± 0,05  | ± 0,11 |         |        |
| 6.35      | ± 0,05  | ± 0,11 | ± 0,05  | ± 0,16 |
| 7.94      | ± 0,05  | ± 0,11 | ± 0,05  | ± 0,16 |
| 9.525     | ± 0,05  | ± 0,11 | ± 0,05  | ± 0,16 |
| 12.7      | ± 0,08  | ± 0,15 | ± 0,08  | ± 0,2  |
| 15.875    | ± 0,10  | ± 0,18 | ± 0,10  | ± 0,27 |
| 19.05     | ± 0,10  | ± 0,18 | ± 0,10  | ± 0,27 |

4- Clamping type

|   |   |   |   |   |
|---|---|---|---|---|
| <b>A</b>  | <b>B</b>  | <b>C</b>  | <b>F</b>  | <b>G</b>  |
|  |  |  |  |  |
| <b>H</b>  | <b>J</b>  | <b>M</b>  | <b>N</b>  | <b>Q</b>  |
|  |  |  |  |  |
| <b>R</b>  | <b>T</b>  | <b>U</b>  | <b>W</b>  | <b>X</b>  |
|  |  |  |  | Special   |

**06**  
5

**02**  
6

**04**  
7

**E**  
8

**-**  
-

**DP**  
9

**5- Cutting edge length**

| In.Circle Dimension (mm) | S Code | S Length | W Code | W Length |
|--------------------------|--------|----------|--------|----------|
| 5.56                     |        |          | 03     | 3.8      |
| 6.35                     | 06     | 6.35     | 04     | 4.3      |
| 7.94                     |        |          | 05     | 5.4      |
| 8.0                      | 08     | 8.0      |        |          |
| 9.525                    | 09     | 9.525    | 06     | 6.5      |
| 12.7                     | 12     | 12.7     | 08     | 8.7      |

**7- Corner radius**

| Example |   |     |
|---------|---|-----|
| 04      | = | 0.4 |
| 08      | = | 0.8 |
| 12      | = | 1.2 |

**8- Cutting edge shape**

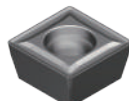

| Example | Illustration       |
|---------|--------------------|
| E       | Honed cutting edge |
| F       | Sharp cutting edge |
| T       | Negative land      |

**6- Insert thickness**

| Thickness illustration | Thickness mark | Example    |
|------------------------|----------------|------------|
|                        |                | 00 = 0.79  |
|                        |                | T0 = 0.99  |
|                        |                | 01 = 1.59  |
|                        |                | T1 = 1.98  |
|                        |                | 02 = 2.38  |
|                        |                | T2 = 2.58  |
|                        |                | 03 = 3.18  |
|                        |                | T3 = 3.97  |
|                        |                | 04 = 4.76  |
|                        |                | T4 = 4.96  |
|                        |                | 05 = 5.56  |
|                        |                | T5 = 5.95  |
|                        |                | 06 = 6.35  |
|                        |                | 07 = 7.94  |
|                        |                | 09 = 9.53  |
|                        |                | 11 = 11.11 |
|                        |                | 12 = 12.70 |
|                        |                | 14 = 14.29 |
|                        |                | 15 = 15.88 |

Insert thickness "S" refers to the distance between cutting edge nose and bottom

**9- Chip breaker code**

| DP   | DU/DG   |
|--|---|
|  |  |

10. Chip breakers' information refer to page 298

Drilling inserts

## Geometry Application Guide

### DP

1. DP geometry has high efficiency. Suitable for short hole high speed drilling.
2. Strong square insert with reinforced geometry offers excellent hole straightness.
3. Drilling holder with helical flute provides excellent chip evacuation and high hole precision.



### DU/DG

1. Suitable cutting angle makes perfect balance for the cutting force.
2. General purpose geometry combined with two grades are suitable for PM,K,S materials, especially good for the chip control in soft materials.
3. Obtains good surface finish.
4. Good versatility. It's suitable for rotating and non-rotating machining.



**Grade Application Guide**

| Drilling insert grade ISO group |                                    |     |        |        |        |        |        |     |
|---------------------------------|------------------------------------|-----|--------|--------|--------|--------|--------|-----|
| Material Group                  | Materials                          | ISO | AP301U | AP351U | AP351M | AC301P | ISO    |     |
| <b>P</b>                        | Unalloy steels / Alloyed steels    | P01 |        |        |        |        | P01    |     |
|                                 |                                    | P05 |        |        |        |        | P05    |     |
|                                 |                                    | P10 |        |        |        |        | P10    |     |
|                                 |                                    | P15 | AP301U |        |        |        |        | P15 |
|                                 |                                    | P20 |        |        |        |        | P20    |     |
|                                 |                                    | P25 |        |        | AP351U | AP351M | AC301P | P25 |
|                                 |                                    | P30 |        |        |        |        |        | P30 |
|                                 |                                    | P35 |        |        |        |        |        | P35 |
|                                 |                                    | P40 |        |        |        |        |        | P40 |
|                                 |                                    | P45 |        |        |        |        |        | P45 |
|                                 |                                    | P50 |        |        |        |        |        | P50 |
| <b>M</b>                        | Stainless steels                   | M01 |        |        |        |        | M01    |     |
|                                 |                                    | M05 |        |        |        |        | M05    |     |
|                                 |                                    | M10 |        |        |        |        | M10    |     |
|                                 |                                    | M15 | AP301U |        |        |        |        | M15 |
|                                 |                                    | M20 |        |        |        |        | M20    |     |
|                                 |                                    | M25 |        |        | AP351U | AP351M |        | M25 |
|                                 |                                    | M30 |        |        |        |        |        | M30 |
|                                 |                                    | M35 |        |        |        |        |        | M35 |
|                                 |                                    | M40 |        |        |        |        |        | M40 |
| M45                             |                                    |     |        |        |        | M45    |        |     |
| <b>K</b>                        | Cast iron                          | K01 |        |        |        |        | K01    |     |
|                                 |                                    | K05 |        |        |        |        | K05    |     |
|                                 |                                    | K10 |        |        |        |        | K10    |     |
|                                 |                                    | K15 |        |        |        |        | K15    |     |
|                                 |                                    | K20 |        |        |        |        | K20    |     |
|                                 |                                    | K25 |        |        |        |        | K25    |     |
|                                 |                                    | K30 |        |        |        |        | K30    |     |
|                                 |                                    | K35 |        |        |        |        | K35    |     |
|                                 |                                    | K40 |        |        |        |        | K40    |     |
|                                 |                                    | K45 |        |        |        |        | K45    |     |
| <b>S</b>                        | Heat resistant alloys              | S01 |        |        |        |        | S01    |     |
|                                 |                                    | S05 |        |        |        |        | S05    |     |
|                                 |                                    | S10 |        |        |        |        | S10    |     |
|                                 |                                    | S15 |        |        |        |        | S15    |     |
|                                 |                                    | S20 |        |        |        |        | S20    |     |
|                                 |                                    | S25 |        |        | AP351U | AP351M |        | S25 |
|                                 |                                    | S30 |        |        |        |        |        | S30 |
|                                 |                                    | S35 |        |        |        |        |        | S35 |
|                                 |                                    | S40 |        |        |        |        |        | S40 |
|                                 |                                    | S45 |        |        |        |        |        | S45 |
| <b>N</b>                        | Aluminum/ Aluminum alloys          | N01 |        |        |        |        | N01    |     |
|                                 |                                    | N05 |        |        |        |        | N05    |     |
|                                 |                                    | N10 |        |        |        |        | N10    |     |
|                                 |                                    | N15 |        |        |        |        | N15    |     |
|                                 |                                    | N20 |        |        |        |        | N20    |     |
|                                 |                                    | N25 |        |        |        |        | N25    |     |
|                                 |                                    | N30 |        |        |        |        | N30    |     |
| <b>H</b>                        | Hardened steels/ Chilled cast iron | H01 |        |        |        |        | H01    |     |
|                                 |                                    | H05 |        |        |        |        | H05    |     |
|                                 |                                    | H10 |        |        |        |        | H10    |     |
|                                 |                                    | H15 |        |        |        |        | H15    |     |
|                                 |                                    | H20 |        |        |        |        | H20    |     |
|                                 |                                    | H25 |        |        |        |        | H25    |     |
| H30                             |                                    |     |        |        | H30    |        |        |     |

Drilling inserts

Grade Application Guide

| Materials |   |                                       |               | PVD coated |        |        | CVD coated |
|-----------|---|---------------------------------------|---------------|------------|--------|--------|------------|
|           |   |                                       |               | AP301U     | AP351U | AP351M | AC301P     |
| ISO       | Material classification                 | Tensile strength (N/mm <sup>2</sup> ) | Hardness (HB) | Priority   |        |        |            |
| P         | Unalloyed steel                         | <600                                  | <180          | ●          | ●      | ●      | ●          |
|           |   | <950                                  | <280          | ●          | ●      | ●      | ●          |
|           | Alloyed steel                           | 700-950                               | 200-280       | ●          | ●      | ●      | ●          |
|           |   | 950-1200                              | 280-355       | ●          | ●      | ●      | ●          |
|           |   | 1200-1400                             | 355-415       | ●          | ●      | ●      | ●          |
| M         | Duplex stainless steel                  | 778                                   | 230           | ◐          | ●      | ●      | -          |
|           | Austenitic stainless steel              | 675                                   | 200           | ◐          | ●      | ●      | -          |
|           | Precipitation-hardening stainless steel | 1013                                  | 300           | ◐          | ●      | ●      | -          |
| K         | Grey cast iron                          | 700                                   | 220           | -          | -      | -      | -          |
|           | Nodular cast iron                       | 880                                   | 260           | -          | -      | -      | -          |
|           | Malleable cast iron                     | 800                                   | 250           | -          | -      | -      | -          |
| S         | Fe-based alloy                          | 943                                   | 280           | -          | ◐      | ●      | -          |
|           | Co-based alloy                          | 1076                                  | 320           | -          | ◐      | ●      | -          |
|           | Ni-based alloy                          | 1177                                  | 350           | -          | ◐      | ●      | -          |
|           | Ti-alloy                                | 1262                                  | 370           | -          | ◐      | ●      | -          |
| N         | Aluminum                                | 260                                   | 75            | -          | -      | -      | -          |
|           | Aluminum alloy                          | 447                                   | 130           | -          | -      | -      | -          |
| H         | Hardened steel                          | -                                     | 50-60HRC      | -          | -      | -      | -          |
|           | Chilled cast iron                       | -                                     | 55HRC         | -          | -      | -      | -          |

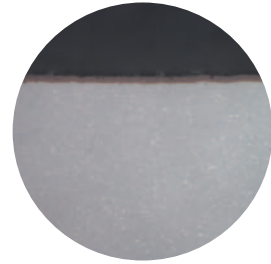
- Best choice
- ◐ 2nd choice
- Inapplicable

**Drilling Grade Description**

**AP301U**

Coating: PVD coating

Suitable for steel, stainless steel drilling. High strength and wear resistance ultra fine carbide substrate with nanostructured PVD coating in controllable layer, high coating adhesion, wear-resistance and strength.



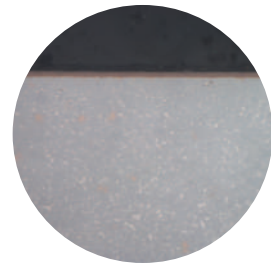
| Application range  |    |    |    |        |    |    |    |    |    |    |    |  |
|--------------------|----|----|----|--------|----|----|----|----|----|----|----|--|
| ISO Classification | 01 | 05 | 10 | 15     | 20 | 25 | 30 | 35 | 40 | 45 | 50 |  |
| P                  |    |    |    | AP301U |    |    |    |    |    |    |    |  |
| M                  |    |    |    | AP301U |    |    |    |    |    |    |    |  |
| K                  |    |    |    |        |    |    |    |    |    |    |    |  |
| S                  |    |    |    |        |    |    |    |    |    |    |    |  |
| N                  |    |    |    |        |    |    |    |    |    |    |    |  |
| H                  |    |    |    |        |    |    |    |    |    |    |    |  |

Remark:  Best choice  
 2nd choice

**AP351U**

Coating: PVD coating

Suitable for steel, stainless steel and heat resistant alloy drilling. High strength carbide substrate with nanostructured PVD coating in controllable layer, high coating adhesion, wear-resistance and strength.



| Application range  |    |    |    |    |    |    |        |    |    |    |    |  |
|--------------------|----|----|----|----|----|----|--------|----|----|----|----|--|
| ISO Classification | 01 | 05 | 10 | 15 | 20 | 25 | 30     | 35 | 40 | 45 | 50 |  |
| P                  |    |    |    |    |    |    | AP351U |    |    |    |    |  |
| M                  |    |    |    |    |    |    | AP351U |    |    |    |    |  |
| K                  |    |    |    |    |    |    |        |    |    |    |    |  |
| S                  |    |    |    |    |    |    | AP351U |    |    |    |    |  |
| N                  |    |    |    |    |    |    |        |    |    |    |    |  |
| H                  |    |    |    |    |    |    |        |    |    |    |    |  |

Remark:  Best choice  
 2nd choice

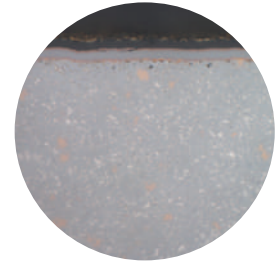
Drilling inserts



**AC301P**

Coating: CVD coating

For steel and cast iron drilling. High strength substrate combined with multi-layer CVD, good coating adhesion and strength.



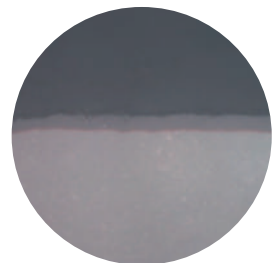
| Application range  |    |    |    |    |    |        |    |    |    |    |    |
|--------------------|----|----|----|----|----|--------|----|----|----|----|----|
| ISO Classification | 01 | 05 | 10 | 15 | 20 | 25     | 30 | 35 | 40 | 45 | 50 |
| P                  |    |    |    |    |    | AC301P |    |    |    |    |    |
| M                  |    |    |    |    |    |        |    |    |    |    |    |
| K                  |    |    |    |    |    |        |    |    |    |    |    |
| S                  |    |    |    |    |    |        |    |    |    |    |    |
| N                  |    |    |    |    |    |        |    |    |    |    |    |
| H                  |    |    |    |    |    |        |    |    |    |    |    |

Remark:  Best choice  
 2nd choice

**AP351M**

Coating: PVD coating

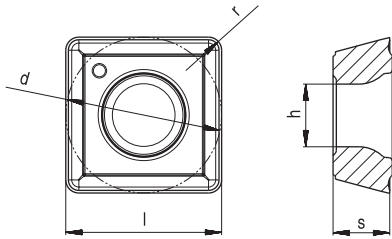
Suitable for steel, stainless steel and heat resistant alloy drilling. Good stability and wear resistance. Good thermal crack resistance and high coating adhesion and strength.

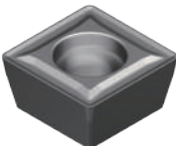


| Application range  |    |    |    |    |    |        |    |    |    |    |    |
|--------------------|----|----|----|----|----|--------|----|----|----|----|----|
| ISO Classification | 01 | 05 | 10 | 15 | 20 | 25     | 30 | 35 | 40 | 45 | 50 |
| P                  |    |    |    |    |    | AP351M |    |    |    |    |    |
| M                  |    |    |    |    |    | AP351M |    |    |    |    |    |
| K                  |    |    |    |    |    |        |    |    |    |    |    |
| S                  |    |    |    |    |    | AP351M |    |    |    |    |    |
| N                  |    |    |    |    |    |        |    |    |    |    |    |
| H                  |    |    |    |    |    |        |    |    |    |    |    |

Remark:  Best choice  
 2nd choice

**SPMT-DP Drilling Insert**

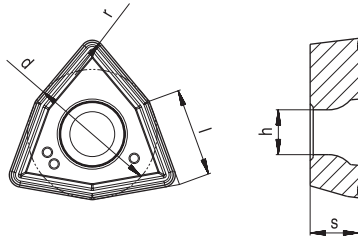



| Inserts   | Product code    | Dimension(mm) |      |      |     |      | Grades |        |        |        |        |        |        |        |        |
|---|-----------------|---------------|------|------|-----|------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
|   |                 | l             | d    | s    | r   | h    | AP301U | AP351U | AC301P | AP351M | AP401U | AP351K | AC301K | AW100K | AP403S |
|  | SPMT 050204E-DP | 5             | 5    | 2.38 | 0.4 | 2.25 | ●      | ●      | ●      | ●      |        |        |        |        |        |
|   | SPMT 060204E-DP | 6             | 6    | 2.38 | 0.4 | 2.61 | ●      | ●      | ●      | ●      |        |        |        |        |        |
|   | SPMT 07T308E-DP | 7.94          | 7.94 | 3.97 | 0.8 | 2.85 | ●      | ●      | ●      | ●      |        |        |        |        |        |
|   | SPMT 090408E-DP | 9.8           | 9.8  | 4.3  | 0.8 | 4.05 | ●      | ●      | ●      | ●      |        |        |        |        |        |
|   | SPMT 110408E-DP | 11.5          | 11.5 | 4.8  | 0.8 | 4.45 | ●      | ●      | ●      | ●      |        |        |        |        |        |
|   | SPMT 140512E-DP | 14.3          | 14.3 | 5.2  | 1.2 | 5.75 | ●      | ●      | ●      | ●      |        |        |        |        |        |
|   |                 |               |      |      |     |      |        |        |        |        |        |        |        |        |        |
|   |                 |               |      |      |     |      |        |        |        |        |        |        |        |        |        |

Marked: ● Stock available

Drilling inserts

**WCMT-DU Drilling Insert**

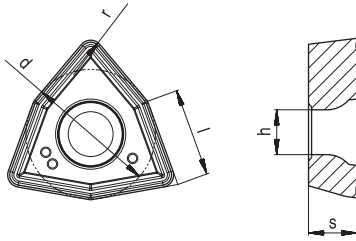



| Inserts   | Product code           | Dimension(mm) |       |      |     |     | Grades |        |        |        |        |        |        |        |        |  |
|---|------------------------|---------------|-------|------|-----|-----|--------|--------|--------|--------|--------|--------|--------|--------|--------|--|
|   |                        | l             | d     | s    | r   | h   | AP301U | AP351U | AC301P | AP351M | AP401U | AP351K | AC301K | AW100K | AP403S |  |
|  | <b>WCMT 030208E-DU</b> | 3.8           | 5.56  | 2.38 | 0.8 | 2.8 | ●      | ●      |        |        |        |        |        |        |        |  |
|   | <b>WCMT 040208E-DU</b> | 4.3           | 6.35  | 2.38 | 0.8 | 3.0 | ●      | ●      |        |        |        |        |        |        |        |  |
|   | <b>WCMT 050308E-DU</b> | 5.4           | 7.94  | 3.18 | 0.8 | 3.4 | ●      | ●      |        |        |        |        |        |        |        |  |
|   | <b>WCMT 06T308E-DU</b> | 6.5           | 9.525 | 3.97 | 0.8 | 3.9 | ●      | ●      |        |        |        |        |        |        |        |  |
|   | <b>WCMT 080412E-DU</b> | 8.7           | 12.7  | 4.76 | 1.2 | 4.4 | ●      | ●      |        |        |        |        |        |        |        |  |
|   |                        |               |       |      |     |     |        |        |        |        |        |        |        |        |        |  |
|   |                        |               |       |      |     |     |        |        |        |        |        |        |        |        |        |  |
|   |                        |               |       |      |     |     |        |        |        |        |        |        |        |        |        |  |

Note: The DU insert is a universal insert and Achteck does not provide a tool holder.

Marked: ● Stock available

**WCMT-DG Drilling Insert**



| Inserts   | Product code           | Dimension(mm) |       |      |     |      | Grades |        |        |        |        |        |        |        |        |  |
|---|------------------------|---------------|-------|------|-----|------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--|
|   |                        | l             | d     | s    | r   | h    | AP301U | AP351U | AC301P | AP351M | AP401U | AP351K | AC301K | AW100K | AP403S |  |
|  | <b>WCMT 030204E-DG</b> | 3.8           | 5.56  | 2.38 | 0.4 | 2.5  | ●      | ●      |        |        |        |        |        |        |        |  |
|   | <b>WCMT 040204E-DG</b> | 4.3           | 6.35  | 2.38 | 0.4 | 2.8  | ●      | ●      |        |        |        |        |        |        |        |  |
|   | <b>WCMT 050308E-DG</b> | 5.4           | 7.94  | 3.18 | 0.8 | 3.4  | ●      | ●      |        |        |        |        |        |        |        |  |
|   | <b>WCMT 06T308E-DG</b> | 6.5           | 9.525 | 3.97 | 0.8 | 4.45 | ●      | ●      |        |        |        |        |        |        |        |  |
|   | <b>WCMT 080408E-DG</b> | 8.7           | 12.7  | 4.76 | 0.8 | 5.5  | ●      | ●      |        |        |        |        |        |        |        |  |
|   |                        |               |       |      |     |      |        |        |        |        |        |        |        |        |        |  |
|   |                        |               |       |      |     |      |        |        |        |        |        |        |        |        |        |  |
|   |                        |               |       |      |     |      |        |        |        |        |        |        |        |        |        |  |

Marked: ● Stock available

Drilling inserts



**Cutting Parameter Recommendation**

| Materials |                            | WC drilling insert series grade application range & cutting parameter recommendation |               |                       |               |     |               |     |     |              |               |                  |              |              |           |           |           |   |
|-----------|----------------------------|--|---------------|-----------------------|---------------|-----|---------------|-----|-----|--------------|---------------|------------------|--------------|--------------|-----------|-----------|-----------|---|
|           |                            | AP301U   | AP351U        | AC301P                | Feed (mm/rev) |     |               |     |     |              |               |                  | φ41mm~φ41 mm | φ41mm~φ58 mm |           |           |           |   |
| ISO       | Material classification    | Tensile strength (N/mm <sup>2</sup> )  | Hardness (HB) | Cutting speed (m/min) |               |     | Feed (mm/rev) |     |     | φ16mm~φ20 mm | φ20.5mm~φ25mm | φ25.5mm ~ φ30 mm | φ81mm~φ41 mm | φ41mm~φ58 mm |           |           |           |   |
|           |                            |  |               | Max                   | Med           | Min | Max           | Med | Min | Max          | Med           | Min              | Max          | Med          | Min       | Max       |           |   |
| P         | Unalloyed steel            | <600   | <180          | 260                   | 240           | 224 | 220           | 185 | 150 | 200          | 175           | 150              | 0.04-0.065   | 0.07-0.09    | 0.07-0.10 | 0.08-0.11 | 0.09-0.13 |   |
|           |                            | <950   | <280          | 250                   | 210           | 170 | 200           | 170 | 140 | 190          | 162.5         | 135              | 0.05-0.07    | 0.09-0.09    | 0.07-0.10 | 0.08-0.11 | 0.09-0.13 |   |
|           |                            | 700-950  | 200-280       | 240                   | 200           | 160 | 190           | 160 | 130 | 180          | 150           | 120              | 0.05-0.09    | 0.065-0.14   | 0.08-0.16 | 0.10-0.18 | 0.10-0.20 |   |
|           |                            | 950-1200   | 280-355       | 210                   | 170           | 130 | 170           | 130 | 90  | 160          | 130           | 100              | 0.04-0.07    | 0.065-0.11   | 0.07-0.14 | 0.09-0.15 | 0.10-0.18 |   |
| M         | Duplex stainless steel     | 1200-1400  | 355-415       | 170                   | 140           | 110 | 160           | 120 | 80  | 140          | 110           | 80               | 0.04-0.065   | 0.05-0.9     | 0.07-0.10 | 0.08-0.12 | 0.09-0.13 |   |
|           |                            | 778  | 230           | 260                   | 200           | 140 | 180           | 135 | 90  | -            | -             | -                | 0.04-0.07    | 0.065-0.11   | 0.08-0.14 | 0.08-0.11 | 0.09-0.13 |   |
| K         | Austenitic stainless steel | 675  | 200           | 220                   | 170           | 120 | 120           | 65  | 60  | -            | -             | -                | 0.04-0.065   | 0.065-0.10   | 0.08-0.12 | 0.08-0.10 | 0.08-0.11 |   |
|           |                            | 1013   | 300           | 180                   | 140           | 100 | 90            | 65  | 40  | -            | -             | -                | -            | -            | -         | -         | -         |   |
|           |                            | 700  | 220           | -                     | -             | -   | -             | -   | -   | -            | -             | -                | -            | -            | -         | -         | -         | - |
| S         | Grey cast iron             | 880  | 260           | -                     | -             | -   | -             | -   | -   | -            | -             | -                | -            | -            | -         | -         | -         | - |
|           |                            | 800  | 250           | -                     | -             | -   | -             | -   | -   | -            | -             | -                | -            | -            | -         | -         | -         | - |
|           |                            | 943  | 280           | -                     | -             | -   | 40            | 30  | 20  | -            | -             | -                | -            | -            | -         | -         | -         | - |
|           |                            | 1076   | 320           | -                     | -             | -   | 35            | 25  | 15  | -            | -             | -                | -            | -            | -         | -         | -         | - |
| N         | Co-based alloy             | 1177   | 350           | -                     | -             | -   | 35            | 25  | 15  | -            | -             | -                | -            | -            | -         | -         | -         | - |
|           |                            | 1262   | 370           | -                     | -             | -   | 40            | 30  | 20  | -            | -             | -                | 0.05-0.10    | 0.06-0.11    | 0.07-0.12 | 0.08-0.13 | 0.08-0.14 |   |
| H         | Aluminum alloy             | 260  | 75            | -                     | -             | -   | -             | -   | -   | -            | -             | -                | -            | -            | -         | -         | -         | - |
|           |                            | 447  | 130           | -                     | -             | -   | -             | -   | -   | -            | -             | -                | -            | -            | -         | -         | -         | - |
| H         | Hardened steel             | -  | 50-60HRC      | -                     | -             | -   | -             | -   | -   | -            | -             | -                | -            | -            | -         | -         | -         | - |
|           |                            | -  | 55HRC         | -                     | -             | -   | -             | -   | -   | -            | -             | -                | -            | -            | -         | -         | -         | - |

\*The recommended cutting conditions always refer to general conditions. These cutting conditions should be adjusted according to the practical machine rigidity, tools, workpiece clamping and coolants.

### Deep-hole Drilling Product Introduction

Achteck has launched general-purpose deep-hole drilling inserts, which offer high productivity for many industries: energy, engineering machinery, injection molding, aircraft, shipbuilding, military, etc. It can achieve good hole straightness in deep hole drilling and good surface finish. Existing geometries and grades cover steel, stainless steel and heat resistant alloy drilling.

Product application and features

- The inserts can be mounted on the deep-hole drilling head.
- AP301U(N) is the first choice for drilling steel and stainless steel
- All geometries offer good chip-breaking result
- Increased efficiency due to high feed rate
- Reduces the cost per hole

### Grade and Application

| Grade     | Coating | Workpiece material |   |   |   |   |   |
|-----------|---------|--------------------|---|---|---|---|---|
|           |         | P                  | M | K | S | N | H |
| AP301U(N) | PVD     | ●                  | ● |   | ○ |   |   |




● Marked: 1<sup>st</sup> Choice    ● Marked: 2<sup>nd</sup> Choice    ○ Marked: Supplementary application

ISO P : (P15-P35) General-purpose PVD coating with excellent wear-resistance and toughness.

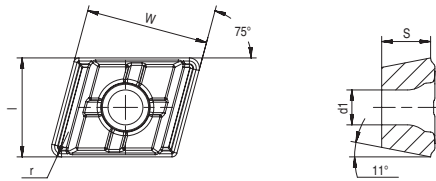
ISO M :(M15-M35) General-purpose grade for ISO-M applications, PVD coating with excellent toughness and resistance to built-up edges.

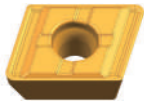
ISO S :(S15-S35) PVD coating with excellent wear resistance and toughness, good resistance to built-up edges.

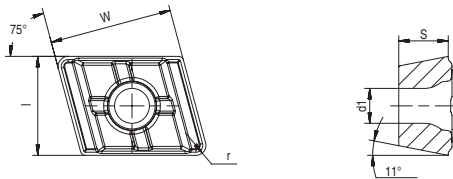
### Geometry Types and Features

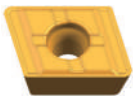
| Geometry | Edge shape  | Application  |
|----------|---|--|
| DH       |  | <ul style="list-style-type: none"> <li>• For general purpose.</li> <li>• Suitable for high cutting speed and feed.</li> <li>• Good chip control in most of materials.</li> </ul>   |
| DL       |  | <ul style="list-style-type: none"> <li>• Suitable for long chip materials (such as low carbon alloy steel and duplex stainless steel).</li> <li>• Obtain a reliable production process in drilling materials where chip jamming can be a problem.</li> </ul> |
| LH       |  | <ul style="list-style-type: none"> <li>• With open geometry;</li> <li>• Suitable for high cutting speed and feed.</li> </ul>   |

**DH Geometry**



| Center insert   | Product code              | l    | w    | s    | r   | d1  | Competitor's description | Stock |
|---|---------------------------|------|------|------|-----|-----|--------------------------|-------|
|  | EPMT 050308C-DH AP301U(N) | 5.56 | 8    | 3.18 | 0.8 | 2.5 | 800-050308M-C-G 1025     | ●     |
|   | EPMT 06T308C-DH AP301U(N) | 6.35 | 9.87 | 3.97 | 0.8 | 2.8 | 800-06T308M-C-G 1025     | ●     |
|   | EPMT 08T308C-DH AP301U(N) | 7.94 | 9.87 | 3.97 | 0.8 | 2.8 | 800-08T308M-C-G 1025     | ●     |
|   | EPMT 10T308C-DH AP301U(N) | 9.53 | 9.87 | 3.97 | 0.8 | 2.8 | 800-10T308M-C-G 1025     | ●     |
|   | EPMT 12T308C-DH AP301U(N) | 12.7 | 9.87 | 3.97 | 0.8 | 2.8 | 800-12T308M-C-G 1025     | ●     |



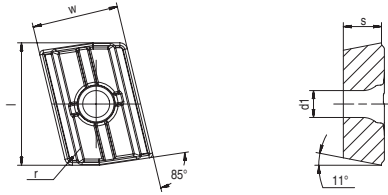
| Intermediate insert   | Product code              | l    | w    | s    | r   | d1  | Competitor's description | Stock |
|---|---------------------------|------|------|------|-----|-----|--------------------------|-------|
|  | EPMT 050308I-DH AP301U(N) | 5.56 | 8    | 3.18 | 0.8 | 2.5 | 800-050308M-I-G 1025     | ●     |
|   | EPMT 06T308I-DH AP301U(N) | 6.35 | 9.87 | 3.97 | 0.8 | 2.8 | 800-06T308M-I-G 1025     | ●     |
|   | EPMT 08T308I-DH AP301U(N) | 7.94 | 9.87 | 3.97 | 0.8 | 2.8 | 800-08T308M-I-G 1025     | ●     |
|   | EPMT 12T308I-DH AP301U(N) | 12.7 | 9.87 | 3.97 | 0.8 | 2.8 | 800-12T308M-I-G 1025     | ●     |

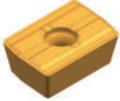
Marked: ● Stock available

Drilling inserts

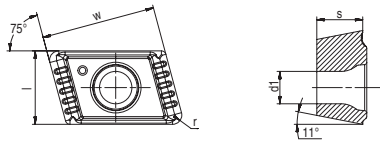



DH Geometry

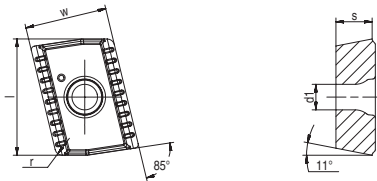


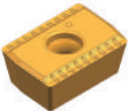
| Periphery insert  | Product code              | l     | w | s    | r   | d1  | Competitor's description | Stock |
|---|---------------------------|-------|---|------|-----|-----|--------------------------|-------|
|  | APHT 060308P-DH AP301U(N) | 6.5   | 8 | 3.18 | 0.8 | 2.5 | 800-060308H-P-G 1025     | ●     |
|   | APHT 08T308P-DH AP301U(N) | 8.5   | 9 | 3.97 | 0.8 | 2.8 | 800-08T308H-P-G 1025     | ●     |
|   | APHT 09T308P-DH AP301U(N) | 9.66  | 9 | 3.97 | 0.8 | 2.8 | 800-09T308H-P-G 1025     | ●     |
|   | APHT 11T308P-DH AP301U(N) | 12.75 | 9 | 3.97 | 0.8 | 2.8 | 800-11T308H-P-G 1025     | ●     |

DL Geometry



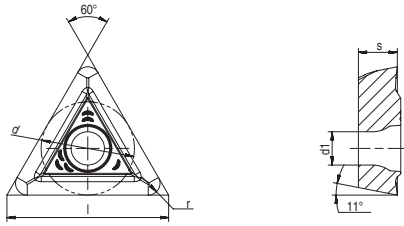
| Intermediate insert   | Product code              | l    | w    | s    | r   | d1  | Competitor's description | Stock |
|---|---------------------------|------|------|------|-----|-----|--------------------------|-------|
|  | EPMT 050308I-DL AP301U(N) | 5.56 | 8    | 3.18 | 0.8 | 2.5 | 800-050308M-I-L 1025     | ●     |
|   | EPMT 06T308I-DL AP301U(N) | 6.35 | 9.87 | 3.97 | 0.8 | 2.8 | 800-06T308M-I-L 1025     | ●     |
|   | EPMT 08T308I-DL AP301U(N) | 7.94 | 9.87 | 3.97 | 0.8 | 2.8 | 800-08T308M-I-L 1025     | ●     |
|   | EPMT 12T308I-DL AP301U(N) | 12.7 | 9.87 | 3.97 | 0.8 | 2.8 | 800-12T308M-I-L 1025     | ●     |

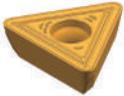


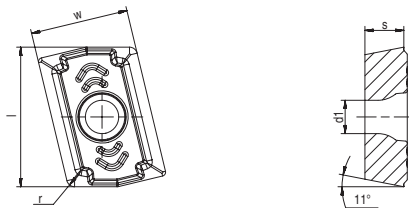
| Periphery insert  | Product code              | l     | w | s    | r   | d1  | Competitor's description | Stock |
|---|---------------------------|-------|---|------|-----|-----|--------------------------|-------|
|  | APHT 060308P-DL AP301U(N) | 6.5   | 8 | 3.18 | 0.8 | 2.5 | 800-060308H-P-L 1025     | ●     |
|   | APHT 08T308P-DL AP301U(N) | 8.5   | 9 | 3.97 | 0.8 | 2.8 | 800-08T308H-P-L 1025     | ●     |
|   | APHT 09T308P-DL AP301U(N) | 9.66  | 9 | 3.97 | 0.8 | 2.8 | 800-09T308H-P-L 1025     | ●     |
|   | APHT 11T308P-DL AP301U(N) | 12.75 | 9 | 3.97 | 0.8 | 2.8 | 800-11T308H-P-L 1025     | ●     |

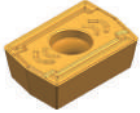
Marked: ● Stock available

**DH Geometry**



| Center/Intermediate insert  | Product code                     | l    | d     | s    | r   | d1  | Competitor's description | Stock |
|---|----------------------------------|------|-------|------|-----|-----|--------------------------|-------|
|  | <b>TPMT 16T312R-DH AP301U(N)</b> | 16.5 | 9.525 | 3.97 | 1.2 | 3.4 | TPMT 16T312R-23 1025     | ●     |
|   | <b>TPMT 220612R-DH AP301U(N)</b> | 22   | 12.7  | 6.35 | 1.2 | 4.4 | TPMT 220612R-23 1025     | ●     |
|   |                                  |      |       |      |     |     |                          |       |

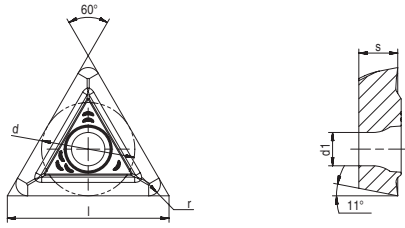


| Periphery insert  | Product code                    | l    | d    | s    | r   | d1  | Competitor's description | Stock |
|---|---------------------------------|------|------|------|-----|-----|--------------------------|-------|
|  | <b>APMT 13T308-DH AP301U(N)</b> | 14.6 | 10   | 3.97 | 0.8 | 3.4 | R424.9-13T308-23 1025    | ●     |
|   | <b>APMT 180608-DH AP301U(N)</b> | 20.6 | 11.5 | 6.35 | 0.8 | 4.4 | R424.9-180608-23 1025    | ●     |
|   |                                 |      |      |      |     |     |                          |       |

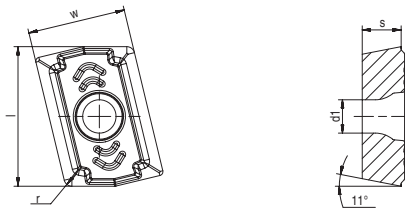
Marked: ● Stock available

Drilling inserts

LH Geometry



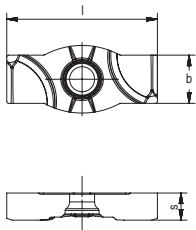
| Center/Intermediate insert | Product code              | l    | d     | s    | r   | d1  | Competitor's description | Stock |
|----------------------------|---------------------------|------|-------|------|-----|-----|--------------------------|-------|
|                            | TPMT 16T312R-LH AP301U(N) | 16.5 | 9.525 | 3.97 | 1.2 | 3.4 | TPMT 16T312R-22 1025     | ●     |
|                            | TPMT 220612R-LH AP301U(N) | 22   | 12.7  | 6.35 | 1.2 | 4.4 | TPMT 220612R-22 1025     | ●     |




| Periphery insert | Product code             | l    | d    | s    | r   | d1  | Competitor's description | Stock |
|------------------|--------------------------|------|------|------|-----|-----|--------------------------|-------|
|                  | APMT 13T308-LH AP301U(N) | 14.6 | 10   | 3.97 | 0.8 | 3.4 | R424.9-13T308-22 1025    | ●     |
|                  | APMT 180608-LH AP301U(N) | 20.6 | 11.5 | 6.35 | 0.8 | 4.4 | R424.9-180608-22 1025    | ●     |

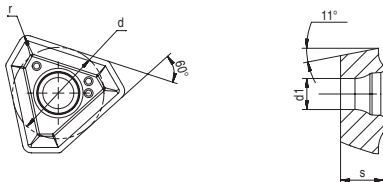
Marked: ● Stock available


**Guiding Pad**



| Guiding pad   | Product code           | b     | l     | s    | Competitor's description | Stock |
|---|------------------------|-------|-------|------|--------------------------|-------|
|  | <b>GPAD-06A AC301K</b> | 6.00  | 18.00 | 3.00 | 800-06A PM1              | ●     |
|   | <b>GPAD-07A AC301K</b> | 6.90  | 20.00 | 3.50 | 800-07A PM1              | ●     |
|   | <b>GPAD-08A AC301K</b> | 8.00  | 25.00 | 4.50 | 800-08A PM1              | ●     |
|   | <b>GPAD-10A AC301K</b> | 10.00 | 30.00 | 4.50 | 800-10A PM1              | ●     |
|   | <b>GPAD-12A AC301K</b> | 12.00 | 35.00 | 5.50 | 800-12A PM1              | ●     |

**TPMX Series**



| Sharp   | Product code                   | s    | d     | r    | d1   | Competitor's description | Stock |
|---|--------------------------------|------|-------|------|------|--------------------------|-------|
|  | <b>TPMX 1403R-DH AP301U(N)</b> | 3.50 | 8.45  | 0.80 | 2.87 | TPMX 1403RG TT9030       | ●     |
|   | <b>TPMX 1704R-DH AP301U(N)</b> | 4.00 | 10.30 | 0.80 | 3.90 | TPMX 1704RG TT9030       | ●     |
|   | <b>TPMX 2405R-DH AP301U(N)</b> | 5.50 | 14.20 | 1.20 | 4.40 | TPMX 2405RG TT9030       | ●     |
|   | <b>TPMX 2405L-DH AP301U(N)</b> | 5.50 | 14.20 | 1.20 | 4.40 | TPMX 2405LG TT9030       | ●     |
|   | <b>TPMX 2807R-DH AP301U(N)</b> | 7.50 | 17.00 | 1.60 | 5.50 | TPMX 2807RG TT9030       | ●     |

Marked: ● Stock available

Drilling inserts

Recommended Cutting Speed for Materials(Dia 25.00-65.00mm)

|                           | Workpiece material                      |   | Brinell hardness (HB) | Grade     |           |   | Cutting speed Vc m/min | Feed fn mm/r    |             |           |
|---------------------------|---|---|-----------------------|-----------|-----------|---|------------------------|-----------------|-------------|-----------|
|                           |   |   |                       | Insert    |           |   |                        | Drilling dia mm |             |           |
|                           |   |   |                       | P         | I         | C |                        | 25.00-43.00     | 43.01-65.00 |           |
| <b>P</b>                  | Unalloyed steel                         | C=0.05-0.10%                            | 125                   | AP301U(N) |           |   | 70-130                 | 0.11-0.41       | 0.14-0.45   |           |
|                           |   | C=0.10-0.25%                            | 125                   |           |           |   | 70-130                 | 0.11-0.41       | 0.14-0.45   |           |
|                           |   | C=0.25-0.55%                            | 150                   |           |           |   | 70-130                 | 0.11-0.41       | 0.14-0.45   |           |
|                           |   | C=0.55-0.80%                            | 170                   |           |           |   | 70-130                 | 0.11-0.41       | 0.14-0.45   |           |
|                           | High carbon steel                       | Carbon tool steel                       | 210                   | AP301U(N) |           |   | 70-120                 | 0.11-0.41       | 0.20-0.45   |           |
|                           | Low-alloyed steel                       | Non-Hardened                            |                       | 180       | AP301U(N) |   |                        | 55-110          | 0.11-0.41   | 0.20-0.45 |
|                           |   | Tempered                                |                       | 275       |           |   |                        | 70-120          | 0.11-0.41   | 0.20-0.45 |
|                           |   | Tempered                                |                       | 350       |           |   |                        | 70-120          | 0.11-0.41   | 0.20-0.45 |
|                           | High-alloyed steel                      | Annealed                                |                       | 200       | AP301U(N) |   |                        | 55-110          | 0.11-0.38   | 0.20-0.40 |
|                           |   | Hardened tool steel                     |                       | 325       |           |   |                        | 55-110          | 0.20-0.38   | 0.20-0.40 |
| Cast steel                | Non-alloyed steel                       |   | 180                   | AP301U(N) |           |   | 55-110                 | 0.11-0.41       | 0.20-0.45   |           |
|                           | Low-alloy (alloy<5%)                    |   | 200                   |           |           |   | 55-110                 | 0.11-0.41       | 0.20-0.45   |           |
| <b>M</b>                  | Stainless steel                         | Non-Hardened/Ferritic/martensitic       |                       | 200       | AP301U(N) |   |                        | 40-110          | 0.11-0.41   | 0.20-0.45 |
|                           |   | Austenitic                              |                       | 200       |           |   |                        | 40-110          | 0.11-0.41   | 0.20-0.45 |
|                           |   | Austenitic, precipitation hardened (PH) |                       | 300       |           |   |                        | 40-110          | 0.11-0.33   | 0.20-0.35 |
|                           |   | Austenitic/ferritic, duplex             |                       | 230       |           |   |                        | 40-80           | 0.11-0.33   | 0.20-0.35 |
| <b>K</b>                  | Malleable cast iron                     | Ferritic                                |                       | 200       | AP301U(N) |   |                        | 80-120          | 0.11-0.38   | 0.24-0.41 |
|                           |   | Pearlitic                               |                       | 260       |           |   |                        | 80-120          | 0.11-0.38   | 0.24-0.41 |
|                           | Grey cast iron                          | Low tensile strength                    |                       | 180       | AP301U(N) |   |                        | 60-110          | 0.11-0.38   | 0.24-0.41 |
|                           |   | High tensile strength                   |                       | 245       |           |   |                        | 60-110          | 0.11-0.38   | 0.24-0.41 |
|                           | Nodular cast iron                       | Ferritic                                |                       | 160       | AP301U(N) |   |                        | 50-110          | 0.11-0.38   | 0.24-0.41 |
|                           |   | Pearlitic                               |                       | 250       |           |   |                        | 50-110          | 0.11-0.38   | 0.24-0.41 |
|                           |   | GGV (CGI)                               |                       | 230       |           |   |                        |                 |             |           |
| <b>N</b>                  | Wrought aluminium alloys                | non-aging                               |                       | 30        | AP301U(N) |   |                        | 65-150          | 0.09-0.33   | 0.20-0.33 |
|                           |   | aged                                    |                       | 100       |           |   |                        | 65-150          | 0.09-0.33   | 0.20-0.33 |
|                           | Cast aluminium alloys                   | ≤ 12% Si, non-aging                     |                       | 75        | AP301U(N) |   |                        | 65-150          | 0.09-0.33   | 0.20-0.33 |
|                           |   | ≤ 12% Si, aged                          |                       | 90        |           |   |                        | 65-150          | 0.09-0.33   | 0.20-0.33 |
|                           |   | > 12% Si, non-aging                     |                       | 130       |           |   |                        | 65-150          | 0.09-0.33   | 0.20-0.33 |
|                           | Magnesium alloy                         |   |                       | 70        |           |   |                        |                 |             |           |
|                           | Copper and copper alloys (bronze/brass) | Unalloyed, electrolytic copper          |                       | 100       | AP301U(N) |   |                        | 65-150          | 0.09-0.33   | 0.20-0.33 |
|                           |   | Brass, bronze, red brass                |                       | 90        |           |   |                        | 65-150          | 0.09-0.33   | 0.20-0.33 |
| Cu alloys, short-chip     |   | 110                                     | 65-150                | 0.09-0.33 |           |   |                        | 0.20-0.33       |             |           |
| High tensile, Ampco alloy |   | 300                                     | 65-150                | 0.09-0.33 |           |   |                        | 0.20-0.33       |             |           |
| <b>S</b>                  | Heat-resistant alloys                   | Fe-based annealed                       |                       | 200       | AP301U(N) |   |                        | 10-55           | 0.09-0.30   | 0.20-0.33 |
|                           |   | Fe-based hardened                       |                       | 280       |           |   |                        | 10-55           | 0.09-0.30   | 0.20-0.33 |
|                           |   | Ni or Co-based annealed                 |                       | 250       |           |   |                        | 10-55           | 0.09-0.30   | 0.20-0.33 |
|                           |   | Ni or Co-based hardened                 |                       | 350       |           |   |                        | 10-55           | 0.09-0.30   | 0.20-0.33 |
|                           |   | Ni or Co-based cast                     |                       | 320       |           |   |                        | 10-55           | 0.09-0.30   | 0.20-0.33 |
|                           | Titanium alloys                         | Pure titanium                           |                       | 200       | AP301U(N) |   |                        | 30-60           | 0.09-0.30   | 0.20-0.33 |
|                           |   | α alloys                                |                       | 375       |           |   |                        | 30-60           | 0.09-0.30   | 0.20-0.33 |
| α and β alloys            |   | 375                                     | 30-60                 | 0.09-0.30 |           |   |                        | 0.20-0.33       |             |           |
|                           |   | β alloys                                |                       | 410       |           |   |                        | 30-60           | 0.09-0.30   | 0.20-0.33 |
| <b>H</b>                  | Hardened steel                          | Hardened and tempered                   |                       | 43-47 HRC |           |   |                        |                 |             |           |
|                           | Hardened cast iron                      |   |                       | 47-60 HRC |           |   |                        |                 |             |           |

\*) Insert position-P, I, C  
P=peripheral insert, I=intermediate insert, C=center insert

**Recommended Cutting Speed for Materials(Dia ≥63.50mm)**

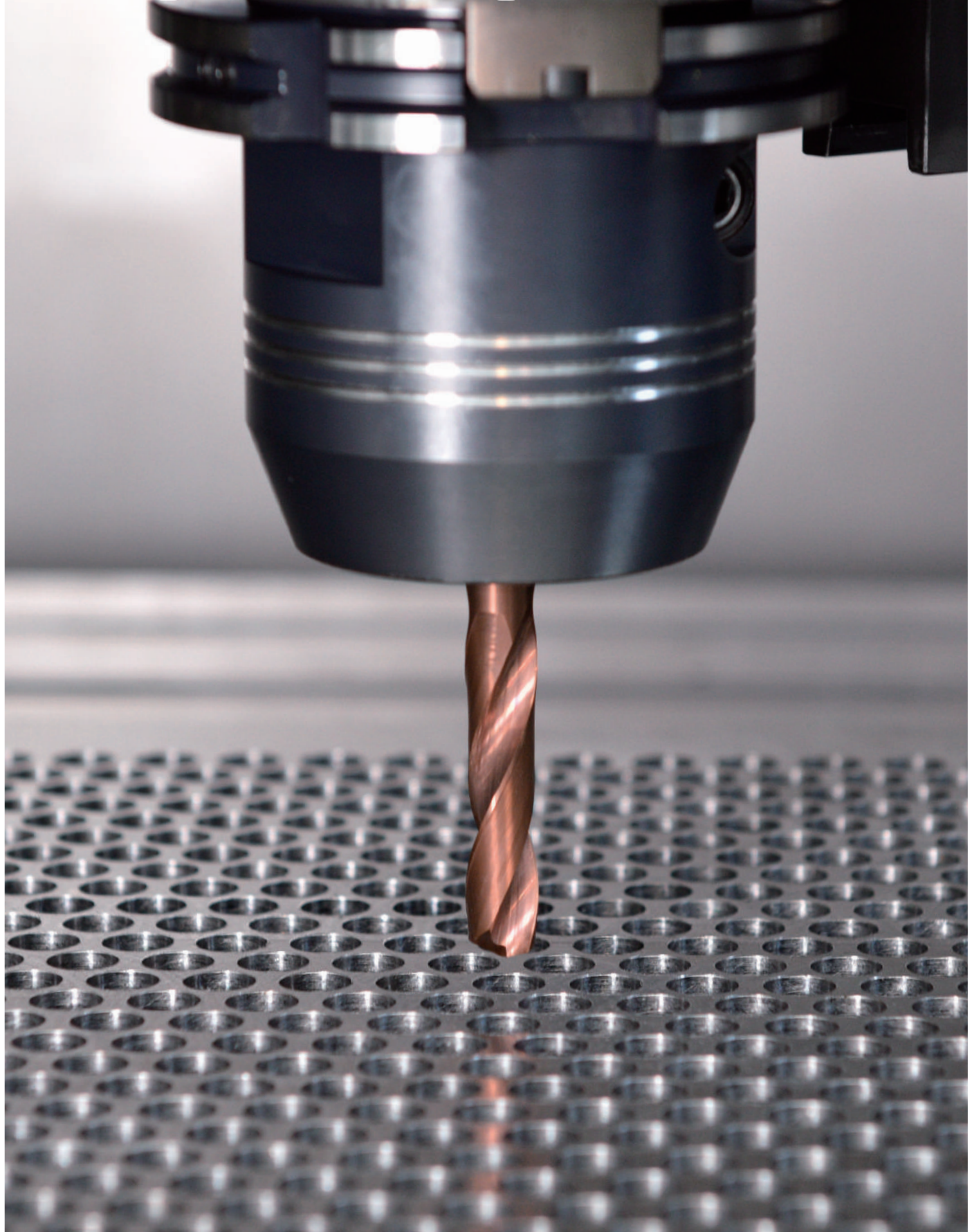
|                           | Workpiece material                      |   | Brinell hardness (HB) | Grade     |           |   | Cutting speed Vc m/min | Feed fn mm/r    |           |
|---------------------------|---|---|-----------------------|-----------|-----------|---|------------------------|-----------------|-----------|
|                           |   |   |                       | Insert    |           |   |                        | Drilling dia mm |           |
|                           |   |   |                       | P         | I         | C |                        | ≥ 63.50         |           |
| <b>P</b>                  | Unalloyed steel                         | C=0.05-0.10%                            | 125                   | AP301U(N) |           |   | 80-100                 | 0.18-0.35       |           |
|                           |   | C=0.10-0.25%                            | 125                   |           |           |   | 80-100                 | 0.18-0.35       |           |
|                           |   | C=0.25-0.55%                            | 150                   |           |           |   | 80-100                 | 0.18-0.35       |           |
|                           |   | C=0.55-0.80%                            | 170                   |           |           |   | 80-100                 | 0.18-0.35       |           |
|                           | High carbon steel                       | Carbon tool steel                       | 210                   | AP301U(N) |           |   | 70-100                 | 0.18-0.35       |           |
|                           | Low-alloyed steel                       | Non-Hardened                            |                       | 180       | AP301U(N) |   |                        | 60-100          | 0.16-0.35 |
|                           |   | Tempered                                |                       | 275       |           |   |                        | 70-100          | 0.18-0.30 |
|                           |   | Tempered                                |                       | 350       |           |   |                        | 70-100          | 0.18-0.30 |
|                           | High-alloyed steel                      | Annealed                                |                       | 200       | AP301U(N) |   |                        | 60-100          | 0.16-0.30 |
|                           |   | Hardened tool steel                     |                       | 325       |           |   |                        | 60-100          | 0.16-0.30 |
| Cast steel                | Non-alloyed steel                       |   | 180                   | AP301U(N) |           |   | 50-100                 | 0.15-0.30       |           |
|                           | Low-alloy (alloy<5%)                    |   | 200                   |           |           |   | 50-100                 | 0.15-0.30       |           |
| <b>M</b>                  | Stainless steel                         | Non-Hardened/Ferritic/martensitic       |                       | 200       | AP301U(N) |   |                        | 50-90           | 0.16-0.35 |
|                           |   | Austenitic                              |                       | 200       |           |   |                        | 50-90           | 0.16-0.35 |
|                           |   | Austenitic, precipitation hardened (PH) |                       | 300       |           |   |                        |                 |           |
|                           |   | Austenitic/ferritic, duplex             |                       | 230       |           |   |                        |                 |           |
| <b>K</b>                  | Malleable cast iron                     | Ferritic                                |                       | 200       | AP301U(N) |   |                        |                 |           |
|                           |   | Pearlitic                               |                       | 260       |           |   |                        |                 |           |
|                           | Grey cast iron                          | Low tensile strength                    |                       | 180       | AP301U(N) |   |                        |                 |           |
|                           |   | High tensile strength                   |                       | 245       |           |   |                        |                 |           |
|                           | Nodular cast iron                       | Ferritic                                |                       | 160       | AP301U(N) |   |                        |                 |           |
|                           |   | Pearlitic                               |                       | 250       |           |   |                        |                 |           |
|                           |   | GGV (CGI)                               |                       | 230       |           |   |                        |                 |           |
| <b>N</b>                  | Wrought aluminium alloys                | non-aging                               |                       | 30        | AP301U(N) |   |                        | 65-130          | 0.10-0.30 |
|                           |   | aged                                    |                       | 100       |           |   |                        | 65-130          | 0.10-0.30 |
|                           | Cast aluminium alloys                   | ≤ 12% Si, non-aging                     |                       | 75        | AP301U(N) |   |                        | 65-130          | 0.10-0.30 |
|                           |   | ≤ 12% Si, aged                          |                       | 90        |           |   |                        | 65-130          | 0.10-0.30 |
|                           |   | > 12% Si, non-aging                     |                       | 130       |           |   |                        | 65-130          | 0.10-0.30 |
|                           | Magnesium alloy                         |   |                       | 70        |           |   |                        |                 |           |
|                           | Copper and copper alloys (bronze/brass) | Unalloyed, electrolytic copper          |                       | 100       | AP301U(N) |   |                        | 65-130          | 0.10-0.30 |
|                           |   | Brass, bronze, red brass                |                       | 90        |           |   |                        | 65-130          | 0.10-0.30 |
| Cu alloys, short-chip     |   | 110                                     | 65-130                | 0.10-0.30 |           |   |                        |                 |           |
| High tensile, Ampco alloy |   | 300                                     | 65-130                | 0.10-0.30 |           |   |                        |                 |           |
| <b>S</b>                  | Heat-resistant alloys                   | Fe-based annealed                       |                       | 200       | AP301U(N) |   |                        | 20-65           | 0.15-0.30 |
|                           |   | Fe-based hardened                       |                       | 280       |           |   |                        | 20-65           | 0.15-0.30 |
|                           |   | Ni or Co-based annealed                 |                       | 250       |           |   |                        | 20-65           | 0.15-0.30 |
|                           |   | Ni or Co-based hardened                 |                       | 350       |           |   |                        | 20-65           | 0.15-0.30 |
|                           |   | Ni or Co-based cast                     |                       | 320       |           |   |                        |                 |           |
|                           | Titanium alloys                         | Pure titanium                           |                       | 200       | AP301U(N) |   |                        | 30-100          | 0.15-0.30 |
|                           |   | α alloys                                |                       | 375       |           |   |                        | 30-100          | 0.15-0.30 |
| α and β alloys            |   | 375                                     | 30-100                | 0.15-0.30 |           |   |                        |                 |           |
|                           |   | β alloys                                |                       | 410       |           |   |                        | 30-100          | 0.15-0.30 |
| <b>H</b>                  | Hardened steel                          | Hardened and tempered                   |                       | 43-47 HRC |           |   |                        |                 |           |
|                           | Hardened cast iron                      |   |                       | 47-60 HRC |           |   |                        |                 |           |

\*) Insert position-P, I, C  
P=peripheral insert, I=intermediate insert, C=center insert

Drilling inserts

# ACHTECK

КОРУН  
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[www.co-run.ru](http://www.co-run.ru)



## CUTTING TOOL CATALOGUE

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|                                      |            |
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| Thread pilot hole diameters- forming | 308        |



Drilling Tools Denomination System

|          |          |           |          |           |          |              |          |          |               |          |
|----------|----------|-----------|----------|-----------|----------|--------------|----------|----------|---------------|----------|
| <b>D</b> | <b>1</b> | <b>06</b> | <b>-</b> | <b>03</b> | <b>-</b> | <b>03000</b> | <b>A</b> | <b>1</b> | <b>AP30P1</b> | <b>U</b> |
| 1        | 2        | 3         | -        | 4         | -        | 5            | 6        | 7        | 8             | 9        |

| 1-Tool group |          |
|--------------|----------|
| D            | Drilling |

| 2-Generation |  |
|--------------|--|
| 1            |  |

| 3-Tool type |           |
|-------------|-----------|
| 06          | Universal |

| 4-Drilling depth |                                       |
|------------------|---------------------------------------|
| 03               | ~ 3 x Dc in accordance with DIN 6537K |
| 05               | ~ 5 x Dc in accordance with DIN 6537L |

| 5-Cutting diameter |        |
|--------------------|--------|
| 03000              | 3.0mm  |
| 12100              | 12.1mm |


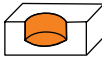


| 6-Shank type |                               |
|--------------|-------------------------------|
| A            | DIN 6535 HA cylindrical shank |


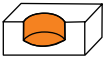


| 7-Coolant |                  |
|-----------|------------------|
| 0         | External coolant |
| 1         | Internal coolant |

| 8-Grade |  |
|---------|--|
| AP30P1  |  |

| 9-Application range |                           |
|---------------------|---------------------------|
| U                   | Universal machining P.K.N |

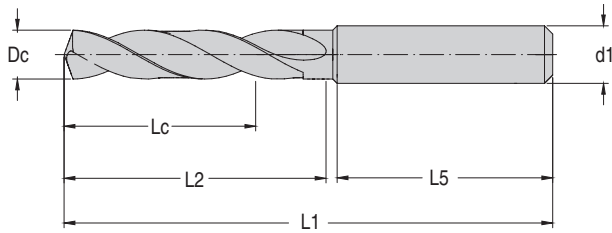
Product Overview

| External coolant      |   |   |
|-----------------------|---|---|
| Machining application |  |  |
|                       | ① Through hole  | ② Blind hole  |
| Drilling depth        | 3xDc  | 5xDc  |
| Series                | D106  | D106  |
| Standard              | DIN 6537 K  | DIN 6537 L  |
| Dia. Range(mm)        | 3~16  | 3~16  |
| Stock items           | P289-P292   | P293-P296   |
|                       |  |  |

| Internal coolant      |   |   |
|-----------------------|---|---|
| Machining application |  |  |
|                       | ① Through hole  | ② Blind hole  |
| Drilling depth        | 3xDc  | 5xDc  |
| Series                | D106  | D106  |
| Standard              | DIN 6537 K  | DIN 6537 L  |
| Dia. Range(mm)        | 3~16  | 3~16  |
| Stock items           | P297-P300   | P301-P304   |
|                       |  |  |

**Solid Carbide Drill D106 with External Coolant - 3xDc**

|    |   |   |    |   |    |   |
|----|---|---|----|---|----|---|
| P  | M | S | K  | H | N  | O |
| •• |   |   | •• |   | •• | • |



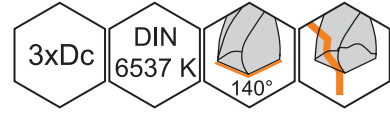
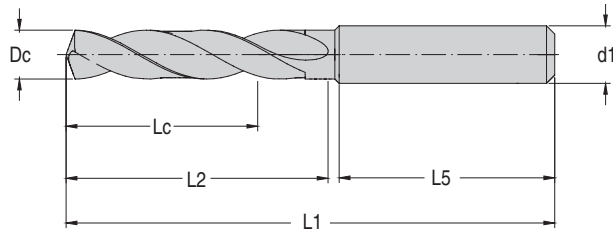
| Product code            | Dc(m7)<br>mm | Dc<br>inch/No. | Lc<br>mm | L1<br>mm | L2<br>mm | L5<br>mm | d1(h6)<br>mm | stock |
|-------------------------|--------------|----------------|----------|----------|----------|----------|--------------|-------|
| D106-03-03000A0 AP30P1U | 3            |                | 14       | 62       | 20       | 36       | 4            | ●     |
| D106-03-03100A0 AP30P1U | 3.1          |                | 14       | 62       | 20       | 36       | 4            | ●     |
| D106-03-03175A0 AP30P1U | 3.175        | 1/8"           | 14       | 62       | 20       | 36       | 4            | ○     |
| D106-03-03200A0 AP30P1U | 3.2          |                | 14       | 62       | 20       | 36       | 4            | ●     |
| D106-03-03250A0 AP30P1U | 3.25         |                | 14       | 62       | 20       | 36       | 4            | ○     |
| D106-03-03300A0 AP30P1U | 3.3          |                | 14       | 62       | 20       | 36       | 4            | ●     |
| D106-03-03400A0 AP30P1U | 3.4          |                | 14       | 62       | 20       | 36       | 4            | ○     |
| D106-03-03500A0 AP30P1U | 3.5          |                | 14       | 62       | 20       | 36       | 4            | ●     |
| D106-03-03572A0 AP30P1U | 3.572        | 9/64"          | 14       | 62       | 20       | 36       | 4            | ○     |
| D106-03-03600A0 AP30P1U | 3.6          |                | 14       | 62       | 20       | 36       | 4            | ●     |
| D106-03-03650A0 AP30P1U | 3.65         |                | 14       | 62       | 20       | 36       | 4            | ○     |
| D106-03-03700A0 AP30P1U | 3.7          |                | 14       | 62       | 20       | 36       | 4            | ●     |
| D106-03-03800A0 AP30P1U | 3.8          |                | 17       | 66       | 24       | 36       | 4            | ○     |
| D106-03-03900A0 AP30P1U | 3.9          |                | 17       | 66       | 24       | 36       | 4            | ●     |
| D106-03-03969A0 AP30P1U | 3.969        | 5/32"          | 17       | 66       | 24       | 36       | 4            | ○     |
| D106-03-04000A0 AP30P1U | 4            |                | 17       | 66       | 24       | 36       | 4            | ●     |
| D106-03-04100A0 AP30P1U | 4.1          |                | 17       | 66       | 24       | 36       | 6            | ○     |
| D106-03-04200A0 AP30P1U | 4.2          |                | 17       | 66       | 24       | 36       | 6            | ●     |
| D106-03-04300A0 AP30P1U | 4.3          |                | 17       | 66       | 24       | 36       | 6            | ○     |
| D106-03-04366A0 AP30P1U | 4.366        | 11/64"         | 17       | 66       | 24       | 36       | 6            | ○     |
| D106-03-04400A0 AP30P1U | 4.4          |                | 17       | 66       | 24       | 36       | 6            | ○     |
| D106-03-04500A0 AP30P1U | 4.5          |                | 17       | 66       | 24       | 36       | 6            | ●     |
| D106-03-04600A0 AP30P1U | 4.6          |                | 17       | 66       | 24       | 36       | 6            | ○     |
| D106-03-04650A0 AP30P1U | 4.65         |                | 17       | 66       | 24       | 36       | 6            | ○     |
| D106-03-04700A0 AP30P1U | 4.7          |                | 17       | 66       | 24       | 36       | 6            | ○     |
| D106-03-04763A0 AP30P1U | 4.763        | 3/16"          | 20       | 66       | 28       | 36       | 6            | ○     |
| D106-03-04800A0 AP30P1U | 4.8          |                | 20       | 66       | 28       | 36       | 6            | ●     |
| D106-03-04900A0 AP30P1U | 4.9          |                | 20       | 66       | 28       | 36       | 6            | ●     |
| D106-03-05000A0 AP30P1U | 5            |                | 20       | 66       | 28       | 36       | 6            | ●     |
| D106-03-05100A0 AP30P1U | 5.1          |                | 20       | 66       | 28       | 36       | 6            | ●     |
| D106-03-05159A0 AP30P1U | 5.159        | 13/64"         | 20       | 66       | 28       | 36       | 6            | ○     |
| D106-03-05200A0 AP30P1U | 5.2          |                | 20       | 66       | 28       | 36       | 6            | ●     |
| D106-03-05300A0 AP30P1U | 5.3          |                | 20       | 66       | 28       | 36       | 6            | ○     |
| D106-03-05400A0 AP30P1U | 5.4          |                | 20       | 66       | 28       | 36       | 6            | ○     |
| D106-03-05500A0 AP30P1U | 5.5          |                | 20       | 66       | 28       | 36       | 6            | ●     |
| D106-03-05550A0 AP30P1U | 5.55         |                | 20       | 66       | 28       | 36       | 6            | ○     |

Marked: ● Stock available ○ Non-stocked standard

Solid Carbide Drill

Solid Carbide Drill D106 with External Coolant - 3xDc

|    |   |   |    |   |    |   |
|----|---|---|----|---|----|---|
| P  | M | S | K  | H | N  | O |
| •• |   |   | •• |   | •• | • |

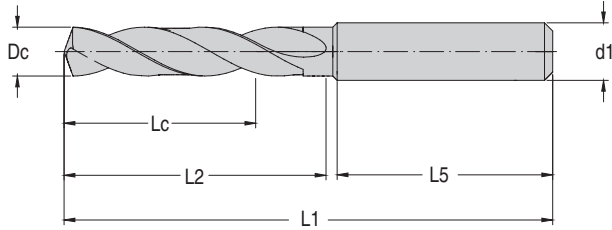


| Product code            | Dc(m7)<br>mm | Dc<br>inch/No. | Lc<br>mm | L1<br>mm | L2<br>mm | L5<br>mm | d1(h6)<br>mm | stock |
|-------------------------|--------------|----------------|----------|----------|----------|----------|--------------|-------|
| D106-03-05556A0 AP30P1U | 5.556        | 7/32"          | 20       | 66       | 28       | 36       | 6            | ○     |
| D106-03-05600A0 AP30P1U | 5.6          |                | 20       | 66       | 28       | 36       | 6            | ○     |
| D106-03-05700A0 AP30P1U | 5.7          |                | 20       | 66       | 28       | 36       | 6            | ○     |
| D106-03-05800A0 AP30P1U | 5.8          |                | 20       | 66       | 28       | 36       | 6            | ●     |
| D106-03-05900A0 AP30P1U | 5.9          |                | 20       | 66       | 28       | 36       | 6            | ●     |
| D106-03-05953A0 AP30P1U | 5.953        | 15/64"         | 20       | 66       | 28       | 36       | 6            | ○     |
| D106-03-06000A0 AP30P1U | 6            |                | 20       | 66       | 28       | 36       | 6            | ●     |
| D106-03-06100A0 AP30P1U | 6.1          |                | 24       | 79       | 41       | 36       | 8            | ○     |
| D106-03-06200A0 AP30P1U | 6.2          |                | 24       | 79       | 41       | 36       | 8            | ○     |
| D106-03-06300A0 AP30P1U | 6.3          |                | 24       | 79       | 41       | 36       | 8            | ○     |
| D106-03-06350A0 AP30P1U | 6.35         | 1/4"           | 24       | 79       | 41       | 36       | 8            | ○     |
| D106-03-06400A0 AP30P1U | 6.4          |                | 24       | 79       | 41       | 36       | 8            | ○     |
| D106-03-06500A0 AP30P1U | 6.5          |                | 24       | 79       | 41       | 36       | 8            | ●     |
| D106-03-06600A0 AP30P1U | 6.6          |                | 24       | 79       | 41       | 36       | 8            | ○     |
| D106-03-06700A0 AP30P1U | 6.7          |                | 24       | 79       | 41       | 36       | 8            | ○     |
| D106-03-06747A0 AP30P1U | 6.747        | 17/64"         | 24       | 79       | 41       | 36       | 8            | ○     |
| D106-03-06800A0 AP30P1U | 6.8          |                | 24       | 79       | 41       | 36       | 8            | ●     |
| D106-03-06900A0 AP30P1U | 6.9          |                | 24       | 79       | 41       | 36       | 8            | ●     |
| D106-03-07000A0 AP30P1U | 7            |                | 24       | 79       | 41       | 36       | 8            | ●     |
| D106-03-07100A0 AP30P1U | 7.1          |                | 29       | 79       | 41       | 36       | 8            | ○     |
| D106-03-07144A0 AP30P1U | 7.144        | 9/32"          | 29       | 79       | 41       | 36       | 8            | ○     |
| D106-03-07200A0 AP30P1U | 7.2          |                | 29       | 79       | 41       | 36       | 8            | ○     |
| D106-03-07300A0 AP30P1U | 7.3          |                | 29       | 79       | 41       | 36       | 8            | ○     |
| D106-03-07400A0 AP30P1U | 7.4          |                | 29       | 79       | 41       | 36       | 8            | ●     |
| D106-03-07500A0 AP30P1U | 7.5          |                | 29       | 79       | 41       | 36       | 8            | ●     |
| D106-03-07541A0 AP30P1U | 7.541        | 19/64"         | 29       | 79       | 41       | 36       | 8            | ○     |
| D106-03-07550A0 AP30P1U | 7.55         |                | 29       | 79       | 41       | 36       | 8            | ○     |
| D106-03-07600A0 AP30P1U | 7.6          |                | 29       | 79       | 41       | 36       | 8            | ○     |
| D106-03-07700A0 AP30P1U | 7.7          |                | 29       | 79       | 41       | 36       | 8            | ○     |
| D106-03-07800A0 AP30P1U | 7.8          |                | 29       | 79       | 41       | 36       | 8            | ●     |
| D106-03-07900A0 AP30P1U | 7.9          |                | 29       | 79       | 41       | 36       | 8            | ●     |
| D106-03-07938A0 AP30P1U | 7.938        | 5/16"          | 29       | 79       | 41       | 36       | 8            | ○     |
| D106-03-08000A0 AP30P1U | 8            |                | 29       | 79       | 41       | 36       | 8            | ●     |
| D106-03-08100A0 AP30P1U | 8.1          |                | 35       | 89       | 47       | 40       | 10           | ○     |
| D106-03-08200A0 AP30P1U | 8.2          |                | 35       | 89       | 47       | 40       | 10           | ○     |
| D106-03-08300A0 AP30P1U | 8.3          |                | 35       | 89       | 47       | 40       | 10           | ○     |
| D106-03-08334A0 AP30P1U | 8.334        | 21/64"         | 35       | 89       | 47       | 40       | 10           | ○     |
| D106-03-08400A0 AP30P1U | 8.4          |                | 35       | 89       | 47       | 40       | 10           | ○     |
| D106-03-08500A0 AP30P1U | 8.5          |                | 35       | 89       | 47       | 40       | 10           | ●     |
| D106-03-08600A0 AP30P1U | 8.6          |                | 35       | 89       | 47       | 40       | 10           | ●     |
| D106-03-08700A0 AP30P1U | 8.7          |                | 35       | 89       | 47       | 40       | 10           | ○     |
| D106-03-08731A0 AP30P1U | 8.731        | 11/32"         | 35       | 89       | 47       | 40       | 10           | ○     |
| D106-03-08800A0 AP30P1U | 8.8          |                | 35       | 89       | 47       | 40       | 10           | ●     |
| D106-03-08900A0 AP30P1U | 8.9          |                | 35       | 89       | 47       | 40       | 10           | ●     |

Marked: ● Stock available ○ Non-stocked standard

**Solid Carbide Drill D106 with External Coolant - 3xDc**

|    |   |   |    |   |    |   |
|----|---|---|----|---|----|---|
| P  | M | S | K  | H | N  | O |
| •• |   |   | •• |   | •• | • |



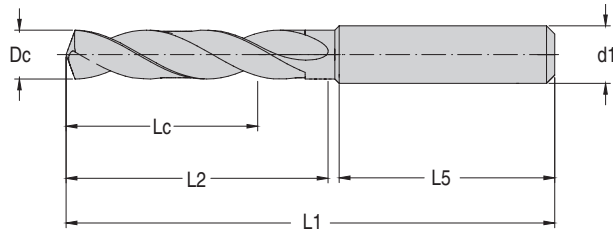
| Product code            | Dc(m7)<br>mm | Dc<br>inch/No. | Lc<br>mm | L1<br>mm | L2<br>mm | L5<br>mm | d1(h6)<br>mm | stock |
|-------------------------|--------------|----------------|----------|----------|----------|----------|--------------|-------|
| D106-03-09000A0 AP30P1U | 9            |                | 35       | 89       | 47       | 40       | 10           | ●     |
| D106-03-09100A0 AP30P1U | 9.1          |                | 35       | 89       | 47       | 40       | 10           | ○     |
| D106-03-09128A0 AP30P1U | 9.128        | 23/64"         | 35       | 89       | 47       | 40       | 10           | ○     |
| D106-03-09200A0 AP30P1U | 9.2          |                | 35       | 89       | 47       | 40       | 10           | ○     |
| D106-03-09300A0 AP30P1U | 9.3          |                | 35       | 89       | 47       | 40       | 10           | ●     |
| D106-03-09400A0 AP30P1U | 9.4          |                | 35       | 89       | 47       | 40       | 10           | ○     |
| D106-03-09500A0 AP30P1U | 9.5          |                | 35       | 89       | 47       | 40       | 10           | ○     |
| D106-03-09525A0 AP30P1U | 9.525        | 3/8"           | 35       | 89       | 47       | 40       | 10           | ○     |
| D106-03-09550A0 AP30P1U | 9.55         |                | 35       | 89       | 47       | 40       | 10           | ○     |
| D106-03-09600A0 AP30P1U | 9.6          |                | 35       | 89       | 47       | 40       | 10           | ○     |
| D106-03-09700A0 AP30P1U | 9.7          |                | 35       | 89       | 47       | 40       | 10           | ○     |
| D106-03-09800A0 AP30P1U | 9.8          |                | 35       | 89       | 47       | 40       | 10           | ●     |
| D106-03-09900A0 AP30P1U | 9.9          |                | 35       | 89       | 47       | 40       | 10           | ●     |
| D106-03-09922A0 AP30P1U | 9.922        | 25/64"         | 35       | 89       | 47       | 40       | 10           | ○     |
| D106-03-10000A0 AP30P1U | 10           |                | 35       | 89       | 47       | 40       | 10           | ●     |
| D106-03-10100A0 AP30P1U | 10.1         |                | 40       | 102      | 55       | 45       | 12           | ●     |
| D106-03-10200A0 AP30P1U | 10.2         |                | 40       | 102      | 55       | 45       | 12           | ●     |
| D106-03-10300A0 AP30P1U | 10.3         |                | 40       | 102      | 55       | 45       | 12           | ●     |
| D106-03-10319A0 AP30P1U | 10.319       | 13/32"         | 40       | 102      | 55       | 45       | 12           | ○     |
| D106-03-10400A0 AP30P1U | 10.4         |                | 40       | 102      | 55       | 45       | 12           | ○     |
| D106-03-10500A0 AP30P1U | 10.5         |                | 40       | 102      | 55       | 45       | 12           | ●     |
| D106-03-10600A0 AP30P1U | 10.6         |                | 40       | 102      | 55       | 45       | 12           | ●     |
| D106-03-10700A0 AP30P1U | 10.7         |                | 40       | 102      | 55       | 45       | 12           | ○     |
| D106-03-10716A0 AP30P1U | 10.716       | 27/64"         | 40       | 102      | 55       | 45       | 12           | ○     |
| D106-03-10800A0 AP30P1U | 10.8         |                | 40       | 102      | 55       | 45       | 12           | ●     |
| D106-03-10900A0 AP30P1U | 10.9         |                | 40       | 102      | 55       | 45       | 12           | ○     |
| D106-03-11000A0 AP30P1U | 11           |                | 40       | 102      | 55       | 45       | 12           | ●     |
| D106-03-11100A0 AP30P1U | 11.1         |                | 40       | 102      | 55       | 45       | 12           | ○     |
| D106-03-11113A0 AP30P1U | 11.113       | 7/16"          | 40       | 102      | 55       | 45       | 12           | ○     |
| D106-03-11200A0 AP30P1U | 11.2         |                | 40       | 102      | 55       | 45       | 12           | ○     |
| D106-03-11300A0 AP30P1U | 11.3         |                | 40       | 102      | 55       | 45       | 12           | ○     |
| D106-03-11400A0 AP30P1U | 11.4         |                | 40       | 102      | 55       | 45       | 12           | ○     |
| D106-03-11500A0 AP30P1U | 11.5         |                | 40       | 102      | 55       | 45       | 12           | ○     |
| D106-03-11509A0 AP30P1U | 11.509       | 29/64"         | 40       | 102      | 55       | 45       | 12           | ○     |
| D106-03-11550A0 AP30P1U | 11.55        |                | 40       | 102      | 55       | 45       | 12           | ○     |
| D106-03-11600A0 AP30P1U | 11.6         |                | 40       | 102      | 55       | 45       | 12           | ○     |
| D106-03-11700A0 AP30P1U | 11.7         |                | 40       | 102      | 55       | 45       | 12           | ○     |
| D106-03-11800A0 AP30P1U | 11.8         |                | 40       | 102      | 55       | 45       | 12           | ●     |
| D106-03-11900A0 AP30P1U | 11.9         |                | 40       | 102      | 55       | 45       | 12           | ○     |
| D106-03-11906A0 AP30P1U | 11.906       | 15/32"         | 40       | 102      | 55       | 45       | 12           | ○     |
| D106-03-12000A0 AP30P1U | 12           |                | 40       | 102      | 55       | 45       | 12           | ●     |
| D106-03-12100A0 AP30P1U | 12.1         |                | 43       | 107      | 60       | 45       | 14           | ○     |
| D106-03-12200A0 AP30P1U | 12.2         |                | 43       | 107      | 60       | 45       | 14           | ○     |
| D106-03-12250A0 AP30P1U | 12.25        |                | 43       | 107      | 60       | 45       | 14           | ○     |

Marked: ● Stock available ○ Non-stocked standard

Solid Carbide Drill

Solid Carbide Drill D106 with External Coolant - 3xDc

|    |   |   |    |   |    |   |
|----|---|---|----|---|----|---|
| P  | M | S | K  | H | N  | O |
| •• |   |   | •• |   | •• | • |

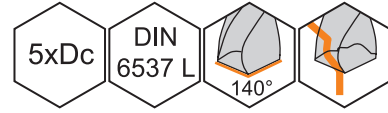
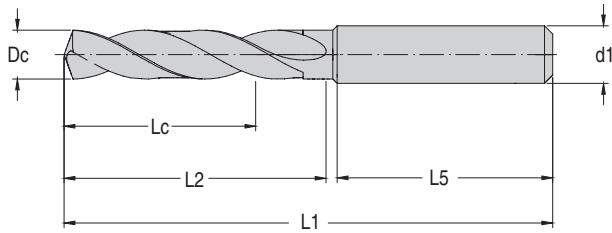


| Product code            | Dc(m7)<br>mm | Dc<br>inch/No. | Lc<br>mm | L1<br>mm | L2<br>mm | L5<br>mm | d1(h6)<br>mm | stock |
|-------------------------|--------------|----------------|----------|----------|----------|----------|--------------|-------|
| D106-03-12300A0 AP30P1U | 12.3         |                | 43       | 107      | 60       | 45       | 14           | ○     |
| D106-03-12303A0 AP30P1U | 12.303       | 31/64"         | 43       | 107      | 60       | 45       | 14           | ○     |
| D106-03-12400A0 AP30P1U | 12.4         |                | 43       | 107      | 60       | 45       | 14           | ○     |
| D106-03-12500A0 AP30P1U | 12.5         |                | 43       | 107      | 60       | 45       | 14           | ●     |
| D106-03-12600A0 AP30P1U | 12.6         |                | 43       | 107      | 60       | 45       | 14           | ○     |
| D106-03-12700A0 AP30P1U | 12.7         | 1/2"           | 43       | 107      | 60       | 45       | 14           | ○     |
| D106-03-12750A0 AP30P1U | 12.75        |                | 43       | 107      | 60       | 45       | 14           | ○     |
| D106-03-12800A0 AP30P1U | 12.8         |                | 43       | 107      | 60       | 45       | 14           | ○     |
| D106-03-12900A0 AP30P1U | 12.9         |                | 43       | 107      | 60       | 45       | 14           | ○     |
| D106-03-13000A0 AP30P1U | 13           |                | 43       | 107      | 60       | 45       | 14           | ●     |
| D106-03-13100A0 AP30P1U | 13.1         |                | 43       | 107      | 60       | 45       | 14           | ○     |
| D106-03-13200A0 AP30P1U | 13.2         |                | 43       | 107      | 60       | 45       | 14           | ●     |
| D106-03-13300A0 AP30P1U | 13.3         |                | 43       | 107      | 60       | 45       | 14           | ○     |
| D106-03-13400A0 AP30P1U | 13.4         |                | 43       | 107      | 60       | 45       | 14           | ○     |
| D106-03-13494A0 AP30P1U | 13.494       | 17/32"         | 43       | 107      | 60       | 45       | 14           | ○     |
| D106-03-13500A0 AP30P1U | 13.5         |                | 43       | 107      | 60       | 45       | 14           | ○     |
| D106-03-13600A0 AP30P1U | 13.6         |                | 43       | 107      | 60       | 45       | 14           | ○     |
| D106-03-13700A0 AP30P1U | 13.7         |                | 43       | 107      | 60       | 45       | 14           | ○     |
| D106-03-13800A0 AP30P1U | 13.8         |                | 43       | 107      | 60       | 45       | 14           | ○     |
| D106-03-13900A0 AP30P1U | 13.9         |                | 43       | 107      | 60       | 45       | 14           | ○     |
| D106-03-14000A0 AP30P1U | 14           |                | 43       | 107      | 60       | 45       | 14           | ●     |
| D106-03-14100A0 AP30P1U | 14.1         |                | 45       | 115      | 65       | 48       | 16           | ●     |
| D106-03-14200A0 AP30P1U | 14.2         |                | 45       | 115      | 65       | 48       | 16           | ●     |
| D106-03-14288A0 AP30P1U | 14.288       | 9/16"          | 45       | 115      | 65       | 48       | 16           | ○     |
| D106-03-14300A0 AP30P1U | 14.3         |                | 45       | 115      | 65       | 48       | 16           | ○     |
| D106-03-14400A0 AP30P1U | 14.4         |                | 45       | 115      | 65       | 48       | 16           | ○     |
| D106-03-14500A0 AP30P1U | 14.5         |                | 45       | 115      | 65       | 48       | 16           | ●     |
| D106-03-14600A0 AP30P1U | 14.6         |                | 45       | 115      | 65       | 48       | 16           | ●     |
| D106-03-14700A0 AP30P1U | 14.7         |                | 45       | 115      | 65       | 48       | 16           | ●     |
| D106-03-14750A0 AP30P1U | 14.75        |                | 45       | 115      | 65       | 48       | 16           | ○     |
| D106-03-14800A0 AP30P1U | 14.8         |                | 45       | 115      | 65       | 48       | 16           | ○     |
| D106-03-15000A0 AP30P1U | 15           |                | 45       | 115      | 65       | 48       | 16           | ●     |
| D106-03-15100A0 AP30P1U | 15.1         |                | 45       | 115      | 65       | 48       | 16           | ○     |
| D106-03-15200A0 AP30P1U | 15.2         |                | 45       | 115      | 65       | 48       | 16           | ○     |
| D106-03-15300A0 AP30P1U | 15.3         |                | 45       | 115      | 65       | 48       | 16           | ○     |
| D106-03-15500A0 AP30P1U | 15.5         |                | 45       | 115      | 65       | 48       | 16           | ●     |
| D106-03-15600A0 AP30P1U | 15.6         |                | 45       | 115      | 65       | 48       | 16           | ○     |
| D106-03-15700A0 AP30P1U | 15.7         |                | 45       | 115      | 65       | 48       | 16           | ●     |
| D106-03-15800A0 AP30P1U | 15.8         |                | 45       | 115      | 65       | 48       | 16           | ●     |
| D106-03-15875A0 AP30P1U | 15.875       | 5/8"           | 45       | 115      | 65       | 48       | 16           | ○     |
| D106-03-15900A0 AP30P1U | 15.9         |                | 45       | 115      | 65       | 48       | 16           | ○     |
| D106-03-16000A0 AP30P1U | 16           |                | 45       | 115      | 65       | 48       | 16           | ●     |

Marked: ● Stock available ○ Non-stocked standard

**Solid Carbide Drill D106 with External Coolant - 5xDc**

|    |   |   |    |   |    |   |
|----|---|---|----|---|----|---|
| P  | M | S | K  | H | N  | O |
| •• |   |   | •• |   | •• | • |



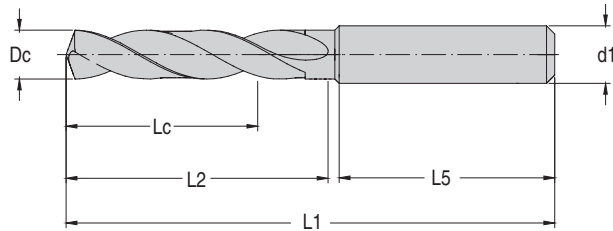
| Product code            | Dc(m7)<br>mm | Dc<br>inch/No. | Lc<br>mm | L1<br>mm | L2<br>mm | L5<br>mm | d1(h6)<br>mm | stock |
|-------------------------|--------------|----------------|----------|----------|----------|----------|--------------|-------|
| D106-05-03000A0 AP30P1U | 3            |                | 23       | 66       | 28       | 36       | 4            | ●     |
| D106-05-03100A0 AP30P1U | 3.1          |                | 23       | 66       | 28       | 36       | 4            | ●     |
| D106-05-03175A0 AP30P1U | 3.175        | 1/8"           | 23       | 66       | 28       | 36       | 4            | ○     |
| D106-05-03200A0 AP30P1U | 3.2          |                | 23       | 66       | 28       | 36       | 4            | ●     |
| D106-05-03250A0 AP30P1U | 3.25         |                | 23       | 66       | 28       | 36       | 4            | ○     |
| D106-05-03300A0 AP30P1U | 3.3          |                | 23       | 66       | 28       | 36       | 4            | ●     |
| D106-05-03400A0 AP30P1U | 3.4          |                | 23       | 66       | 28       | 36       | 4            | ○     |
| D106-05-03500A0 AP30P1U | 3.5          |                | 23       | 66       | 28       | 36       | 4            | ●     |
| D106-05-03572A0 AP30P1U | 3.572        | 9/64"          | 23       | 66       | 28       | 36       | 4            | ○     |
| D106-05-03600A0 AP30P1U | 3.6          |                | 23       | 66       | 28       | 36       | 4            | ●     |
| D106-05-03650A0 AP30P1U | 3.65         |                | 23       | 66       | 28       | 36       | 4            | ○     |
| D106-05-03700A0 AP30P1U | 3.7          |                | 23       | 66       | 28       | 36       | 4            | ●     |
| D106-05-03800A0 AP30P1U | 3.8          |                | 29       | 74       | 36       | 36       | 4            | ○     |
| D106-05-03900A0 AP30P1U | 3.9          |                | 29       | 74       | 36       | 36       | 4            | ●     |
| D106-05-03969A0 AP30P1U | 3.969        | 5/32"          | 29       | 74       | 36       | 36       | 4            | ○     |
| D106-05-04000A0 AP30P1U | 4            |                | 29       | 74       | 36       | 36       | 4            | ●     |
| D106-05-04100A0 AP30P1U | 4.1          |                | 29       | 74       | 36       | 36       | 6            | ○     |
| D106-05-04200A0 AP30P1U | 4.2          |                | 29       | 74       | 36       | 36       | 6            | ●     |
| D106-05-04300A0 AP30P1U | 4.3          |                | 29       | 74       | 36       | 36       | 6            | ○     |
| D106-05-04366A0 AP30P1U | 4.366        | 11/64"         | 29       | 74       | 36       | 36       | 6            | ○     |
| D106-05-04400A0 AP30P1U | 4.4          |                | 29       | 74       | 36       | 36       | 6            | ○     |
| D106-05-04500A0 AP30P1U | 4.5          |                | 29       | 74       | 36       | 36       | 6            | ●     |
| D106-05-04600A0 AP30P1U | 4.6          |                | 29       | 74       | 36       | 36       | 6            | ○     |
| D106-05-04650A0 AP30P1U | 4.65         |                | 29       | 74       | 36       | 36       | 6            | ○     |
| D106-05-04700A0 AP30P1U | 4.7          |                | 29       | 74       | 36       | 36       | 6            | ○     |
| D106-05-04763A0 AP30P1U | 4.763        | 3/16"          | 35       | 82       | 44       | 36       | 6            | ○     |
| D106-05-04800A0 AP30P1U | 4.8          |                | 35       | 82       | 44       | 36       | 6            | ●     |
| D106-05-04900A0 AP30P1U | 4.9          |                | 35       | 82       | 44       | 36       | 6            | ●     |
| D106-05-05000A0 AP30P1U | 5            |                | 35       | 82       | 44       | 36       | 6            | ●     |
| D106-05-05100A0 AP30P1U | 5.1          |                | 35       | 82       | 44       | 36       | 6            | ●     |
| D106-05-05159A0 AP30P1U | 5.159        | 13/64"         | 35       | 82       | 44       | 36       | 6            | ○     |
| D106-05-05200A0 AP30P1U | 5.2          |                | 35       | 82       | 44       | 36       | 6            | ●     |
| D106-05-05300A0 AP30P1U | 5.3          |                | 35       | 82       | 44       | 36       | 6            | ○     |
| D106-05-05400A0 AP30P1U | 5.4          |                | 35       | 82       | 44       | 36       | 6            | ○     |
| D106-05-05500A0 AP30P1U | 5.5          |                | 35       | 82       | 44       | 36       | 6            | ●     |
| D106-05-05550A0 AP30P1U | 5.55         |                | 35       | 82       | 44       | 36       | 6            | ○     |

Marked: ● Stock available ○ Non-stocked standard

Solid Carbide Drill

Solid Carbide Drill D106 with External Coolant - 5xDc

|    |   |   |    |   |    |   |
|----|---|---|----|---|----|---|
| P  | M | S | K  | H | N  | O |
| •• |   |   | •• |   | •• | • |

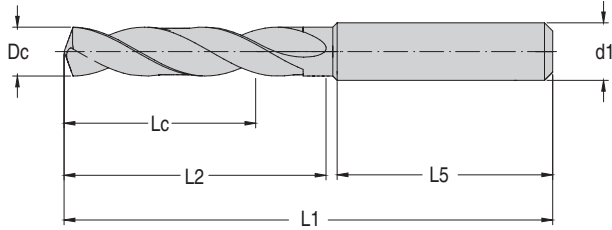


| Product code            | Dc(m7)<br>mm | Dc<br>inch/No. | Lc<br>mm | L1<br>mm | L2<br>mm | L5<br>mm | d1(h6)<br>mm | stock |
|-------------------------|--------------|----------------|----------|----------|----------|----------|--------------|-------|
| D106-05-05556A0 AP30P1U | 5.556        | 7/32"          | 35       | 82       | 44       | 36       | 6            | ○     |
| D106-05-05600A0 AP30P1U | 5.6          |                | 35       | 82       | 44       | 36       | 6            | ○     |
| D106-05-05700A0 AP30P1U | 5.7          |                | 35       | 82       | 44       | 36       | 6            | ○     |
| D106-05-05800A0 AP30P1U | 5.8          |                | 35       | 82       | 44       | 36       | 6            | ●     |
| D106-05-05900A0 AP30P1U | 5.9          |                | 35       | 82       | 44       | 36       | 6            | ●     |
| D106-05-05953A0 AP30P1U | 5.953        | 15/64"         | 35       | 82       | 44       | 36       | 6            | ○     |
| D106-05-06000A0 AP30P1U | 6            |                | 35       | 82       | 44       | 36       | 6            | ●     |
| D106-05-06100A0 AP30P1U | 6.1          |                | 43       | 91       | 53       | 36       | 8            | ○     |
| D106-05-06200A0 AP30P1U | 6.2          |                | 43       | 91       | 53       | 36       | 8            | ○     |
| D106-05-06300A0 AP30P1U | 6.3          |                | 43       | 91       | 53       | 36       | 8            | ○     |
| D106-05-06350A0 AP30P1U | 6.35         | 1/4"           | 43       | 91       | 53       | 36       | 8            | ○     |
| D106-05-06400A0 AP30P1U | 6.4          |                | 43       | 91       | 53       | 36       | 8            | ○     |
| D106-05-06500A0 AP30P1U | 6.5          |                | 43       | 91       | 53       | 36       | 8            | ●     |
| D106-05-06600A0 AP30P1U | 6.6          |                | 43       | 91       | 53       | 36       | 8            | ○     |
| D106-05-06700A0 AP30P1U | 6.7          |                | 43       | 91       | 53       | 36       | 8            | ○     |
| D106-05-06747A0 AP30P1U | 6.747        | 17/64"         | 43       | 91       | 53       | 36       | 8            | ○     |
| D106-05-06800A0 AP30P1U | 6.8          |                | 43       | 91       | 53       | 36       | 8            | ●     |
| D106-05-06900A0 AP30P1U | 6.9          |                | 43       | 91       | 53       | 36       | 8            | ●     |
| D106-05-07000A0 AP30P1U | 7            |                | 43       | 91       | 53       | 36       | 8            | ●     |
| D106-05-07100A0 AP30P1U | 7.1          |                | 43       | 91       | 53       | 36       | 8            | ○     |
| D106-05-07144A0 AP30P1U | 7.144        | 9/32"          | 43       | 91       | 53       | 36       | 8            | ○     |
| D106-05-07200A0 AP30P1U | 7.2          |                | 43       | 91       | 53       | 36       | 8            | ○     |
| D106-05-07300A0 AP30P1U | 7.3          |                | 43       | 91       | 53       | 36       | 8            | ○     |
| D106-05-07400A0 AP30P1U | 7.4          |                | 43       | 91       | 53       | 36       | 8            | ●     |
| D106-05-07500A0 AP30P1U | 7.5          |                | 43       | 91       | 53       | 36       | 8            | ●     |
| D106-05-07541A0 AP30P1U | 7.541        | 19/64"         | 43       | 91       | 53       | 36       | 8            | ○     |
| D106-05-07550A0 AP30P1U | 7.55         |                | 43       | 91       | 53       | 36       | 8            | ○     |
| D106-05-07600A0 AP30P1U | 7.6          |                | 43       | 91       | 53       | 36       | 8            | ○     |
| D106-05-07700A0 AP30P1U | 7.7          |                | 43       | 91       | 53       | 36       | 8            | ○     |
| D106-05-07800A0 AP30P1U | 7.8          |                | 43       | 91       | 53       | 36       | 8            | ●     |
| D106-05-07900A0 AP30P1U | 7.9          |                | 43       | 91       | 53       | 36       | 8            | ●     |
| D106-05-07938A0 AP30P1U | 7.938        | 5/16"          | 43       | 91       | 53       | 36       | 8            | ○     |
| D106-05-08000A0 AP30P1U | 8            |                | 43       | 91       | 53       | 36       | 8            | ●     |
| D106-05-08100A0 AP30P1U | 8.1          |                | 49       | 103      | 61       | 40       | 10           | ○     |
| D106-05-08200A0 AP30P1U | 8.2          |                | 49       | 103      | 61       | 40       | 10           | ○     |
| D106-05-08300A0 AP30P1U | 8.3          |                | 49       | 103      | 61       | 40       | 10           | ○     |
| D106-05-08334A0 AP30P1U | 8.334        | 21/64"         | 49       | 103      | 61       | 40       | 10           | ○     |
| D106-05-08400A0 AP30P1U | 8.4          |                | 49       | 103      | 61       | 40       | 10           | ○     |
| D106-05-08500A0 AP30P1U | 8.5          |                | 49       | 103      | 61       | 40       | 10           | ●     |
| D106-05-08600A0 AP30P1U | 8.6          |                | 49       | 103      | 61       | 40       | 10           | ●     |
| D106-05-08700A0 AP30P1U | 8.7          |                | 49       | 103      | 61       | 40       | 10           | ○     |
| D106-05-08731A0 AP30P1U | 8.731        | 11/32"         | 49       | 103      | 61       | 40       | 10           | ○     |
| D106-05-08800A0 AP30P1U | 8.8          |                | 49       | 103      | 61       | 40       | 10           | ●     |
| D106-05-08900A0 AP30P1U | 8.9          |                | 49       | 103      | 61       | 40       | 10           | ●     |

Marked: ● Stock available ○ Non-stocked standard

**Solid Carbide Drill D106 with External Coolant - 5xDc**

|    |   |   |    |   |    |   |
|----|---|---|----|---|----|---|
| P  | M | S | K  | H | N  | O |
| •• |   |   | •• |   | •• | • |



| Product code            | Dc(m7)<br>mm | Dc<br>inch/No. | Lc<br>mm | L1<br>mm | L2<br>mm | L5<br>mm | d1(h6)<br>mm | stock |
|-------------------------|--------------|----------------|----------|----------|----------|----------|--------------|-------|
| D106-05-09000A0 AP30P1U | 9            |                | 49       | 103      | 61       | 40       | 10           | ●     |
| D106-05-09100A0 AP30P1U | 9.1          |                | 49       | 103      | 61       | 40       | 10           | ○     |
| D106-05-09128A0 AP30P1U | 9.128        | 23/64"         | 49       | 103      | 61       | 40       | 10           | ○     |
| D106-05-09200A0 AP30P1U | 9.2          |                | 49       | 103      | 61       | 40       | 10           | ○     |
| D106-05-09300A0 AP30P1U | 9.3          |                | 49       | 103      | 61       | 40       | 10           | ●     |
| D106-05-09400A0 AP30P1U | 9.4          |                | 49       | 103      | 61       | 40       | 10           | ○     |
| D106-05-09500A0 AP30P1U | 9.5          |                | 49       | 103      | 61       | 40       | 10           | ○     |
| D106-05-09525A0 AP30P1U | 9.525        | 3/8"           | 49       | 103      | 61       | 40       | 10           | ○     |
| D106-05-09550A0 AP30P1U | 9.55         |                | 49       | 103      | 61       | 40       | 10           | ○     |
| D106-05-09600A0 AP30P1U | 9.6          |                | 49       | 103      | 61       | 40       | 10           | ○     |
| D106-05-09700A0 AP30P1U | 9.7          |                | 49       | 103      | 61       | 40       | 10           | ○     |
| D106-05-09800A0 AP30P1U | 9.8          |                | 49       | 103      | 61       | 40       | 10           | ●     |
| D106-05-09900A0 AP30P1U | 9.9          |                | 49       | 103      | 61       | 40       | 10           | ●     |
| D106-05-09922A0 AP30P1U | 9.922        | 25/64"         | 49       | 103      | 61       | 40       | 10           | ○     |
| D106-05-10000A0 AP30P1U | 10           |                | 49       | 103      | 61       | 40       | 10           | ●     |
| D106-05-10100A0 AP30P1U | 10.1         |                | 56       | 118      | 71       | 45       | 12           | ●     |
| D106-05-10200A0 AP30P1U | 10.2         |                | 56       | 118      | 71       | 45       | 12           | ●     |
| D106-05-10300A0 AP30P1U | 10.3         |                | 56       | 118      | 71       | 45       | 12           | ●     |
| D106-05-10319A0 AP30P1U | 10.319       | 13/32"         | 56       | 118      | 71       | 45       | 12           | ○     |
| D106-05-10400A0 AP30P1U | 10.4         |                | 56       | 118      | 71       | 45       | 12           | ○     |
| D106-05-10500A0 AP30P1U | 10.5         |                | 56       | 118      | 71       | 45       | 12           | ●     |
| D106-05-10600A0 AP30P1U | 10.6         |                | 56       | 118      | 71       | 45       | 12           | ●     |
| D106-05-10700A0 AP30P1U | 10.7         |                | 56       | 118      | 71       | 45       | 12           | ○     |
| D106-05-10716A0 AP30P1U | 10.716       | 27/64"         | 56       | 118      | 71       | 45       | 12           | ○     |
| D106-05-10800A0 AP30P1U | 10.8         |                | 56       | 118      | 71       | 45       | 12           | ●     |
| D106-05-10900A0 AP30P1U | 10.9         |                | 56       | 118      | 71       | 45       | 12           | ○     |
| D106-05-11000A0 AP30P1U | 11           |                | 56       | 118      | 71       | 45       | 12           | ●     |
| D106-05-11100A0 AP30P1U | 11.1         |                | 56       | 118      | 71       | 45       | 12           | ○     |
| D106-05-11113A0 AP30P1U | 11.113       | 7/16"          | 56       | 118      | 71       | 45       | 12           | ○     |
| D106-05-11200A0 AP30P1U | 11.2         |                | 56       | 118      | 71       | 45       | 12           | ○     |
| D106-05-11300A0 AP30P1U | 11.3         |                | 56       | 118      | 71       | 45       | 12           | ○     |
| D106-05-11400A0 AP30P1U | 11.4         |                | 56       | 118      | 71       | 45       | 12           | ○     |
| D106-05-11500A0 AP30P1U | 11.5         |                | 56       | 118      | 71       | 45       | 12           | ○     |
| D106-05-11509A0 AP30P1U | 11.509       | 29/64"         | 56       | 118      | 71       | 45       | 12           | ○     |
| D106-05-11550A0 AP30P1U | 11.55        |                | 56       | 118      | 71       | 45       | 12           | ○     |
| D106-05-11600A0 AP30P1U | 11.6         |                | 56       | 118      | 71       | 45       | 12           | ○     |
| D106-05-11700A0 AP30P1U | 11.7         |                | 56       | 118      | 71       | 45       | 12           | ○     |
| D106-05-11800A0 AP30P1U | 11.8         |                | 56       | 118      | 71       | 45       | 12           | ●     |
| D106-05-11900A0 AP30P1U | 11.9         |                | 56       | 118      | 71       | 45       | 12           | ○     |
| D106-05-11906A0 AP30P1U | 11.906       | 15/32"         | 56       | 118      | 71       | 45       | 12           | ○     |
| D106-05-12000A0 AP30P1U | 12           |                | 56       | 118      | 71       | 45       | 12           | ●     |
| D106-05-12100A0 AP30P1U | 12.1         |                | 60       | 124      | 77       | 45       | 14           | ○     |
| D106-05-12200A0 AP30P1U | 12.2         |                | 60       | 124      | 77       | 45       | 14           | ○     |
| D106-05-12250A0 AP30P1U | 12.25        |                | 60       | 124      | 77       | 45       | 14           | ○     |

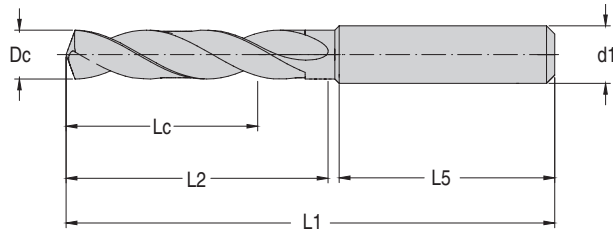
Marked : ● Stock available ○ Non-stocked standard

Solid Carbide Drill



Solid Carbide Drill D106 with External Coolant - 5xDc

|    |   |   |    |   |    |   |
|----|---|---|----|---|----|---|
| P  | M | S | K  | H | N  | O |
| •• |   |   | •• |   | •• | • |

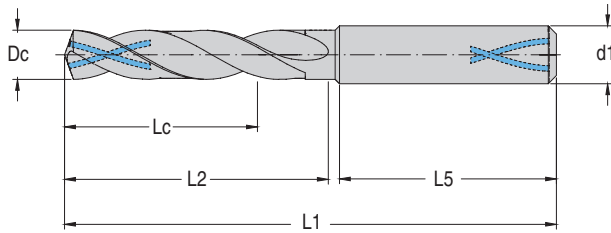


| Product code            | Dc(m7)<br>mm | Dc<br>inch/No. | Lc<br>mm | L1<br>mm | L2<br>mm | L5<br>mm | d1(h6)<br>mm | stock |
|-------------------------|--------------|----------------|----------|----------|----------|----------|--------------|-------|
| D106-05-12300A0 AP30P1U | 12.3         |                | 60       | 124      | 77       | 45       | 14           | ○     |
| D106-05-12303A0 AP30P1U | 12.303       | 31/64"         | 60       | 124      | 77       | 45       | 14           | ○     |
| D106-05-12400A0 AP30P1U | 12.4         |                | 60       | 124      | 77       | 45       | 14           | ○     |
| D106-05-12500A0 AP30P1U | 12.5         |                | 60       | 124      | 77       | 45       | 14           | ●     |
| D106-05-12600A0 AP30P1U | 12.6         |                | 60       | 124      | 77       | 45       | 14           | ○     |
| D106-05-12700A0 AP30P1U | 12.7         | 1/2"           | 60       | 124      | 77       | 45       | 14           | ○     |
| D106-05-12750A0 AP30P1U | 12.75        |                | 60       | 124      | 77       | 45       | 14           | ○     |
| D106-05-12800A0 AP30P1U | 12.8         |                | 60       | 124      | 77       | 45       | 14           | ○     |
| D106-05-12900A0 AP30P1U | 12.9         |                | 60       | 124      | 77       | 45       | 14           | ○     |
| D106-05-13000A0 AP30P1U | 13           |                | 60       | 124      | 77       | 45       | 14           | ●     |
| D106-05-13100A0 AP30P1U | 13.1         |                | 60       | 124      | 77       | 45       | 14           | ○     |
| D106-05-13200A0 AP30P1U | 13.2         |                | 60       | 124      | 77       | 45       | 14           | ●     |
| D106-05-13300A0 AP30P1U | 13.3         |                | 60       | 124      | 77       | 45       | 14           | ○     |
| D106-05-13400A0 AP30P1U | 13.4         |                | 60       | 124      | 77       | 45       | 14           | ○     |
| D106-05-13494A0 AP30P1U | 13.494       | 17/32"         | 60       | 124      | 77       | 45       | 14           | ○     |
| D106-05-13500A0 AP30P1U | 13.5         |                | 60       | 124      | 77       | 45       | 14           | ○     |
| D106-05-13600A0 AP30P1U | 13.6         |                | 60       | 124      | 77       | 45       | 14           | ○     |
| D106-05-13700A0 AP30P1U | 13.7         |                | 60       | 124      | 77       | 45       | 14           | ●     |
| D106-05-13800A0 AP30P1U | 13.8         |                | 60       | 124      | 77       | 45       | 14           | ○     |
| D106-05-13900A0 AP30P1U | 13.9         |                | 60       | 124      | 77       | 45       | 14           | ○     |
| D106-05-14000A0 AP30P1U | 14           |                | 60       | 124      | 77       | 45       | 14           | ●     |
| D106-05-14100A0 AP30P1U | 14.1         |                | 63       | 133      | 83       | 48       | 16           | ●     |
| D106-05-14200A0 AP30P1U | 14.2         |                | 63       | 133      | 83       | 48       | 16           | ●     |
| D106-05-14288A0 AP30P1U | 14.288       | 9/16"          | 63       | 133      | 83       | 48       | 16           | ○     |
| D106-05-14300A0 AP30P1U | 14.3         |                | 63       | 133      | 83       | 48       | 16           | ○     |
| D106-05-14400A0 AP30P1U | 14.4         |                | 63       | 133      | 83       | 48       | 16           | ○     |
| D106-05-14500A0 AP30P1U | 14.5         |                | 63       | 133      | 83       | 48       | 16           | ●     |
| D106-05-14600A0 AP30P1U | 14.6         |                | 63       | 133      | 83       | 48       | 16           | ●     |
| D106-05-14700A0 AP30P1U | 14.7         |                | 63       | 133      | 83       | 48       | 16           | ●     |
| D106-05-14750A0 AP30P1U | 14.75        |                | 63       | 133      | 83       | 48       | 16           | ○     |
| D106-05-14800A0 AP30P1U | 14.8         |                | 63       | 133      | 83       | 48       | 16           | ○     |
| D106-05-15000A0 AP30P1U | 15           |                | 63       | 133      | 83       | 48       | 16           | ●     |
| D106-05-15100A0 AP30P1U | 15.1         |                | 63       | 133      | 83       | 48       | 16           | ○     |
| D106-05-15200A0 AP30P1U | 15.2         |                | 63       | 133      | 83       | 48       | 16           | ○     |
| D106-05-15300A0 AP30P1U | 15.3         |                | 63       | 133      | 83       | 48       | 16           | ○     |
| D106-05-15500A0 AP30P1U | 15.5         |                | 63       | 133      | 83       | 48       | 16           | ●     |
| D106-05-15600A0 AP30P1U | 15.6         |                | 63       | 133      | 83       | 48       | 16           | ○     |
| D106-05-15700A0 AP30P1U | 15.7         |                | 63       | 133      | 83       | 48       | 16           | ●     |
| D106-05-15800A0 AP30P1U | 15.8         |                | 63       | 133      | 83       | 48       | 16           | ●     |
| D106-05-15875A0 AP30P1U | 15.875       | 5/8"           | 63       | 133      | 83       | 48       | 16           | ○     |
| D106-05-15900A0 AP30P1U | 15.9         |                | 63       | 133      | 83       | 48       | 16           | ○     |
| D106-05-16000A0 AP30P1U | 16           |                | 63       | 133      | 83       | 48       | 16           | ●     |

Marked: ● Stock available ○ Non-stocked standard

**Solid Carbide Drill D106 with Internal Coolant - 3xDc**

|    |   |   |    |   |    |   |
|----|---|---|----|---|----|---|
| P  | M | S | K  | H | N  | O |
| •• | • | • | •• | • | •• | • |



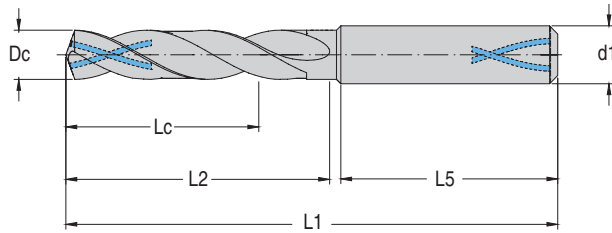
| Product code            | Dc(m7)<br>mm | Dc<br>inch/No. | Lc<br>mm | L1<br>mm | L2<br>mm | L5<br>mm | d1(h6)<br>mm | stock |
|-------------------------|--------------|----------------|----------|----------|----------|----------|--------------|-------|
| D106-03-03000A1 AP30P1U | 3            |                | 14       | 62       | 20       | 36       | 4            | ●     |
| D106-03-03100A1 AP30P1U | 3.1          |                | 14       | 62       | 20       | 36       | 4            | ●     |
| D106-03-03175A1 AP30P1U | 3.175        | 1/8"           | 14       | 62       | 20       | 36       | 4            | ○     |
| D106-03-03200A1 AP30P1U | 3.2          |                | 14       | 62       | 20       | 36       | 4            | ●     |
| D106-03-03250A1 AP30P1U | 3.25         |                | 14       | 62       | 20       | 36       | 4            | ○     |
| D106-03-03300A1 AP30P1U | 3.3          |                | 14       | 62       | 20       | 36       | 4            | ●     |
| D106-03-03400A1 AP30P1U | 3.4          |                | 14       | 62       | 20       | 36       | 4            | ○     |
| D106-03-03500A1 AP30P1U | 3.5          |                | 14       | 62       | 20       | 36       | 4            | ●     |
| D106-03-03572A1 AP30P1U | 3.572        | 9/64"          | 14       | 62       | 20       | 36       | 4            | ○     |
| D106-03-03600A1 AP30P1U | 3.6          |                | 14       | 62       | 20       | 36       | 4            | ●     |
| D106-03-03650A1 AP30P1U | 3.65         |                | 14       | 62       | 20       | 36       | 4            | ○     |
| D106-03-03700A1 AP30P1U | 3.7          |                | 14       | 62       | 20       | 36       | 4            | ●     |
| D106-03-03800A1 AP30P1U | 3.8          |                | 17       | 66       | 24       | 36       | 4            | ○     |
| D106-03-03900A1 AP30P1U | 3.9          |                | 17       | 66       | 24       | 36       | 4            | ●     |
| D106-03-03969A1 AP30P1U | 3.969        | 5/32"          | 17       | 66       | 24       | 36       | 4            | ○     |
| D106-03-04000A1 AP30P1U | 4            |                | 17       | 66       | 24       | 36       | 4            | ●     |
| D106-03-04100A1 AP30P1U | 4.1          |                | 17       | 66       | 24       | 36       | 6            | ○     |
| D106-03-04200A1 AP30P1U | 4.2          |                | 17       | 66       | 24       | 36       | 6            | ●     |
| D106-03-04300A1 AP30P1U | 4.3          |                | 17       | 66       | 24       | 36       | 6            | ○     |
| D106-03-04366A1 AP30P1U | 4.366        | 11/64"         | 17       | 66       | 24       | 36       | 6            | ○     |
| D106-03-04400A1 AP30P1U | 4.4          |                | 17       | 66       | 24       | 36       | 6            | ○     |
| D106-03-04500A1 AP30P1U | 4.5          |                | 17       | 66       | 24       | 36       | 6            | ●     |
| D106-03-04600A1 AP30P1U | 4.6          |                | 17       | 66       | 24       | 36       | 6            | ○     |
| D106-03-04650A1 AP30P1U | 4.65         |                | 17       | 66       | 24       | 36       | 6            | ○     |
| D106-03-04700A1 AP30P1U | 4.7          |                | 17       | 66       | 24       | 36       | 6            | ○     |
| D106-03-04763A1 AP30P1U | 4.763        | 3/16"          | 20       | 66       | 28       | 36       | 6            | ○     |
| D106-03-04800A1 AP30P1U | 4.8          |                | 20       | 66       | 28       | 36       | 6            | ●     |
| D106-03-04900A1 AP30P1U | 4.9          |                | 20       | 66       | 28       | 36       | 6            | ●     |
| D106-03-05000A1 AP30P1U | 5            |                | 20       | 66       | 28       | 36       | 6            | ●     |
| D106-03-05100A1 AP30P1U | 5.1          |                | 20       | 66       | 28       | 36       | 6            | ●     |
| D106-03-05159A1 AP30P1U | 5.159        | 13/64"         | 20       | 66       | 28       | 36       | 6            | ○     |
| D106-03-05200A1 AP30P1U | 5.2          |                | 20       | 66       | 28       | 36       | 6            | ●     |
| D106-03-05300A1 AP30P1U | 5.3          |                | 20       | 66       | 28       | 36       | 6            | ○     |
| D106-03-05400A1 AP30P1U | 5.4          |                | 20       | 66       | 28       | 36       | 6            | ○     |
| D106-03-05500A1 AP30P1U | 5.5          |                | 20       | 66       | 28       | 36       | 6            | ●     |
| D106-03-05550A1 AP30P1U | 5.55         |                | 20       | 66       | 28       | 36       | 6            | ○     |

Marked: ● Stock available ○ Non-stocked standard

Solid Carbide Drill

Solid Carbide Drill D106 with Internal Coolant - 3xDc

|    |   |   |    |   |    |   |
|----|---|---|----|---|----|---|
| P  | M | S | K  | H | N  | O |
| •• | • | • | •• | • | •• | • |

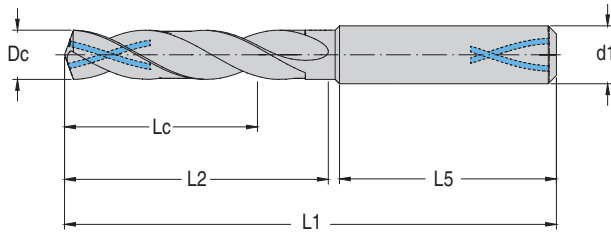


| Product code            | Dc(m7)<br>mm | Dc<br>inch/No. | Lc<br>mm | L1<br>mm | L2<br>mm | L5<br>mm | d1(h6)<br>mm | stock |
|-------------------------|--------------|----------------|----------|----------|----------|----------|--------------|-------|
| D106-03-05556A1 AP30P1U | 5.556        | 7/32"          | 20       | 66       | 28       | 36       | 6            | ○     |
| D106-03-05600A1 AP30P1U | 5.6          |                | 20       | 66       | 28       | 36       | 6            | ○     |
| D106-03-05700A1 AP30P1U | 5.7          |                | 20       | 66       | 28       | 36       | 6            | ○     |
| D106-03-05800A1 AP30P1U | 5.8          |                | 20       | 66       | 28       | 36       | 6            | ●     |
| D106-03-05900A1 AP30P1U | 5.9          |                | 20       | 66       | 28       | 36       | 6            | ●     |
| D106-03-05953A1 AP30P1U | 5.953        | 15/64"         | 20       | 66       | 28       | 36       | 6            | ○     |
| D106-03-06000A1 AP30P1U | 6            |                | 20       | 66       | 28       | 36       | 6            | ●     |
| D106-03-06100A1 AP30P1U | 6.1          |                | 24       | 79       | 41       | 36       | 8            | ○     |
| D106-03-06200A1 AP30P1U | 6.2          |                | 24       | 79       | 41       | 36       | 8            | ○     |
| D106-03-06300A1 AP30P1U | 6.3          |                | 24       | 79       | 41       | 36       | 8            | ○     |
| D106-03-06350A1 AP30P1U | 6.35         | 1/4"           | 24       | 79       | 41       | 36       | 8            | ○     |
| D106-03-06400A1 AP30P1U | 6.4          |                | 24       | 79       | 41       | 36       | 8            | ○     |
| D106-03-06500A1 AP30P1U | 6.5          |                | 24       | 79       | 41       | 36       | 8            | ●     |
| D106-03-06600A1 AP30P1U | 6.6          |                | 24       | 79       | 41       | 36       | 8            | ○     |
| D106-03-06700A1 AP30P1U | 6.7          |                | 24       | 79       | 41       | 36       | 8            | ○     |
| D106-03-06747A1 AP30P1U | 6.747        | 17/64"         | 24       | 79       | 41       | 36       | 8            | ○     |
| D106-03-06800A1 AP30P1U | 6.8          |                | 24       | 79       | 41       | 36       | 8            | ●     |
| D106-03-06900A1 AP30P1U | 6.9          |                | 24       | 79       | 41       | 36       | 8            | ●     |
| D106-03-07000A1 AP30P1U | 7            |                | 24       | 79       | 41       | 36       | 8            | ●     |
| D106-03-07100A1 AP30P1U | 7.1          |                | 29       | 79       | 41       | 36       | 8            | ○     |
| D106-03-07144A1 AP30P1U | 7.144        | 9/32"          | 29       | 79       | 41       | 36       | 8            | ○     |
| D106-03-07200A1 AP30P1U | 7.2          |                | 29       | 79       | 41       | 36       | 8            | ○     |
| D106-03-07300A1 AP30P1U | 7.3          |                | 29       | 79       | 41       | 36       | 8            | ○     |
| D106-03-07400A1 AP30P1U | 7.4          |                | 29       | 79       | 41       | 36       | 8            | ●     |
| D106-03-07500A1 AP30P1U | 7.5          |                | 29       | 79       | 41       | 36       | 8            | ●     |
| D106-03-07541A1 AP30P1U | 7.541        | 19/64"         | 29       | 79       | 41       | 36       | 8            | ○     |
| D106-03-07550A1 AP30P1U | 7.55         |                | 29       | 79       | 41       | 36       | 8            | ○     |
| D106-03-07600A1 AP30P1U | 7.6          |                | 29       | 79       | 41       | 36       | 8            | ○     |
| D106-03-07700A1 AP30P1U | 7.7          |                | 29       | 79       | 41       | 36       | 8            | ○     |
| D106-03-07800A1 AP30P1U | 7.8          |                | 29       | 79       | 41       | 36       | 8            | ●     |
| D106-03-07900A1 AP30P1U | 7.9          |                | 29       | 79       | 41       | 36       | 8            | ●     |
| D106-03-07938A1 AP30P1U | 7.938        | 5/16"          | 29       | 79       | 41       | 36       | 8            | ○     |
| D106-03-08000A1 AP30P1U | 8            |                | 29       | 79       | 41       | 36       | 8            | ●     |
| D106-03-08100A1 AP30P1U | 8.1          |                | 35       | 89       | 47       | 40       | 10           | ○     |
| D106-03-08200A1 AP30P1U | 8.2          |                | 35       | 89       | 47       | 40       | 10           | ○     |
| D106-03-08300A1 AP30P1U | 8.3          |                | 35       | 89       | 47       | 40       | 10           | ○     |
| D106-03-08334A1 AP30P1U | 8.334        | 21/64"         | 35       | 89       | 47       | 40       | 10           | ○     |
| D106-03-08400A1 AP30P1U | 8.4          |                | 35       | 89       | 47       | 40       | 10           | ○     |
| D106-03-08500A1 AP30P1U | 8.5          |                | 35       | 89       | 47       | 40       | 10           | ●     |
| D106-03-08600A1 AP30P1U | 8.6          |                | 35       | 89       | 47       | 40       | 10           | ●     |
| D106-03-08700A1 AP30P1U | 8.7          |                | 35       | 89       | 47       | 40       | 10           | ○     |
| D106-03-08731A1 AP30P1U | 8.731        | 11/32"         | 35       | 89       | 47       | 40       | 10           | ○     |
| D106-03-08800A1 AP30P1U | 8.8          |                | 35       | 89       | 47       | 40       | 10           | ●     |
| D106-03-08900A1 AP30P1U | 8.9          |                | 35       | 89       | 47       | 40       | 10           | ●     |

Marked: ● Stock available ○ Non-stocked standard

**Solid Carbide Drill D106 with Internal Coolant - 3xDc**

|    |   |   |    |   |    |   |
|----|---|---|----|---|----|---|
| P  | M | S | K  | H | N  | O |
| •• | • | • | •• | • | •• | • |



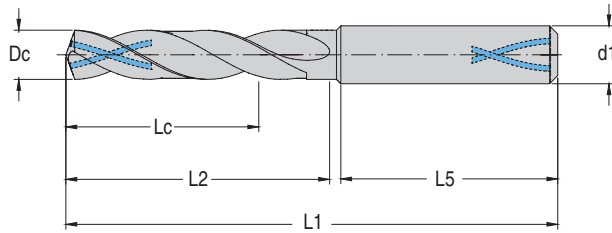
| Product code            | Dc(m7)<br>mm | Dc<br>inch/No. | Lc<br>mm | L1<br>mm | L2<br>mm | L5<br>mm | d1(h6)<br>mm | stock |
|-------------------------|--------------|----------------|----------|----------|----------|----------|--------------|-------|
| D106-03-09000A1 AP30P1U | 9            |                | 35       | 89       | 47       | 40       | 10           | ●     |
| D106-03-09100A1 AP30P1U | 9.1          |                | 35       | 89       | 47       | 40       | 10           | ○     |
| D106-03-09128A1 AP30P1U | 9.128        | 23/64"         | 35       | 89       | 47       | 40       | 10           | ○     |
| D106-03-09200A1 AP30P1U | 9.2          |                | 35       | 89       | 47       | 40       | 10           | ○     |
| D106-03-09300A1 AP30P1U | 9.3          |                | 35       | 89       | 47       | 40       | 10           | ●     |
| D106-03-09400A1 AP30P1U | 9.4          |                | 35       | 89       | 47       | 40       | 10           | ○     |
| D106-03-09500A1 AP30P1U | 9.5          |                | 35       | 89       | 47       | 40       | 10           | ○     |
| D106-03-09525A1 AP30P1U | 9.525        | 3/8"           | 35       | 89       | 47       | 40       | 10           | ○     |
| D106-03-09550A1 AP30P1U | 9.55         |                | 35       | 89       | 47       | 40       | 10           | ○     |
| D106-03-09600A1 AP30P1U | 9.6          |                | 35       | 89       | 47       | 40       | 10           | ○     |
| D106-03-09700A1 AP30P1U | 9.7          |                | 35       | 89       | 47       | 40       | 10           | ○     |
| D106-03-09800A1 AP30P1U | 9.8          |                | 35       | 89       | 47       | 40       | 10           | ●     |
| D106-03-09900A1 AP30P1U | 9.9          |                | 35       | 89       | 47       | 40       | 10           | ●     |
| D106-03-09922A1 AP30P1U | 9.922        | 25/64"         | 35       | 89       | 47       | 40       | 10           | ○     |
| D106-03-10000A1 AP30P1U | 10           |                | 35       | 89       | 47       | 40       | 10           | ●     |
| D106-03-10100A1 AP30P1U | 10.1         |                | 40       | 102      | 55       | 45       | 12           | ●     |
| D106-03-10200A1 AP30P1U | 10.2         |                | 40       | 102      | 55       | 45       | 12           | ●     |
| D106-03-10300A1 AP30P1U | 10.3         |                | 40       | 102      | 55       | 45       | 12           | ●     |
| D106-03-10319A1 AP30P1U | 10.319       | 13/32"         | 40       | 102      | 55       | 45       | 12           | ○     |
| D106-03-10400A1 AP30P1U | 10.4         |                | 40       | 102      | 55       | 45       | 12           | ○     |
| D106-03-10500A1 AP30P1U | 10.5         |                | 40       | 102      | 55       | 45       | 12           | ●     |
| D106-03-10600A1 AP30P1U | 10.6         |                | 40       | 102      | 55       | 45       | 12           | ●     |
| D106-03-10700A1 AP30P1U | 10.7         |                | 40       | 102      | 55       | 45       | 12           | ○     |
| D106-03-10716A1 AP30P1U | 10.716       | 27/64"         | 40       | 102      | 55       | 45       | 12           | ○     |
| D106-03-10800A1 AP30P1U | 10.8         |                | 40       | 102      | 55       | 45       | 12           | ●     |
| D106-03-10900A1 AP30P1U | 10.9         |                | 40       | 102      | 55       | 45       | 12           | ○     |
| D106-03-11000A1 AP30P1U | 11           |                | 40       | 102      | 55       | 45       | 12           | ●     |
| D106-03-11100A1 AP30P1U | 11.1         |                | 40       | 102      | 55       | 45       | 12           | ○     |
| D106-03-11113A1 AP30P1U | 11.113       | 7/16"          | 40       | 102      | 55       | 45       | 12           | ○     |
| D106-03-11200A1 AP30P1U | 11.2         |                | 40       | 102      | 55       | 45       | 12           | ○     |
| D106-03-11300A1 AP30P1U | 11.3         |                | 40       | 102      | 55       | 45       | 12           | ○     |
| D106-03-11400A1 AP30P1U | 11.4         |                | 40       | 102      | 55       | 45       | 12           | ○     |
| D106-03-11500A1 AP30P1U | 11.5         |                | 40       | 102      | 55       | 45       | 12           | ○     |
| D106-03-11509A1 AP30P1U | 11.509       | 29/64"         | 40       | 102      | 55       | 45       | 12           | ○     |
| D106-03-11550A1 AP30P1U | 11.55        |                | 40       | 102      | 55       | 45       | 12           | ○     |
| D106-03-11600A1 AP30P1U | 11.6         |                | 40       | 102      | 55       | 45       | 12           | ○     |
| D106-03-11700A1 AP30P1U | 11.7         |                | 40       | 102      | 55       | 45       | 12           | ○     |
| D106-03-11800A1 AP30P1U | 11.8         |                | 40       | 102      | 55       | 45       | 12           | ●     |
| D106-03-11900A1 AP30P1U | 11.9         |                | 40       | 102      | 55       | 45       | 12           | ○     |
| D106-03-11906A1 AP30P1U | 11.906       | 15/32"         | 40       | 102      | 55       | 45       | 12           | ○     |
| D106-03-12000A1 AP30P1U | 12           |                | 40       | 102      | 55       | 45       | 12           | ●     |
| D106-03-12100A1 AP30P1U | 12.1         |                | 43       | 107      | 60       | 45       | 14           | ○     |
| D106-03-12200A1 AP30P1U | 12.2         |                | 43       | 107      | 60       | 45       | 14           | ○     |
| D106-03-12250A1 AP30P1U | 12.25        |                | 43       | 107      | 60       | 45       | 14           | ○     |

Marked: ● Stock available ○ Non-stocked standard

Solid Carbide Drill

Solid Carbide Drill D106 with Internal Coolant - 3xDc

|    |   |   |    |   |    |   |
|----|---|---|----|---|----|---|
| P  | M | S | K  | H | N  | O |
| •• | • | • | •• | • | •• | • |

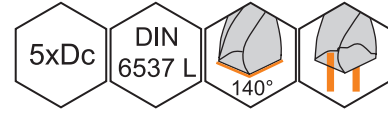
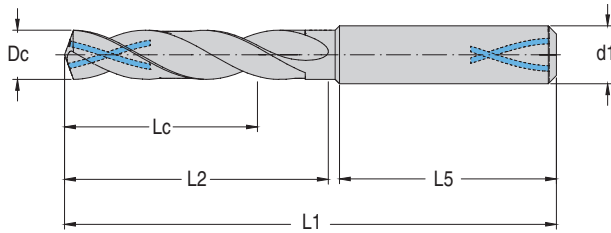


| Product code            | Dc(m7)<br>mm | Dc<br>inch/No. | Lc<br>mm | L1<br>mm | L2<br>mm | L5<br>mm | d1(h6)<br>mm | stock |
|-------------------------|--------------|----------------|----------|----------|----------|----------|--------------|-------|
| D106-03-12300A1 AP30P1U | 12.3         |                | 43       | 107      | 60       | 45       | 14           | ○     |
| D106-03-12303A1 AP30P1U | 12.303       | 31/64"         | 43       | 107      | 60       | 45       | 14           | ○     |
| D106-03-12400A1 AP30P1U | 12.4         |                | 43       | 107      | 60       | 45       | 14           | ○     |
| D106-03-12500A1 AP30P1U | 12.5         |                | 43       | 107      | 60       | 45       | 14           | ●     |
| D106-03-12600A1 AP30P1U | 12.6         |                | 43       | 107      | 60       | 45       | 14           | ○     |
| D106-03-12700A1 AP30P1U | 12.7         | 1/2"           | 43       | 107      | 60       | 45       | 14           | ○     |
| D106-03-12750A1 AP30P1U | 12.75        |                | 43       | 107      | 60       | 45       | 14           | ○     |
| D106-03-12800A1 AP30P1U | 12.8         |                | 43       | 107      | 60       | 45       | 14           | ○     |
| D106-03-12900A1 AP30P1U | 12.9         |                | 43       | 107      | 60       | 45       | 14           | ○     |
| D106-03-13000A1 AP30P1U | 13           |                | 43       | 107      | 60       | 45       | 14           | ●     |
| D106-03-13100A1 AP30P1U | 13.1         |                | 43       | 107      | 60       | 45       | 14           | ○     |
| D106-03-13200A1 AP30P1U | 13.2         |                | 43       | 107      | 60       | 45       | 14           | ●     |
| D106-03-13300A1 AP30P1U | 13.3         |                | 43       | 107      | 60       | 45       | 14           | ○     |
| D106-03-13400A1 AP30P1U | 13.4         |                | 43       | 107      | 60       | 45       | 14           | ○     |
| D106-03-13494A1 AP30P1U | 13.494       | 17/32"         | 43       | 107      | 60       | 45       | 14           | ○     |
| D106-03-13500A1 AP30P1U | 13.5         |                | 43       | 107      | 60       | 45       | 14           | ○     |
| D106-03-13600A1 AP30P1U | 13.6         |                | 43       | 107      | 60       | 45       | 14           | ○     |
| D106-03-13700A1 AP30P1U | 13.7         |                | 43       | 107      | 60       | 45       | 14           | ○     |
| D106-03-13800A1 AP30P1U | 13.8         |                | 43       | 107      | 60       | 45       | 14           | ○     |
| D106-03-13900A1 AP30P1U | 13.9         |                | 43       | 107      | 60       | 45       | 14           | ○     |
| D106-03-14000A1 AP30P1U | 14           |                | 43       | 107      | 60       | 45       | 14           | ●     |
| D106-03-14100A1 AP30P1U | 14.1         |                | 45       | 115      | 65       | 48       | 16           | ●     |
| D106-03-14200A1 AP30P1U | 14.2         |                | 45       | 115      | 65       | 48       | 16           | ●     |
| D106-03-14288A1 AP30P1U | 14.288       | 9/16"          | 45       | 115      | 65       | 48       | 16           | ○     |
| D106-03-14300A1 AP30P1U | 14.3         |                | 45       | 115      | 65       | 48       | 16           | ○     |
| D106-03-14400A1 AP30P1U | 14.4         |                | 45       | 115      | 65       | 48       | 16           | ○     |
| D106-03-14500A1 AP30P1U | 14.5         |                | 45       | 115      | 65       | 48       | 16           | ●     |
| D106-03-14600A1 AP30P1U | 14.6         |                | 45       | 115      | 65       | 48       | 16           | ●     |
| D106-03-14700A1 AP30P1U | 14.7         |                | 45       | 115      | 65       | 48       | 16           | ●     |
| D106-03-14750A1 AP30P1U | 14.75        |                | 45       | 115      | 65       | 48       | 16           | ○     |
| D106-03-14800A1 AP30P1U | 14.8         |                | 45       | 115      | 65       | 48       | 16           | ○     |
| D106-03-15000A1 AP30P1U | 15           |                | 45       | 115      | 65       | 48       | 16           | ●     |
| D106-03-15100A1 AP30P1U | 15.1         |                | 45       | 115      | 65       | 48       | 16           | ○     |
| D106-03-15200A1 AP30P1U | 15.2         |                | 45       | 115      | 65       | 48       | 16           | ○     |
| D106-03-15300A1 AP30P1U | 15.3         |                | 45       | 115      | 65       | 48       | 16           | ○     |
| D106-03-15500A1 AP30P1U | 15.5         |                | 45       | 115      | 65       | 48       | 16           | ●     |
| D106-03-15600A1 AP30P1U | 15.6         |                | 45       | 115      | 65       | 48       | 16           | ○     |
| D106-03-15700A1 AP30P1U | 15.7         |                | 45       | 115      | 65       | 48       | 16           | ●     |
| D106-03-15800A1 AP30P1U | 15.8         |                | 45       | 115      | 65       | 48       | 16           | ●     |
| D106-03-15875A1 AP30P1U | 15.875       | 5/8"           | 45       | 115      | 65       | 48       | 16           | ○     |
| D106-03-15900A1 AP30P1U | 15.9         |                | 45       | 115      | 65       | 48       | 16           | ○     |
| D106-03-16000A1 AP30P1U | 16           |                | 45       | 115      | 65       | 48       | 16           | ●     |

Marked: ● Stock available ○ Non-stocked standard

**Solid Carbide Drill D106 with Internal Coolant - 5xDc**

|    |   |   |    |   |    |   |
|----|---|---|----|---|----|---|
| P  | M | S | K  | H | N  | O |
| •• | • | • | •• | • | •• | • |



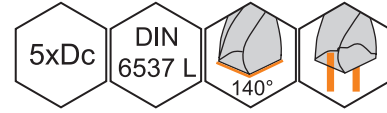
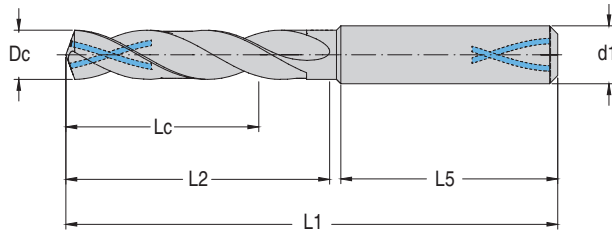
| Product code            | Dc(m7)<br>mm | Dc<br>inch/No. | Lc<br>mm | L1<br>mm | L2<br>mm | L5<br>mm | d1(h6)<br>mm | stock |
|-------------------------|--------------|----------------|----------|----------|----------|----------|--------------|-------|
| D106-05-03000A1 AP30P1U | 3            |                | 23       | 66       | 28       | 36       | 4            | ●     |
| D106-05-03100A1 AP30P1U | 3.1          |                | 23       | 66       | 28       | 36       | 4            | ●     |
| D106-05-03175A1 AP30P1U | 3.175        | 1/8"           | 23       | 66       | 28       | 36       | 4            | ○     |
| D106-05-03200A1 AP30P1U | 3.2          |                | 23       | 66       | 28       | 36       | 4            | ●     |
| D106-05-03250A1 AP30P1U | 3.25         |                | 23       | 66       | 28       | 36       | 4            | ○     |
| D106-05-03300A1 AP30P1U | 3.3          |                | 23       | 66       | 28       | 36       | 4            | ●     |
| D106-05-03400A1 AP30P1U | 3.4          |                | 23       | 66       | 28       | 36       | 4            | ○     |
| D106-05-03500A1 AP30P1U | 3.5          |                | 23       | 66       | 28       | 36       | 4            | ●     |
| D106-05-03572A1 AP30P1U | 3.572        | 9/64"          | 23       | 66       | 28       | 36       | 4            | ○     |
| D106-05-03600A1 AP30P1U | 3.6          |                | 23       | 66       | 28       | 36       | 4            | ●     |
| D106-05-03650A1 AP30P1U | 3.65         |                | 23       | 66       | 28       | 36       | 4            | ○     |
| D106-05-03700A1 AP30P1U | 3.7          |                | 23       | 66       | 28       | 36       | 4            | ●     |
| D106-05-03800A1 AP30P1U | 3.8          |                | 29       | 74       | 36       | 36       | 4            | ○     |
| D106-05-03900A1 AP30P1U | 3.9          |                | 29       | 74       | 36       | 36       | 4            | ●     |
| D106-05-03969A1 AP30P1U | 3.969        | 5/32"          | 29       | 74       | 36       | 36       | 4            | ○     |
| D106-05-04000A1 AP30P1U | 4            |                | 29       | 74       | 36       | 36       | 4            | ●     |
| D106-05-04100A1 AP30P1U | 4.1          |                | 29       | 74       | 36       | 36       | 6            | ○     |
| D106-05-04200A1 AP30P1U | 4.2          |                | 29       | 74       | 36       | 36       | 6            | ●     |
| D106-05-04300A1 AP30P1U | 4.3          |                | 29       | 74       | 36       | 36       | 6            | ○     |
| D106-05-04366A1 AP30P1U | 4.366        | 11/64"         | 29       | 74       | 36       | 36       | 6            | ○     |
| D106-05-04400A1 AP30P1U | 4.4          |                | 29       | 74       | 36       | 36       | 6            | ○     |
| D106-05-04500A1 AP30P1U | 4.5          |                | 29       | 74       | 36       | 36       | 6            | ●     |
| D106-05-04600A1 AP30P1U | 4.6          |                | 29       | 74       | 36       | 36       | 6            | ○     |
| D106-05-04650A1 AP30P1U | 4.65         |                | 29       | 74       | 36       | 36       | 6            | ○     |
| D106-05-04700A1 AP30P1U | 4.7          |                | 29       | 74       | 36       | 36       | 6            | ○     |
| D106-05-04763A1 AP30P1U | 4.763        | 3/16"          | 35       | 82       | 44       | 36       | 6            | ○     |
| D106-05-04800A1 AP30P1U | 4.8          |                | 35       | 82       | 44       | 36       | 6            | ●     |
| D106-05-04900A1 AP30P1U | 4.9          |                | 35       | 82       | 44       | 36       | 6            | ●     |
| D106-05-05000A1 AP30P1U | 5            |                | 35       | 82       | 44       | 36       | 6            | ●     |
| D106-05-05100A1 AP30P1U | 5.1          |                | 35       | 82       | 44       | 36       | 6            | ●     |
| D106-05-05159A1 AP30P1U | 5.159        | 13/64"         | 35       | 82       | 44       | 36       | 6            | ○     |
| D106-05-05200A1 AP30P1U | 5.2          |                | 35       | 82       | 44       | 36       | 6            | ●     |
| D106-05-05300A1 AP30P1U | 5.3          |                | 35       | 82       | 44       | 36       | 6            | ○     |
| D106-05-05400A1 AP30P1U | 5.4          |                | 35       | 82       | 44       | 36       | 6            | ○     |
| D106-05-05500A1 AP30P1U | 5.5          |                | 35       | 82       | 44       | 36       | 6            | ●     |
| D106-05-05550A1 AP30P1U | 5.55         |                | 35       | 82       | 44       | 36       | 6            | ○     |

Marked: ● Stock available ○ Non-stocked standard

Solid Carbide Drill

Solid Carbide Drill D106 with Internal Coolant - 5xDc

|    |   |   |    |   |    |   |
|----|---|---|----|---|----|---|
| P  | M | S | K  | H | N  | O |
| •• | • | • | •• | • | •• | • |

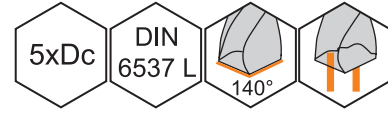
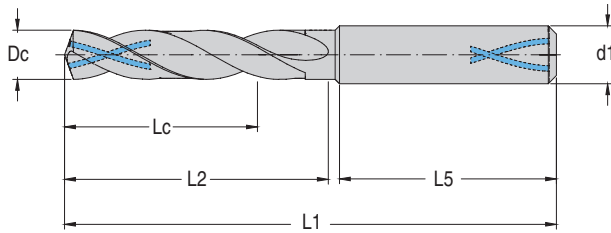


| Product code            | Dc(m7)<br>mm | Dc<br>inch/No. | Lc<br>mm | L1<br>mm | L2<br>mm | L5<br>mm | d1(h6)<br>mm | stock |
|-------------------------|--------------|----------------|----------|----------|----------|----------|--------------|-------|
| D106-05-05556A1 AP30P1U | 5.556        | 7/32"          | 35       | 82       | 44       | 36       | 6            | ○     |
| D106-05-05600A1 AP30P1U | 5.6          |                | 35       | 82       | 44       | 36       | 6            | ○     |
| D106-05-05700A1 AP30P1U | 5.7          |                | 35       | 82       | 44       | 36       | 6            | ○     |
| D106-05-05800A1 AP30P1U | 5.8          |                | 35       | 82       | 44       | 36       | 6            | ●     |
| D106-05-05900A1 AP30P1U | 5.9          |                | 35       | 82       | 44       | 36       | 6            | ●     |
| D106-05-05953A1 AP30P1U | 5.953        | 15/64"         | 35       | 82       | 44       | 36       | 6            | ○     |
| D106-05-06000A1 AP30P1U | 6            |                | 35       | 82       | 44       | 36       | 6            | ●     |
| D106-05-06100A1 AP30P1U | 6.1          |                | 43       | 91       | 53       | 36       | 8            | ○     |
| D106-05-06200A1 AP30P1U | 6.2          |                | 43       | 91       | 53       | 36       | 8            | ○     |
| D106-05-06300A1 AP30P1U | 6.3          |                | 43       | 91       | 53       | 36       | 8            | ○     |
| D106-05-06350A1 AP30P1U | 6.35         | 1/4"           | 43       | 91       | 53       | 36       | 8            | ○     |
| D106-05-06400A1 AP30P1U | 6.4          |                | 43       | 91       | 53       | 36       | 8            | ○     |
| D106-05-06500A1 AP30P1U | 6.5          |                | 43       | 91       | 53       | 36       | 8            | ●     |
| D106-05-06600A1 AP30P1U | 6.6          |                | 43       | 91       | 53       | 36       | 8            | ○     |
| D106-05-06700A1 AP30P1U | 6.7          |                | 43       | 91       | 53       | 36       | 8            | ○     |
| D106-05-06747A1 AP30P1U | 6.747        | 17/64"         | 43       | 91       | 53       | 36       | 8            | ○     |
| D106-05-06800A1 AP30P1U | 6.8          |                | 43       | 91       | 53       | 36       | 8            | ●     |
| D106-05-06900A1 AP30P1U | 6.9          |                | 43       | 91       | 53       | 36       | 8            | ●     |
| D106-05-07000A1 AP30P1U | 7            |                | 43       | 91       | 53       | 36       | 8            | ●     |
| D106-05-07100A1 AP30P1U | 7.1          |                | 43       | 91       | 53       | 36       | 8            | ○     |
| D106-05-07144A1 AP30P1U | 7.144        | 9/32"          | 43       | 91       | 53       | 36       | 8            | ○     |
| D106-05-07200A1 AP30P1U | 7.2          |                | 43       | 91       | 53       | 36       | 8            | ○     |
| D106-05-07300A1 AP30P1U | 7.3          |                | 43       | 91       | 53       | 36       | 8            | ○     |
| D106-05-07400A1 AP30P1U | 7.4          |                | 43       | 91       | 53       | 36       | 8            | ●     |
| D106-05-07500A1 AP30P1U | 7.5          |                | 43       | 91       | 53       | 36       | 8            | ●     |
| D106-05-07541A1 AP30P1U | 7.541        | 19/64"         | 43       | 91       | 53       | 36       | 8            | ○     |
| D106-05-07550A1 AP30P1U | 7.55         |                | 43       | 91       | 53       | 36       | 8            | ○     |
| D106-05-07600A1 AP30P1U | 7.6          |                | 43       | 91       | 53       | 36       | 8            | ○     |
| D106-05-07700A1 AP30P1U | 7.7          |                | 43       | 91       | 53       | 36       | 8            | ○     |
| D106-05-07800A1 AP30P1U | 7.8          |                | 43       | 91       | 53       | 36       | 8            | ●     |
| D106-05-07900A1 AP30P1U | 7.9          |                | 43       | 91       | 53       | 36       | 8            | ●     |
| D106-05-07938A1 AP30P1U | 7.938        | 5/16"          | 43       | 91       | 53       | 36       | 8            | ○     |
| D106-05-08000A1 AP30P1U | 8            |                | 43       | 91       | 53       | 36       | 8            | ●     |
| D106-05-08100A1 AP30P1U | 8.1          |                | 49       | 103      | 61       | 40       | 10           | ○     |
| D106-05-08200A1 AP30P1U | 8.2          |                | 49       | 103      | 61       | 40       | 10           | ○     |
| D106-05-08300A1 AP30P1U | 8.3          |                | 49       | 103      | 61       | 40       | 10           | ○     |
| D106-05-08334A1 AP30P1U | 8.334        | 21/64"         | 49       | 103      | 61       | 40       | 10           | ○     |
| D106-05-08400A1 AP30P1U | 8.4          |                | 49       | 103      | 61       | 40       | 10           | ○     |
| D106-05-08500A1 AP30P1U | 8.5          |                | 49       | 103      | 61       | 40       | 10           | ●     |
| D106-05-08600A1 AP30P1U | 8.6          |                | 49       | 103      | 61       | 40       | 10           | ●     |
| D106-05-08700A1 AP30P1U | 8.7          |                | 49       | 103      | 61       | 40       | 10           | ○     |
| D106-05-08731A1 AP30P1U | 8.731        | 11/32"         | 49       | 103      | 61       | 40       | 10           | ○     |
| D106-05-08800A1 AP30P1U | 8.8          |                | 49       | 103      | 61       | 40       | 10           | ●     |
| D106-05-08900A1 AP30P1U | 8.9          |                | 49       | 103      | 61       | 40       | 10           | ●     |

Marked: ● Stock available ○ Non-stocked standard

**Solid Carbide Drill D106 with Internal Coolant - 5xDc**

|    |   |   |    |   |    |   |
|----|---|---|----|---|----|---|
| P  | M | S | K  | H | N  | O |
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| Product code            | Dc(m7)<br>mm | Dc<br>inch/No. | Lc<br>mm | L1<br>mm | L2<br>mm | L5<br>mm | d1(h6)<br>mm | stock |
|-------------------------|--------------|----------------|----------|----------|----------|----------|--------------|-------|
| D106-05-09000A1 AP30P1U | 9            |                | 49       | 103      | 61       | 40       | 10           | ●     |
| D106-05-09100A1 AP30P1U | 9.1          |                | 49       | 103      | 61       | 40       | 10           | ○     |
| D106-05-09128A1 AP30P1U | 9.128        | 23/64"         | 49       | 103      | 61       | 40       | 10           | ○     |
| D106-05-09200A1 AP30P1U | 9.2          |                | 49       | 103      | 61       | 40       | 10           | ○     |
| D106-05-09300A1 AP30P1U | 9.3          |                | 49       | 103      | 61       | 40       | 10           | ●     |
| D106-05-09400A1 AP30P1U | 9.4          |                | 49       | 103      | 61       | 40       | 10           | ○     |
| D106-05-09500A1 AP30P1U | 9.5          |                | 49       | 103      | 61       | 40       | 10           | ○     |
| D106-05-09525A1 AP30P1U | 9.525        | 3/8"           | 49       | 103      | 61       | 40       | 10           | ○     |
| D106-05-09550A1 AP30P1U | 9.55         |                | 49       | 103      | 61       | 40       | 10           | ○     |
| D106-05-09600A1 AP30P1U | 9.6          |                | 49       | 103      | 61       | 40       | 10           | ○     |
| D106-05-09700A1 AP30P1U | 9.7          |                | 49       | 103      | 61       | 40       | 10           | ○     |
| D106-05-09800A1 AP30P1U | 9.8          |                | 49       | 103      | 61       | 40       | 10           | ●     |
| D106-05-09900A1 AP30P1U | 9.9          |                | 49       | 103      | 61       | 40       | 10           | ●     |
| D106-05-09922A1 AP30P1U | 9.922        | 25/64"         | 49       | 103      | 61       | 40       | 10           | ○     |
| D106-05-10000A1 AP30P1U | 10           |                | 49       | 103      | 61       | 40       | 10           | ●     |
| D106-05-10100A1 AP30P1U | 10.1         |                | 56       | 118      | 71       | 45       | 12           | ●     |
| D106-05-10200A1 AP30P1U | 10.2         |                | 56       | 118      | 71       | 45       | 12           | ●     |
| D106-05-10300A1 AP30P1U | 10.3         |                | 56       | 118      | 71       | 45       | 12           | ●     |
| D106-05-10319A1 AP30P1U | 10.319       | 13/32"         | 56       | 118      | 71       | 45       | 12           | ○     |
| D106-05-10400A1 AP30P1U | 10.4         |                | 56       | 118      | 71       | 45       | 12           | ○     |
| D106-05-10500A1 AP30P1U | 10.5         |                | 56       | 118      | 71       | 45       | 12           | ●     |
| D106-05-10600A1 AP30P1U | 10.6         |                | 56       | 118      | 71       | 45       | 12           | ●     |
| D106-05-10700A1 AP30P1U | 10.7         |                | 56       | 118      | 71       | 45       | 12           | ○     |
| D106-05-10716A1 AP30P1U | 10.716       | 27/64"         | 56       | 118      | 71       | 45       | 12           | ○     |
| D106-05-10800A1 AP30P1U | 10.8         |                | 56       | 118      | 71       | 45       | 12           | ●     |
| D106-05-10900A1 AP30P1U | 10.9         |                | 56       | 118      | 71       | 45       | 12           | ○     |
| D106-05-11000A1 AP30P1U | 11           |                | 56       | 118      | 71       | 45       | 12           | ●     |
| D106-05-11100A1 AP30P1U | 11.1         |                | 56       | 118      | 71       | 45       | 12           | ○     |
| D106-05-11113A1 AP30P1U | 11.113       | 7/16"          | 56       | 118      | 71       | 45       | 12           | ○     |
| D106-05-11200A1 AP30P1U | 11.2         |                | 56       | 118      | 71       | 45       | 12           | ○     |
| D106-05-11300A1 AP30P1U | 11.3         |                | 56       | 118      | 71       | 45       | 12           | ○     |
| D106-05-11400A1 AP30P1U | 11.4         |                | 56       | 118      | 71       | 45       | 12           | ○     |
| D106-05-11500A1 AP30P1U | 11.5         |                | 56       | 118      | 71       | 45       | 12           | ○     |
| D106-05-11509A1 AP30P1U | 11.509       | 29/64"         | 56       | 118      | 71       | 45       | 12           | ○     |
| D106-05-11550A1 AP30P1U | 11.55        |                | 56       | 118      | 71       | 45       | 12           | ○     |
| D106-05-11600A1 AP30P1U | 11.6         |                | 56       | 118      | 71       | 45       | 12           | ○     |
| D106-05-11700A1 AP30P1U | 11.7         |                | 56       | 118      | 71       | 45       | 12           | ○     |
| D106-05-11800A1 AP30P1U | 11.8         |                | 56       | 118      | 71       | 45       | 12           | ●     |
| D106-05-11900A1 AP30P1U | 11.9         |                | 56       | 118      | 71       | 45       | 12           | ○     |
| D106-05-11906A1 AP30P1U | 11.906       | 15/32"         | 56       | 118      | 71       | 45       | 12           | ○     |
| D106-05-12000A1 AP30P1U | 12           |                | 56       | 118      | 71       | 45       | 12           | ●     |
| D106-05-12100A1 AP30P1U | 12.1         |                | 60       | 124      | 77       | 45       | 14           | ○     |
| D106-05-12200A1 AP30P1U | 12.2         |                | 60       | 124      | 77       | 45       | 14           | ○     |
| D106-05-12250A1 AP30P1U | 12.25        |                | 60       | 124      | 77       | 45       | 14           | ○     |

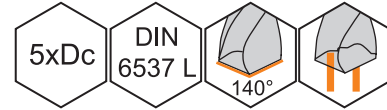
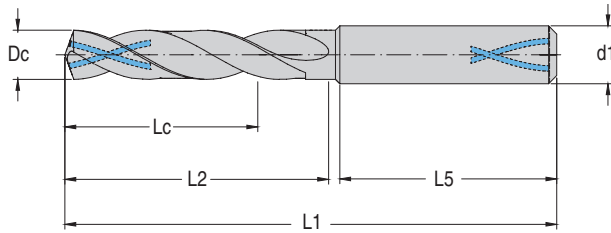
Marked: ● Stock available ○ Non-stocked standard

Solid Carbide Drill



Solid Carbide Drill D106 with Internal Coolant - 5xDc

|    |   |   |    |   |    |   |
|----|---|---|----|---|----|---|
| P  | M | S | K  | H | N  | O |
| •• | • | • | •• | • | •• | • |







| Product code            | Dc(m7)<br>mm | Dc<br>inch/No. | Lc<br>mm | L1<br>mm | L2<br>mm | L5<br>mm | d1(h6)<br>mm | stock |
|-------------------------|--------------|----------------|----------|----------|----------|----------|--------------|-------|
| D106-05-12300A1 AP30P1U | 12.3         |                | 60       | 124      | 77       | 45       | 14           | ○     |
| D106-05-12303A1 AP30P1U | 12.303       | 31/64"         | 60       | 124      | 77       | 45       | 14           | ○     |
| D106-05-12400A1 AP30P1U | 12.4         |                | 60       | 124      | 77       | 45       | 14           | ○     |
| D106-05-12500A1 AP30P1U | 12.5         |                | 60       | 124      | 77       | 45       | 14           | ●     |
| D106-05-12600A1 AP30P1U | 12.6         |                | 60       | 124      | 77       | 45       | 14           | ○     |
| D106-05-12700A1 AP30P1U | 12.7         | 1/2"           | 60       | 124      | 77       | 45       | 14           | ○     |
| D106-05-12750A1 AP30P1U | 12.75        |                | 60       | 124      | 77       | 45       | 14           | ○     |
| D106-05-12800A1 AP30P1U | 12.8         |                | 60       | 124      | 77       | 45       | 14           | ○     |
| D106-05-12900A1 AP30P1U | 12.9         |                | 60       | 124      | 77       | 45       | 14           | ○     |
| D106-05-13000A1 AP30P1U | 13           |                | 60       | 124      | 77       | 45       | 14           | ●     |
| D106-05-13100A1 AP30P1U | 13.1         |                | 60       | 124      | 77       | 45       | 14           | ○     |
| D106-05-13200A1 AP30P1U | 13.2         |                | 60       | 124      | 77       | 45       | 14           | ●     |
| D106-05-13300A1 AP30P1U | 13.3         |                | 60       | 124      | 77       | 45       | 14           | ○     |
| D106-05-13400A1 AP30P1U | 13.4         |                | 60       | 124      | 77       | 45       | 14           | ○     |
| D106-05-13494A1 AP30P1U | 13.494       | 17/32"         | 60       | 124      | 77       | 45       | 14           | ○     |
| D106-05-13500A1 AP30P1U | 13.5         |                | 60       | 124      | 77       | 45       | 14           | ○     |
| D106-05-13600A1 AP30P1U | 13.6         |                | 60       | 124      | 77       | 45       | 14           | ○     |
| D106-05-13700A1 AP30P1U | 13.7         |                | 60       | 124      | 77       | 45       | 14           | ●     |
| D106-05-13800A1 AP30P1U | 13.8         |                | 60       | 124      | 77       | 45       | 14           | ○     |
| D106-05-13900A1 AP30P1U | 13.9         |                | 60       | 124      | 77       | 45       | 14           | ○     |
| D106-05-14000A1 AP30P1U | 14           |                | 60       | 124      | 77       | 45       | 14           | ●     |
| D106-05-14100A1 AP30P1U | 14.1         |                | 63       | 133      | 83       | 48       | 16           | ●     |
| D106-05-14200A1 AP30P1U | 14.2         |                | 63       | 133      | 83       | 48       | 16           | ●     |
| D106-05-14288A1 AP30P1U | 14.288       | 9/16"          | 63       | 133      | 83       | 48       | 16           | ○     |
| D106-05-14300A1 AP30P1U | 14.3         |                | 63       | 133      | 83       | 48       | 16           | ○     |
| D106-05-14400A1 AP30P1U | 14.4         |                | 63       | 133      | 83       | 48       | 16           | ○     |
| D106-05-14500A1 AP30P1U | 14.5         |                | 63       | 133      | 83       | 48       | 16           | ●     |
| D106-05-14600A1 AP30P1U | 14.6         |                | 63       | 133      | 83       | 48       | 16           | ●     |
| D106-05-14700A1 AP30P1U | 14.7         |                | 63       | 133      | 83       | 48       | 16           | ●     |
| D106-05-14750A1 AP30P1U | 14.75        |                | 63       | 133      | 83       | 48       | 16           | ○     |
| D106-05-14800A1 AP30P1U | 14.8         |                | 63       | 133      | 83       | 48       | 16           | ○     |
| D106-05-15000A1 AP30P1U | 15           |                | 63       | 133      | 83       | 48       | 16           | ●     |
| D106-05-15100A1 AP30P1U | 15.1         |                | 63       | 133      | 83       | 48       | 16           | ○     |
| D106-05-15200A1 AP30P1U | 15.2         |                | 63       | 133      | 83       | 48       | 16           | ○     |
| D106-05-15300A1 AP30P1U | 15.3         |                | 63       | 133      | 83       | 48       | 16           | ○     |
| D106-05-15500A1 AP30P1U | 15.5         |                | 63       | 133      | 83       | 48       | 16           | ●     |
| D106-05-15600A1 AP30P1U | 15.6         |                | 63       | 133      | 83       | 48       | 16           | ○     |
| D106-05-15700A1 AP30P1U | 15.7         |                | 63       | 133      | 83       | 48       | 16           | ●     |
| D106-05-15800A1 AP30P1U | 15.8         |                | 63       | 133      | 83       | 48       | 16           | ●     |
| D106-05-15875A1 AP30P1U | 15.875       | 5/8"           | 63       | 133      | 83       | 48       | 16           | ○     |
| D106-05-15900A1 AP30P1U | 15.9         |                | 63       | 133      | 83       | 48       | 16           | ○     |
| D106-05-16000A1 AP30P1U | 16           |                | 63       | 133      | 83       | 48       | 16           | ●     |

Marked: ● Stock available ○ Non-stocked standard

**Cutting Data for D106 Solid Carbide Drill Family**


The specified cutting data are average recommended values. For special applications, adjustment is recommended.


| Vc=Cutting speed (m/min)<br>Feed code = feed reference table see page 306 |  |   |                       | Drilling depth        |  | 3xDc             |           |   |           | 5xDc  |           |   |           |   |  |
|---|--|---|-----------------------|-----------------------|--|------------------|-----------|---|-----------|---|-----------|---|-----------|---|--|
|   |  |   |                       |                       |  |                  |           |  |           |  |           |  |           |  |  |
|   |  |   |                       | Product family        |  |                  |           | D106  |           | D106  |           | D106  |           | D106  |  |
|   |  |   |                       | Dia. Range(mm)        |  |                  |           | 3.00-16.00  |           | 3.00-16.00  |           | 3.00-16.00  |           | 3.00-16.00  |  |
| Coolant   |  |   |                       | External coolant      |  | Internal coolant |           | External coolant  |           | Internal coolant  |           |   |           |   |  |
| Workpiece material  |  |   |                       | Brinell hardness (HB) | Tensile strength Rm (N/mm <sup>2</sup> ) | Vc               | Feed code | Vc  | Feed code | Vc  | Feed code | Vc  | Feed code |   |  |
| <b>P</b>  | Unalloyed steel                                | C≤0.25%                                 | Annealed              | 125                   | 428                                      | 80-100           | F         | 90-115  | F         | 80-100  | F         | 90-115  | F         |   |  |
|   |  | 0.25 < C≤0.55%                          | Annealed              | 190                   | 639                                      | 70-90            | E         | 80-100  | E         | 70-90   | E         | 80-100  | E         |   |  |
|   |  | 0.25 < C≤0.55%                          | Heat-treated          | 210                   | 708                                      | 70-90            | E         | 80-100  | E         | 70-90   | E         | 80-100  | E         |   |  |
|   |  | C > 0.55%                               | Annealed              | 190                   | 639                                      | 70-90            | E         | 80-100  | E         | 70-90   | E         | 80-100  | E         |   |  |
|   |  | C > 0.55%                               | Heat-treated          | 300                   | 1013                                     | 50-70            | D         | 50-70   | D         | 50-70   | D         | 50-70   | D         |   |  |
|   |  | Free cutting steel (short-chipping)     | Annealed              | 220                   | 745                                      | 80-100           | F         | 90-115  | F         | 80-100  | F         | 90-115  | F         |   |  |
|   | Low-alloyed steel                              | Annealed                                |                       | 175                   | 591                                      | 70-100           | E         | 80-110  | E         | 70-100  | E         | 80-110  | E         |   |  |
|   |  | Heat-treated                            |                       | 300                   | 1013                                     | 50-70            | D         | 60-70   | D         | 50-70   | D         | 60-70   | D         |   |  |
|   |  | Heat-treated                            |                       | 380                   | 1282                                     | 35-45            | C         | 40-50   | C         | 35-45   | C         | 40-50   | C         |   |  |
|   |  | Heat-treated                            |                       | 430                   | 1477                                     | 30-40            | B         | 30-40   | B         | 30-40   | B         | 30-40   | B         |   |  |
|   | High-alloyed steel and high-alloyed tool steel | Annealed                                |                       | 200                   | 675                                      | 55-65            | D         | 60-80   | D         | 55-65   | D         | 60-80   | D         |   |  |
|   |  | Hardened and tempered                   |                       | 300                   | 1013                                     | 40-50            | C         | 40-60   | C         | 40-50   | C         | 40-60   | C         |   |  |
|   |  | Hardened and tempered                   |                       | 400                   | 1361                                     | 30-40            | C         | 45-50   | C         | 30-40   | C         | 45-50   | C         |   |  |
|   | Stainless steel                                | Ferritic/martensitic, annealed          |                       | 200                   | 675                                      | 50-70            | D         | 60-80   | D         | 50-70   | D         | 60-80   | D         |   |  |
|   |  | Martensitic, heat-treated               |                       | 330                   | 1114                                     | 40-50            | C         | 40-50   | C         | 40-50   | C         | 40-50   | C         |   |  |
| <b>M</b>  | Stainless steel                                | Austenitic, quench hardened             |                       | 200                   | 675                                      |                  |           | 40-50   | C         |   |           | 40-50   | C         |   |  |
|   |  | Austenitic, precipitation hardened (PH) |                       | 300                   | 1013                                     | 35-45            | C         | 40-50   | C         | 35-45   | C         | 40-50   | C         |   |  |
|   |  | Austenitic/ferritic, duplex             |                       | 230                   | 778                                      |                  |           | 25-35   | B         |   |           | 25-35   | B         |   |  |
| <b>K</b>  | Malleable cast iron                            | Ferritic                                |                       | 200                   | 400                                      | 70-90            | G         | 70-90   | G         | 70-90   | G         | 70-90   | G         |   |  |
|   |  | Pearlitic                               |                       | 260                   | 700                                      | 60-80            | G         | 60-80   | G         | 60-80   | G         | 60-80   | G         |   |  |
|   | Grey cast iron                                 | Low tensile strength                    |                       | 180                   | 200                                      | 80-100           | H         | 80-110  | H         | 80-100  | H         | 80-110  | H         |   |  |
|   |  | High tensile strength/austenitic        |                       | 245                   | 350                                      | 70-90            | G         | 70-90   | G         | 70-90   | G         | 70-90   | G         |   |  |
|   | Cast iron with spheroidal graphite             | Ferritic                                |                       | 155                   | 400                                      | 80-100           | G         | 80-110  | H         | 80-100  | G         | 80-110  | H         |   |  |
| Pearlitic   |  | 265                                     | 700                   | 60-80                 | F  | 60-80            | F         | 60-80   | F         | 60-80   | F         |   |           |   |  |
| GGV (CGI)   |  |   |                       | 230                   | 400                                      | 60-80            | F         | 60-80   | F         | 60-80   | F         | 60-80   | F         |   |  |
| <b>N</b>  | Wrought aluminium alloys                       | non-aging                               |                       | 30                    | -  | 200-300          | G         | 300-400   | G         | 200-300   | G         | 300-400   | G         |   |  |
|   |  | aged                                    |                       | 100                   | 340                                      | 200-300          | G         | 300-400   | G         | 200-300   | G         | 300-400   | G         |   |  |
|   | Cast aluminium alloys                          | ≤ 12% Si, non-aging                     |                       | 75                    | 260                                      | 160-220          | H         | 180-240   | H         | 160-220   | H         | 180-240   | H         |   |  |
|   |  | ≤ 12% Si, aged                          |                       | 90                    | 310                                      | 160-200          | H         | 180-200   | H         | 160-200   | H         | 180-200   | H         |   |  |
|   |  | > 12% Si, non-aging                     |                       | 130                   | 450                                      | 130-160          | G         | 140-180   | G         | 130-160   | G         | 140-180   | G         |   |  |
|   | Magnesium alloys                               |   |                       |                       | 70                                       | 250              |           |   |           |   |           |   |           |   |  |
|   | Copper and copper alloys (bronze/brass)        | Unalloyed, electrolytic copper          |                       | 100                   | 340                                      | 120-160          | C         | 140-170   | D         | 120-160   | C         | 140-170   | D         |   |  |
| Brass, bronze, red brass  |  | 90                                      | 310                   | 110-140               | E  | 120-140          | E         | 110-140   | E         | 120-140   | E         |   |           |   |  |
| Cu alloys, short-chip   |  | 110                                     | 380                   | 120-150               | F  | 140-180          | F         | 120-150   | F         | 140-180   | F         |   |           |   |  |
| High tensile, Ampco alloy   |  | 300                                     | 1010                  | 45-60                 | B  | 45-60            | B         | 45-60   | B         | 45-60   | B         |   |           |   |  |
| <b>S</b>  | Heat-resistant alloys                          | Fe-based                                | Annealed              | 200                   | 680                                      |                  |           | 30-40   | B         |   |           | 30-40   | B         |   |  |
|   |  |   | Hardened              | 280                   | 940                                      |                  |           | 20-25   | A         |   |           | 20-25   | A         |   |  |
|   |  | Ni or Co based                          | Annealed              | 250                   | 840                                      |                  |           | 20-30   | B         |   |           | 20-30   | B         |   |  |
|   |  |   | Hardened              | 350                   | 1180                                     |                  |           | 10-15   | A         |   |           | 10-15   | A         |   |  |
|   | Cast   |   | 320                   | 1080                  |  |                  | 15-25     | A   |           |   | 15-25     | A   |           |   |  |
|   | Titanium alloys                                | Pure titanium                           |                       | 200                   | 680                                      | 30-40            | B         | 40-50   | C         | 30-40   | B         | 40-50   | C         |   |  |
| α and β alloys, hardened  |  | 375                                     | 1260                  | 20-30                 | A  | 25-35            | B         | 20-30   | A         | 25-35   | B         |   |           |   |  |
| β alloys  |  | 410                                     | 1400                  |                       |  | 10-15            | A         |   |           | 10-15   | A         |   |           |   |  |
| Tungsten alloys   |  | 1177                                    |                       | 300                   | 1010                                     |                  |           |   |           |   |           |   |           |   |  |
| Molybdenum alloys   |  | 1262                                    |                       | 300                   | 1010                                     |                  |           |   |           |   |           |   |           |   |  |
| <b>H</b>  | Hardened steel                                 | Hardened and tempered                   |                       | 50HRC                 | -  | 20-35            | A         | 20-35   | A         | 20-35   | A         | 20-35   | A         |   |  |
|   |  | Hardened and tempered                   |                       | 55HRC                 | -  |                  |           |   |           |   |           |   |           |   |  |
|   |  | Hardened and tempered                   |                       | 60HRC                 | -  |                  |           |   |           |   |           |   |           |   |  |
|   | Hardened cast iron                             |   | Hardened and tempered |                       | 50HRC                                    | -                |           |   |           |   |           |   |           |   |  |


## Feed Reference Table


|            |      | Feed rate f (mm/rev) |      |      |      |      |      |      |      |
|------------|------|----------------------|------|------|------|------|------|------|------|
| Dia.<br>mm |      | A                    | B    | C    | D    | E    | F    | G    | H    |
|            | 3.0  | 0.03                 | 0.04 | 0.05 | 0.06 | 0.08 | 0.10 | 0.12 | 0.14 |
|            | 4.0  | 0.04                 | 0.05 | 0.06 | 0.08 | 0.10 | 0.12 | 0.14 | 0.16 |
|            | 5.0  | 0.05                 | 0.06 | 0.07 | 0.09 | 0.10 | 0.12 | 0.16 | 0.18 |
|            | 6.0  | 0.05                 | 0.07 | 0.08 | 0.10 | 0.12 | 0.15 | 0.18 | 0.20 |
|            | 8.0  | 0.06                 | 0.08 | 0.10 | 0.12 | 0.15 | 0.18 | 0.20 | 0.23 |
|            | 10.0 | 0.08                 | 0.10 | 0.12 | 0.14 | 0.18 | 0.20 | 0.24 | 0.28 |
|            | 12.0 | 0.10                 | 0.12 | 0.14 | 0.18 | 0.20 | 0.24 | 0.28 | 0.32 |
|            | 14.0 | 0.10                 | 0.14 | 0.18 | 0.20 | 0.24 | 0.28 | 0.32 | 0.34 |
|            | 16.0 | 0.12                 | 0.15 | 0.18 | 0.20 | 0.25 | 0.30 | 0.34 | 0.36 |
| 20.0       | 0.15 | 0.16                 | 0.20 | 0.25 | 0.30 | 0.34 | 0.37 | 0.40 |      |

**Thread Pilot Hole Diameters-Tapping**

| <b>M</b>   |          |                  |   |
|--|----------|------------------|---|
| Metric coarse pitch thread<br>DIN 13 and DIN ISO 965-1 |          |                  |   |
| D  | D1       |                  |  |
| Diameter   | Min (mm) | Max(mm)<br>5H/6H | Diameter  |
| M4   | 3.242    | 3.422            | 3.30  |
| M4.5   | 3.688    | 3.878            | 3.70  |
| M5   | 4.134    | 4.334            | 4.20  |
| M6   | 4.917    | 5.153            | 5.00  |
| M7   | 5.917    | 6.153            | 6.00  |
| M8   | 6.647    | 6.912            | 6.80  |
| M9   | 7.647    | 7.912            | 7.80  |
| M10  | 8.376    | 8.676            | 8.50  |
| M11  | 9.376    | 9.676            | 9.50  |
| M12  | 10.106   | 10.441           | 10.20   |
| M14  | 11.835   | 12.210           | 12.00   |
| M16  | 13.835   | 14.210           | 14.00   |
| M18  | 15.294   | 15.744           | 15.50   |
| M20  | 17.294   | 17.744           | 17.50   |
| M22  | 19.294   | 19.744           | 19.50   |


| <b>UNC</b>                          |                   |               |   |
|-------------------------------------|-------------------|---------------|---|
| Coarse thread<br>ASME B1.1 standard |                   |               |   |
| D                                   | D1                |               |  |
| Diameter<br>P Gg/1"                 | Min (mm)<br>2B/3B | Max(mm)<br>2B | Diameter  |
| 8-32 UNC                            | 3.302             | 3.531         | 3.50  |
| 10-24 UNC                           | 3.683             | 3.962         | 3.90  |
| 12-24 UNC                           | 4.343             | 4.597         | 4.50  |
| 1/4-20 UNC                          | 4.976             | 5.268         | 5.10  |
| 5/16-18 UNC                         | 6.411             | 6.734         | 6.60  |
| 3/8-16 UNC                          | 7.805             | 8.164         | 8.00  |
| 7/16-14 UNC                         | 9.149             | 9.550         | 9.40  |
| 1/2-13 UNC                          | 10.584            | 11.013        | 10.28   |
| 9/16-12 UNC                         | 11.996            | 12.456        | 12.20   |
| 5/8-11 UNC                          | 13.376            | 13.868        | 13.50   |
| 3/4-10 UNC                          | 16.299            | 16.833        | 16.50   |
| 7/8-9 UNC                           | 19.169            | 19.748        | 19.50   |


| <b>UNF</b>                        |                   |           |   |
|-----------------------------------|-------------------|-----------|---|
| Fine thread<br>ASME B1.1 standard |                   |           |   |
| D                                 | D1                |           |  |
| Diameter<br>P Gg/1"               | Min (mm)<br>2B/3B | Max(mm)2B | Diameter  |
| 8-36 UNF                          | 3.404             | 3.607     | 3.50  |
| 10-32 UNF                         | 3.962             | 4.166     | 4.10  |
| 12-28 UNF                         | 4.496             | 4.724     | 4.60  |
| 1/4-28 UNF                        | 5.367             | 5.580     | 5.50  |
| 5/16-24 UNF                       | 6.792             | 7.038     | 6.90  |
| 3/8-24 UNF                        | 8.379             | 8.626     | 8.50  |
| 7/16-20 UNF                       | 9.738             | 10.030    | 9.90  |
| 1/2-20 UNF                        | 11.326            | 11.618    | 11.50   |
| 9/16-18 UNF                       | 12.761            | 13.084    | 12.90   |
| 5/8-18 UNF                        | 14.348            | 14.671    | 14.50   |
| 3/4-16 UNF                        | 17.330            | 17.689    | 17.50   |


| <b>MF</b>  |                 |   |
|--|-----------------|---|
| Metric fine pitch thread<br>DIN 13 and DIN ISO 965-1 |                 |   |
| D  | D1              |  |
| Diameter*P   | Max mm<br>5H/6H | Diameter  |
| M3.5x0.35  | 3.221           | 3.15  |
| M4x0.35  | 3.721           | 3.65  |
| M4x0.5   | 3.599           | 3.50  |
| M4.5x0.5   | 4.099           | 4.00  |
| M5x0.35  | 4.721           | 4.65  |
| M5x0.5   | 4.599           | 4.50  |
| M5x0.75  | 4.378           | 4.20  |
| M5x0.5   | 5.599           | 5.50  |
| M6x0.75  | 5.378           | 5.25  |
| M7x0.5   | 6.599           | 6.50  |
| M7x0.75  | 6.378           | 6.25  |
| M8x0.5   | 7.599           | 7.50  |
| M8x0.75  | 7.378           | 7.25  |
| M8x1   | 7.153           | 7.00  |
| M9x0.75  | 8.378           | 8.25  |
| M9x1   | 8.153           | 8.00  |
| M10x0.5  | 9.599           | 9.50  |
| M10x0.75   | 9.378           | 9.25  |
| M10x1  | 9.153           | 9.00  |
| M10x1.25   | 8.912           | 8.75  |
| M11x1  | 10.153          | 10.00   |
| M12x0.5  | 11.599          | 11.50   |
| M12x1  | 11.153          | 11.00   |
| M12x1.25   | 10.912          | 10.75   |
| M12x1.5  | 10.676          | 10.50   |
| M13x1  | 12.153          | 12.00   |
| M14x0.75   | 13.378          | 13.20   |
| M14x1  | 13.153          | 13.00   |
| M14x1.25   | 12.912          | 12.75   |
| M14x1.5  | 12.676          | 12.50   |
| M15x1  | 14.153          | 14.00   |
| M15x1.5  | 13.676          | 13.50   |
| M16x0.75   | 15.378          | 15.20   |
| M16x1  | 15.153          | 15.00   |
| M16x1.25   | 14.912          | 14.80   |
| M16x1.5  | 14.676          | 14.50   |
| M17x1  | 16.153          | 16.00   |
| M18x1  | 17.153          | 17.00   |
| M18x1.5  | 16.676          | 16.50   |
| M18x2  | 16.21           | 16.00   |
| M20x1  | 19.153          | 19.00   |
| M20x1.5  | 18.676          | 18.50   |
| M20x2  | 18.21           | 18.00   |


Solid Carbide Drill

**Thread Pilot Hole Diameters- Forming**

| <b>M</b> | Metric coarse pitch thread<br>DIN 13 and DIN ISO 965-1                            |
|----------|---|
| D        |  |
| Diameter | Diameter  |
| M3.5     | 3.25  |
| M4       | 3.70  |
| M5       | 4.65  |
| M6       | 5.55  |
| M8       | 7.40  |
| M10      | 9.30  |
| M12      | 11.20   |
| M14      | 13.10   |
| M16      | 15.10   |
| M18      | 16.90   |
| M20      | 18.90   |

| <b>MF</b> | Metric fine pitch thread<br>DIN 13 and DIN ISO 965-1                                |
|-----------|---|
| D         |  |
| Diameter  | Diameter  |
| M4x0.5    | 3.80  |
| M5x0.5    | 4.80  |
| M6x0.5    | 5.80  |
| M6x0.75   | 5.65  |
| M7x0.75   | 6.65  |
| M8x0.75   | 7.65  |
| M8x1      | 7.55  |
| M10x0.75  | 9.65  |
| M10x1     | 9.55  |
| M10x1.25  | 9.40  |
| M12x1     | 11.55   |
| M12x1.25  | 11.40   |
| M12x1.5   | 11.30   |
| M14x1     | 13.55   |
| M14x1.5   | 13.30   |
| M16x1     | 15.55   |
| M16x1.5   | 15.30   |
| M18x1     | 17.55   |
| M18x1.5   | 17.30   |
| M20x1.5   | 19.30   |
| M20x2     | 19.10   |
| M22x1.5   | 21.30   |

| <b>UNC</b>  | Coarse thread<br>ASME B1.1 standard   |
|-------------|---|
| D           |  |
| Diameter    | Diameter  |
| 6-32 UNC    | 3.15  |
| 8-32 UNC    | 3.80  |
| 10-24 UNC   | 4.30  |
| 12-24 UNC   | 5.00  |
| 1/4-20 UNC  | 5.75  |
| 5/16-18 UNC | 7.25  |
| 3/8-16 UNC  | 8.75  |
| 7/16-14 UNC | 10.30   |
| 1/2-13 UNC  | 11.80   |
| 9/16-12 UNC | 13.30   |
| 5/8-11 UNC  | 14.80   |
| 3/4-10 UNC  | 17.90   |

| <b>UNF</b>  | Fine thread<br>ASME B1.1 standard   |
|-------------|---|
| D           |  |
| Diameter    | Diameter  |
| 6-40 UNF    | 3.20  |
| 8-36 UNF    | 3.85  |
| 10-32 UNF   | 4.45  |
| 12-28 UNF   | 5.05  |
| 1/4-28 UNF  | 5.90  |
| 5/16-24 UNF | 7.45  |
| 3/8-24 UNF  | 9.00  |
| 7/16-20 UNF | 10.50   |
| 1/2-20 UNF  | 12.10   |
| 9/16-18 UNF | 13.70   |
| 5/8-18 UNF  | 15.25   |
| 3/4-16 UNF  | 18.40   |



# ACHTTECK

КОРУН  
CORUN [www.co-run.ru](http://www.co-run.ru)



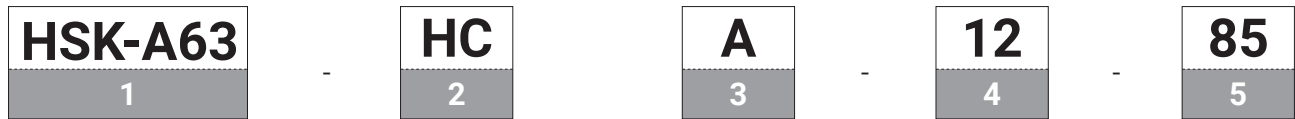
## CUTTING TOOL CATALOGUE

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|                         |            |
|-------------------------|------------|
| Chuck denomination rule | 312        |
| <b>HSK series</b>       | <b>313</b> |
| Side lock chuck         | 313        |
| Milling cutter arbor    | 315        |
| <b>BT series</b>        | <b>317</b> |
| Side lock chuck         | 317        |
| Milling cutter arbor    | 319        |
| Extension               | 322        |
| <b>Accessories</b>      | <b>323</b> |
| HSK coolant tube        | 323        |



**Chuck Denomination Rule**



| 1-Type of spindle                           |
|---|
| HSK-A63<br>HSK-A100<br>BT30<br>BT40<br>BT50 |

| 2-Type of clamping |                           |
|--------------------|---------------------------|
| Code               | Name                      |
| HC                 | Hydraulic Chuck           |
| SF                 | Shrink Fit Chuck          |
| ER                 | ER Collet Chuck           |
| SL                 | Side Lock Chuck           |
| PC                 | Power Mill Chuck          |
| FM                 | Face Milling Cutter Arbor |

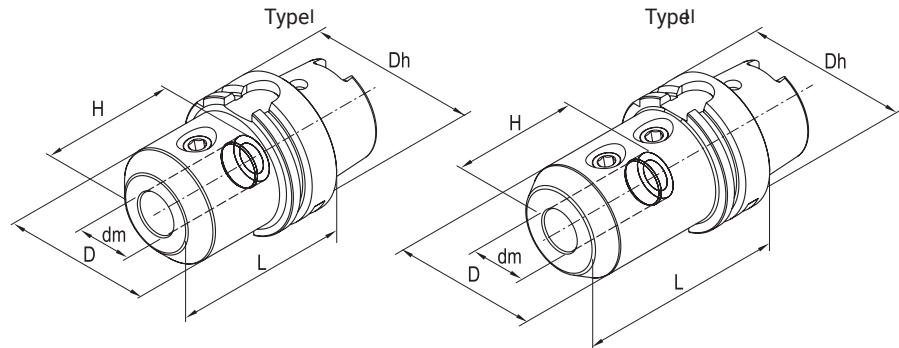
| 3-Distinguishing code                                 |  |
|---|--|
| Shrink Fit Chuck/Hydraulic Chuck/<br>Power Mill Chuck | Without-----Standard<br>L-----Mini<br>H-----Heavy Duty Design  |
| Side Lock Chuck                                       | B-----Weldon Type<br>E-----Whistle Notch Type  |
| Face Milling Cutter Arbor                             | A-----Common Clamping Screw<br>B-----Cross Clamping Screw<br>C-----Periphery Clamping Screw<br>D-----For Slot Milling Cutter |
| ER Collet Chuck                                       | Without-----General Type<br>V-----Tapping Type<br>H-----High Speed Type  |

| 4- Clamping diameter |
|----------------------|
| dm=12                |

| 5-Length of chuck |
|-------------------|
| L=85              |

Side Lock Chuck, Weldon Type

DIN69893



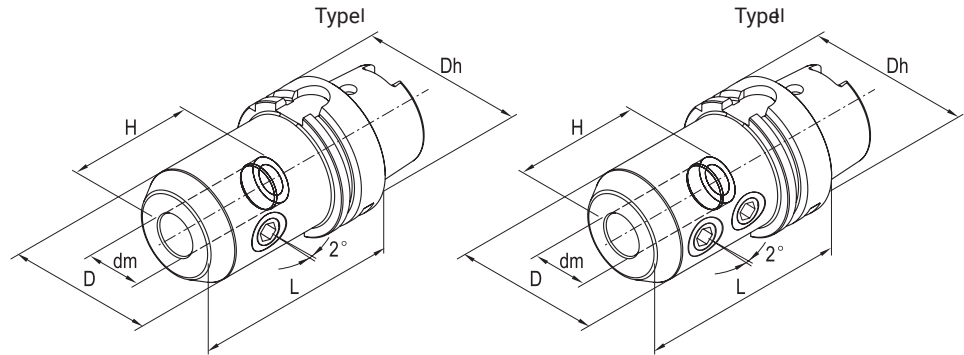
| Product code       | Stock |          | Dimension (mm) |    |    |     |    | Model |
|--------------------|-------|----------|----------------|----|----|-----|----|-------|
|                    |       |          | Dh             | dm | D  | L   | H  |       |
| DIN69893           |       |          |                |    |    |     |    |       |
| HSK-A63-SLB16-80   | ●     | HSK-A63  | 63             | 16 | 48 | 80  | 52 | I     |
| HSK-A63-SLB20-80   | ●     | HSK-A63  | 63             | 20 | 52 | 80  | 54 | I     |
| HSK-A63-SLB25-110  | ●     | HSK-A63  | 63             | 25 | 65 | 110 | 66 | II    |
| HSK-A63-SLB32-110  | ●     | HSK-A63  | 63             | 32 | 72 | 110 | 70 | II    |
| HSK-A100-SLB16-100 | ○     | HSK-A100 | 100            | 16 | 48 | 100 | 52 | I     |
| HSK-A100-SLB20-100 | ●     | HSK-A100 | 100            | 20 | 52 | 100 | 54 | I     |
| HSK-A100-SLB25-100 | ●     | HSK-A100 | 100            | 25 | 65 | 100 | 66 | II    |
| HSK-A100-SLB32-100 | ●     | HSK-A100 | 100            | 32 | 72 | 100 | 66 | II    |
| HSK-A100-SLB40-100 | ●     | HSK-A100 | 100            | 40 | 80 | 100 | 80 | II    |
| HSK-A100-SLB40-160 | ○     | HSK-A100 | 100            | 40 | 80 | 160 | 80 | II    |

● Stock available ○ Produced by order

HSK series

**Side Lock Chuck, Whistle Notch Type**

DIN69893

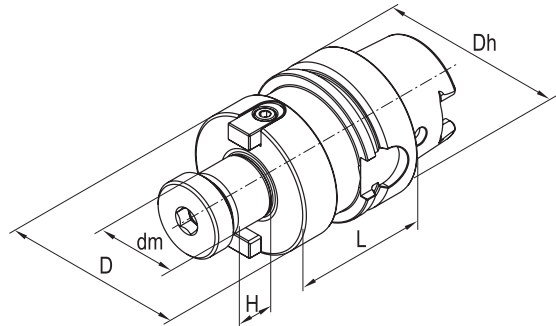


| Product code       | Stock |          | Dimension (mm) |    |    |     |    | Model |
|--------------------|-------|----------|----------------|----|----|-----|----|-------|
|                    |       |          | Dh             | dm | D  | L   | H  |       |
| DIN69893           |       |          |                |    |    |     |    |       |
| HSK-A63-SLE16-100  | ○     | HSK-A63  | 63             | 16 | 48 | 100 | 52 | I     |
| HSK-A63-SLE20-100  | ○     | HSK-A63  | 63             | 20 | 52 | 100 | 54 | I     |
| HSK-A63-SLE25-110  | ○     | HSK-A63  | 63             | 25 | 65 | 110 | 59 | II    |
| HSK-A63-SLE32-110  | ○     | HSK-A63  | 63             | 32 | 72 | 110 | 63 | II    |
| HSK-A100-SLE16-100 | ○     | HSK-A100 | 100            | 16 | 48 | 100 | 52 | I     |
| HSK-A100-SLE20-110 | ○     | HSK-A100 | 100            | 20 | 52 | 110 | 54 | I     |
| HSK-A100-SLE25-120 | ○     | HSK-A100 | 100            | 25 | 65 | 120 | 59 | II    |
| HSK-A100-SLE32-120 | ○     | HSK-A100 | 100            | 32 | 72 | 120 | 63 | II    |

● Stock available ○ Produced by order

## Face Milling Cutter Arbor

DIN69893

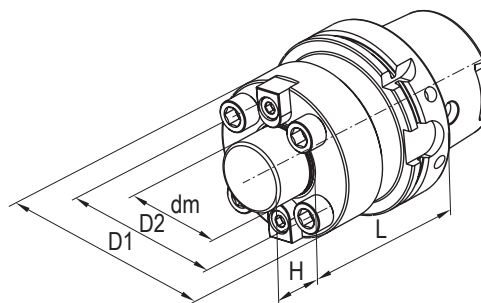


| Product code      | Stock |          | Dimension (mm) |    |    |     |    |
|-------------------|-------|----------|----------------|----|----|-----|----|
|                   |       |          | Dh             | dm | D  | L   | H  |
| DIN69893          |       |          |                |    |    |     |    |
| HSK-A63-FMA16-60  | ●     | HSK-A63  | 63             | 16 | 35 | 60  | 17 |
| -100              | ○     | HSK-A63  | 63             | 16 | 35 | 100 | 17 |
| HSK-A63-FMA22-60  | ●     | HSK-A63  | 63             | 22 | 48 | 60  | 19 |
| -100              | ○     | HSK-A63  | 63             | 22 | 48 | 100 | 19 |
| HSK-A63-FMA27-60  | ●     | HSK-A63  | 63             | 27 | 60 | 60  | 21 |
| -100              | ○     | HSK-A63  | 63             | 27 | 60 | 100 | 21 |
| HSK-A63-FMB32-60  | ●     | HSK-A63  | 63             | 32 | 78 | 60  | 24 |
| -100              | ○     | HSK-A63  | 63             | 32 | 78 | 100 | 24 |
| HSK-A63-FMB40-60  | ●     | HSK-A63  | 63             | 40 | 89 | 60  | 27 |
| HSK-A100-FMA22-60 | ●     | HSK-A100 | 100            | 22 | 48 | 60  | 19 |
| -100              | ○     | HSK-A100 | 100            | 22 | 48 | 100 | 19 |
| HSK-A100-FMA27-60 | ●     | HSK-A100 | 100            | 27 | 60 | 60  | 21 |
| -100              | ○     | HSK-A100 | 100            | 27 | 60 | 100 | 21 |
| HSK-A100-FMB32-60 | ●     | HSK-A100 | 100            | 32 | 78 | 60  | 24 |
| -100              | ○     | HSK-A100 | 100            | 32 | 78 | 100 | 24 |
| HSK-A100-FMB40-60 | ●     | HSK-A100 | 100            | 40 | 89 | 60  | 27 |
| -100              | ○     | HSK-A100 | 100            | 40 | 89 | 100 | 27 |

● Stock available ○ Produced by order

**Face Milling Cutter Arbor**

DIN69893

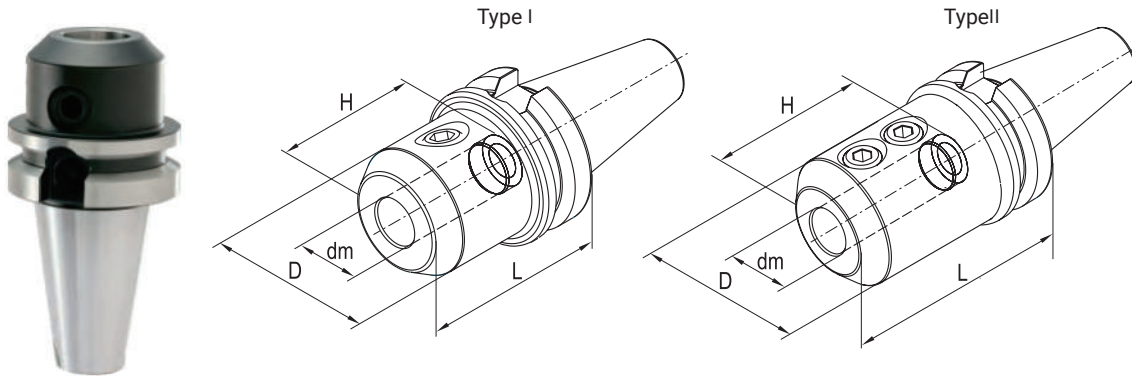


| Product code      | Stock |          | Dimension (mm) |     |       |    |    |
|-------------------|-------|----------|----------------|-----|-------|----|----|
|                   |       |          | dm             | D1  | D2    | L  | H  |
| DIN69893          |       |          |                |     |       |    |    |
| HSK-A100-FMC40-60 | ○     | HSK-A100 | 40             | 108 | 66.7  | 60 | 27 |
| HSK-A100-FMC60-75 | ○     | HSK-A100 | 60             | 129 | 101.6 | 75 | 38 |

● Stock available ○ Produced by order

**Side Lock Chuck, Weldon Type**

JIS B6339



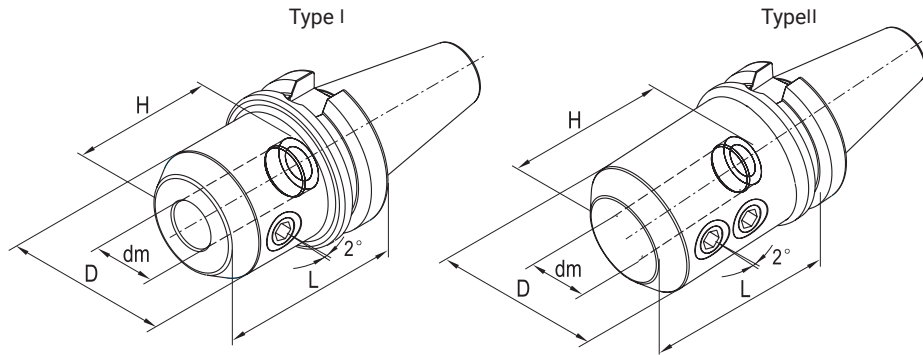
| Product code   | Stock |    | Dimension (mm) |    |     |    | Model |
|----------------|-------|----|----------------|----|-----|----|-------|
|                |       |    | dm             | D  | L   | H  |       |
| JIS B6339-AD   |       |    |                |    |     |    |       |
| BT40-SLB16-90  | ●     | 40 | 16             | 48 | 90  | 52 | I     |
| BT40-SLB20-100 | ●     | 40 | 20             | 52 | 100 | 54 | I     |
| BT40-SLB25-100 | ●     | 40 | 25             | 65 | 100 | 66 | II    |
| BT40-SLB32-100 | ●     | 40 | 32             | 72 | 100 | 70 | II    |
| BT50-SLB16-80  | ●     | 50 | 16             | 48 | 80  | 52 | I     |
| BT50-SLB20-100 | ●     | 50 | 20             | 52 | 100 | 54 | I     |
| BT50-SLB25-100 | ●     | 50 | 25             | 65 | 100 | 66 | II    |
| BT50-SLB32-100 | ●     | 50 | 32             | 74 | 100 | 70 | II    |
| BT50-SLB40-115 | ●     | 50 | 40             | 80 | 115 | 80 | II    |

● Stock available ○ Produced by order

BT series

**Side Lock Chuck, Whistle Notch Type**

JIS B6339

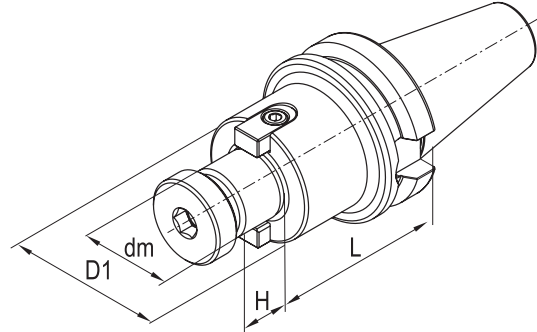


| Product code   | Stock |    | Dimension (mm) |    |     |    | Model |
|----------------|-------|----|----------------|----|-----|----|-------|
|                |       |    | dm             | D  | L   | H  |       |
| JIS B6339-AD   |       |    |                |    |     |    |       |
| BT40-SLE16-63  | ○     | 40 | 16             | 48 | 63  | 52 | I     |
| BT40-SLE20-63  | ●     | 40 | 20             | 52 | 63  | 54 | I     |
| BT40-SLE25-100 | ●     | 40 | 25             | 65 | 100 | 59 | II    |
| BT40-SLE32-100 | ●     | 40 | 32             | 72 | 100 | 63 | II    |
| BT50-SLE16-80  | ○     | 50 | 16             | 48 | 80  | 52 | I     |
| BT50-SLE20-80  | ●     | 50 | 20             | 52 | 80  | 54 | I     |
| BT50-SLE25-100 | ●     | 50 | 25             | 65 | 100 | 59 | II    |
| BT50-SLE32-100 | ●     | 50 | 32             | 72 | 100 | 63 | II    |

● Stock available ○ Produced by order

Face Milling Cutter Arbor

JIS B6339



| Product code  | Stock |    | Dimension (mm) |    |     |    |
|---------------|-------|----|----------------|----|-----|----|
|               |       |    | dm             | D1 | L   | H  |
| JIS B6339-A   |       |    |                |    |     |    |
| BT40-FMA16-60 | ●     | 40 | 16             | 35 | 60  | 17 |
| -100          | ○     | 40 | 16             | 35 | 100 | 17 |
| -150          | ○     | 40 | 16             | 35 | 150 | 17 |
| BT40-FMA22-60 | ●     | 40 | 22             | 48 | 60  | 19 |
| -100          | ●     | 40 | 22             | 48 | 100 | 19 |
| -150          | ●     | 40 | 22             | 48 | 150 | 19 |
| BT40-FMA27-60 | ●     | 40 | 27             | 60 | 60  | 21 |
| -100          | ○     | 40 | 27             | 60 | 100 | 21 |
| -150          | ○     | 40 | 27             | 60 | 150 | 21 |
| BT40-FMB32-60 | ●     | 40 | 32             | 78 | 60  | 24 |
| BT40-FMB40-60 | ●     | 40 | 40             | 89 | 60  | 27 |

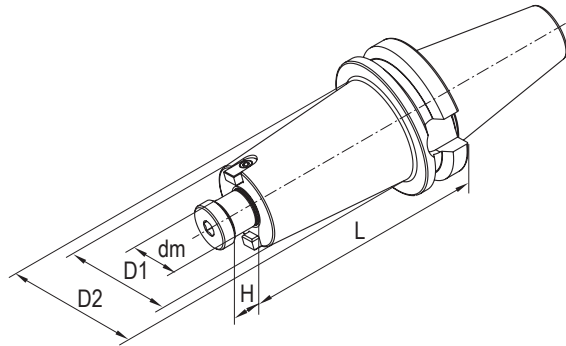
● Stock available ○ Produced by order

BT series



**Face Milling Cutter Arbor**

**JIS B6339**

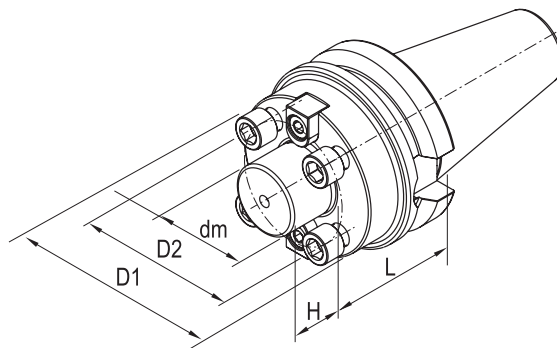


| Product code  | Stock |    | Dimension (mm) |    |    |     |    |
|---------------|-------|----|----------------|----|----|-----|----|
|               |       |    | dm             | D1 | D2 | L   | H  |
| JIS B6339-A   |       |    |                |    |    |     |    |
| BT50-FMA22-60 | ●     | 50 | 22             | 48 | -  | 60  | 19 |
| -100          | ●     | 50 | 22             | 48 | -  | 100 | 19 |
| -150          | ●     | 50 | 22             | 48 | 60 | 150 | 19 |
| -200          | ●     | 50 | 22             | 48 | 60 | 200 | 19 |
| -250          | ○     | 50 | 22             | 48 | 60 | 250 | 19 |
| BT50-FMA27-60 | ●     | 50 | 27             | 60 | -  | 60  | 21 |
| -100          | ●     | 50 | 27             | 60 | -  | 100 | 21 |
| -150          | ●     | 50 | 27             | 60 | 75 | 150 | 21 |
| -200          | ○     | 50 | 27             | 60 | 75 | 200 | 21 |
| -250          | ○     | 50 | 27             | 60 | 75 | 250 | 21 |
| BT50-FMB32-60 | ●     | 50 | 32             | 78 | -  | 60  | 24 |
| -100          | ○     | 50 | 32             | 78 | -  | 100 | 24 |
| -150          | ○     | 50 | 32             | 78 | -  | 150 | 24 |
| BT50-FMB40-60 | ●     | 50 | 40             | 89 | -  | 60  | 27 |
| -100          | ○     | 50 | 40             | 89 | -  | 100 | 27 |

● Stock available ○ Produced by order

Face Milling Cutter Arbor

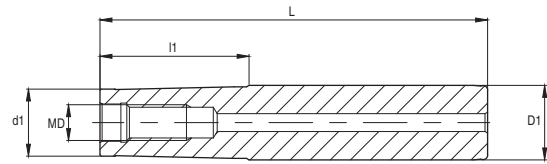
JIS B6339



| Product code  | Stock |    | Dimension (mm) |     |       |    |    |
|---------------|-------|----|----------------|-----|-------|----|----|
|               |       |    | dm             | D1  | D2    | L  | H  |
| JIS B6339-A   |       |    |                |     |       |    |    |
| BT50-FMC40-60 | ●     | 50 | 40             | 108 | 66.7  | 60 | 27 |
| BT50-FMC60-75 | ●     | 50 | 40             | 129 | 101.6 | 75 | 38 |

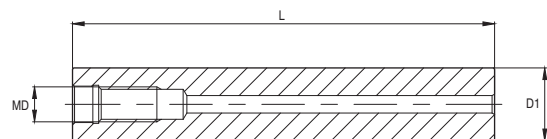
● Stock available ○ Produced by order

Head Taper Shank



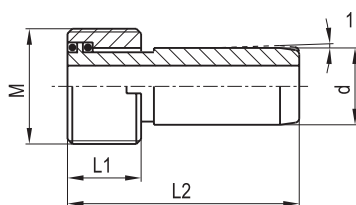
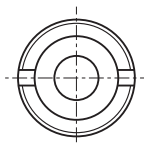
| Product code        | Dimension (mm) |    |      |     |     | Coolant | Material |
|---------------------|----------------|----|------|-----|-----|---------|----------|
|                     | MD             | D1 | d1   | L   | l1  |         |          |
| AMS-M08-020-080-16T | M8             | 16 | 14.5 | 80  | 20  |         | steel    |
| AMS-M08-040-100-16T | M8             | 16 | 14.5 | 100 | 40  |         | steel    |
| AMC-M08-080-150-16T | M8             | 16 | 14.5 | 150 | 80  |         | carbide  |
| AMC-M08-150-200-16T | M8             | 16 | 14.5 | 200 | 150 |         | carbide  |
| AMS-M10-030-100-20T | M10            | 20 | 18   | 100 | 30  |         | steel    |
| AMS-M10-050-120-20T | M10            | 20 | 18   | 120 | 50  |         | steel    |
| AMC-M10-090-150-20T | M10            | 20 | 18   | 150 | 90  |         | carbide  |
| AMC-M10-140-200-20T | M10            | 20 | 18   | 200 | 140 |         | carbide  |
| AMS-M12-030-110-25T | M12            | 25 | 22.5 | 110 | 30  |         | steel    |
| AMS-M12-050-130-25T | M12            | 25 | 22.5 | 130 | 50  |         | steel    |
| AMC-M12-120-180-25T | M12            | 25 | 22.5 | 180 | 120 |         | carbide  |
| AMC-M12-140-250-25T | M12            | 25 | 22.5 | 250 | 140 |         | carbide  |
| AMS-M16-035-125-32T | M16            | 32 | 28.5 | 125 | 35  |         | steel    |
| AMS-M16-055-145-32T | M16            | 32 | 28.5 | 145 | 55  |         | steel    |
| AMC-M16-120-200-32T | M16            | 32 | 28.5 | 200 | 120 |         | carbide  |
| AMC-M16-180-260-32T | M16            | 32 | 28.5 | 260 | 180 |         | carbide  |

Straight Shank



| Product code    | Dimension (mm) |    |     | Coolant | Material |
|-----------------|----------------|----|-----|---------|----------|
|                 | MD             | D1 | L   |         |          |
| AMC-M08-105-16S | M8             | 16 | 105 |         | carbide  |
| AMC-M08-160-16S | M8             | 16 | 160 |         | carbide  |
| AMC-M10-130-20S | M10            | 20 | 130 |         | carbide  |
| AMC-M10-250-20S | M10            | 20 | 250 |         | carbide  |
| AMC-M12-145-25S | M12            | 25 | 145 |         | carbide  |
| AMC-M12-285-25S | M12            | 25 | 285 |         | carbide  |
| AMC-M16-157-32S | M16            | 32 | 157 |         | carbide  |
| AMC-M16-287-32S | M16            | 32 | 287 |         | carbide  |

**HSK Coolant Tube**



| Product code | Stock |         | Dimension (mm) |    |      |      |
|--------------|-------|---------|----------------|----|------|------|
|              |       |         | M              | d  | L1   | L2   |
| CT-HSK63     | ●     | HSK-63  | M18×1          | 12 | 11.5 | 36.6 |
| CT-HSK100    | ●     | HSK-100 | M24×1.5        | 16 | 15.5 | 44.2 |

● Stock available ○ Produced by order

# ACHTECK

КОРУН  
CORUN [www.co-run.ru](http://www.co-run.ru)



## CUTTING TOOL CATALOGUE

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**Grade Conversion Table**

Turning

| ISO classification | Material classification | ACHTECK          | COROMANT                     | ISCAR            | KENAMETAL                    | KORLOY            | KYOCERA   | MITSUBISHI                             | SECO                          | SUMITOMO                     | TAEGUTEK          | TUNGALOY                                      | WALTER                      | ZCC                                     |
|--------------------|-------------------------|------------------|------------------------------|------------------|------------------------------|-------------------|---|--|-------------------------------|------------------------------|-------------------|---|-----------------------------|---|
| <b>P</b>           | P10                     | AC150P           | GC4315<br>GC4215             | IC8150           | KCP10<br>KC9110              | NC3010<br>NC3015  | CA515<br>CA5515                                   | MC6015<br>UE6110                       | TP1500<br>TP1501              | AC810P<br>AC700G             | TT8115            | T9115<br>T9015                                | WPP10S<br>WPP10             | YBC152<br>YBC151                        |
|                    | P20                     | AC250P           | GC4325<br>GC4225             | IC8250           | KCP25<br>KC9215              | NC3220<br>NC3120  | CA525<br>CA5525                                   | MC6025<br>UE6020                       | TP2500<br>TP2501              | AC8025P<br>AC820P            | TT8125            | T9125<br>T9025                                | WPP20S<br>WPP20             | YBC251<br>YBC252                        |
|                    | P30                     | AC350P           | GC4335<br>GC4235             | IC8350           | KCP30<br>KCP40<br>KC9040     | NC3030<br>NC500H  | CA5535  | MC6035<br>UE6035                       | TP3500                        | AC830P                       | TT8135<br>TT8020* | T9135<br>T9035                                | WPP30S<br>WPP30             | YBC351<br>YBC352                        |
| <b>M</b>           | M10                     | AP100S*          | GC2015<br>GC1105*            | IC907*<br>IC807* | KCM15<br>KC5510*<br>KCU10*   | PC8110*           | CA6515<br>PR1305*<br>PR1310*<br>PR1215*           | MC7015<br>US7020<br>VP10RT*<br>MP9005* | TS2000*<br>TH1000*<br>CP200*  | AC610M<br>AC6020M<br>AC510U* | TT9215<br>TT5080* | AH110*<br>AH905*<br>AH8005*                   | WSM10*<br>WSM10S*           | YBM151<br>YBG102*<br>YBG105*            |
|                    | M20                     | AP301M*          | GC2025<br>GC1115*<br>GC15*   | IC908*<br>IC887* | KCM25<br>KC5525*<br>KCU25*   | NC9025<br>PC5300* | CA6525<br>PR930*<br>PR1025*<br>RP1225*<br>PR1325* | MC7025<br>VP15TF*<br>MP9015*           | TM2000<br>CP500*              | AC620M<br>AC6030M<br>AC520U* | TT9225<br>TT9080* | T6120<br>T6020<br>AH120*<br>AH630*<br>AH8015* | WSM20*<br>WSM20S*<br>WMP20S | YBM251<br>YBG202*<br>YBG212*<br>YBG205* |
| <b>K</b>           | K10                     | AC100K           | GC3205<br>GC3005             | IC5005           | KCK05                        | NC6205            | CA4505<br>CA4010                                  | MC5005<br>UC5105                       | TK1001<br>TK1000              | AC405K<br>AC410K             | TT7005            | T505  | WKK10S<br>WAK10             | YBD052                                  |
|                    | K20                     | AC150K<br>ACK15A | GC3210<br>GC3215             | IC5010           | KCK15<br>KC9315              | NC6110            | CA4515<br>CA415                                   | MC5015<br>UC5115                       | TK2001<br>TK2000              | AC415K<br>AC700G             | TT7310<br>TT7015  | T5115<br>T515                                 | WKK20S<br>WAK20             | YBD152C<br>YBD152                       |
| <b>S</b>           | S10                     | AP100S*          | GCS05F<br>GC1105*<br>GC1115* | IC807*<br>IC907* | KCU10*<br>KC5510*<br>KC5010  | PC8110*           | PR1305*<br>PR1310*                                | VP10RT*<br>MP9005*                     | TH1000*<br>TH1500*<br>TS2000* | AC510U*                      | TT5080*           | AH110*<br>AH905*<br>AH8005*                   | WSM10*                      | YBG102*<br>YBG105*                      |
|                    | S20                     | AP301M*          | GC15*<br>GC1115*             | IC808*<br>IC908* | KCU20*<br>KC5525*<br>KC5025* | PC5300*           | PR1025*<br>PR1225*<br>PR1325*                     | VP15TF*<br>MP9015*                     | CP500*                        | AC520U*                      | TT9080*           | AH120*<br>AH8015*                             | WSM20*                      | YBG212*<br>YBG202*<br>YBG205*           |
| <b>N</b>           | N10                     | AW100K           | H10                          | IC20             | K68<br>K313                  | H01               | KW10  | HTI10                                  | KX                            | H1                           | K10               | TH10  | WK1                         | YD101                                   |

\*\*PVD coating grades

### Turning Chip Breaker Conversion Table

#### Negative turning insert

| ISO classification | Application        | ACHTECK        | COROMANT                          | ISCAR   | DURACARB | KENNAMETAL           | KORLOY                  | KYOCERA                      | MITSUBISHI             | SECO                       | SUMITOMO                 | TAEGUTEC                   | TUNGALOY                          | VALENITE   | WALTER                  | ZCC          |                    |
|--------------------|--------------------|----------------|-----------------------------------|---------|----------|----------------------|-------------------------|------------------------------|------------------------|----------------------------|--------------------------|----------------------------|-----------------------------------|------------|-------------------------|--------------|--------------------|
| P                  | Finishing          | PB1            | QF                                | SF, F3P | 41       | FF, FS<br>FP, LF, FN | HU, VL<br>VG, VF, VQ    | DP, GP, PP, VF<br>XF, XP, HQ | FH<br>LP, SH, FY       | FF1, FF2<br>MF2            | FA, FL<br>SU, SE         | FA, FS, FX<br>FG, FM       | TF, 01, ZF<br>NS, 11, TS, AS, TSF | F2         | FP5<br>NF4              | SF<br>NF, DF |                    |
|                    |                    | Semi-finishing | PB3                               | PF, XF  |          | 43                   |                         | VB, VC, HC                   | CQ, PQ, CJ             | SA                         |                          | LU                         | FC, FT                            |            |                         | NS6          | NM                 |
|                    | Medium machining   | PL5            | K                                 |         |          | 52                   | MN                      | HC                           | GS                     | ES                         | UX                       | GX, HM                     | VF, DNUX, FS                      | S          |                         |              |                    |
|                    |                    |                | QM, 23, LC, SM, -NGP, 23, SR, SMR | PP, TF  |          | 42                   | MS, MP, UP, P, -NGP, RP | HA, VP3, VM                  | XQ, XS, A3, AH, MS, MU | MJ, SY, MS, GJ             | MF4, MF5, M5, MR3, MR4   | UP, GX, AG, EG, EX, UP, MU | ML, MP                            | P, HMM, SA | M2                      | MP3          | NMS, NMT, NRS, NRT |
|                    |                    | PC3            | PM, XM, QM                        | M3P, VL | 45       | P                    | VM, HS, GS              | PG, PS                       | MP, MV, MA             | MF3, MF5, M3               | GE, GU                   | PC                         | TM                                | M2         | MP5, NM4                | PM           |                    |
|                    |                    | PD3            | HM, XMR                           | GN      | 46       | MP, RP, RM           | HM, GM                  | HS, CS                       |                        |                            | UX, UG                   | MT                         |                                   | M3         | NM6, NM9                | DM           |                    |
|                    | PC4                |                | MG-                               | 53      | UN       | B25                  | MG-C                    | MG-                          | M4, MR4                | UZ                         | MG-                      | 33, 37, 38, DM, MG-        |                                   | MG-        | MG-                     |              |                    |
|                    | Roughing machining | PD5            | PR                                | NR, R3P |          | RN                   | HR, GR                  | PT, GT, PH, HT               | MH, GH, RP             | M5, MR7, M6                | ME, MU, MX               | RT                         | TH                                | R3         | NR4, RP5                | DR           |                    |
|                    | Heavy machining    | PD8            | PR                                |         |          |                      | RM                      |                              | PX                     |                            |                          |                            | RX                                |            |                         | NRF          |                    |
|                    |                    |                | QR, MR                            | R3P, NM |          |                      | MR, RP                  | GH                           | HX                     | HZ                         | R6, RR9, R4, R5, 37, RR6 | MP, HG, HP                 | RH                                | TRS, 57    | R6                      | NR6          |                    |
|                    |                    | PC9            | HR, 31                            |         |          | RH                   | VT                      |                              | HCS, HX, HBS           | R8, 56, 57, R7             | HF, HU                   | HT, HD                     | 65, TU                            |            | NRR                     | ER, HDR      |                    |
|                    | PD9                |                |                                   |         |          |                      | VH                      |                              | HV, HDS, HXD           |                            | HW                       | HY, HZ                     |                                   |            |                         |              |                    |
| M                  | Finishing          | MB2            | MF                                | SF, F3M | 41       | FP                   | HA, VP2                 | MQ, GU                       | FS, LM                 | MF1                        | SU                       | EA, SF                     | SF                                | F5         | NF4                     | EF           |                    |
|                    | Medium machining   | MC3            | MM                                | M3M     | 42       | MP, UP               | GS, HS                  | MS, MU                       | MS, GM, MA             | MF4                        | EX, UP, GU               | EM                         | SS, S                             |            | NM4                     | EM           |                    |
|                    | Roughing machining | MC4            | MR                                | R3M     | 45       | RP                   | VM                      | HU                           | RM                     | MR6, MF5                   | MU, HM                   | ET                         | SM                                | M5         | NR4, NRS                | ER           |                    |
| K                  | Medium machining   | PC4            |                                   | MG-     | 53       | RP                   |                         | C                            | MG-, GK                | M5                         |                          | MG-                        | MG-                               |            | NM5, RK5                | MG-          |                    |
|                    | Roughing machining | KC4, KD5       | KR                                |         |          | UN                   | GR                      | ZS, GC                       | GX, RK                 | MR7                        | GZ                       | KT, RT                     | CH                                |            | RK7                     | DR           |                    |
| S                  | Finishing          | MB2            | SF                                | SF      |          | FS                   | VP1                     | MQ                           | FJ                     | MF1                        | EF                       | EA, SF                     |                                   | F5         | NF4                     | NF           |                    |
|                    | Medium machining   | SC3            | SGF, SM, -NGP, 23, SR, SMR        | PP, TF  | 42       | MS, UP, P, -NGP, RP  | VP2, VP3, VM            | MS, MU                       | MJ, MS, GJ             | M1, MF4, MF5, M5, MR3, MR4 | SU, EG, EX, UP, MU       | ML, MP, SU, MK             | HMM, SA                           | M2         | NFT, NMS, NMT, NRS, NRT | NM           |                    |
|                    | Roughing machining | MC4            | MR                                | R3M     | 45       | RP                   | VM                      | HU                           | RM                     | MR6, MF5                   | MU, HM                   | ET                         | SM                                | M5         | NR4, NRS                | ER           |                    |



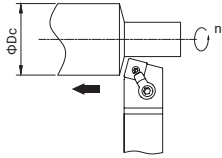
**Turning Chip Breaker Conversion Table**

Positive turning insert

| ISO classification   | Application    | ACHTECK            | COROMANT | DURACARB          | ISCAR    | KENNAMETAL     | KORLOY      | KYOCERA            | mitsubishi | SECO               | SUMITOMO | TAEGUTEK   | TUNGALOY    | VALENITE           | WALTER   | ZCC      |
|----------------------|----------------|--------------------|----------|-------------------|----------|----------------|-------------|--------------------|------------|--------------------|----------|------------|-------------|--------------------|----------|----------|
| <b>P<br/>M<br/>K</b> | Finishing      |                    | PF, UF   |                   | 38, PF   | UF, 11, GM     | VL, VF, HFP | XP GK, GP, DP VF   | FV         | FF1                | LU FP    | FA FX      | 01, PF, PSF |                    | PF4, PF5 | SF HF    |
|                      |                | PB1<br>PC2         |          |                   |          |                |             | CF, GF GQ CK       | SMG        |                    | FC       | SA         | JS          |                    |          |          |
|                      | Semi-finishing | UM<br>XF           | 51       | SM<br>16, GT-     | FP<br>LF | VF<br>HMP, C05 | XQ<br>GX    | SQ, SV             | F1         | FK<br>SU<br>SC, SK | FG       | PM3<br>PM4 | PS5         | HM                 |          |          |
|                      |                | PC2                | PM       | 41                |          | MP             |             | HQ                 |            |                    |          | PC<br>FM   | PSS<br>PS   |                    |          | EF<br>EM |
| Medium machining     | KC2            | XM<br>PR, UR<br>XR | 52       | 14, 17<br>19, MT- | MF       | C25            | MT-         | MQ, MV<br>MT-<br>G | F2         | SF, MU             | MT       | PM         | PM5         | PM5<br>E47,<br>MT- | HR       |          |
| <b>N</b>             | Semi-finishing | NC2                | AL       | AU                | AF, AS   | HP             | AK, AR      | AH                 | AZ         | AL                 | AW, AG   | FL         | AL          | IL                 | PM2      | LH       |

## Turning Machining Formula

● Cutting speed



$$V_c = \frac{\pi * D_c * n}{1000} \text{ (m/min)}$$

Vc:Cutting speed(m/min)    π: ≈3.14  
Dc:Workpiece diameter(mm)    n:Spindle speed(rev/min)

● Feed speed

$$V_f = f * n \text{ (mm/min)}$$

Vf:Cutting speed(mm/min)    f:Feed rate(mm/rev)  
n:Spindle speed(rev/min)

● Chip thickness

$$h = f * \sin \alpha \text{ (mm)}$$

h:Chip thickness(mm)    f:Feed rate(mm/rev)

● Chip width

$$b = \frac{a_p}{\sin \alpha} \text{ (mm)}$$

b:Chip width(mm)    ap:Axial depth of cut (mm)

● Chip area

$$A = h * b = a_p * f \text{ (mm}^2\text{)}$$

A:Chip area(mm<sup>2</sup>)    ap:Axial depth of cut (mm)  
f:Feed rate(mm/rev)

● Cutting force

$$F_c = K_c * a_p * f \text{ (N)}$$

Fc:Cutting force(N)    Kc:Unit cutting force(N/mm<sup>2</sup>)  
ap:Axial depth of cut (mm)    f:Feed rate(mm/rev)

● Cutting power

$$P_{mot} = \frac{K_c * V_c * a_p * f}{60000 * \eta} \text{ (KW)}$$

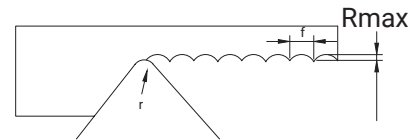
Pmot:Cutting power(KW)    Kc:Unit cutting force(N/mm<sup>2</sup>)  
Vc:Cutting speed(m/min)    ap:Axial depth of cut (mm)  
f:Feed rate(mm/rev)    η:Mechanical efficiency

● Chip removal

$$Q = a_p * f * V_c \text{ (cm}^3\text{/min)}$$

Q:Chip removal(cm<sup>3</sup>/min)    ap:Axial depth of cut (mm)  
f:Feed rate(mm/rev)    Vc:Cutting speed(m/min)

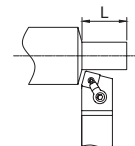
● Theoretic surface roughness



$$R_{max} = \frac{f^2}{8 * r} * 1000 \text{ (um)}$$

Rmax:Theoretic surface roughness (um)  
f:Feed rate(mm/rev)    r:Corner radius (mm)

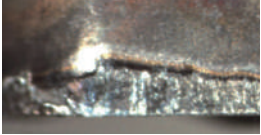

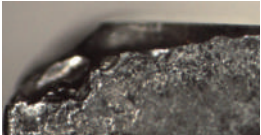



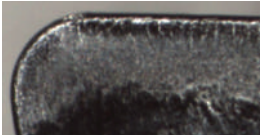


● Work time



$$T_c = \frac{L}{f * n} \text{ (min)}$$

Tc:Work time    f:Feed rate(mm/rev)  
n:Spindle speed(rev/min)    L: Working length(mm)

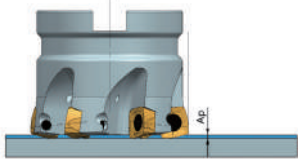
Turning Insert Normal Failures & Solutions

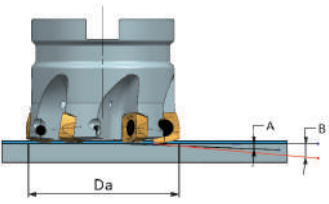
| Failures         | Pic.  | Analysis   | Solution   |
|------------------|---|--|--|
| Flank wear       |    | <ul style="list-style-type: none"> <li>• Tool materials too soft</li> <li>• Excessive cutting speed</li> <li>• Less clearance angle</li> <li>• Less feed rate</li> <li>• Insufficient cooling</li> </ul> | <ul style="list-style-type: none"> <li>• Choosing high wear-resistance insert grade</li> <li>• Reduce cutting speed</li> <li>• Enlarge clearance angle</li> <li>• Increase feed rate</li> </ul>  |
| Crater wear      |    | <ul style="list-style-type: none"> <li>• Tool materials too soft</li> <li>• Excessive cutting speed</li> <li>• Excessive feed rate</li> </ul>  | <ul style="list-style-type: none"> <li>• Choosing high wear-resistance insert grade</li> <li>• Reduce cutting speed</li> <li>• Reduce feed rate</li> <li>• Increasing the flow of coolant</li> </ul>   |
| Chipping         |    | <ul style="list-style-type: none"> <li>• Tool materials too hard</li> <li>• Less cutting strength</li> </ul>   | <ul style="list-style-type: none"> <li>• Choosing tougher grade</li> <li>• Enhancing cutting edge strength</li> </ul>  |
| Deformation      |   | <ul style="list-style-type: none"> <li>• Tool materials too soft</li> <li>• Over strong cutting edge</li> <li>• Excessive cutting depth &amp; feed rate</li> <li>• Insufficient cooling</li> </ul>       | <ul style="list-style-type: none"> <li>• Choosing high wear-resistance insert grade</li> <li>• Reduce cutting speed</li> <li>• reduce cutting depth &amp; feed rate</li> <li>• Choosing good thermal conductivity grade</li> <li>• Increasing the flow of coolant</li> </ul> |
| Built-up edge    |  | <ul style="list-style-type: none"> <li>• Less cutting speed</li> <li>• Cutting edge not sharp</li> <li>• Unsuitable grade</li> <li>• Insufficient cooling</li> </ul>                                     | <ul style="list-style-type: none"> <li>• Increase cutting rate</li> <li>• Choosing sharp geometry</li> <li>• Choosing less adhesion grade</li> <li>• Increasing the flow of coolant</li> </ul>   |
| Mechanical wear  |  | <ul style="list-style-type: none"> <li>• Excessive feed rate and cutting depth</li> <li>• Vibration</li> </ul>   | <ul style="list-style-type: none"> <li>• Choosing tougher grade</li> <li>• Enlarge lead angle</li> <li>• Choosing bigger corner radius</li> <li>• Change to strong rigidity holder</li> </ul>  |
| Thermal cracking |  | <ul style="list-style-type: none"> <li>• Excessive cutting heat</li> <li>• change of edges</li> </ul>  | <ul style="list-style-type: none"> <li>• Choosing dry cutting or adequate cooling</li> <li>• Choosing tougher grade</li> </ul>   |
| Peripheral wear  |  | <ul style="list-style-type: none"> <li>• Excessive feed rate &amp; cutting speed</li> <li>• Tool materials too soft</li> </ul>   | <ul style="list-style-type: none"> <li>• Choosing high wear-resistance tool grade</li> <li>• Enlarge rake angle leads to sharp edge</li> <li>• Reduce cutting speed</li> </ul>   |
| Coating peeling  |  | <ul style="list-style-type: none"> <li>• Sticky chip on the cutting edge</li> <li>• Chip evacuation failure</li> </ul>   | <ul style="list-style-type: none"> <li>• Enlarge rake angle leads to sharp edge</li> <li>• Use chip breaker with bigger space</li> </ul>   |

### Milling Grades Conversion Table

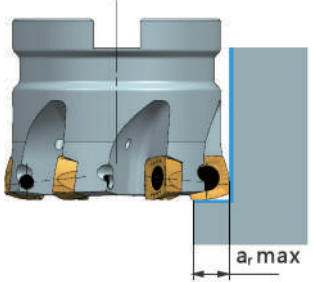
| ISO classification | ACHTECK          | COROMANT         | ISCAR                   | KENAMETAL                  | KORLOY                               | KYOCERA                           | MITSUBISHI                 | SECO                       | SUMITOMO                     | TAEGUTEC                   | TUNGALOY                         | WALTER                   |
|--------------------|------------------|------------------|-------------------------|----------------------------|--------------------------------------|-----------------------------------|----------------------------|----------------------------|------------------------------|----------------------------|----------------------------------|--------------------------|
| P                  | AP301U<br>AC301P | GC4220<br>GC4230 | IC950                   | KC522M<br>KC635M           | PC3600<br>PC3500<br>PC3535<br>PC3525 | PR630<br>PR660<br>PR730           | VP15TF                     | MP1500<br>MP2500<br>T250M  |                              | TT7080<br>TT7030           | T3130<br>AH330                   | WKP25<br>WAM10<br>WAM20  |
|                    | AP351U           | GC1030<br>GC4240 | IC808<br>IC908          | KC522M<br>KC635M<br>KC725M | PC5300<br>NC5330<br>PC9530           | PR9925<br>PR830                   | VP15TF<br>VP20RT           | F30M<br>MP3000             | ACP2000                      | TT9080<br>TT9030           | AH120<br>AH725<br>AH730<br>GH330 | WAM30                    |
|                    | AP401U           | GC1040           | IC830<br>IC330<br>IC928 | KC735M<br>KC935M           | PC3545                               |                                   | VP30RT<br>FH7020X<br>F7030 | F40M<br>MP2500             | ACP300<br>ACZ350             | TT8020<br>TT7800<br>TT8080 | AH140<br>T3130<br>AH130          | WKP235<br>WXP45<br>WSP45 |
| M S                | AP301U           | GC1030<br>GC2030 | IC808<br>IC908          | KC635M                     | PC5300<br>NC5330<br>PC9530           | PR730<br>PR830<br>PR925<br>PR1025 | VP15TF                     | MP2500<br>F30M             | ACP2000                      | TT9300<br>TT9080           | T3130<br>AH725<br>AH120          | WAM30<br>WXM35           |
|                    | AP351U           | GC2040<br>S40T   | IC830<br>IC330<br>IC928 | KC7725M                    | PC3545<br>PC5300                     | PR1225<br>PR905                   | VP30RT<br>MP9030<br>F7030  | F40M<br>MM4500<br>MS2500   | ACP300<br>EH20Z<br>EH520Z    | TT8020<br>TT8080           | AH130<br>AH140<br>SH730          | WXM35<br>WSM35<br>WSP45  |
| K                  | AC301K<br>AP351K | GC3220<br>GC4220 | IC810<br>IC910          | KCK15<br>KC520M            | PC6510<br>PC215K<br>PC5300           | PR905<br>PR510<br>PR610           | MC5020<br>VP15TF<br>MP8010 | MK2050<br>MK2000<br>MK3000 | ACK2000<br>ACK3000<br>ACZ310 | TT6080                     | T1115<br>AH120<br>GH110          | WKP25<br>WKP35           |

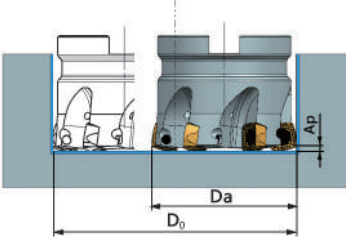
High Feed Cutter AHM15-XD Application Information

| Face milling  | Maximum milling depth $a_p$ (mm) |          |          |
|---|----------------------------------|----------|----------|
|  | $a_p$ .max                       | XD..0904 | XD..1205 |
|   |                                  | 1.5      | 2.5      |
|   |                                  |          |          |

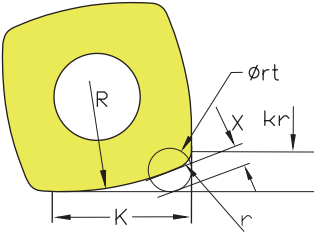
| Ramping  | Maximum bevel |                 |                 |                 |                 |
|--|---------------|-----------------|-----------------|-----------------|-----------------|
|  | $D_a$<br>(mm) | XD..0904        |                 | XD..1205        |                 |
|  |               | Maximum bevel A | Maximum bevel B | Maximum bevel A | Maximum bevel B |
|  | 25            | 2.80°           | 6.30°           | -               | -               |
|  | 32            | 1.50°           | 5.00°           | -               | -               |
|  | 40            | 0.80°           | 2.70°           | -               | -               |
|  | 52            | -               | -               | 0.8°            | 2.7°            |
|  | 63            | -               | -               | 0.6°            | 1.8°            |
|  | 66            | -               | -               | 0.45°           | 1.8°            |
|  | 100           | -               | -               | 0.32°           | 1.45°           |
| 125  | -             | -               | 0.24°           | 1.06°           |                 |

A=Maximum bevel angle of full flat contact B= Maximum bevel of full contact + radius

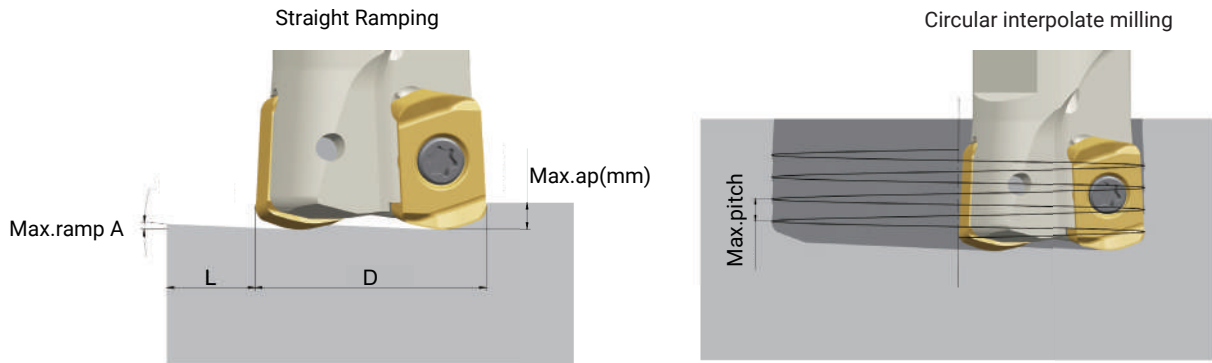
| Plunging  | Maximum milling depth $a_r$ (mm) |          |                 |
|---|----------------------------------|----------|-----------------|
|  | $D_a$ (mm)                       | XD..0904 | XD..1205        |
|   | 25                               | 6.0      | Maximum bevel A |
|   | 32                               | 6.0      | -               |
|   | 40                               | 6.0      | -               |
|   | 50                               | 6.0      | -               |
|   | 52                               | -        | 9.0             |
|   | 63                               | -        | 9.0             |
|   | 66                               | -        | 9.0             |
|   | 80                               | -        | 9.0             |
|   | 100                              | -        | 9.0             |
|   | 25                               | -        | 9.0             |

| Circular Interpolation Milling  | Diameter range of hole that can be milled in one pass (mm) |                         |                         |                         |                         |
|---|--|-------------------------|-------------------------|-------------------------|-------------------------|
|   | Da (mm)  | XD..0904                |                         | XD..1205                |                         |
|   |  | D <sub>o</sub> min (mm) | D <sub>o</sub> max (mm) | D <sub>o</sub> min (mm) | D <sub>o</sub> max (mm) |
|  | 25   | 30                      | 50                      | -                       | -                       |
|   | 32   | 51                      | 64                      | -                       | -                       |
|   | 40   | 67                      | 80                      | -                       | -                       |
|   | 50   | 87                      | 100                     | -                       | -                       |
|   | 52   | -                       | -                       | 87.2                    | 104                     |
|   | 63   | -                       | -                       | 109.2                   | 126                     |
|   | 66   | -                       | -                       | 115.2                   | 132                     |
|   | 80   | -                       | -                       | 143.2                   | 160                     |
|   | 100  | -                       | -                       | 183.2                   | 200                     |
|   | 25   | -                       | -                       | 233.2                   | 250                     |

**Programming Information**

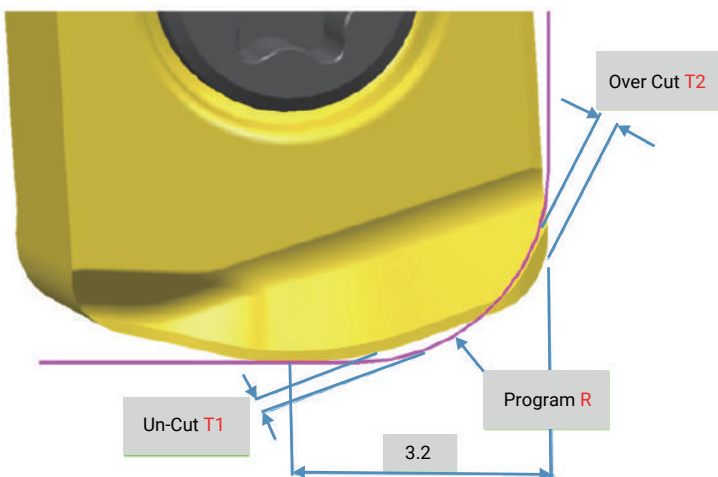
| Circular Interpolation Milling  | Indexable insert   |      |     |     |     |     |      |
|---|--|------|-----|-----|-----|-----|------|
|   | R  | r    | rt  | k   | kr  | x   |      |
|  | XD..090408   | 17   | 0.8 | 2.0 | 6.5 | 1.9 | 1.47 |
|   | XD..120508   | 22.8 | 0.8 | 2.5 | 8.4 | 2.4 | 1.00 |
|   | XD..120512   | 20   | 1.2 | 3.0 | 8.3 | 2.8 | 0.86 |
|   | XD..120520   | 20   | 2.0 | 3.0 | 8.0 | 3.4 | 0.90 |
|   | When programmed with the theoretical tool radius "rt", the maximum deviation shown above is produced with the final contour.<br>Minor deviations that occur only in rounded corners can be corrected by other tools in subsequent process. |      |     |     |     |     |      |

High Feed Cutter AHM20-LN06 Application Information



| Cutter Dia(D) | Straight ramp down |            |                  | Circular interpolate milling |             |
|---------------|--------------------|------------|------------------|------------------------------|-------------|
|               | Max.ramp-A         | Max.ap(mm) | Min.length-L(mm) | Min.Dia.(mm)                 | Max.Dia(mm) |
| φ16           | 2.9°               | 0.7        | 13.8             | 23                           | 32          |
| φ17           | 2.6°               | 0.7        | 15.4             | 25                           | 34          |
| φ20           | 1.9°               | 1.0        | 30.1             | 31                           | 40          |
| φ21           | 1.8°               | 1.0        | 31.8             | 33                           | 42          |
| φ25           | 1.3°               | 1.0        | 44.0             | 41                           | 50          |
| φ26           | 1.3°               | 1.0        | 44.0             | 43                           | 52          |
| φ32           | 0.9°               | 1.0        | 63.6             | 55                           | 64          |
| φ33           | 0.9°               | 1.0        | 63.6             | 57                           | 66          |
| φ40           | 0.7°               | 1.0        | 81.8             | 71                           | 80          |
| φ50           | 0.5°               | 1.0        | 114.5            | 91                           | 100         |
| φ63           | 0.4°               | 1.0        | 143.2            | 117                          | 126         |

NC Program Radius

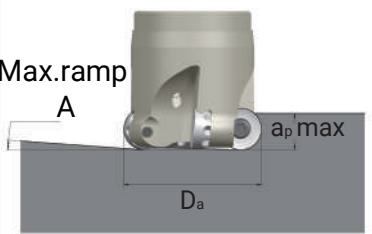


Technical information for NC program

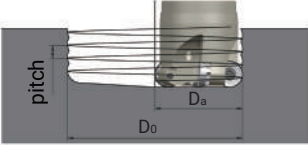
| Program R | Un-Cut T1 | Over-Cut T2 |
|-----------|-----------|-------------|
| R1.5      | 0.43      | 0           |
| R2.0      | 0.29      | 0.06        |
| R2.5      | 0.15      | 0.24        |

Note: select R1.5 as program R , without over-cut.

**Ramping Milling Parameters**

| Ramping   |        | Maximum angle A (°)               |      |     |      |     |
|---|--------|-----------------------------------|------|-----|------|-----|
|  | Da(mm) | Indexable inserts diameter d (mm) |      |     |      |     |
|   |        | d8                                | d10  | d12 | d16  | d20 |
|   | 25     | 3.2                               | 6.5  | -   | -    | -   |
|   | 32     | -                                 | 3.0  | 4.2 | -    | -   |
|   | 40     | -                                 | 1.4  | 3.0 | -    | -   |
|   | 50     | -                                 | 2.0  | 2.1 | -    | -   |
|   | 63     | -                                 | -    | 1.5 | 2.6  | -   |
|   | 80     | -                                 | -    | 1.4 | 1.4  | -   |
|   | 100    | -                                 | -    | -   | 1.0  | 1.3 |
|   | 125    | -                                 | -    | -   | -    | 0.9 |
| 160   | -      | -                                 | -    | -   | 0.7  |     |
| ap max(mm)  | 6.6    | 8.8                               | 10.7 | 14  | 17.2 |     |

**Circular Interpolate Milling Parameters**

| Actual circular interpolate milling data on workpiece                               |        | Diameter range of the hole that can be milled by one pass (mm) |             |             |             |             |             |             |             |             |             |
|---|--------|--|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
|  | Da(mm) | Indexable inserts diameter d (mm)                              |             |             |             |             |             |             |             |             |             |
|   |        | d8   |             | d10         |             | d12         |             | d16         |             | d20         |             |
|   |        | DO min (mm)  | DO max (mm) | DO min (mm) | DO max (mm) | DO min (mm) | DO max (mm) | DO min (mm) | DO max (mm) | DO min (mm) | DO max (mm) |
|   | 25     | 36.5   | 50          | 32          | 50          | -           | -           | -           | -           | -           | -           |
|   | 32     | -  | -           | 46          | 64          | 42.5        | 64          | -           | -           | -           | -           |
|   | 40     | -  | -           | 62          | 80          | 59          | 80          | -           | -           | -           | -           |
|   | 50     | -  | -           | 82          | 100         | 78.5        | 100         | 97.5        | 126         | -           | -           |
|   | 63     | -  | -           | -           | -           | 104.5       | 126         | 131.5       | 160         | -           | -           |
|   | 80     | -  | -           | -           | -           | 138         | 160         | 171.5       | 200         | -           | -           |
|   | 100    | -  | -           | -           | -           | -           | -           | -           | -           | 165.5       | 200         |
| 125   | -      | -  | -           | -           | -           | -           | -           | -           | 215.5       | 250         |             |
| 160   | -      | -  | -           | -           | -           | 10.7        | -           | -           | 285.5       | 320         |             |



**Milling General Formula**

● **Cutting speed**

$$V_c = \frac{\pi * D_c * n}{1000} \text{ (m/min)}$$

V<sub>c</sub>:Cutting speed(m/min) π: ≈3.14  
D<sub>c</sub>:Cutter diameter(mm) n:Spindle speed(rev/min)

● **Spindle speed**

$$n = \frac{1000 * V_c}{\pi * D_c} \text{ (rev/min)}$$

V<sub>c</sub>:Cutting speed(m/min) π: ≈3.14  
D<sub>c</sub>:Cutter diameter(mm) n:Spindle speed(rev/min)

● **Feed speed**

$$V_f = f_z * n * Z \text{ (mm/min)}$$

V<sub>f</sub>:Feed speed(mm/min) f<sub>z</sub>:Feed per tooth(mm/z)  
n:Spindle speed(rev/min) Z:Number of teeth

● **Feed rate per rev.**

$$f_z = \frac{V_f}{n * Z} \text{ (mm/z)}$$

f<sub>z</sub>:Feed rate per rev.(mm/z) V<sub>f</sub>:Feed speed(mm/min)  
n:Spindle speed(rev/min) Z:Number of teeth

● **Feed rate per rev.**

$$f = \frac{V_f}{n} \text{ (mm/rev)}$$

f:Feed rate per rev.(mm/rev) V<sub>f</sub>:Feed speed(mm/min)  
n:Spindle speed(rev/min)

● **Time of cut**

$$T_c = \frac{L}{V_f} \text{ (min)}$$

T<sub>c</sub>:Time of cut(min) L:Length of feed(mm)  
V<sub>f</sub>:Feed speed(mm/min)

● **Horse power**

$$H_p = \frac{P_{mot}}{0.75}$$

H<sub>p</sub>:Horse power P<sub>mot</sub>:Cutting power(KW)

● **Power demand**

$$P_{mot} = \frac{a_p * a_e * V_f * K_c}{6 * 10^7 * \eta} \text{ (KW)}$$

P<sub>mot</sub>:Cutting power(KW) a<sub>p</sub>:Cutting depth a<sub>e</sub>:Cutting width  
K<sub>c</sub>:Unit cutting force(N/mm<sup>2</sup>) η:Machine efficiency coefficient(0.7-0.95)

● **Average chip thickness**

$$h_m = \frac{114.7 * f_z * \sin \psi * (a_e/D_c)}{\psi_s} \text{ (mm)}$$

h<sub>m</sub>:Average chip thickness f<sub>z</sub>:Feed per tooth(mm/z)  
a<sub>e</sub>:Cutting width D<sub>c</sub>:Cutter diameter(mm) ψ<sub>s</sub>:Pressure angle

● **Feed force**

Cutter in the center site

$$\psi_s = 2 * \arcsin \left( \frac{a_e}{D_c} \right) [^\circ]$$

Cutter in excentric site

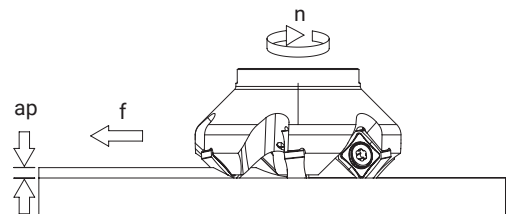
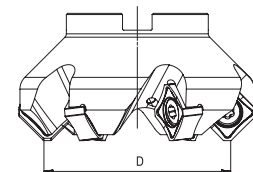
$$\psi_s = 90^\circ + \arcsin \frac{a_e - (D_c/2)}{(D_c/2)} [^\circ]$$

ψ<sub>s</sub>:Pressure angle a<sub>e</sub>:Cutting width  
D<sub>c</sub>:Cutter diameter(mm)

● **Chip removal**

$$Q = \frac{a_p * a_e * V_f}{1000} \text{ (cm}^3\text{/min)}$$

Q:Chip removal(cm<sup>3</sup>/min) a<sub>p</sub>:Cutting depth  
a<sub>e</sub>:Cutting width V<sub>f</sub>:Feed speed(mm/min)



## Drilling General Recommendation

### ● Cutting speed

$$V_c = \frac{\pi * D_c * n}{1000} \text{ (m/min)}$$

V<sub>c</sub>:Cutting speed(m/min) π:≈3.14

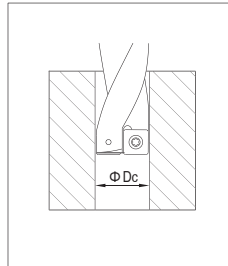
D<sub>c</sub>:Drill diameter(mm) n:Spindle speed(rev/min)

### ● Spindle speed

$$n = \frac{1000 * V_c}{\pi * D_c} \text{ (rev/min)}$$

V<sub>c</sub>:Cutting speed(m/min) π:≈3.14

D<sub>c</sub>:Drill diameter(mm) n:Spindle speed(rev/min)

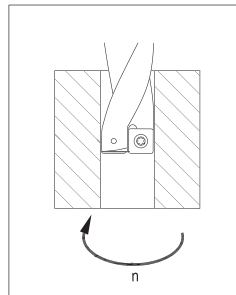


### ● Feed speed

$$V_f = f_z * n * Z \text{ (mm/min)}$$

V<sub>f</sub>:Feed speed(mm/min) f<sub>z</sub>:Feed per tooth(mm/z)

n:Spindle speed(rev/min) Z:Number of teeth

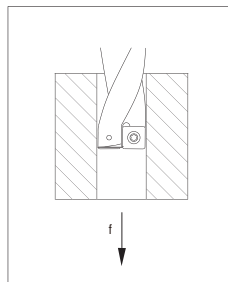


### ● Feed rate per rev.

$$f_z = \frac{V_f}{n * Z} \text{ (mm/z)}$$

f<sub>z</sub>:Feed per tooth(mm/z) V<sub>f</sub>:Feed speed(mm/min)

n:Spindle speed(rev/min) Z:Number of teeth



### ● Feed rate per rev.

$$f = \frac{V_f}{n} \text{ (mm/rev)}$$

f:Feed rate per rev.(mm/rev) V<sub>f</sub>:Feed

speed(mm/min)n:Spindle speed(rev/min)

### ● Chip removal

$$Q = \frac{V_f * \pi * D_c^2}{4 * 1000} \text{ (cm}^3\text{/min)}$$

Q:Chip removal(cm<sup>3</sup>/min) V<sub>f</sub>:Feed speed(mm/min)

π:≈3.14 D<sub>c</sub>:Drill diameter(mm)

### ● Horse power

$$H_p = \frac{P_{mot}}{0.75}$$

H<sub>p</sub>:Horsepower P<sub>mot</sub>:Cutting power(KW)

### ● Power demand

$$P_{mot} = \frac{Q * K_c}{60000 * \eta} \text{ (KW)}$$

P<sub>mot</sub>:Cutting power(KW) Q:Chip removal(cm<sup>3</sup>/min)

K<sub>c</sub>:Unit cutting force(N/mm<sup>2</sup>)

η:Machine efficiency coefficient (0.7-0.95)

### ● Torque

$$M_c = \frac{D_c^2 * K_c * f}{8000} \text{ (N*m)}$$

M<sub>c</sub>:Torque D<sub>c</sub>:Drill diameter(mm)

K<sub>c</sub>:Unit cutting force(N/mm<sup>2</sup>) f:Feed rate per rev.(mm/rev)

### ● Feed force

$$F_f = 0.63 * \frac{f * D_c * K_c}{2} \text{ (N)}$$

F<sub>f</sub>:Feed force f:Feed rate per rev.(mm/rev)

D<sub>c</sub>:Drill diameter(mm) K<sub>c</sub>:Unit cutting force(N/mm<sup>2</sup>)

### ● Cutting thickness

$$h = f_z * \text{sink} \text{ (mm)}$$

h:Cutting thickness(mm) f<sub>z</sub>:Feed rate(mm/rev)

**Hardness Conversion Table**

| Brinell Hardness 10 ball load 3000Kg |            | Micro Vickers Hardness HV | Rockwell Hardness               |                                |                                  |                                  | Shore's Hardness | Tensile Strength (approximate) kgf/mm |
|--------------------------------------|------------|---------------------------|---------------------------------|--------------------------------|----------------------------------|----------------------------------|------------------|---------------------------------------|
| Master ball                          | WC ball HB |                           | A scale 60kgf diamond brale HRA | B scale 100kgf 1/16in ball HRB | C scale 150kgf diamond brale HRC | D scale 100kgf diamond brale HRD |                  |                                       |
| -                                    | -          | 1865                      | 92.0                            | -                              | 80                               | -                                | -                |                                       |
| -                                    | -          | 1787                      | 91.5                            | -                              | 79                               | -                                | -                |                                       |
| -                                    | -          | 1710                      | 91.0                            | -                              | 78                               | -                                | -                |                                       |
| -                                    | -          | 1633                      | 90.5                            | -                              | 77                               | -                                | -                |                                       |
| -                                    | -          | 1556                      | 90.0                            | -                              | 76                               | -                                | -                |                                       |
| -                                    | -          | 1478                      | 89.5                            | -                              | 75                               | -                                | -                |                                       |
| -                                    | -          | 1400                      | 89.0                            | -                              | 74                               | -                                | -                |                                       |
| -                                    | -          | 1323                      | 88.5                            | -                              | 73                               | -                                | -                |                                       |
| -                                    | -          | 1245                      | 88.0                            | -                              | 72                               | -                                | -                |                                       |
| -                                    | -          | 1160                      | 87.0                            | -                              | 71                               | -                                | -                |                                       |
| -                                    | -          | 1076                      | 86.5                            | -                              | 70                               | -                                | -                |                                       |
| -                                    | -          | 1004                      | 86.0                            | -                              | 69                               | -                                | -                |                                       |
| -                                    | -          | 940                       | 85.6                            | -                              | 68.0                             | 76.9                             | 97               |                                       |
| -                                    | -          | 920                       | 85.3                            | -                              | 67.5                             | 76.5                             | 96               |                                       |
| -                                    | -          | 900                       | 85.0                            | -                              | 67.0                             | 76.1                             | 95               |                                       |
| -                                    | 767        | 880                       | 84.7                            | -                              | 66.4                             | 75.7                             | 93               |                                       |
| -                                    | 757        | 860                       | 84.4                            | -                              | 65.9                             | 75.3                             | 92               |                                       |
| -                                    | 745        | 840                       | 84.1                            | -                              | 65.3                             | 74.8                             | 91               |                                       |
| -                                    | 733        | 820                       | 83.8                            | -                              | 64.7                             | 74.3                             | 90               |                                       |
| -                                    | 722        | 800                       | 93.4                            | -                              | 64.0                             | 73.8                             | 88               |                                       |
| -                                    | 712        | -                         | -                               | -                              | -                                | -                                | -                |                                       |
| -                                    | 710        | 780                       | 83.0                            | -                              | 63.3                             | 73.3                             | 87               |                                       |
| -                                    | 698        | 760                       | 82.6                            | -                              | 62.5                             | 72.6                             | 86               |                                       |
| -                                    | 684        | 740                       | 82.2                            | -                              | 61.8                             | 72.1                             | -                |                                       |
| -                                    | 682        | 737                       | 82.2                            | -                              | 61.7                             | 72.0                             | 84               |                                       |
| -                                    | 670        | 720                       | 81.8                            | -                              | 61.0                             | 71.5                             | 83               |                                       |
| -                                    | 656        | 700                       | 81.3                            | -                              | 60.1                             | 70.8                             | -                |                                       |
| -                                    | 653        | 697                       | 81.2                            | -                              | 60.0                             | 70.7                             | 81               |                                       |
| -                                    | 647        | 690                       | 81.1                            | -                              | 59.7                             | 70.5                             | -                |                                       |
| -                                    | 638        | 680                       | 80.8                            | -                              | 59.2                             | 70.1                             | 80               |                                       |
| -                                    | 630        | 670                       | 80.6                            | -                              | 58.8                             | 69.8                             | -                |                                       |
| -                                    | 627        | 667                       | 80.5                            | -                              | 58.7                             | 69.7                             | 79               |                                       |
| -                                    | 601        | 640                       | 79.8                            | -                              | 57.3                             | 68.7                             | 77               |                                       |
| -                                    | 578        | 615                       | 79.1                            | -                              | 56.0                             | 67.7                             | 75               |                                       |
| -                                    | 555        | 591                       | 78.4                            | -                              | 54.7                             | 66.7                             | 73               |                                       |
| -                                    | 534        | 569                       | 77.8                            | -                              | 53.5                             | 65.8                             | 71               |                                       |
| -                                    | 514        | 547                       | 76.9                            | -                              | 52.1                             | 64.7                             | 70               |                                       |
| -                                    | 495        | 528                       | 76.3                            | -                              | 51.0                             | 63.8                             | 68               |                                       |
| -                                    | 477        | 508                       | 75.6                            | -                              | 49.6                             | 62.7                             | 66               |                                       |
| -                                    | 461        | 491                       | 74.9                            | -                              | 48.5                             | 61.7                             | 65               |                                       |
| -                                    | 444        | 472                       | 74.2                            | -                              | 47.1                             | 60.8                             | 63               |                                       |
| 429                                  | 429        | 455                       | 73.4                            | -                              | 45.7                             | 59.7                             | 61               |                                       |
| 415                                  | 415        | 440                       | 72.8                            | -                              | 44.5                             | 58.8                             | 59               |                                       |
| 401                                  | 401        | 425                       | 72.0                            | -                              | 43.1                             | 57.8                             | 58               |                                       |
| 388                                  | 388        | 410                       | 71.4                            | -                              | 41.8                             | 56.8                             | 56               |                                       |
| 375                                  | 375        | 396                       | 70.6                            | -                              | 40.4                             | 55.7                             | 54               |                                       |
| 363                                  | 363        | 383                       | 70.0                            | -                              | 39.1                             | 54.6                             | 52               |                                       |
| 352                                  | 352        | 372                       | 69.3                            | (110.0)                        | 37.9                             | 53.8                             | 51               |                                       |
| 341                                  | 341        | 360                       | 68.7                            | (109.0)                        | 36.6                             | 52.8                             | 50               |                                       |
| 331                                  | 331        | 350                       | 68.1                            | (108.5)                        | 36.6                             | 51.9                             | 48               |                                       |
| 321                                  | 321        | 339                       | 67.5                            | (108.0)                        | 34.3                             | 51.0                             | 47               |                                       |
| 311                                  | 311        | 328                       | 66.9                            | (107.5)                        | 33.1                             | 50.0                             | 46               |                                       |
| 302                                  | 302        | 319                       | 66.3                            | (107.0)                        | 32.1                             | 49.3                             | 45               |                                       |
| 293                                  | 293        | 309                       | 65.7                            | (106.0)                        | 30.9                             | 48.3                             | 43               |                                       |
| 285                                  | 285        | 301                       | 65.3                            | (105.5)                        | 29.9                             | 47.6                             | -                |                                       |
| 277                                  | 277        | 292                       | 64.6                            | (104.5)                        | 28.8                             | 46.7                             | 41               |                                       |



Material Conversion Table

| ISO | Country and standard |               |         |               |               |     |         |        |            |           |           |
|-----|----------------------|---------------|---------|---------------|---------------|-----|---------|--------|------------|-----------|-----------|
|     | China                | International | Germany | U.S.A.        | U.K.          |     | France  | Sweden | Italy      | Spain     | Japan     |
|     | GB                   | DIN           | W.-nr   | AISI/SAE      | BS            | EN  | AFNOR   | SS     | UNI        | UNE       | JIS       |
| P   | Structural steel     |               |         |               |               |     |         |        |            |           |           |
|     | 15                   | C15           | 1.0401  | 1015          | 080M15        | -   | CC12    | 1350   | C15C16     | F.111     | -         |
|     | 20                   | C22           | 1.0402  | 1020          | 050A20        | 2C  | CC20    | 1450   | C20C21     | F.112     | -         |
|     | 35                   | C35           | 1.0501  | 1035          | 060A35        | -   | CC35    | 1550   | C35        | F.113     | -         |
|     | 45                   | C45           | 1.0503  | 1045          | 080M40        | -   | CC45    | 1650   | C45        | F.114     | -         |
|     | 55                   | C55           | 1.0535  | 1055          | 070M55        | -   | -       | 1655   | C55        | -         | -         |
|     | 60                   | C60           | 1.0601  | 1060          | 080A62        | 43D | CC55    | -      | C60        | -         | -         |
|     | Y15                  | 9SMn28        | 1.0715  | 1213          | 230M07        | -   | S250    | 1912   | CF9SMn28   | 11SMn28   | SUM22     |
|     | -                    | 9SMnPb28      | 1.0718  | 12L13         | -             | -   | S250Pb  | 1914   | CF9MnPb28  | 11SMnPb28 | SUM22L    |
|     | -                    | 10SPb20       | 1.0722  | -             | -             | -   | 10PbF2  | -      | CF10Pb20   | 10SPb20   | -         |
|     | -                    | 35S20         | 1.0726  | 1140          | 212M36        | 8M  | 35MF4   | 1957   | -          | F210G     | -         |
|     | Y13                  | 9SMn36        | 1.0736  | 1215          | 240M07        | 1B  | S300    | -      | CF9SMn36   | 12SMn35   | -         |
|     | -                    | 9SMnPb36      | 1.0737  | 12L14         | -             | -   | S300Pb  | 1926   | CF9SMnPb36 | 12SMnP35  | -         |
|     | 55Si2Mn              | 55Si9         | 1.0904  | 9255          | 250A53        | 45  | 55S7    | 2085   | 55Si8      | 56Si7     | -         |
|     | -                    | 60SiCr7       | 1.0961  | 9262          | -             | -   | 60SC7   | -      | 60SiCr8    | 60SiCr8   | -         |
|     | 15                   | Ck15          | 1.1141  | 1015          | 080M15        | 32C | XC12    | 1370   | C16        | C15K      | S15C      |
|     | 40Mn                 | 40Mn4         | 1.1157  | 1039          | 150M36        | 15  | 35M5    | -      | -          | -         | -         |
|     | 25                   | Ck25          | 1.1158  | 1025          | -             | -   | -       | -      | -          | -         | S25C      |
|     | 35Mn2                | 36Mn5         | 1.1167  | 1335          | -             | -   | 40Mn5   | 2120   | -          | 36Mn5     | SMn438(H) |
|     | 30Mn                 | 28Mn6         | 1.117   | 1330          | 150M28        | 14A | 20M5    | -      | C28Mn      | -         | SCMn1     |
|     | 35Mn                 | Cf35          | 1.1183  | 1035          | 060A35        | -   | XS38TS  | 1572   | C36        | -         | S35C      |
|     | Ck45                 | 45            | 1.1191  | 1045          | 080M46        | -   | XC42    | 1672   | C45        | C45K      | S45C      |
|     | 55                   | Ck55          | 1.1203  | 1055          | 070M55        | -   | XC45    | -      | C50        | C55K      | S55C      |
|     | 50                   | Cf53          | 1.1213  | 1050          | 060A52        | -   | XC48TS  | 1674   | C53        | -         | S50C      |
|     | 60Mn                 | Ck60          | 1.1221  | 1060          | 080A62        | 43D | XC60    | 1678   | C60        | -         | S58C      |
|     | -                    | Ck101         | 1.1274  | 1095          | 060A96        | -   | -       | 1870   | -          | -         | SUP4      |
|     | -                    | X120Mn12      | 1.3401  | -             | Z120M12       | -   | X120M12 | -      | XG120Mn12  | X120Mn12  | SCMnH/1   |
|     | GCr15                | 100Cr6        | 1.3505  | 52100         | 534A99        | 31  | 100C6   | 2258   | 100Cr6     | F.131     | SUJ2      |
|     | -                    | 15Mo3         | 1.5415  | ASTM A204Gr.A | 1501-240      | -   | 15D3    | 2912   | 16Mo3KW    | 16Mo3     | -         |
|     | -                    | 16Mo5         | 1.5426  | 4520          | 1503-245-420  | -   | -       | -      | 16Mo5      | 16Mo5     | -         |
|     | -                    | 14Ni6         | 1.5622  | ASTM A350LF5  | -             | -   | 16N6    | -      | 14Ni6      | 15Ni6     | -         |
|     | -                    | X8Ni9         | 1.5662  | ASTM A353     | 1501-509; 510 | -   | -       | -      | X10Ni9     | XBNi09    | -         |

### Material Conversion Table

| ISO | Country and standard |               |         |                     |                      |      |                     |        |                |           |                |
|-----|----------------------|---------------|---------|---------------------|----------------------|------|---------------------|--------|----------------|-----------|----------------|
|     | China                | International | Germany | U.S.A.              | U.K.                 |      | France              | Sweden | Italy          | Spain     | Japan          |
|     | GB                   | DIN           | W.-nr   | AISI/SAE            | BS                   | EN   | AFNOR               | SS     | UNI            | UNE       | JIS            |
| P   | Structural steel     |               |         |                     |                      |      |                     |        |                |           |                |
|     | -                    | 12Ni19        | 1.5680  | 2515                | -                    | -    | Z18N5               | -      | -              | -         | -              |
|     | -                    | 36NiCr6       | 1.5710  | 3135                | 640A35               | 111A | 35NC6               | -      | -              | -         | SNC236         |
|     | -                    | 14NiCr10      | 1.5732  | 3415                | -                    | -    | 14NC11              | -      | 16NiCr11       | 15NiCr11  | SNC415 (H)     |
|     | -                    | 14NiCr14      | 1.5752  | 34153310            | 655M13655A12         | 36A  | 12NC15              | -      | -              | -         | SNC815 (H)     |
|     | -                    | 36CrNiMo4     | 1.6511  | 9840                | 816M40               | 110  | 40NCD3              | -      | 38CrNiMo4 (KB) | 35CrNiMo4 | -              |
|     | -                    | 21NiCrMo2     | 1.6523  | 8620                | 850M20               | 362  | 20NCD2              | 2503   | 20NiCrMo2      | 20NiCrMo2 | SNCCM220 (H)   |
|     | -                    | 40NiCrMo2     | 1.6546  | 8740                | 311-Type7            | -    | -                   | -      | 40NiCrMo2 (KB) | 40NiCrMo2 | SNC240         |
|     | 40CrNiMoA            | 34CrNiMo6     | 1.6582  | 4340                | 817M40               | 24   | 35NCD6              | 2541   | 35CrNiMo6 (KB) | -         | -              |
|     | -                    | 17CrNiMo6     | 1.6587  | -                   | 820A16               | -    | 18NCD6              | -      | -              | 14CrNiMo1 | -              |
|     | 15Cr                 | 15Cr3         | 1.7015  | 5015                | 523M15               | -    | 12C3                | -      | -              | -         | SCr415(H)      |
|     | 35Cr                 | 34Cr4         | 1.7033  | 5132                | 530A32               | 18B  | 32C4                | -      | 34Cr4(KB)      | 35Cr4     | SCr430(H)      |
|     | 40Cr                 | 41Cr4         | 1.7035  | 5140                | 530M40               | 18   | 42C4                | -      | 41Cr4          | 42Cr4     | SCr440(H)      |
|     | 40Cr                 | 42Cr4         | 1.7045  | 5140                | -                    | -    | -                   | 2245   | -              | 42Cr4     | SCr440         |
|     | 18CrMn               | 16MnCr15      | 1.7131  | 5115                | (527M20)             | -    | 16MC5               | 2511   | 16MnCr15       | 16MnCr15  | -              |
|     | 20CrMn               | 55Cr3         | 1.7176  | 5155                | 527A60               | 48   | 55C3                | -      | -              | -         | SUP9(A)        |
|     | 30CrMo               | 25CrMo4       | 1.7218  | 4130                | 1717CDS110           | -    | 25CD4               | 2225   | 25CrMo4 (KB)   | 55Cr3     | SCM420; SCM430 |
|     | 35CrMo               | 34CrMo4       | 1.7220  | 4137;4135           | 708A37               | 19B  | 35CD4               | 2234   | 35CrMo4        | 34CrMo4   | SCM432; SCR3M3 |
|     | 40CrMoA              | 41CrMo4       | 1.7223  | 4140;4142           | 708M40               | 19A  | 42CD4TS             | 2244   | 41CrMo4        | 41CrMo4   | SCM440         |
|     | 42CrMo<br>42CrMnMo   | 42CrMo4       | 1.7225  | 4140                | 708M40               | 19A  | 42CD4               | 2244   | 42CrMo4        | 42CrMo4   | SCM440(H)      |
|     | -                    | 15CrMo5       | 1.7262  | -                   | -                    | -    | 12CD4               | 2216   | -              | 12CrMo4   | SCM415(H)      |
|     | -                    | 13CrMo44      | 1.7335  | ASTMA182F11;<br>F12 | 1501-620Gr.27        | -    | 15CD3.5;<br>15CD4.5 | -      | 14CrMo44       | 14CrMo45  | -              |
|     | -                    | 32CrMo12      | 1.7361  | -                   | 722M24               | 40B  | 30CD12              | 2240   | 32CrMo12       | F.124.A   | -              |
|     | -                    | 10CrMo910     | 1.7380  | ASTMA182F.22        | 1501-<br>622Gr.31;45 | -    | 12CD9;10            | 2218   | 12CrMo9,10     | TU.H      | -              |
|     | -                    | 14MoV63       | 1.7715  | -                   | 1503-660-440         | -    | -                   | -      | -              | 13MoCrV6  | -              |
|     | 50CrVA               | 50CrV4        | 1.8159  | 6150                | 735A50               | 47   | 50CV4               | 2230   | 50CrV4         | 51CrV4    | SUP10          |
|     | -                    | 41CrAlMo7     | 1.8509  | -                   | 905M39               | 41B  | 40CAD6,12           | 2940   | 41CrAlMo7      | 41CrAlMo7 | -              |
|     | -                    | 39CrMoV139    | 1.8523  | -                   | 897M39               | 40C  | -                   | -      | 36CrMoV12      | -         | -              |

Material Conversion Table

| ISO | Country and standard |                          |         |          |      |       |                         |        |                              |                |                       |
|-----|----------------------|--------------------------|---------|----------|------|-------|-------------------------|--------|------------------------------|----------------|-----------------------|
|     | China                | International            | Germany | U.S.A.   | U.K. |       | France                  | Sweden | Italy                        | Spain          | Japan                 |
|     | GB                   | DIN                      | W.-nr   | AISI/SAE | BS   | EN    | AFNOR                   | SS     | UNI                          | UNE            | JIS                   |
| P   | Tool steel           |                          |         |          |      |       |                         |        |                              |                |                       |
|     | T10                  | C105W1                   | 1.1545  | W.110    | -    | -     | Y1105                   | 1880   | C98KU<br>C100KU              | F.515<br>F.516 | -                     |
|     | T12A                 | C125W                    | 1.1663  | W.112    | -    | -     | Y2120                   | -      | C120KU                       | (C120)         | SK20                  |
|     | GCr15                | 100Cr6                   | 1.2067  | L3       | BL3  | -     | Y100C6                  | -      | -                            | 100Cr6         | -                     |
|     | Cr12                 | X210Cr12                 | 1.2080  | D3       | BD3  | -     | Z200Cr12                | -      | X210Cr13KU<br>X250Cr12KU     | X210Cr12       | SKD1                  |
|     | 4Cr5MoVSi            | X40CrMoV5 1              | 1.2344  | H13      | BH13 | -     | Z40CDV5                 | 2242   | X35CrMoV05KU<br>X40CrMoV51KU | X40CrMoV5      | SKD61                 |
|     | Cr6WV                | X100CrMoV5 1             | 1.2363  | A2       | BA2  | -     | Z100CDV5                | 2260   | X100CrMoV51KU                | X100CrMoV5     | SKD12                 |
|     | CrWMo                | 105WCr6                  | 1.2419  | -        | -    | -     | 105WC13                 | 2140   | 10WCr6<br>107WCr5KU          | 105WCr5        | SKS31<br>SKS2<br>SKS3 |
|     | Cr12W                | X210CrW12                | 1.2436  | -        | -    | -     | -                       | 2312   | X215CrW12 1KU                | X210CrW12      | SKD2                  |
|     | 5CrNiMo              | 45WCrV7                  | 1.2542  | S1       | BS1  | -     | -                       | 2710   | 45WCrV8KU                    | 45WCrSi8       | -                     |
|     | 3Cr2W8V              | X30WCrV93<br>X30WCrV93KU | 1.2581  | H21      | BH21 | -     | Z30WCV9                 | -      | X28W09KU<br>X30WCrV9 3KU     | X30WCrV9       | SKD5                  |
|     | Cr12MoV              | X165CrMoV 12             | 1.2601  | -        | -    | -     | -                       | 2310   | X165CrMoW12KU                | X160CrMoV12    | SKD11                 |
|     | 5CrNiMo              | 55NiCrMoV6               | 1.2713  | L6       | -    | -     | 55NCDV7                 | -      | -                            | F.250.S        | SKT4                  |
|     | V                    | 100V1                    | 1.2833  | W210     | BW2  | -     | Y1105V                  | -      | -                            | -              | SKS43                 |
|     | W6Mo5Cr4V2Co5        | S6-5-2-5                 | 1.3243  | -        | -    | -     | Z85WDKCV                | 2723   | HS6-5-2-5                    | HS6-5-2-5      | SKH55                 |
|     | W18Cr4VCo5           | S18-1-2-5                | 1.3255  | T4       | BT4  | -     | Z80WKCV<br>10-05-04-01  | -      | X78WCo1805KU                 | HS18-1-1-5     | SKH3                  |
|     | W6Mo5Cr4V2           | S6-5-2                   | 1.3343  | M2       | BM2  | -     | Z85WDCV<br>06-05-04-02  | 2722   | X82WMo0605KU                 | HS6-5-2        | SKH9                  |
|     | -                    | S2-9-2                   | 1.3348  | M7       | -    | - Z - | Z100WCWV<br>09-02-04-02 | 2782   | HS2-9-2                      | HS2-9-2        | -                     |
|     | W18Cr4V              | S18-0-1                  | 1.3355  | T1       | BT1  | -     | Z80WCV<br>18-04-01      | -      | X75W18KU                     | HS18-0-1       | SKH2                  |
|     | W6Mo5Cr4V3           | S6-5-3                   | -       | M3       | -    | -     | -                       | -      | -                            | -              | SKH52                 |
| -   | -                    | -                        | M42     | BM42     | -    | -     | -                       | -      | -                            | SKH59          |                       |

### Material Conversion Table

| ISO           | Country and standard       |                   |         |          |        |                |             |               |               |                             |          |
|---------------|----------------------------|-------------------|---------|----------|--------|----------------|-------------|---------------|---------------|-----------------------------|----------|
|               | China                      | International     | Germany | U.S.A.   | U.K.   |                | France      | Sweden        | Italy         | Spain                       | Japan    |
|               | GB                         | DIN               | W.-nr   | AISI/SAE | BS     | EN             | AFNOR       | SS            | UNI           | UNE                         | JIS      |
| M             | Stainless steel            |                   |         |          |        |                |             |               |               |                             |          |
|               | 0Cr13;<br>1Cr12            | 403               | 1.4000  | 403      | 403S17 | -              | Z6C13       | 2301          | X6Cr13        | F.3110                      | SUS403   |
|               | -                          | -                 | 1.4001  | -        | -      | -              | -           | -             | -             | F.8401                      | -        |
|               | 1Cr13                      | 410               | 1.4006  | 410      | 410S21 | 56A            | X12Cr13     | 2302          | X12Cr13       | F.3401                      | SUS410   |
|               | 1Cr17                      | 430               | 1.4016  | 430      | 430S15 | 60             | X8Cr17      | 220           | X8Cr17        | F.3113                      | SUS430   |
|               | 2Cr13                      | 410               | 1.4021  | 40       | S62    | 56B;56C        | X20C13      | -             | X20C13        | F.3401                      | SUS410   |
|               | -                          | -                 | 1.4027  | -        | 420C29 | 56B            | -           | -             | -             | -                           | SCS2     |
|               | 4Cr13                      | -                 | 1.4034  | -        | 420S45 | 56D            | X40Cr14     | 2304          | X40Cr14       | F.3405                      | SUS420J2 |
|               | 1Cr17Ni2                   | 431               | 1.4057  | 431      | 431S29 | 57             | X16CrNi16   | 2321          | X16CrNi16     | F.3427                      | SUS431   |
|               | Y1Cr17                     | 430F              | 1.4104  | 430F     | -      | -              | X10CrS17    | 2383          | X10CrS17      | F.3117                      | SUS430F  |
|               | 1Cr17Mo                    | 434               | 1.4113  | 434      | 434S17 | -              | X8CrMo17    | 2325          | X8CrMo17      | -                           | SUS434   |
|               | -                          | -                 | 1.4313  | -        | 425C11 | -              | -           | -             | -             | -                           | SCS5     |
|               | -                          | -                 | 1.4408  | -        | 316C16 | -              | -           | -             | -             | F.8414                      | SCS14    |
|               | 4Cr9Si2                    | HW3               | 1.4718  | HW3      | 401S45 | 52             | X45CrSi8    | -             | X45CrSi8      | F.322                       | SUH1     |
|               | 0Cr13Al                    | 405               | 1.4724  | 405      | 403S17 | -              | X10CrAl12   | -             | X10CrAl12     | F.311                       | SUS405   |
|               | Cr17                       | 430               | 1.4742  | 430      | 430S15 | 60             | X8Cr17      | -             | X8Cr17        | F.3113                      | SUS430   |
|               | 8Cr20Si2Ni                 | HNV6              | 1.4757  | HNV6     | 443S65 | 59             | X80CrSiNi20 | -             | X80CrSiNi20   | F.320V                      | SUH4     |
|               | 2Cr25N                     | 446               | 1.4762  | 446      | -      | -              | X16Cr26     | 2322          | X16Cr26       | -                           | SUH446   |
|               | Austenitic stainless steel |                   |         |          |        |                |             |               |               |                             |          |
|               | 0Cr18Ni9                   | X5CrNi1810        | 1.4301  | 304      | 304S15 | 58E            | Z6CN18.09   | 2332          | X5CrNi1810    | F.3551<br>F.3541;<br>F.3504 | SUS304   |
|               | 1Cr18Ni9MoZr               | X10CrNiS189       | 1.4305  | 303      | 303S21 | 58M            | Z10CNF18.09 | 2346          | X10CrNiS18.09 | F.3508                      | SUS303   |
|               | 0Cr19Ni10                  | X2CrNi1911        | 1.4306  | 304L     | 304S12 | -              | Z2CN18.10   | 2352          | X2CrNi18.11   | F.3503                      | SCS19    |
|               | -                          | G-X6CrNi189       | 1.4308  | -        | 304C15 | -              | Z6CN18.10M  | -             | -             | -                           | SCS13    |
|               | Cr17Ni17                   | X12CrNi177        | 1.4310  | 301      | -      | -              | Z12CN17.07  | 2331          | X12CrNi1707   | F.3517                      | SUS301   |
|               | -                          | X2CrNi1810        | 1.4311  | 304LN    | 304S62 | -              | Z2CN18.10   | 2371          | -             | -                           | SUS304LN |
|               | 0Cr19Ni9                   | X5CrNi189         | 1.4350  | 304      | 304S31 | 58E            | Z6CN18.09   | -             | X5CrNi1810    | -                           | SUS304   |
|               | 0Cr17Ni11Mo2               | X5CrNi<br>Mo1712  | 1.4401  | 316      | 316S16 | Z6CND<br>17.11 | 1.4401      | 2347          | X5CrNiMo1712  | F.3543                      | SUS316   |
|               | 00Cr17Ni13Mo2              | X2CrNi<br>Mo17133 | 1.4429  | 316LN    | -      | -              | Z2CND17.13  | 2375          | -             | -                           | SUS316LN |
| 0Cr27Ni12Mo3  | X2CrNi<br>Mo18143          | 1.4435            | 316L    | 316S12   | -      | Z2CDN17.13     | 2353        | X2CrNiMo1713  | -             | SCS16                       |          |
| 00Cr19Ni13Mo3 | X2CrNi<br>Mo17133          | 1.4438            | 317L    | 317S12   | -      | Z2CND19.15     | 2367        | X2CrNiMo18.16 | -             | SUS317L                     |          |
| -             | X8CrNiMo275                | 1.4460            | 329L    | -        | -      | -              | 2324        | -             | -             | SUS329L;<br>SCH11;<br>SCS11 |          |



Material Conversion Table

| ISO        | Country and standard       |                  |         |          |                   |            |              |              |                |        |        |
|------------|----------------------------|------------------|---------|----------|-------------------|------------|--------------|--------------|----------------|--------|--------|
|            | China                      | International    | Germany | U.S.A.   | U.K.              |            | France       | Sweden       | Italy          | Spain  | Japan  |
|            | GB                         | DIN              | W.-nr   | AISI/SAE | BS                | EN         | AFNOR        | SS           | UNI            | UNE    | JIS    |
| M          | Austenitic stainless steel |                  |         |          |                   |            |              |              |                |        |        |
|            | 1Cr18Ni9Ti                 | X6CrNiTi1810     | 1.4541  | 321      | 2337              | 321S12     | Z6CNT18.10   | 58B          | X6CrNiTi1811   | F.3553 | SUS321 |
|            | 1Cr18Ni11Nb                | X6CrNiNb1810     | 1.4550  | 347      | 347S17            | 58F        | Z6CNNb18.1   | 2338         | X6CrNiTi1811   | F.3552 | SUS347 |
|            | Cr18Ni12Mo2Ti              | X6CrNiMoTi17122  | 1.4571  | 316Ti    | 320S17            | 58J        | Z6NDT17.12   | 2350         | X6CrNiMoTi17   | F.3535 | -      |
|            | -                          | G-X5CrNiMoNb1810 | 1.4581  | -        | 318C7             | -          | Z4CNDNb1812M | -            | XG8CrNiMo18    | -      | SCS22  |
|            | Cr17Ni12Mo3Nb              | X10CrNiMoNb1812  | 1.4583  | 318      | -                 | -          | Z6CNDNb1713B | -            | X6CrNiMoTiNb17 | -      | -      |
|            | 1Cr23Ni13                  | X15CrNiSi2012    | 1.4828  | 309      | 309S24            | -          | Z15CNS20.1   | -            | -              | -      | SUH309 |
|            | 0Cr25Ni20                  | X12CrNi2521      | 1.4845  | 310S     | 310S24            | -          | Z12CN2520    | 2361         | X6CrNi2520     | F.331  | SUH310 |
|            | Cr15Ni36W3Ti               | X12NiCrSi3616    | 1.4864  | 330      | -                 | -          | Z12CNS35.1   | -            | -              | -      | SUH330 |
|            | -                          | G-X40NiCrSi3818  | 1.4865  | -        | 330C11            | -          | -            | -            | XG50NiCr3919   | -      | SCH15  |
|            | 5Cr2Mn9Ni4N                | X53CrMnNiN219    | 1.4871  | EV8      | 349S54;<br>321S12 | -<br>58B   | Z52CMN21.0   | -            | X53CrMnNiN219  | -      | SUH35  |
| 1Cr18Ni9Ti | X12CrNiTi189               | 1.4878           | 321     | 321S320  | 58C               | Z6CNT18.12 | -            | X6CrNiTi1811 | F.3523         | SU321  |        |

| ISO | Country and standard |         |           |        |           |         |          |          |        |  |
|-----|----------------------|---------|-----------|--------|-----------|---------|----------|----------|--------|--|
|     | China                | Germany | U.S.A.    | U.K.   | France    | Sweden  | Italy    | Spain    | Japan  |  |
|     | GB                   | W.-nr   | AISI/SAE  | EN     | AFNOR     | SS      | UNI      | UNE      | JIS    |  |
| K   | Nodular cast iron    |         |           |        |           |         |          |          |        |  |
|     | QT400-18             | GGG40   | 60-40-18  | 400/17 | FGS370-17 | 0717-02 | GS370-17 | FGE38-17 | FCD400 |  |
|     | QT450-10             | --      | 65-45-12  | 420/12 | FGS400-12 | --      | GS400-12 | FGE42-12 | FCD450 |  |
|     | QT500-7              | GGG50   | 70-50-05  | 500/7  | FGS500-7  | 0727-02 | GS500-7  | FGE50-7  | FCD500 |  |
|     | QT600-3              | GGG60   | 80-60-03  | 600/7  | FGS600-2  | 0732-03 | GS600-2  | FGE60-2  | FCD600 |  |
|     | QT700-2              | GGG70   | 100-70-03 | 700/2  | FGS700-2  | 0737-01 | GS700-2  | FGE70-2  | FCD700 |  |
|     | QT800-2              | GGG80   | 120-90-02 | 800/2  | FGS800-2  | 0864-03 | GS800-2  | FGE80-2  | FCD800 |  |
|     | QT900-2              | --      | --        | 900/2  | --        | --      | --       | --       | --     |  |
|     | Grey cast iron       |         |           |        |           |         |          |          |        |  |
|     | --                   | GG40    | NO.60     | --     | FGL400    | 0140    | --       | --       | --     |  |
|     | HT350                | GG35    | NO.50     | 350    | FGL350    | 0135    | G35      | FG35     | FC350  |  |
|     | HT300                | GG30    | NO.45     | 300    | FGL300    | 0130    | G30      | FG30     | FC300  |  |
|     | HT250                | GG25    | NO.35     | 250    | FGL250    | 0125    | G25      | FG25     | FC250  |  |
|     | HT200                | GG20    | NO.30     | 200    | FGL200    | 0120    | G20      | FG20     | FC200  |  |
|     | HT150                | GG15    | NO.20     | 150    | FGL150    | 0115    | G15      | FG15     | FC150  |  |
|     | HT100                | --      | --        | 100    | --        | 0110    | G10      | --       | FC100  |  |

**Material Conversion table**

| ISO | Country and standard |               |          |            |        |              |        |            |       |       |
|-----|----------------------|---------------|----------|------------|--------|--------------|--------|------------|-------|-------|
|     | China                | International | Germany  | U.S.A.     | U.K.   | France       | Sweden | Italy      | Spain | Japan |
|     | GB                   | DIN           | W.-nr    | AISI/SAE   | BS     | AFNOR        | SS     | UNI        | UNE   | JIS   |
| N   | Al-based alloy       |               |          |            |        |              |        |            |       |       |
|     | ZAlSi7Mg             | Al-Si7Mg(Fe)  | ~AlSi7Mg | 356        | LM25   | A-S7G        | 4244   | 3599       | -     | AC4C  |
|     | ZAlSi7MgA            | Al-Si7Mg      | AlSi7Mg  | A356.0     | 2L99   | A-S7G03      | -      | 8024       | -     | AC4C  |
|     | ZAlSi12              | Al-Si12       | AlSi12   | 413;B413.0 | LM6    | A-S13        | 4261   | 4514       | -     | AC3A  |
|     | ZAlSi9Mg             | ~Al-Si10Mg    | AlSi9Mg  | 360        | LM9    | A-S9G;A-S10G | 4253   | 3051       | -     | AC4A  |
|     | -                    | Al-Si5        | AlSi5Mg  | A 443.0    | -      | -            | -      | 5077       | -     | -     |
|     | -                    | Al-Si5Fe      | -        | B443.0     | -      | -            | -      | GD-AiSi5Fe | -     | -     |
|     | -                    | (AlSi7Fe)     | -        | A444.0     | -      | -            | -      | -          | -     | -     |
| -   | Al-Si12Fe            | -             | 413      | LM20       | ~A-S12 | 4260         | 5079   | -          | ADC1  |       |

| ISO | Country and standard |                  |          |            |                  |            |        |       |       |       |
|-----|----------------------|------------------|----------|------------|------------------|------------|--------|-------|-------|-------|
|     | China                | International    | Germany  | U.S.A.     | U.K.             | France     | Sweden | Italy | Spain | Japan |
|     | GB                   | DIN              | W.-nr    | AISI/SAE   | BS               | AFNOR      | SS     | UNI   | UNE   | JIS   |
| S   | Ni-based alloy       |                  |          |            |                  |            |        |       |       |       |
|     | -                    | S-NiCr13A16MoNb  | LW2 4670 | 5391       | mar - 46         | NC12AD     | -      | -     | -     | -     |
|     | -                    | NiCo15Cr10MoAlTi | LW2 4674 | AMS 5397   | -                | -          | -      | -     | -     | -     |
|     | -                    | NiFe35Cr14MoTi   | LW2.4662 | 5660       | -                | ZSNCDT42   | -      | -     | -     | -     |
|     | -                    | NiCr19Fe19NbMo   | LW2.4668 | 5383       | HR8              | NC19eNB    | -      | -     | -     | -     |
|     | -                    | NiCr20TiAk       | 2.4631   | -          | Hr401.601        | NC20TA     | -      | -     | -     | -     |
|     | -                    | NiCr19Co11MoTi   | 2.4973   | AMS 5399   | -                | NC19KDT    | -      | -     | -     | -     |
|     | -                    | NiCr19Fe19NbMo   | LW2.4668 | AMS 5544   | -                | NC20K14    | -      | -     | -     | -     |
|     | -                    | -                | 2.4603   | 5390A      | -                | NC22FeD    | -      | -     | -     | -     |
|     | -                    | NiCr22Mo9Nb      | 2.4856   | 5666       | -                | NC22FeDNB  | -      | -     | -     | -     |
|     | -                    | NiCr20Ti         | 2.4630   | -          | HR5.203-4        | NC20T      | -      | -     | -     | -     |
|     | -                    | NiCu30AL3Ti      | 2.4375   | 4676       | 3072-76          | -          | -      | -     | -     | -     |
|     | Co-based alloy       |                  |          |            |                  |            |        |       |       |       |
|     | -                    | CoCr20W15Ni      | -        | 5537C,AMS  | -                | KC20WN     | -      | -     | -     | -     |
|     | -                    | CoCr22W14Ni      | LW2.4964 | 5772       | -                | KC22WN     | -      | -     | -     | -     |
|     | Ti-alloy             |                  |          |            |                  |            |        |       |       |       |
|     | -                    | TiAl5Sn2.5       | 3.7115.1 | UNS R54520 | TA14/17          | T-A5E      | -      | -     | -     | -     |
|     | -                    | -                | -        | -          | -                | UNS R56400 | -      | -     | -     | -     |
|     | -                    | TiAl6V4          | 3.7165.1 | -          | TA10-13/<br>TA28 | UNS R56401 | -      | T-A6V | -     | -     |
|     | -                    | TiAl5V5Mo5Cr3    | -        | -          | -                | -          | -      | -     | -     | -     |
| -   | TiAl4Mo4Sn4Si0.5     | 3.7185           | -        | -          | -                | -          | -      | -     | -     |       |

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| TPMT-PC2     | 62  | WNMG-KC4     | 53  |          |     |
| TPMX-DH      | 283 | WNMG-MB2     | 52  |          |     |
|              |     | WNMG-MC3     | 52  |          |     |













ООО "КоРУН"

445043, Россия, г. Тольятти, ул. Коммунальная, 39  
тел./факс +7 (8482) 39-21-80  
info@co-run.ru

CoRUN LTD

39 Kommunalnaya street, Togliatti, Russia,  
445043 tel./fax: +7 (8482) 39-21-80

info@co-run.ru



WWW.CO-RUN.RU

