

CERABIT

CUTTING TOOLS

- CERAMIC
- CERMET
- PCBN/PCD
- TOOL HOLDER
- MILLING CUTTER

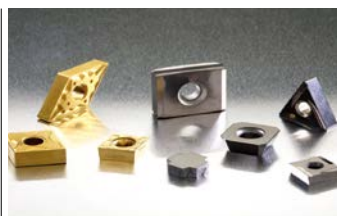


union
materials

SPEEDY SOLUTION!!



A22



A82



A106



A130

High Speed !

High Quality !

High Performance !



A178



B1



C1



D1

INTRODUCTION

Union Materials Corporation has accumulated technologies and experiences over 40 years through developing and manufacturing various high-tech materials. Including hard ferrite magnets which are awarded Best Supplier from Robert Bosch GmbH for seven times consecutively in last 18 years, Union Materials Corporation manufactures various ceramic-based parts, cutting tools and industrial ceramics for automotive, electrical & electronic engineering and machinery industry.

Union cutting tool products are advanced materials developed with high technologies through long-term experiences, continuous studies and applications to commercialization of new materials. We have attained many great achievements in the field of various cutting tools for automotive, steel mill, aerospace and machinery field.

As of March 14 2017, Union Corporation has been the largest shareholder of Union Materials Corporation. We started new era with new company name, Union Materials Corporation since September 28, 2017 in accordance with the change of major shareholder which was originally Ssangyong Cement to Union Corporation.

Union Materials Corporation firmly promises to engage in its current business activities and will endeavor to support our customers for satisfaction.



Seoul HQ Office



Daegu plant

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UNION MATERIALS

CUTTING TOOLS

A

TURNING &

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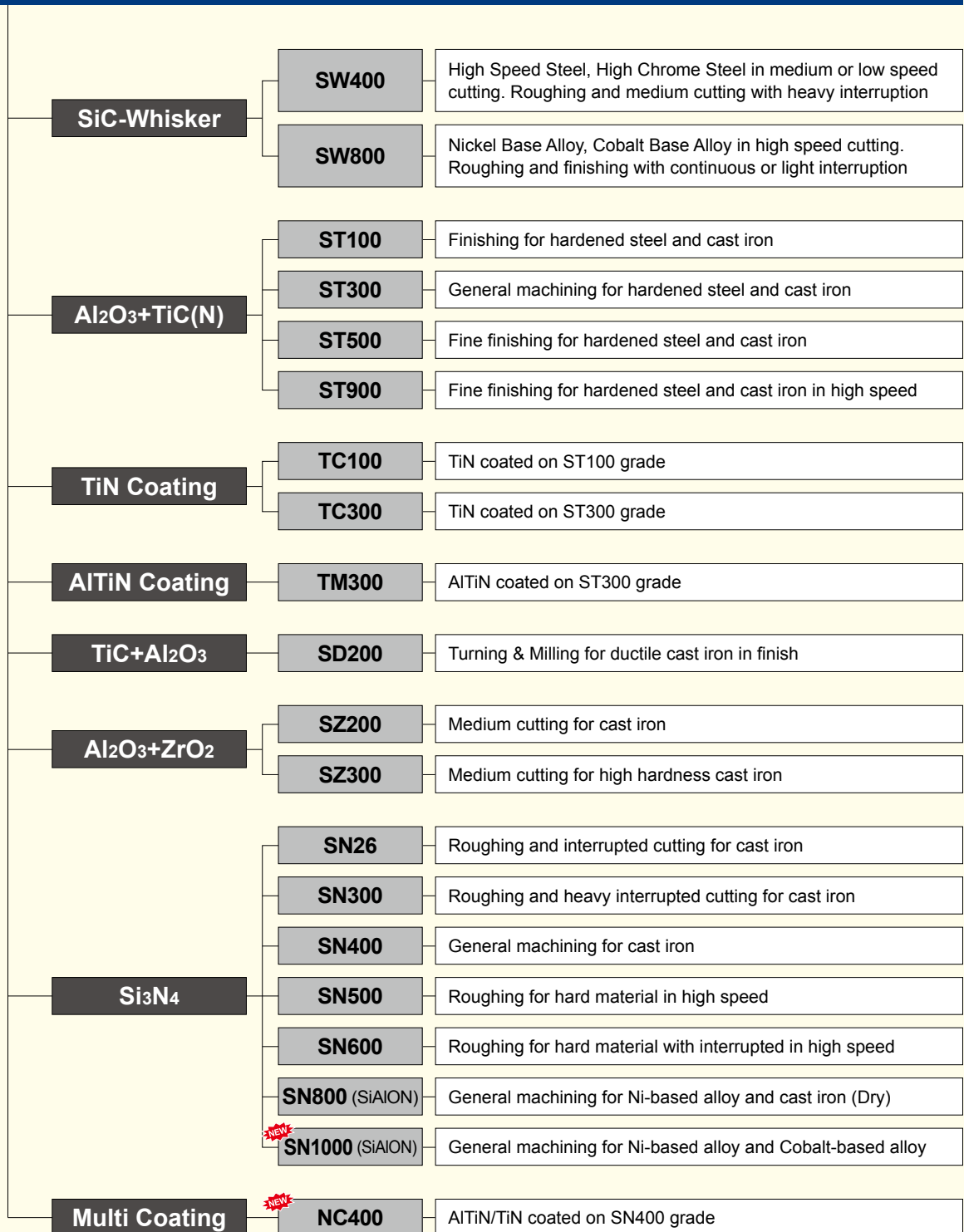
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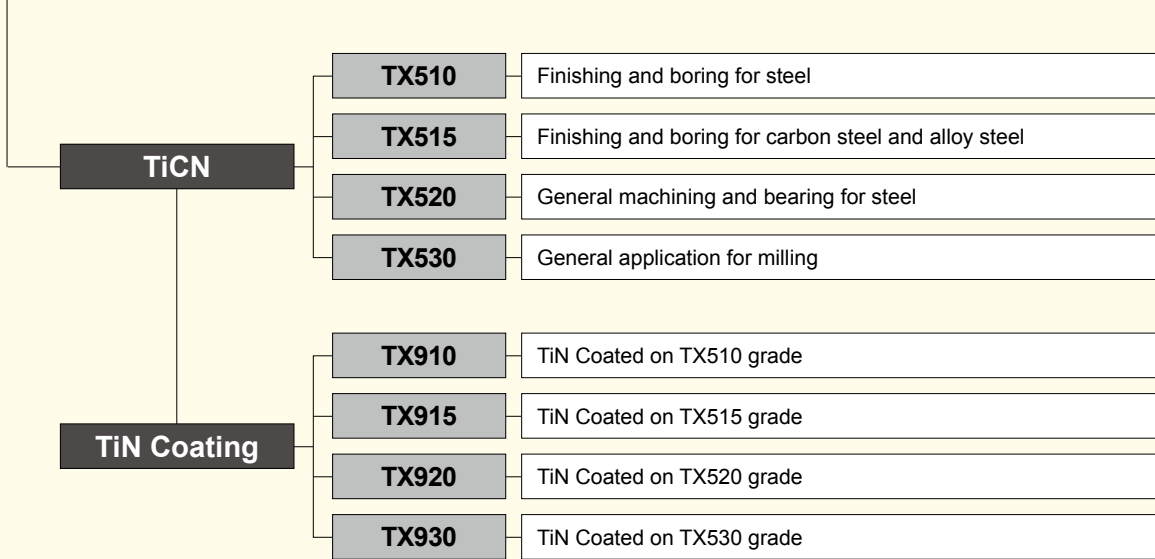
MILLING

GRADE INFORMATION

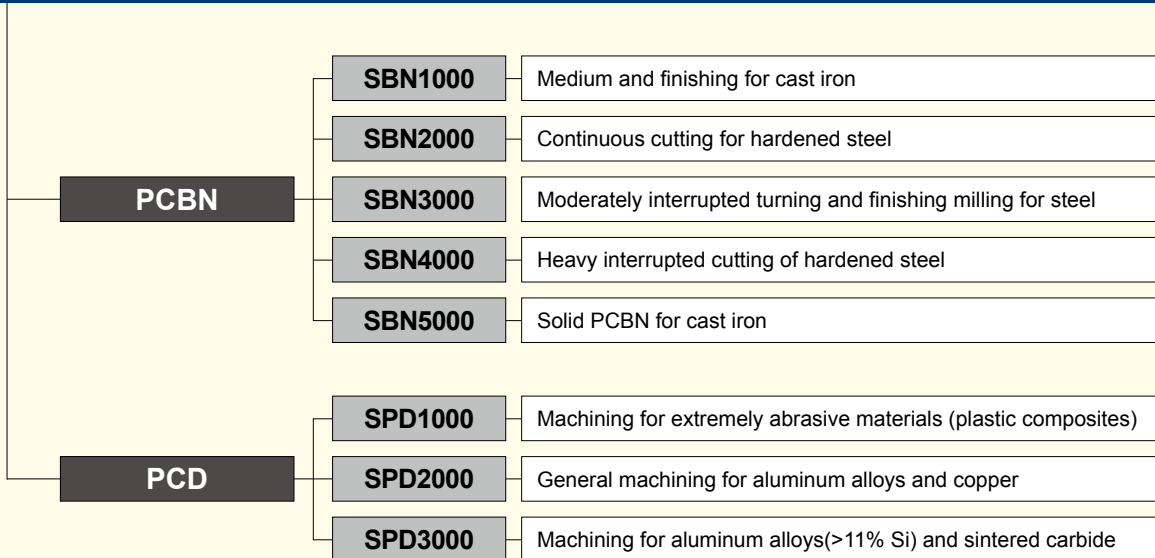
CERAMIC



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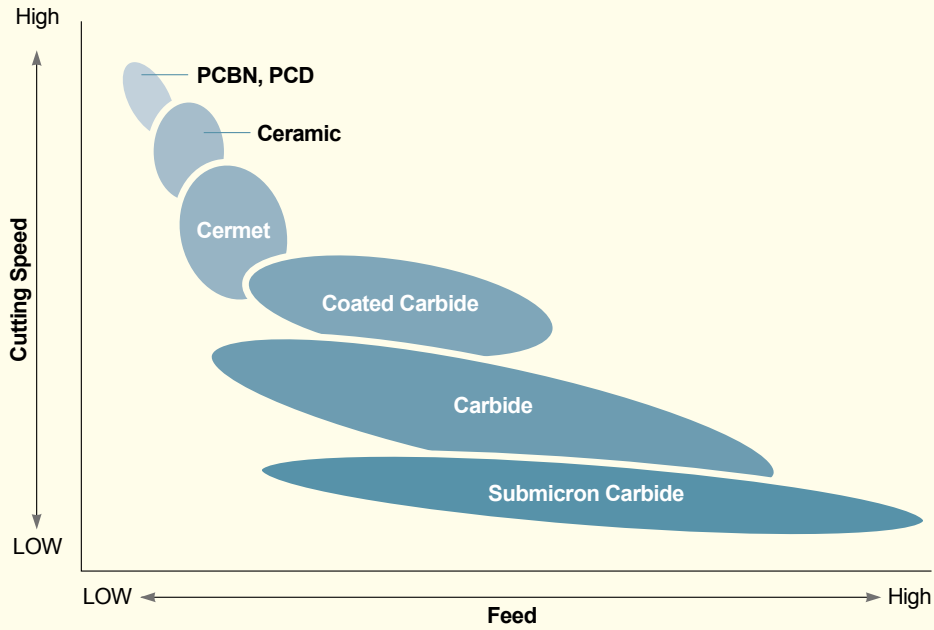


PCBN/PCD

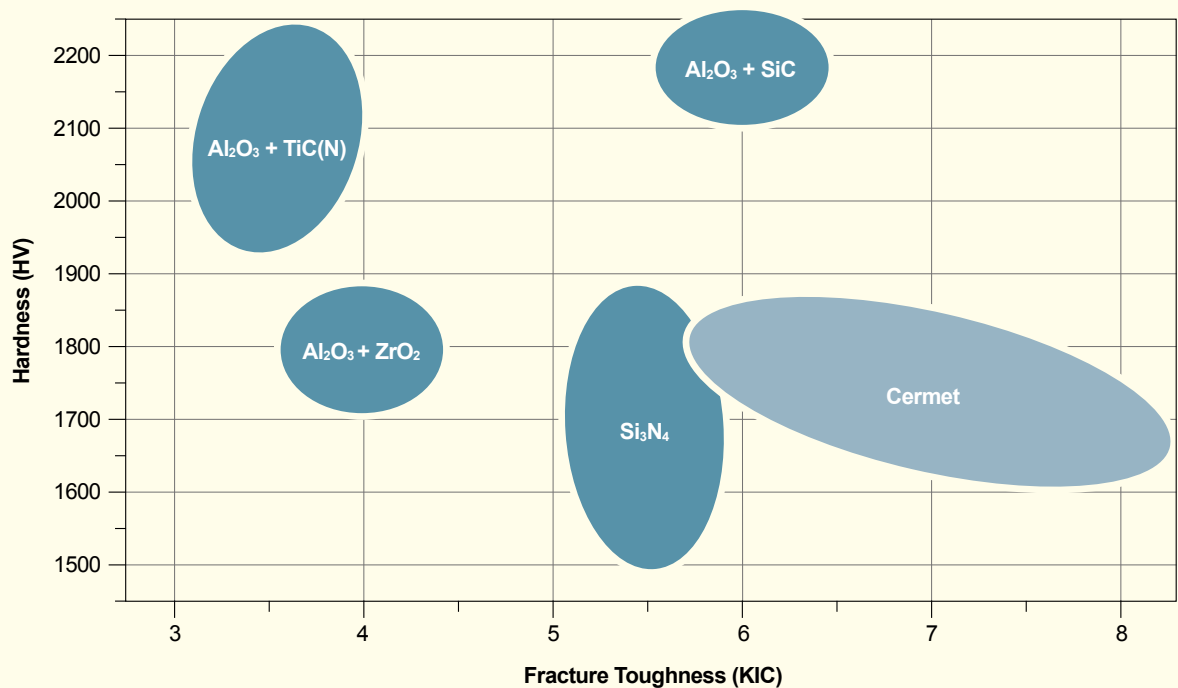


GRADE INFORMATION

Application Range



Mechanical Properties



CERAMIC



Union Ceramics take pride in its outstanding wear resistance and thermal shock resistance with high speed cutting. Pure raw materials give stability and fine microstructure to the products. Through HIP process, shaped bodies are completely condensed so that the finished goods are strong and resistant against fracture and wear.

- Improved work efficiency by increasing cutting speed on extremely higher than carbide inserts.
- Longer tool life through excellent wear resistance
- Precise cutting and superior surface roughness

| | | | | | | |
|--|---------------------------------------|--|--|--|--|---------------------------------|
| | Whisker | SW400 | Excellent flank & notch wear in high speed cutting Al ₂ O ₃ +SiC | High Speed Steel, High Chrome Steel in medium or low speed cutting Roughing and medium cutting with heavy interruption | Tougher | |
| | | SW800 | Excellent flank & notch wear in high speed cutting Al ₂ O ₃ +SiC | Nickel Base Alloy, Cobalt Base Alloy in high speed cutting Roughing and finishing with continuous or light interruption | Harder | |
| | Al ₂ O ₃ Series | ST100 | Tougher alternative to ST300 High thermal shock resistance Al ₂ O ₃ +TiC | Universal grade for machining cast iron and hardened steel | Tougher | |
| | | ST300 | Excellent wear resistance Al ₂ O ₃ +TiCN | A basic choice for machining hardened steel and alloy steel | | |
| | | ST500 | Alternative to PCBN fine microstructure Al ₂ O ₃ +TiCN | Fine finishing for hardened steel and cast iron | | |
| | | ST900 | Excellent wear and thermal shock resistance Al ₂ O ₃ +TiCN | Fine finishing for hardened steel and cast iron in high speed | | |
| | | TC100 | Wear resistance improved TiN coated | Finishing for hardened steel and cast iron | | |
| | | TC300 | Excellent wear resistance TiN coated | Finishing for hardened steel and cast iron | | |
| | | TM300 | Excellent wear resistance & thermal shock resistance | Finishing for hardened steel and cast iron | | Harder |
| | | SD200 | High thermal shock resistance Usable with coolant TiC+Al ₂ O ₃ | Machining ductile cast iron Finishing for ductile cast iron and hard materials | | Finishing for ductile cast iron |
| | ZrO ₂ Series | SZ200 | Toughened by zirconia High chemical stability Al ₂ O ₃ +ZrO ₂ | Finishing, semi-finishing of cast iron and steel | Tougher | |
| | | SZ300 | Harder alternative to SZ200 Al ₂ O ₃ +ZrO ₂ | Finishing, semi-finishing of cast iron and steel | Harder | |
| | Si ₃ N ₄ Series | SN26 | Good toughness and thermal shock resistance Well balanced wear resistance and toughness Si ₃ N ₄ | First choice for roughing with interrupted cuts Roll turning and milling of cast iron and steel | Roughing in lower speed | |
| | | SN300 | Tougher alternative to SN400 Thermal shock resistance and good toughness Si ₃ N ₄ | Roughing and high speed cutting with interruption | Tougher | |
| | | SN400 | Excellent wear resistance in high speed cutting Si ₃ N ₄ | First choice for roughing of cast iron High speed machining with interrupted cuts | Harder | |
| | | SN500 | Harder alternative to SN400 Improved wear resistance at high cutting speed Si ₃ N ₄ | High speed roughing for cast iron | | |
| | | SN600 | Excellent wear resistance in interrupted cutting Si ₃ N ₄ | Roughing for hard material with interruption and high speed | Harder | |
| | | SN800 | Advanced grade with SiAlON contained superior edge strength SiAlON | Great performance against notch wear High speed roughing of high temperature alloy and inconel | Harder | |
| | | SN900 | Excellent thermal shock resistance and thermal conductivity SiAlON | Tough machining in Heat Resistance Super Alloy (HRSA) | Tougher | |
| | | | SN1000 | Excellent thermal shock resistance and thermal conductivity SiAlON | Ni-based Alloy, Cobalt-based Alloy in medium or low speed cutting Roughing and Medium cutting with heavy interruption | |
| | NC400 | Excellent wear resistance & thermal shock resistance | Cast Iron in roughing and semi-finishing cutting | | | |

GRADE INFORMATION

Physical Properties

| Grade | Composition | Color | Density (g/cm ³) | Hardness (HV) | Toughness (MPa·m ^{1/2}) | Thermal Conductivity (cal/cm. sec. °C) |
|--|--|-------|------------------------------|---------------|-----------------------------------|--|
| SW400 | Al ₂ O ₃ +SiC | Green | 3.8 | 2,100 | 7.0 | - |
| SW800 | Al ₂ O ₃ +SiC | Green | 3.7 | 2,100 | 7.0 | - |
| ST100 | Al ₂ O ₃ +TiC | Black | 4.20 | 2,100 | 4.00 | 0.08 |
| ST300 | Al ₂ O ₃ +TiCN | Black | 4.40 | 2,150 | 4.50 | 0.08 |
| ST500 | Al ₂ O ₃ +TiCN | Black | 4.30 | 2,200 | 4.50 | 0.08 |
| ST900 | Al ₂ O ₃ +TiCN | Black | 4.30 | 2,250 | 4.70 | 0.08 |
| TC100 | ST100+TiN PVD | Gold | 4.20 | 2,150 | 4.00 | - |
| TC300 | ST300+TiN PVD | Gold | 4.40 | 2,200 | 4.50 | - |
| TM300 | ST300+AlTiN PVD | Black | 4.40 | 2,250 | 4.50 | |
| SD200 | TiC+Al ₂ O ₃ | Black | 4.60 | 2,200 | 4.50 | 0.07 |
| SZ200 | Al ₂ O ₃ +ZrO ₂ | White | 4.00 | 1,800 | 4.50 | 0.07 |
| SZ300 | Al ₂ O ₃ +ZrO ₂ | Pink | 4.10 | 1,850 | 4.50 | 0.07 |
| SN26 | Si ₃ N ₄ | Black | 3.30 | 1,600 | 5.00 | 0.06 |
| SN300 | Si ₃ N ₄ | Gray | 3.20 | 1,600 | 6.00 | 0.05 |
| SN400 | Si ₃ N ₄ | Gray | 3.20 | 1,650 | 6.00 | 0.05 |
| SN500 | Si ₃ N ₄ | Gray | 3.20 | 1,700 | 6.00 | 0.05 |
| SN600 | Si ₃ N ₄ | Black | 3.20 | 1,700 | 6.50 | 0.07 |
| SN800 | Si ₃ N ₄ | Black | 3.20 | 1,900 | 6.00 | 0.04 |
| SN1000  | Si ₃ N ₄ +Al ₂ O ₃ | Black | 3.3 | 1,800 | 7.00 | |
| NC400  | SN400+PVD (AlTiN/TiN) | Gold | 3.2 | 1,650 | 6.00 | |

Choice of Ceramic Grade for Workpiece

| | ST100/ST300 ST500/ST900 TC100/TC300 TM300 | SD200 | SZ200 SZ300 | SN26 SN300/SN400 SN500/SN600 NC400 | SN800 SN1000 | SW400 | SW800 |
|-----------|--|-------|----------------|---|-----------------|-------|-------|
| Cast Iron | Gray Cast Iron | ⊙ | ○ | ⊙ | ○ | | |
| | Chilled Cast Iron | ⊙ | | ⊙ | ⊙ | | |
| | Ductile Cast Iron | ○ | ⊙ | | ○ | | ○ |
| Steel | Mild Steel | | ○ | | | | |
| | Carbon Steel | | ○ | | | | |
| | Alloy Steel | ⊙ | | ○ | | ⊙ | ○ |
| | Forged Steel | ⊙ | | | | | |
| | Heat Treated Steel | ⊙ | | | | | |
| | High Speed Steel | ⊙ | | | | | ⊙ |
| | High Manganese Steel | ○ | | | ○ | ○ | ⊙ |
| | Stainless Steel | | | | | | |
| | Heat Resistant Steel | ○ | | | ○ | ○ | ○ |
| | Super Alloy Steel | ○ | | | ○ | ⊙ | ⊙ |
| Inconel | | | | | ⊙ | ○ | |

⊙ : Excellent ○ : Good

Choice of Ceramic Grade for Workpiece

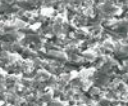
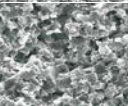

| Application | Grade | Workpiece | Machining Type | Speed (V) (m/min) | Feed (f) (mm/rev) | Depth (DOC) (mm) | | |
|----------------|---|---|--|---------------------|--------------------|---------------------|------------|-----|
| Turning | ST100 ST300 ST500 ST900 TC100 TC300 TM300 | Gray Cast Iron | Gray Cast Iron (FC) | Rough | 150 ~ 800 | 0.2 ~ 0.5 | 3 ~ 6 | |
| | | | Malleable (FCMB) | Finish | 200 ~ 1,200 | 0.3 ~ 0.5 | 0.1 ~ 0.5 | |
| | | | Chilled Cast Iron | Rough | 30 ~ 100 | 0.1 ~ 0.2 | 0.5 ~ 1.5 | |
| | | | | Finish | 50 ~ 200 | 0.05 ~ 0.15 | 0.1 ~ 0.5 | |
| | | Steel | Carbon Steel Alloy Steel Bearing Steel | Rough | 150 ~ 400 | 0.2 ~ 0.5 | 2 ~ 5 | |
| | | | | Finish | 200 ~ 800 | 0.05 ~ 0.2 | 0.1 ~ 0.5 | |
| | | Hard Steel (HRC 45≥) | Rough | 20 ~ 100 | 0.1 ~ 0.2 | 0.5 ~ 1.5 | | |
| | | | Finish | 40 ~ 200 | 0.05 ~ 0.5 | 0.1 ~ 0.5 | | |
| | SD200 | Ductile Cast Iron Nodular Cast Iron | Rough | 100 ~ 400 | 0.1 ~ 0.2 | 1 ~ 2 | | |
| | | | Finish | 200 ~ 800 | 0.05 ~ 0.25 | 0.1 ~ 0.5 | | |
| | SZ200 SZ300 | Gray Cast Iron (FC) Steel (HRC 45≤) | Rough | 200 ~ 700 | 0.2 ~ 0.4 | 2 ~ 5 | | |
| | | | Finish | 300 ~ 1,200 | 0.05 ~ 0.3 | 0.1 ~ 0.5 | | |
| | NEW | SN26 SN300 SN400 SN500 SN600 NC400 | Gray Cast Iron | Gray Cast Iron (FC) | Rough | 150 ~ 1,100 | 0.3 ~ 0.8 | < 5 |
| | | | | Malleable (FCMB) | Finish | 250 ~ 1,200 | 0.15 ~ 0.4 | < 1 |
| | | | Chilled Cast Iron | Rough | 20 ~ 100 | 1.0 ~ 2.0 | < 5 | |
| Finish | | | | 60 ~ 200 | 0.5 ~ 1.0 | < 1 | | |
| NEW | SN800 SN1000 | Ni-Based Alloy | Rough | 150 ~ 250 | 0.2 ~ 0.4 | < 5 | | |
| | | Non-Ferrous Metal Inconel | Finish | 150 ~ 450 | 0.1 ~ 0.2 | < 1 | | |
| SW400 SW800 | High temperature alloys Inconel Stellite | Rough | 180 ~ 360 | 0.1 ~ 0.25 | 1 ~ 3 | | | |
| | | Finish | 180 ~ 450 | 0.1 ~ 0.30 | 0.5 ~ 2.0 | | | |
| Milling | SN26 SN300 SN400 | Gray Cast Iron (FC) | Rough | 100 ~ 1,200 | 0.3 ~ 0.5 | < 5 | | |
| | | | Finish | 150 ~ 1,500 | 0.3 ~ 0.7 | < 3 | | |
| | | | | | | | | |
| | NEW | SN500 SN600 NC400 | Ductile Cast Iron Alloy Steel | Rough | 90 ~ 500 | 0.1 ~ 0.3 | < 5 | |
| | | | | Finish | 100 ~ 700 | 0.1 ~ 0.4 | < 3 | |
| | | | | | | | | |
| | NEW | SN800 SN1000 | High temperature alloys Inconel Stellite | Finish | 700 ~ 1,000 | 0.05 ~ 0.15 / tooth | 0.5 ~ 2.5 | |
| | | | | | | | | |
| | SW400 SW800 | High temperature alloys Inconel | Rough | 150 ~ 400 | 0.05 ~ 0.1 / tooth | 1 ~ 3 | | |
| | | | | | | | | |

GRADE INFORMATION

CERMET

A matrix of TiCN with carbide as a metal binder, Union Cermets are tougher than ceramics and harder than tungsten carbides. It shows greater wear resistance than carbide and its cutting speed is also much higher than carbide. Cermet inserts give excellent surface finish and high-speed machining.

- Four different grades for different workpiece and cutting condition.
- Ideal for high-speed finishing and milling of mild steel, carbon steel and alloy steel.
- Excellent performance in turning, grooving, boring, bearing and milling.

| | | | | |
|--|-------|---|--|-----------------------------|
|  | TX510 | Excellent wear resistance Outstanding surface finish TiCN | Fine-finishing and boring for steel | Harder ↑ ↓ Tougher |
| | TX910 | TiN coating | | |
|  | TX515 | Wear resistance and high mechanical strength TiCN | Finishing and boring for carbon steel and alloy steel | |
| | TX915 | TiN coating | | |
|  | TX520 | Excellent thermal conductivity and wear resistance TiCN | The first choice for machining steel Turning, grooving, boring and bearing for steel | |
| | TX920 | TiN coating | | |
| | TX530 | The toughest cermet grade TiCN | | |
| | TX930 | TiN coating | | |
| | | | Wide range of milling for steel materials | |

Physical Properties

| Grade | Composition | Color | Density (g/cm ³) | Hardness (HRA) | Toughness (MPa·m ^{1/2}) | Thermal Conductivity (cal/cm. sec. °C) |
|-------|---------------|--------|---------------------------------|-------------------|--------------------------------------|---|
| TX510 | TiCN | Silver | 6.50 | 93.50 | 7.00 | 0.08 |
| TX515 | TiCN | Silver | 6.48 | 93.00 | 7.50 | 0.08 |
| TX520 | TiCN | Silver | 6.53 | 92.50 | 8.00 | 0.09 |
| TX530 | TiCN | Silver | 6.35 | 91.00 | 8.40 | 0.09 |
| TX910 | TX510+TiN PVD | Gold | 6.50 | 98.50 | 7.00 | - |
| TX915 | TX515+TiN PVD | Gold | 6.48 | 98.00 | 7.50 | - |
| TX920 | TX520+TiN PVD | Gold | 6.53 | 97.50 | 8.00 | - |
| TX930 | TX530+TiN PVD | Gold | 6.35 | 96.00 | 8.40 | - |

Choice of Ceramic Grade for Workpiece

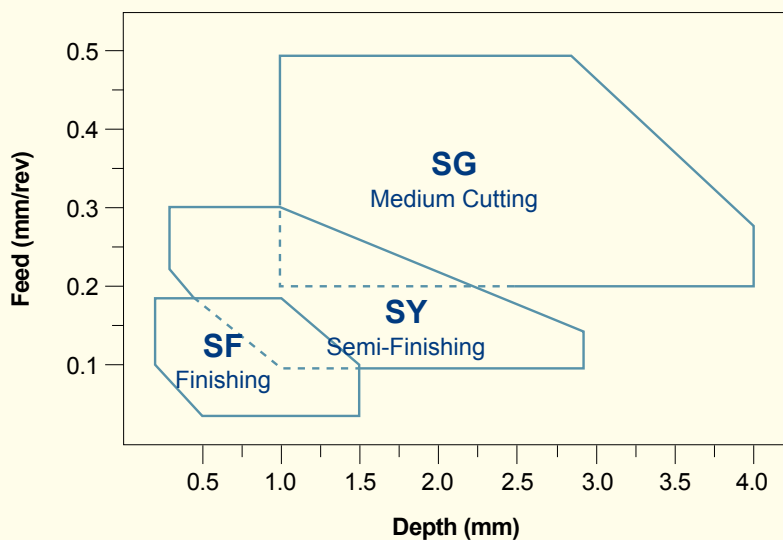
| | TX510/TX910 | TX515/TX915 | TX520/TX920 | TX530/TX930 |
|----------------------|-------------|-------------|-------------|-------------|
| MILD STEEL | ◎ | ◎ | ◎ | ○ |
| CARBON STEEL | ◎ | ◎ | ◎ | ◎ |
| ALLOY STEEL | ○ | ○ | ○ | ○ |
| FORGED STEEL | ◎ | | | |
| HEAT TREATED STEEL | ◎ | | | |
| HEAT RESISTANT STEEL | | ◎ | ◎ | ◎ |




◎ : Excellent ○ : Good

Choice of Ceramic Grade for Workpiece

| Application | Grade | Workpiece | Machining Type | Speed (V) (m/min) | Feed (f) (mm/rev) | Depth (DOC) (mm) |
|-------------|-------------|---------------------------------------|---------------------|-------------------|-------------------|------------------|
| Turning | TX510/TX910 | Mild Steel, Carbon Steel, Alloy Steel | Finishing | 100 ~ 600 | 0.03 ~ 0.3 | 0.1 ~ 1.5 |
| | TX515/TX915 | Mild Steel, Carbon Steel, Alloy Steel | Finishing Medium | 100 ~ 500 | 0.03 ~ 0.3 | 0.1 ~ 2.0 |
| | TX520/TX920 | Bearing Steel, General Steel | Finishing Medium | 100 ~ 400 | 0.03 ~ 0.3 | 0.1 ~ 2.0 |
| Milling | TX530/TX930 | Mild Steel, Carbon Steel, Alloy Steel | Medium | 100 ~ 400 | 0.1 ~ 0.3 | < 5 |
| | | | Roughing | 100 ~ 500 | 0.1 ~ 0.5 | < 3 |

Choice of Chipbreaker



| Chipbreaker Type | Shape | Machining Type | Characteristics |
|------------------|---|----------------|---|
| SF |  | Finishing | Sharp and narrow C/B Optimum for D=0.10~1.50, f=0.05~0.20 Specialized for shaft machining |
| SY |  | Semi-finishing | General performing C/B Optimum for D=0.30~2.50, f=0.10~0.30 Low carbon steel, pipe (STKM) machining |
| SG |  | Medium cutting | Wider C/B design Optimum for D=1.00~5.00, f=0.20~0.50 Low carbon steel |

Recommended Cutting Conditions

| Application | Grade | Workpiece | Speed (V) (m/min) | Feed (f) (mm/rev) | Depth (DOC) (mm) | |
|--------------------------------------|------------------------|---|---|----------------------|---------------------|-------------|
| Turning | PCBN | SBN1000 | Cast iron | 400 ~ 1,000 | 0.15 ~ 0.45 | 0.10 ~ 2.00 |
| | | | High hardened cast iron | 75 ~ 150 | 0.15 ~ 0.30 | 0.10 ~ 1.80 |
| | | | Nodular cast iron roll | 45 ~ 60 | 0.60 ~ 0.80 | 2.00 ~ 3.50 |
| | | | Carbide roll | 10 ~ 15 | 0.15 ~ 0.25 | 0.50 ~ 2.50 |
| | | SBN2000 | High hardened steel (roughing) | 60 ~ 140 | 0.15 ~ 0.40 | 0.70 ~ 2.30 |
| | SBN2000 | High hardened steel (finishing, >H _R C 45) | 100 ~ 140 | 0.10 ~ 0.20 | 0.10 ~ 0.75 | |
| | | Hardened alloy steel (>H _R C 35) | 100 ~ 240 | 0.05 ~ 0.30 | 0.10 ~ 2.50 | |
| | SBN3000 | Hardened steel | 80 ~ 160 | 0.02 ~ 0.20 | <0.5 | |
| | | Heat resistance sintered steel | 50 ~ 100 | 0.05 ~ 0.20 | <0.5 | |
| | SBN4000 | Hardened steel | 120 ~ 250 | 0.025 ~ 0.50 | 0.05 ~ 0.30 | |
| | | Powder metal & Sintered irons | 200 ~ 400 | 0.025 ~ 0.20 | 0.05 ~ 0.20 | |
| | | superalloys | 200 ~ 400 | 0.10 ~ 0.30 | 0.20 ~ 2.00 | |
| | SBN5000 | Cast iron | 500 ~ 2,000 | 0.10 ~ 0.50 | <0.5 | |
| | | Ductile cast iron | 200 ~ 600 | 0.10 ~ 0.40 | <0.5 | |
| Hard cast iron (H _R C 59) | | 50 ~ 150 | 0.10 ~ 1.00 | <0.5 | | |
| PCD | SPD1000 | Plastic alloy | 300 ~ 1,000 | 0.05 ~ 0.25 | 0.05 ~ 3.00 | |
| | | Wood | 1,000 ~ 2,500 | 0.10 ~ 0.50 | 0.20 ~ 4.50 | |
| | SPD2000 | Aluminum / Zinc / Copper | 600 ~ 1,000 | 0.05 ~ 0.25 | 0.05 ~ 0.30 | |
| | SPD2000 | Aluminum alloy (Si 4~8%) | 800 ~ 2,500 | 0.10 ~ 0.30 | 0.05 ~ 3.00 | |
| | | (Si 9~14%) | 500 ~ 1,290 | 0.10 ~ 0.30 | 0.05 ~ 3.00 | |
| | SPD3000 | (Si 16~18%) | 300 ~ 600 | 0.10 ~ 0.30 | 0.05 ~ 3.00 | |
| SPD3000 | Powdered Carbide Piece | 50 ~ 250 | 0.10 ~ 0.40 | 0.10 ~ 4.00 | | |
| | Sintered Carbide | 20 ~ 40 | 0.05 ~ 0.20 | 0.02 ~ 0.45 | | |
| Milling | PCBN | SBN1000 | Cast iron (H _B 180~230) | 400 ~ 1,000 | 0.12 ~ 0.30 | 0.20 ~ 2.00 |
| | | | Hardened cast iron (>H _B 400) | 120 ~ 240 | 0.12 ~ 0.30 | 0.20 ~ 2.00 |
| | | SBN2000 | Hardened steel (>H _R C 45) | 120 ~ 240 | 0.10 ~ 0.25 | 0.12 ~ 1.00 |
| | | | Hardened alloy steel (>H _R C 35) | 120 ~ 240 | 0.10 ~ 0.35 | 0.10 ~ 1.00 |
| | SBN3000 | Hardened steel (>H _R C 45) | 100 ~ 200 | 0.10 ~ 0.15 | <0.5 | |
| | SBN4000 | Hardened steel | 150 ~ 250 | 0.025 ~ 0.30 | 0.05 ~ 0.20 | |
| | PCD | SPD3000 | Aluminum alloy (<Si 14%) | 300 ~ 3,000 | 0.10 ~ 0.25 | 0.12 ~ 1.00 |
| (>Si 15%) | | | 100 ~ 240 | 0.10 ~ 0.35 | 0.10 ~ 1.00 | |

Physical Properties

| Grade | Contents of pCBN (%) | Particle size (μm) | Hardness (HV) |
|---------|----------------------|--------------------|---------------|
| SBN1000 | 95 | 3 | 3,900 |
| SBN2000 | 50 | 1 | 2,700 |
| SBN3000 | 60 | 2 | 2,700 |
| SBN4000 | 65 | 5 | 2,900 |
| SBN5000 | 93 | 10 | 3,900 |

| Grade | Particle size (μm) | Hardness (HV) |
|---------|--------------------|----------------|
| SPD1000 | 4 ~ 5 | 6,000 ~ 8,000 |
| SPD2000 | 8 ~ 9 | 7,000 ~ 9,000 |
| SPD3000 | 15 ~ 22 | 8,000 ~ 10,000 |

APPLICATION INDEX

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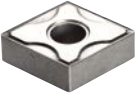


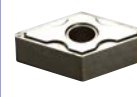




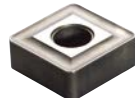


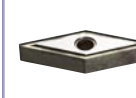




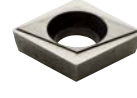




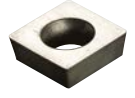
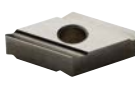


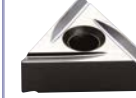


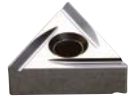

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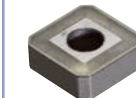




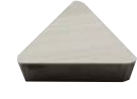



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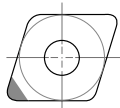
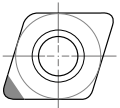
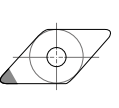
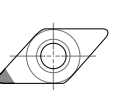
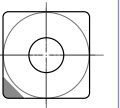
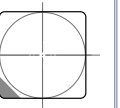
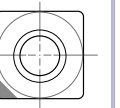
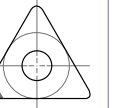
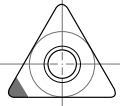
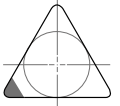
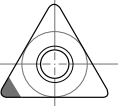
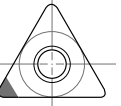
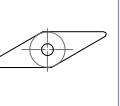
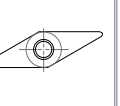
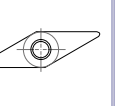
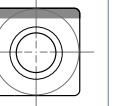
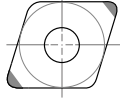
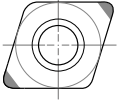
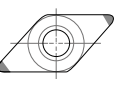
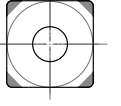
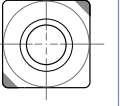
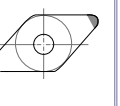
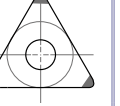
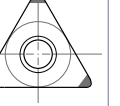
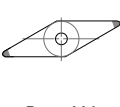
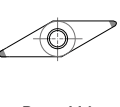
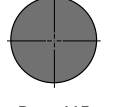
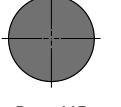
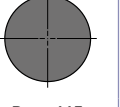
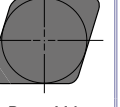
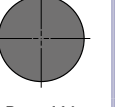
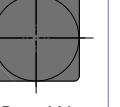

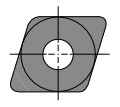
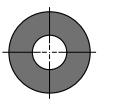
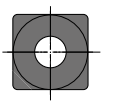
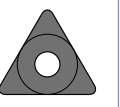
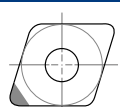
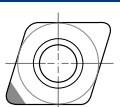



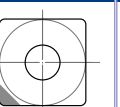
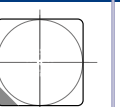
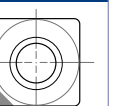
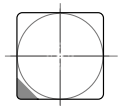
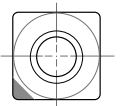
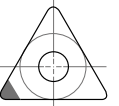
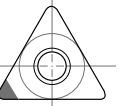

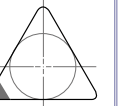
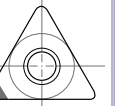
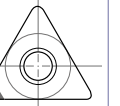
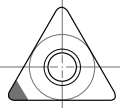
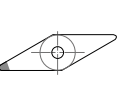
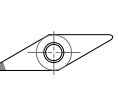
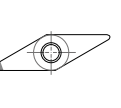
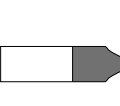
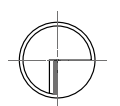
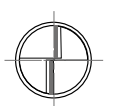

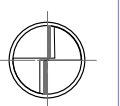
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|  | |  |  |  | | | | | |
| Page 122 | | Page 122 | Page 122 | Page 123 | | | | | |
| SPECIAL | | NOTCH BITE | SFE .. 1C | SFE .. 2C | SBE .. 1C | SBE .. 2C | | | |
| |  |  |  |  |  | | | | |
| | Page 124 | Page 125 | Page 125 | Page 126 | Page 126 | | | | |

IDENTIFICATION SYSTEM

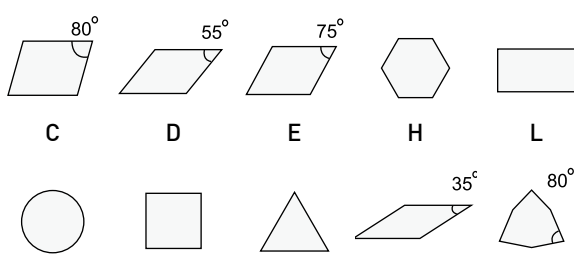
ISO
ASA

TURNING

| | | | |
|----------|----------|----------|----------|
| S | N | G | N |
| S | N | G | N |
| S | P | K | N |
| 1 | 2 | 3 | 4 |

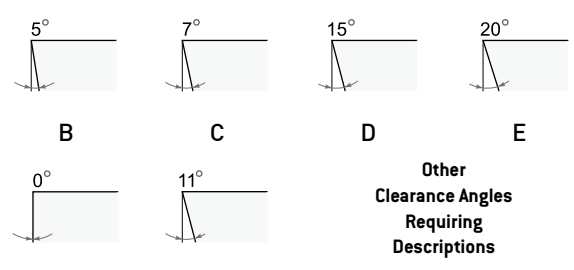
MILLING

1 Shape



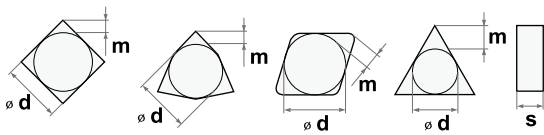
C D E H L
R S T V W

2 Clearance Angle



B C D E
N P O

3 Tolerance

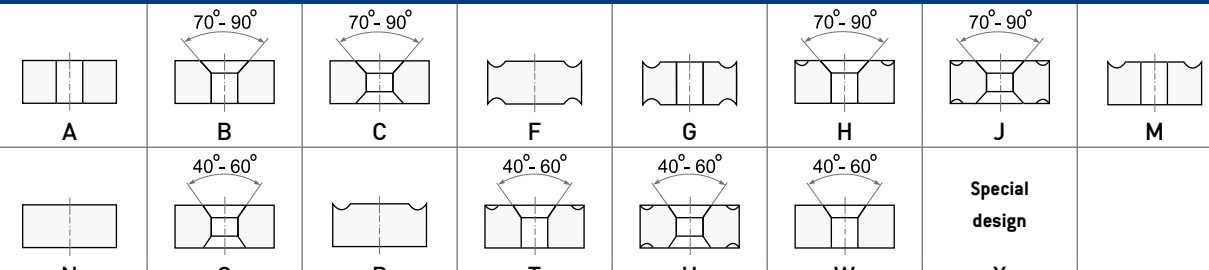


*See tables below

| Symbol | d(mm) | m(mm) | s(mm) |
|--------|--------|--------|--------|
| A | ±0.025 | ±0.005 | ±0.025 |
| C | ±0.025 | ±0.013 | ±0.025 |
| E | ±0.025 | ±0.025 | ±0.025 |
| F | ±0.013 | ±0.005 | ±0.025 |
| G | ±0.025 | ±0.025 | ±0.130 |
| H | ±0.013 | ±0.013 | ±0.025 |
| J | * | ±0.005 | ±0.025 |
| K | * | ±0.013 | ±0.025 |
| L | * | ±0.025 | ±0.025 |
| M | * | * | ±0.127 |
| U | * | * | ±0.127 |
| N | * | * | ±0.025 |

| IC (mm) | D | | C, E, H, O, S, T, R, W | | | |
|---------|-------|-------|------------------------|-------|-------|-------|
| | d(mm) | m(mm) | d(mm) | | m(mm) | |
| | M, N | M, N | J, K, L, M, N | U | M, N | U |
| 5.56 | ±0.05 | ±0.11 | ±0.05 | ±0.08 | ±0.08 | ±0.13 |
| 6.35 | ±0.05 | ±0.11 | ±0.05 | ±0.08 | ±0.08 | ±0.13 |
| 7.94 | ±0.05 | ±0.11 | ±0.05 | ±0.08 | ±0.08 | ±0.13 |
| 9.52 | ±0.05 | ±0.11 | ±0.05 | ±0.08 | ±0.08 | ±0.13 |
| 12.70 | ±0.08 | ±0.15 | ±0.08 | ±0.13 | ±0.13 | ±0.20 |
| 15.87 | ±0.10 | ±0.18 | ±0.10 | ±0.18 | ±0.15 | ±0.27 |
| 19.05 | ±0.10 | ±0.18 | ±0.10 | ±0.18 | ±0.15 | ±0.27 |
| 25.40 | - | - | ±0.13 | ±0.25 | ±0.18 | ±0.38 |

4 Type



A B C F G H J M
N Q R T U W X

12 04 08 E040

4 3 2

4 3 E D T R
5 6 7 8 9 10 11 12

| 5 Cutting Edge Length | | | | | | | | | |
|------------------------------|----------------|----------------|-----|----|----|----|----|----|----|
| Diameter of inscribed circle | ASA | | ISO | | | | | | |
| | over 6.35 (IC) | over 5.56 (IC) | R | W | V | D | C | S | T |
| 3.969 | - | 5 | 03 | 02 | - | 04 | 03 | 03 | 06 |
| 4.762 | - | 6 | 04 | 03 | - | 05 | 04 | 04 | 08 |
| 5.556 | - | 7 | 05 | 03 | 09 | 06 | 05 | 05 | 09 |
| 6.350 | 2 | (8) | 06 | 04 | 11 | 07 | 06 | 06 | 11 |
| 7.938 | - | 0 | 07 | 05 | 13 | 09 | 08 | 07 | 13 |
| 9.525 | 3 | - | 09 | 06 | 16 | 11 | 09 | 09 | 16 |
| 12.700 | 4 | - | 12 | 08 | 22 | 15 | 12 | 12 | 22 |
| 15.875 | 5 | - | 15 | 10 | 27 | 19 | 16 | 15 | 27 |
| 19.050 | 6 | - | 19 | 13 | 33 | 23 | 19 | 19 | 33 |
| 22.225 | 7 | - | 22 | - | 38 | 27 | 22 | 22 | 38 |
| 25.400 | 8 | - | 25 | - | 44 | 31 | 25 | 25 | 44 |
| 31.750 | 0 | - | 31 | - | 54 | 38 | 32 | 31 | 55 |

| 6 Thickness | | | |
|---------------|-----|---------------|---------------|
| Thickness(mm) | ISO | ASA | |
| | | Over 6.35(IC) | Over 5.56(IC) |
| 1.59 | 01 | - | 2 |
| 2.38 | 02 | - | 3 |
| 3.18 | 03 | 2 | 4 |
| 3.97 | T3 | - | 5 |
| 4.76 | 04 | 3 | 6 |
| 5.56 | 05 | - | - |
| 6.35 | 06 | 4 | - |
| 7.94 | 07 | 5 | - |
| 9.52 | 09 | 6 | - |
| 12.70 | 12 | 8 | - |

| 7 Nose-Radius | | |
|---------------|-----|-----|
| (mm) | ISO | ASA |
| Sharp | 00 | O |
| 0.2 | 02 | Y |
| 0.4 | 04 | 1 |
| 0.8 | 08 | 2 |
| 1.2 | 12 | 3 |
| 1.6 | 16 | 4 |
| 2.0 | 20 | 5 |
| 2.4 | 24 | 6 |
| 2.8 | 28 | 7 |
| 3.2 | 32 | 8 |

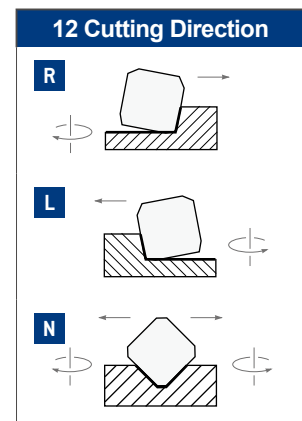
8 Shape and Corner

Detailed edge preparations refer to the next page.

| 9 Land Angle | |
|--------------|-----|
| A | 45° |
| D | 60° |
| E | 75° |
| F | 85° |
| P | 90° |

| 10 Relief Angle for Land | |
|--------------------------|-----|
| A | 3° |
| B | 5° |
| C | 7° |
| D | 15° |
| E | 20° |
| F | 25° |
| G | 30° |
| N | 0° |
| P | 11° |

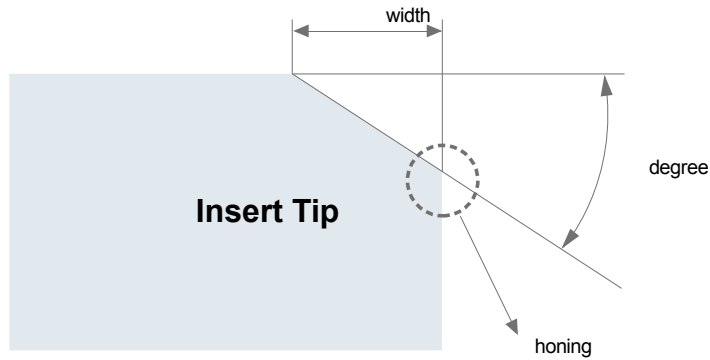
| 11 Edge | |
|---------|-------------------|
| F | Sharp |
| E | Honed |
| T | Chamfered |
| S | Chamfered + Honed |



IDENTIFICATION SYSTEM

8 Chamfer Specification

1 Mono chamfer

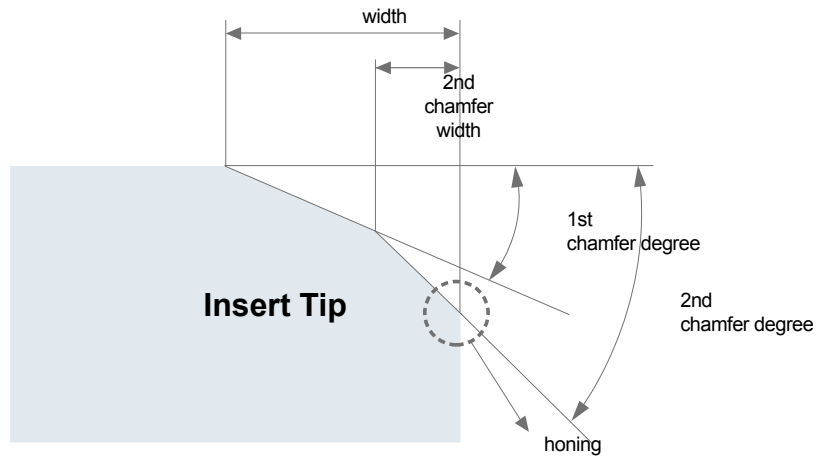


ISO

S N G N 1 2 0 4 0 8 E 0 4 0

| Chamfer Degree (°) | Chamfer Width (mm) | | Honing (μm) |
|--------------------|--------------------|-----------|---------------|
| E : 20 | 01 : 0.05 | 10 : 0.50 | 0 : No Honing |
| F : 25 | 02 : 0.10 | 20 : 1.00 | 1 : 10 |
| G : 30 | 03 : 0.15 | 40 : 2.00 | 2 : 20 |
| | 04 : 0.20 | | 3 : 30 |

2 Double chamfer



ISO

S N G N 1 9 0 7 1 6 X 5 4 2

| 1st Chamfer Degree (°) | 1st Chamfer Width (mm) | | 2nd Chamfer Width(mm)×Degree | | Honing (μm) |
|------------------------|--|----------------------------------|---|----------------------------|---|
| W : 10 X : 15 | 3 : 1.00 4 : 1.20 5 : 1.50 6 : 2.00 | A : 0.75 B : 1.25 D : 2.30 | 3 : 0.20×25 4 : 0.10×30 5 : 0.20×30 | A : 0.15×30 B : 0.45×25 | 0 : No Honing 1 : 10 2 : 20 3 : 30 5 : 50 |

CERAMIC INSERT

Union Ceramic Cutting Tool is an inorganic material, die-pressed and sintered using very fine and pure raw materials with fine microstructure.

Since the Union ceramic inserts are prepared by HIP process to condense completely, it has high thermal shock resistance, excellent fracture toughness and distinguished wear resistance through HIP.

CERMET INSERT

Union Cermet Cutting Tool is a composite between titanium carbide or titanium nitride with carbide-metal binder. Since the toughness of the cermet is higher than that of ceramic and the hardness of the cermet is harder than that of the tungsten carbide, cermet cutting tool shows high wear resistance and excellent surface finish under high speed cutting.

PCBN/PCD INSERT

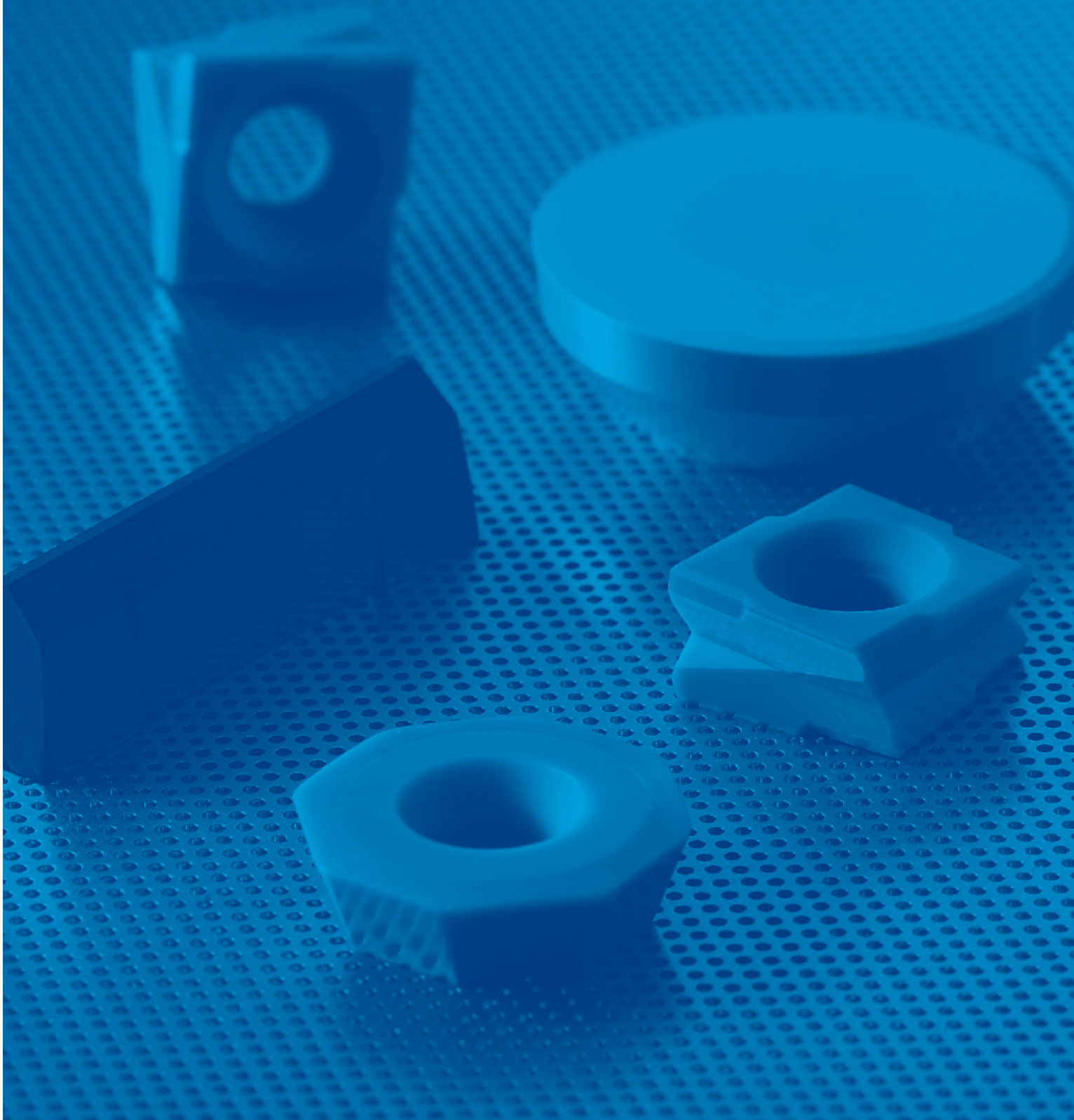
Union PCBN is an ultra hard cutting tool material consisting of polycrystalline cubicboron nitride with metallic or ceramic binder.

It is available both tip brazed and solid PCBN. Primarily used to machine hardened ferrous materials.

Union PCD is an ultra hard cutting tool material consisting of polycrystalline diamond which is tip brazed to a carbide insert according to the various applications.

It is used for non-ferrous material, wood, aluminum and copper alloys at extremely high speed.

CERAMIC



TURNING A 24

Roll Turning A 52

Grooving A 58

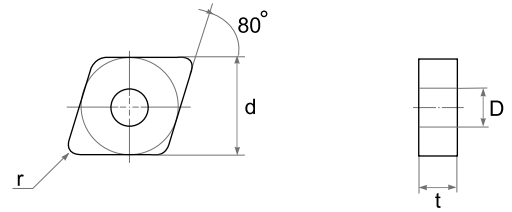
Milling A 65

Wiper A 73

Special A 77



CNGA



| Type | | Dimensions (mm) | | | | | | | | | | | | | | | | | | | | | | | |
|--------------------|----------|-----------------|------|-----|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|---|
| ISO | ASA | d | t | r | D | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 | |
| CNGA 120404 | CNGA 431 | 12.70 | 4.76 | 0.4 | 5.16 | • | • | • | • | | • | • | | | • | | | | | • | • | | | | |
| CNGA 120408 | CNGA 432 | 12.70 | 4.76 | 0.8 | 5.16 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| CNGA 120412 | CNGA 433 | 12.70 | 4.76 | 1.2 | 5.16 | • | • | | | | • | • | • | | • | • | • | • | • | • | • | • | • | • | • |
| CNGA 120416 | CNGA 434 | 12.70 | 4.76 | 1.6 | 5.16 | • | • | | | | | • | | | • | • | • | | | • | • | • | • | • | • |
| CNGA 120704 | CNGA 451 | 12.70 | 7.94 | 0.4 | 5.16 | | | | | | | | | | | | | | | | | | | | |
| CNGA 120708 | CNGA 452 | 12.70 | 7.94 | 0.8 | 5.16 | • | • | | | | | | • | | • | • | | | | | | | | | |
| CNGA 120712 | CNGA 453 | 12.70 | 7.94 | 1.2 | 5.16 | • | • | • | | | | | • | | • | • | | | | • | • | | • | • | • |
| CNGA 120716 | CNGA 454 | 12.70 | 7.94 | 1.6 | 5.16 | • | | | | | | | • | | • | • | | | | • | • | | | | |
| CNGA 160608 | CNGA 542 | 15.87 | 6.35 | 0.8 | 6.35 | | | | | | | | | | • | | | | | | | | | | |
| CNGA 160612 | CNGA 543 | 15.87 | 6.35 | 1.2 | 6.35 | | | | | | | | | | • | • | • | | | | | • | • | • | |
| CNGA 160616 | CNGA 544 | 15.87 | 6.35 | 1.6 | 6.35 | • | | | | | | | | | | | • | | | | | • | | | |
| CNGA 160708 | CNGA 552 | 15.87 | 7.94 | 0.8 | 6.35 | • | • | | | | | | | | | | | | | | | | | | |
| CNGA 160712 | CNGA 553 | 15.87 | 7.94 | 1.2 | 6.35 | • | • | | | | | | | | | • | | | | | | | | | |
| CNGA 160716 | CNGA 554 | 15.87 | 7.94 | 1.6 | 6.35 | | | | | | | | | | | • | | | | | | | | | |
| CNGA 190608 | CNGA 642 | 19.05 | 6.35 | 0.8 | 7.93 | • | | | | | | | | | • | • | | | | • | • | | | | |
| CNGA 190612 | CNGA 643 | 19.05 | 6.35 | 1.2 | 7.93 | | | | | | | | | | • | | | | | | | | | • | • |
| CNGA 190616 | CNGA 644 | 19.05 | 6.35 | 1.6 | 7.93 | • | • | | | | | | | | | | | | | | | | | | |
| CNGA 190712 | CNGA 653 | 19.05 | 7.94 | 1.2 | 7.93 | | | | | | | | | | | | | | | | | | | | |
| CNGA 190716 | CNGA 654 | 19.05 | 7.94 | 1.6 | 7.93 | • | | | | | | | | | | | | | | | | | | | |

CERAMIC

CERMET

PCBN
/
PCD

TOOL
HOLDER

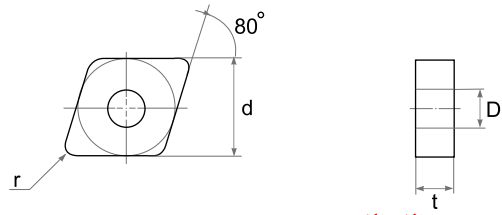
MILLING
CUTTER

TURNING INSERT

PART.

A

CNMA



| Type | | Dimensions (mm) | | | | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 |
|--------------------|-----------------|-----------------|------|-----|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|
| ISO | ASA | d | t | r | D | | | | | | | | | | | | | | | | | | | |
| CNMA 120408 | CNMA 432 | 12.70 | 4.76 | 0.8 | 5.16 | | | | | | | | | | | • | • | | | | | • | | |
| CNMA 120412 | CNMA 433 | 12.70 | 4.76 | 1.2 | 5.16 | | | | | | | | | | | • | • | • | • | • | • | • | | |
| CNMA 120416 | CNMA 434 | 12.70 | 4.76 | 1.6 | 5.16 | | | | | | | | | | | • | • | • | • | • | • | • | | |
| CNMA 160612 | CNMA 543 | 15.87 | 6.35 | 1.2 | 6.35 | | | | | | | | | | | | • | | • | | | • | | |
| CNMA 160616 | CNMA 544 | 15.87 | 6.35 | 1.6 | 6.35 | | | | | | | | | | | | • | | • | | | • | | |

CERAMIC

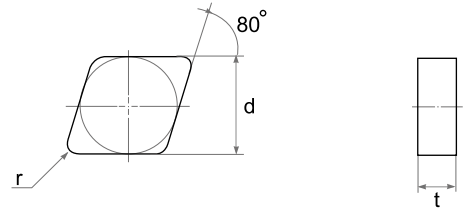
CERMET

PCBN
/
PCD

TOOL
HOLDER

MILLING
CUTTER

CNGN



| Type | | Dimensions (mm) | | | Material | | | | | | | | | | | | | | | | | | | |
|-------------|----------|-----------------|------|-----|----------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|---|
| ISO | ASA | d | t | r | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 | |
| CNGN 090304 | CNGN 321 | 9.52 | 3.18 | 0.4 | | • | | | | | | | | | | | | | | | | | | |
| CNGN 090308 | CNGN 322 | 9.52 | 3.18 | 0.8 | | | • | | | | | | | | | | | • | • | • | | | | |
| CNGN 090312 | CNGN 323 | 9.52 | 3.18 | 1.2 | | | | | | | | | | | | | | • | • | • | | | | |
| CNGN 120304 | CNGN 421 | 12.70 | 3.18 | 0.4 | • | | | | | | | | | | | | | | | | | | | |
| CNGN 120308 | CNGN 422 | 12.70 | 3.18 | 0.8 | • | | | | | | | | | | | | | | | | | | | |
| CNGN 120312 | CNGN 423 | 12.70 | 3.18 | 1.2 | • | | | | | | | | | | | | | | | | | | | |
| CNGN 120404 | CNGN 431 | 12.70 | 4.76 | 0.4 | • | • | | | | | • | • | | | | | | | | | | | | |
| CNGN 120408 | CNGN 432 | 12.70 | 4.76 | 0.8 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| CNGN 120412 | CNGN 433 | 12.70 | 4.76 | 1.2 | • | • | • | • | | | • | • | | • | | • | • | • | • | • | • | • | • | • |
| CNGN 120416 | CNGN 434 | 12.70 | 4.76 | 1.6 | • | • | • | | | | • | | | • | | • | • | • | • | • | • | • | • | • |
| CNGN 120704 | CNGN 451 | 12.70 | 7.94 | 0.4 | | | | | | | | | | | | | | | | | | • | • | |
| CNGN 120708 | CNGN 452 | 12.70 | 7.94 | 0.8 | | | | | | | | | | • | • | | | | • | • | | | | |
| CNGN 120712 | CNGN 453 | 12.70 | 7.94 | 1.2 | • | • | | | | | • | • | | • | | • | • | | • | • | • | • | • | • |
| CNGN 120716 | CNGN 454 | 12.70 | 7.94 | 1.6 | • | • | | | | | • | • | | • | | • | • | | • | • | • | • | • | • |
| CNGN 160608 | CNGN 542 | 15.87 | 6.35 | 0.8 | | | | | | | | | | | | | | | | | | | | |
| CNGN 160612 | CNGN 543 | 15.87 | 6.35 | 1.2 | • | | | | | | | | | | | • | | | | | | • | • | • |
| CNGN 160616 | CNGN 544 | 15.87 | 6.35 | 1.6 | • | | | | | | | | | | | | | | | | | | | |
| CNGN 160708 | CNGN 552 | 15.87 | 7.94 | 0.8 | • | | | | | | | • | | | | | | | | | | | | |
| CNGN 160712 | CNGN 553 | 15.87 | 7.94 | 1.2 | • | • | • | | | | | | | • | | • | • | | | | | • | | |
| CNGN 160716 | CNGN 554 | 15.87 | 7.94 | 1.6 | • | • | • | | | | • | | • | • | • | • | • | | | | | • | | |
| CNGN 160720 | CNGN 555 | 15.87 | 7.94 | 2.0 | • | | | | | | | | | • | • | | | | | | | | | |
| CNGN 190612 | CNGN 643 | 19.05 | 6.35 | 1.2 | • | • | | | | | | | | | | | | | | | | | | |
| CNGN 190616 | CNGN 644 | 19.05 | 6.35 | 1.6 | • | • | | | | | | | | | | | | | | | | | | |
| CNGN 190712 | CNGN 653 | 19.05 | 7.94 | 1.2 | • | • | | | | | | | | | | | | | | | | | | |
| CNGN 190716 | CNGN 654 | 19.05 | 7.94 | 1.6 | • | • | | | | | | | | | | | | | | | | | | |
| CNGN 190720 | CNGN 655 | 19.05 | 7.94 | 2.0 | • | | | | | | | | | | | | | | | | | | | |
| CNGN 250724 | CNGN 856 | 25.40 | 7.94 | 2.4 | • | | | | | | | | | | | | | | | | | | | |
| CNGN 250924 | CNGN 866 | 25.40 | 9.52 | 2.4 | • | • | • | | | | | | | • | | | | | | | | | | |

CERAMIC

CERMET

PCBN
/
PCD

TOOL
HOLDER

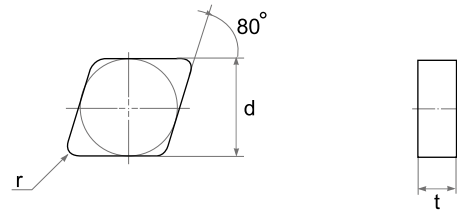
MILLING
CUTTER

TURNING INSERT

PART.

A

CNMN



| Type | | Dimensions (mm) | | | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 | |
|--------------------|-----------------|-----------------|------|-----|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|--|
| ISO | ASA | d | t | r | | | | | | | | | | | | | | | | | | | | |
| CNMN 120412 | CNMN 433 | 12.70 | 4.76 | 1.2 | | | | | | | | | | | | • | | | • | • | • | | | |
| CNMN 120416 | CNMN 434 | 12.70 | 4.76 | 1.6 | | | | | | | | | | | | • | | | • | • | • | | | |

NEW

NEW

TURNING
&
MILLING

CERAMIC

CERMET

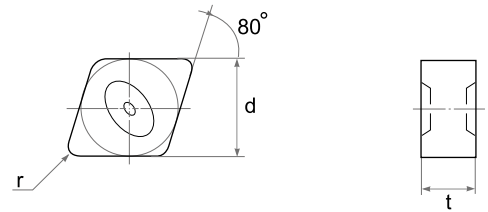
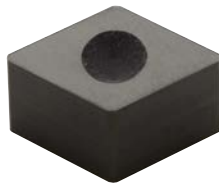
PCBN
/
PCD

TOOL
HOLDER

MILLING
CUTTER

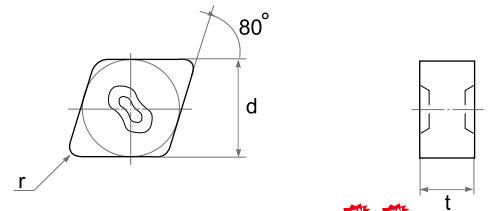
TURNING INSERT

CNGX



| Type | | Dimensions (mm) | | | | | | | | | | | | | | | | | | | | | | |
|-------------|----------|-----------------|------|-----|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|--|
| ISO | ASA | d | t | r | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 | |
| CNGX 120412 | CNGX 433 | 12.70 | 4.76 | 1.2 | | | | | | | | | | | • | • | | | | | | • | | |
| CNGX 120416 | CNGX 434 | 12.70 | 4.76 | 1.6 | | | | | | | | | | | | • | | | | | | • | | |
| CNGX 120708 | CNGX 452 | 12.70 | 7.94 | 0.8 | • | • | | | | | | | | | • | | | | | | | | | |
| CNGX 120712 | CNGX 453 | 12.70 | 7.94 | 1.2 | • | • | | | | | | | | | • | • | • | | | | | • | | |
| CNGX 120716 | CNGX 454 | 12.70 | 7.94 | 1.6 | • | • | | | | | | | | | • | • | • | • | | | | • | | |
| CNGX 160708 | CNGX 552 | 15.87 | 7.94 | 0.8 | | | | | | | | | | | • | | | | | | | | | |
| CNGX 160712 | CNGX 553 | 15.87 | 7.94 | 1.2 | | | | | | | | | | | • | • | • | | | | | • | | |
| CNGX 160716 | CNGX 554 | 15.87 | 7.94 | 1.6 | | | | | | | | | | | • | • | | | | | | • | | |

CNVX



| Type | | Dimensions (mm) | | | | | | | | | | | | | | | | | | | | | | |
|-------------|----------|-----------------|------|-----|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|--|
| ISO | ASA | d | t | r | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 | |
| CNVX 120412 | CNVX 433 | 12.70 | 4.76 | 1.2 | | | | | | | | | | | | • | | | | | | • | | |
| CNVX 120416 | CNVX 434 | 12.70 | 4.76 | 1.6 | | | | | | | | | | | | • | | | | | | • | | |
| CNVX 120708 | CNVX 452 | 12.70 | 7.94 | 0.8 | • | | | | | | | • | | | • | | | | | | | | | |
| CNVX 120712 | CNVX 453 | 12.70 | 7.94 | 1.2 | • | • | | | | | | • | | | • | • | • | • | • | • | • | • | | |
| CNVX 120716 | CNVX 454 | 12.70 | 7.94 | 1.6 | | • | | • | | | | • | | | • | • | • | • | • | • | • | • | | |

CERAMIC

CERMET

PCBN
/
PCD

TOOL
HOLDER

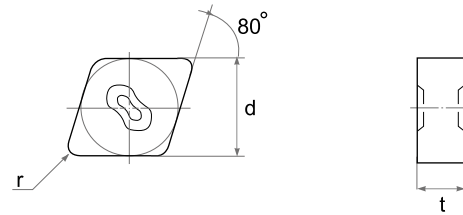
MILLING
CUTTER

TURNING INSERT

PART.
A

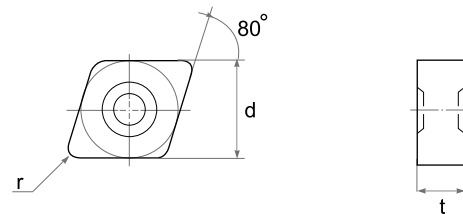
TURNING
&
MILLING

CNMX



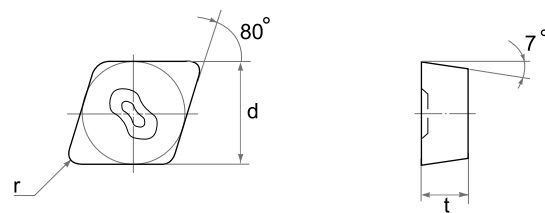
| Type | | Dimensions (mm) | | | | | | | | | | | | | | | | | | | | | | |
|-------------|----------|-----------------|------|-----|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|--|
| ISO | ASA | d | t | r | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 | |
| CNMX 120712 | CNMX 453 | 12.70 | 7.94 | 1.2 | | | | | | | | | | | | • | • | • | | | | • | | |
| CNMX 120716 | CNMX 454 | 12.70 | 7.94 | 1.6 | | | | | | | | | | | | • | • | • | • | • | • | • | | |

CNMX .. RD



| Type | | Dimensions (mm) | | | | | | | | | | | | | | | | | | | | | | |
|----------------|-------------|-----------------|------|-----|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|--|
| ISO | ASA | d | t | r | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 | |
| CNMX 120716 RD | CNMX 454 RD | 12.7 | 7.94 | 1.6 | | | | | | | | | | | | • | • | | | | | • | | |

CCGX



| Type | | Dimensions (mm) | | | | | | | | | | | | | | | | | | | | | | |
|-------------|----------|-----------------|------|-----|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|--|
| ISO | ASA | d | t | r | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 | |
| CCGX 120608 | CCGX 442 | 12.70 | 6.35 | 0.8 | | | | | | | | | | | | • | | | | | | • | | |
| CCGX 120612 | CCGX 443 | 12.70 | 6.35 | 1.2 | | | | | | | | | | | | • | • | • | • | • | • | • | | |
| CCGX 120616 | CCGX 444 | 12.70 | 6.35 | 1.6 | | | | | | | | | | | | • | | | | | | • | | |

CERAMIC

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PCD

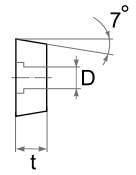
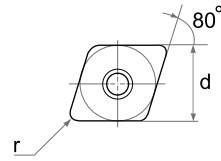
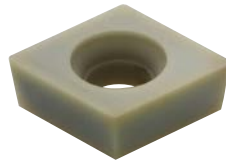
TOOL
HOLDER

MILLING
CUTTER

TURNING INSERT

TURNING
&
MILLING

CCGW



| Type | Dimensions (mm) | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------------|-----------------|------|-----|------|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|--|
| | ISO | d | t | r | D | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 | |
| CCGW 09T304 | 9.52 | 3.97 | 0.4 | 4.40 | | | | | | | | • | | | | • | • | | | | | | • | | |
| CCGW 09T308 | 9.52 | 3.97 | 0.8 | 4.40 | | | | | | | | • | | | | • | • | | • | | | | • | | |
| CCGW 09T312 | 9.52 | 3.97 | 1.2 | 4.40 | | | | | | | | | | | | • | • | | • | | | | • | | |
| CCGW 120408 | 12.70 | 4.76 | 0.8 | 5.50 | | | | | | | | | | | | | • | | | | | | • | | |
| CCGW 120412 | 12.70 | 4.76 | 1.2 | 5.50 | | | | | | | | | | | | | • | | | | | | • | | |

CERAMIC

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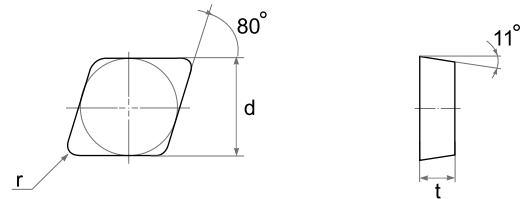
TOOL
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PART.
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CPGN



| Type | | Dimensions (mm) | | | Material | | | | | | | | | | | | | | | | | | | | |
|-------------|----------|-----------------|------|-----|----------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|---|---|
| ISO | ASA | d | t | r | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 | | |
| CPGN 090304 | CPGN 321 | 9.52 | 3.18 | 0.4 | | | | | | | | | | | | | | | | | | | | • | • |
| CPGN 090308 | CPGN 322 | 9.52 | 3.18 | 0.8 | | | | | | | | | | | | | | | | | | | | • | • |
| CPGN 120408 | CPGN 432 | 12.70 | 4.76 | 0.8 | • | | | | | | | | | | | | | | | | | | | • | • |
| CPGN 120412 | CPGN 433 | 12.70 | 4.76 | 1.2 | | | | | | | | | | | | | | | | | | | | | |
| CPGN 120416 | CPGN 434 | 12.70 | 4.76 | 1.6 | | | | | | | | | | | | | | | | | | | | | |

CERAMIC

CERMET

PCBN
/
PCD

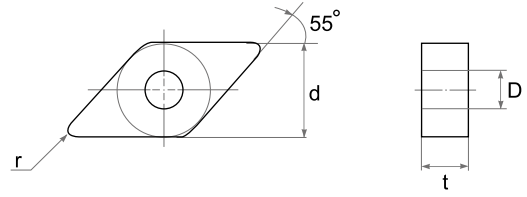
TOOL
HOLDER

MILLING
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TURNING
&
MILLING

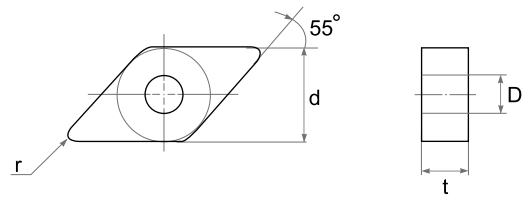
DNGA



| Type | | Dimensions (mm) | | | | NEW NEW | | | | | | | | | | | | | | | | | | | |
|-------------|----------|-----------------|------|-----|------|---------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|---|
| ISO | ASA | d | t | r | D | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 | |
| DNGA 150404 | DNGA 431 | 12.70 | 4.76 | 0.4 | 5.16 | • | • | | • | | • | | | | | | | | | | | | | | |
| DNGA 150408 | DNGA 432 | 12.70 | 4.76 | 0.8 | 5.16 | • | • | • | • | • | • | | | | • | • | • | | | | | | • | • | • |
| DNGA 150412 | DNGA 433 | 12.70 | 4.76 | 1.2 | 5.16 | • | • | • | • | | | | | | | • | • | • | | • | • | • | • | • | • |
| DNGA 150416 | DNGA 434 | 12.70 | 4.76 | 1.6 | 5.16 | • | | | | | | | | | • | | | | | | | | • | • | |
| DNGA 150604 | DNGA 441 | 12.70 | 6.35 | 0.4 | 5.16 | • | • | • | • | | | • | | • | | | | | | | | | | | |
| DNGA 150608 | DNGA 442 | 12.70 | 6.35 | 0.8 | 5.16 | • | • | • | • | | | • | | | • | | • | | | | | | • | | |
| DNGA 150612 | DNGA 443 | 12.70 | 6.35 | 1.2 | 5.16 | • | • | • | • | | | | | | • | | • | • | | • | • | • | | | |
| DNGA 150616 | DNGA 444 | 12.70 | 6.35 | 1.6 | 5.16 | • | • | • | | | | | | | | | | | | | | | | | |
| DNGA 150704 | DNGA 451 | 12.70 | 7.94 | 0.4 | 5.16 | • | • | | | | | | | | | | | | | | | | | | |
| DNGA 150708 | DNGA 452 | 12.70 | 7.94 | 0.8 | 5.16 | • | • | | | | | | | | • | • | • | • | | | | | • | | |
| DNGA 150712 | DNGA 453 | 12.70 | 7.94 | 1.2 | 5.16 | • | • | | | | | | | | • | | • | • | • | • | • | • | | | |
| DNGA 150716 | DNGA 454 | 12.70 | 7.94 | 1.6 | 5.16 | | | | | | | | | | | | | | | | | | | | |
| DNGA 190608 | DNGA 542 | 15.87 | 6.35 | 0.8 | 6.35 | • | • | | | | | | | | | | | | | | | | | | |
| DNGA 190612 | DNGA 543 | 15.87 | 6.35 | 1.2 | 6.35 | • | • | | | | | | | | • | • | | • | | • | • | • | | | |
| DNGA 190616 | DNGA 544 | 15.87 | 6.35 | 1.6 | 6.35 | • | | | | | | | | | | | | | | | | | | | |

CERAMIC

DNMA



| Type | | Dimensions (mm) | | | | NEW NEW | | | | | | | | | | | | | | | | | | | |
|-------------|----------|-----------------|------|-----|------|---------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|--|
| ISO | ASA | d | t | r | D | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 | |
| DNMA 150612 | DNMA 443 | 12.70 | 6.35 | 1.2 | 5.16 | | | | | | | | | | | • | • | | | | | | • | | |
| DNMA 150616 | DNMA 444 | 12.70 | 6.35 | 1.6 | 5.16 | | | | | | | | | | | | • | | | | | | • | | |

CERMET

PCBN
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PCD

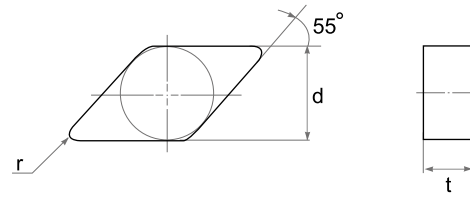
TOOL
HOLDER

MILLING
CUTTER

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PART.
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DNGN



| Type | | Dimensions (mm) | | | NEW NEW | | | | | | | | | | | | | | | | | | | |
|--------------------|-----------------|-----------------|------|-----|---------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|---|
| ISO | ASA | d | t | r | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 | |
| DNGN 150404 | DNGN 431 | 12.70 | 4.76 | 0.4 | | | | | | | | | | | | | | | | | | | | |
| DNGN 150408 | DNGN 432 | 12.70 | 4.76 | 0.8 | • | | | | | • | | | | | | • | | | | | | • | • | • |
| DNGN 150412 | DNGN 433 | 12.70 | 4.76 | 1.2 | • | | | | | | • | | | • | | • | | | | | | • | • | • |
| DNGN 150416 | DNGN 434 | 12.70 | 4.76 | 1.6 | | | | | | | | | | | | | | | | | | | • | • |
| DNGN 150604 | DNGN 441 | 12.70 | 6.35 | 0.4 | | | | | | | | | | | | | | | | | | | | |
| DNGN 150608 | DNGN 442 | 12.70 | 6.35 | 0.8 | • | | | • | | | | | | | | • | | | • | • | • | | | |
| DNGN 150612 | DNGN 443 | 12.70 | 6.35 | 1.2 | • | • | | • | | | | | | | | • | | | • | • | • | | | |
| DNGN 150616 | DNGN 444 | 12.70 | 6.35 | 1.6 | | | | | | | | | | | | | | | | | | | | |
| DNGN 150704 | DNGN 451 | 12.70 | 7.94 | 0.4 | • | • | | | | | | | | | | | | | | | | | | |
| DNGN 150708 | DNGN 452 | 12.70 | 7.94 | 0.8 | • | • | • | • | | | | • | • | • | • | | | | • | • | | | | |
| DNGN 150712 | DNGN 453 | 12.70 | 7.94 | 1.2 | • | • | • | • | | | | • | • | • | • | • | | | • | • | • | | | |
| DNGN 150716 | DNGN 454 | 12.70 | 7.94 | 1.6 | • | • | | | | | | • | | • | • | • | | | • | • | • | | | |

CERAMIC

CERMET

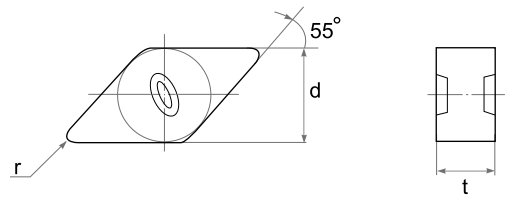
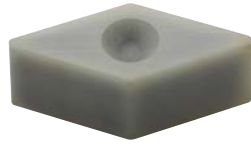
PCBN
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PCD

TOOL
HOLDER

MILLING
CUTTER

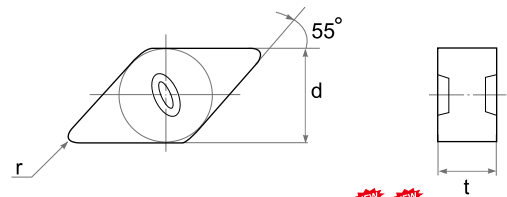
TURNING INSERT

DNGX



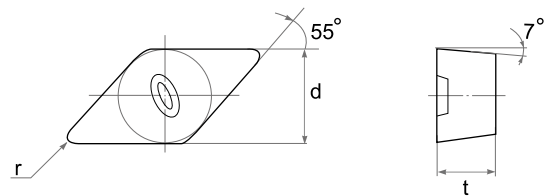
| Type | | Dimensions (mm) | | | NEW NEW | | | | | | | | | | | | | | | | | | | |
|-------------|----------|-----------------|------|-----|---------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|--|
| ISO | ASA | d | t | r | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 | |
| DNGX 120708 | DNGX 352 | 10.00 | 7.94 | 0.8 | | | | | | | | • | | | | • | | | | | | • | | |
| DNGX 120712 | DNGX 353 | 10.00 | 7.94 | 1.2 | | | | | | | | • | | | • | • | • | • | • | • | • | | | |
| DNGX 120716 | DNGX 354 | 10.00 | 7.94 | 1.6 | | | | | | | | • | | | • | • | • | | | | | • | | |
| DNGX 150708 | DNGX 452 | 12.70 | 7.94 | 0.8 | | | | | | | | | | | | | | | | | | | | |
| DNGX 150712 | DNGX 453 | 12.70 | 7.94 | 1.2 | | | | | | | | • | | | • | • | | | | | | • | | |
| DNGX 150716 | DNGX 454 | 12.70 | 7.94 | 1.6 | | | | | | | | | | | • | • | • | • | • | • | • | | | |

DNMX



| Type | | Dimensions (mm) | | | NEW NEW | | | | | | | | | | | | | | | | | | | |
|-------------|----------|-----------------|------|-----|---------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|--|
| ISO | ASA | d | t | r | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 | |
| DNMX 120708 | DNMX 352 | 10.00 | 7.94 | 0.8 | | | | | | | | | | | | | • | | | | | | | |
| DNMX 120712 | DNMX 353 | 10.00 | 7.94 | 1.2 | | | | | | | | | | | | • | • | | | | | • | | |
| DNMX 120716 | DNMX 354 | 10.00 | 7.94 | 1.6 | | | | | | | | | | | | • | • | • | | | | • | | |

DCGX



| Type | | Dimensions (mm) | | | NEW NEW | | | | | | | | | | | | | | | | | | | |
|-------------|----------|-----------------|------|-----|---------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|--|
| ISO | ASA | d | t | r | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 | |
| DCGX 150612 | DCGX 443 | 12.70 | 6.35 | 1.2 | | | | | | | | | | | | • | | • | | | | • | | |
| DCGX 150616 | DCGX 444 | 12.70 | 6.35 | 1.6 | | | | | | | | | | | | • | | • | | | | • | | |

CERAMIC

CERMET

PCBN
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PCD

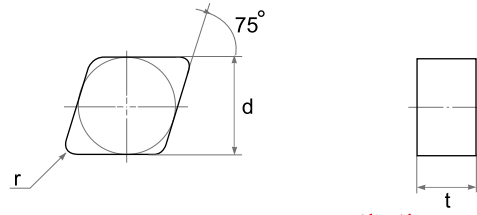
TOOL
HOLDER

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ENGN



| Type | | Dimensions (mm) | | | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 | |
|-------------|----------|-----------------|------|-----|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|---|
| ISO | ASA | d | t | r | | | | | | | | | | | | | | | | | | | | |
| ENGN 130404 | ENGN 431 | 12.70 | 4.76 | 0.4 | | | | | | | | | | | | | | | | | | | | |
| ENGN 130408 | ENGN 432 | 12.70 | 4.76 | 0.8 | | • | | | | | | | | • | | • | | | | | | • | | |
| ENGN 130412 | ENGN 433 | 12.70 | 4.76 | 1.2 | | • | | | | | | | | • | | • | | | | | | • | | |
| ENGN 130704 | ENGN 451 | 12.70 | 7.94 | 0.4 | • | • | | | | | | | | | | | | | | | | | | |
| ENGN 130708 | ENGN 452 | 12.70 | 7.94 | 0.8 | • | • | • | • | | | | • | • | • | • | • | | | | | | • | | |
| ENGN 130712 | ENGN 453 | 12.70 | 7.94 | 1.2 | • | • | • | • | | | | | | • | • | • | | | • | • | • | • | • | • |
| ENGN 130716 | ENGN 454 | 12.70 | 7.94 | 1.6 | • | • | | | | | • | | | • | • | • | | | | | | • | | |

CERAMIC

CERMET

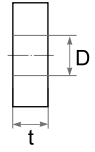
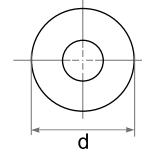
PCBN
/
PCD

TOOL
HOLDER

MILLING
CUTTER

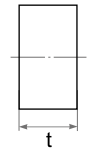
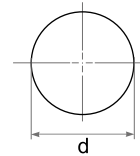
TURNING INSERT

RNGA



| Type | | Dimensions (mm) | | | NEW NEW | | | | | | | | | | | | | | | | | | | |
|--------------------|-----------------|-----------------|------|------|---------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|---|
| ISO | ASA | d | t | D | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 | |
| RNGA 120400 | RNGA 430 | 12.70 | 4.76 | 5.16 | • | • | | | | | | | | | | | | | | | | | | |
| RNGA 120700 | RNGA 450 | 12.70 | 7.94 | 5.16 | • | • | | | | | | | | | | | | | | | | | • | • |

RNGN



| Type | | Dimensions (mm) | | NEW NEW | | | | | | | | | | | | | | | | | | | |
|--------------------|-----------------|-----------------|------|---------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|---|
| ISO | ASA | d | t | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 | |
| RNGN 060300 | RNGN 220 | 6.35 | 3.18 | | • | | | | | | | | | | | | | | | | | | |
| RNGN 060400 | RNGN 230 | 6.35 | 4.76 | • | | • | | | | | | | | | | | | | | | | | |
| RNGN 090300 | RNGN 320 | 9.52 | 3.18 | • | | • | | | | | | | • | • | | | | | | | | | |
| RNGN 090400 | RNGN 330 | 9.52 | 4.76 | • | • | • | | | | • | | | • | | | | | • | • | | • | • | |
| RNGN 120300 | RNGN 420 | 12.70 | 3.18 | | | | | | | | | | • | | | | | • | • | | | | |
| RNGN 120400 | RNGN 430 | 12.70 | 4.76 | • | • | • | | | • | • | • | | • | • | • | • | • | • | • | • | • | • | • |
| RNGN 120600 | RNGN 440 | 12.70 | 6.35 | | | | | | | | | | | | | | | | | | | | |
| RNGN 120700 | RNGN 450 | 12.70 | 7.94 | • | • | • | • | • | • | | | | • | • | • | | | • | • | • | • | • | • |
| RNGN 150700 | RNGN 550 | 15.87 | 7.94 | • | | | | | | | | | • | • | | | | | | | | | |
| RNGN 190600 | RNGN 640 | 19.05 | 6.35 | • | • | | | | | | | | • | | | | | • | • | | | | |
| RNGN 190700 | RNGN 650 | 19.05 | 7.94 | • | • | • | | | | | • | | | • | | | | • | • | | • | • | |
| RNGN 250700 | RNGN 850 | 25.40 | 7.94 | • | | • | • | | | | • | • | • | • | | | | | | | | | |
| RNGN 250900 | RNGN 860 | 25.40 | 9.52 | | | | | | | | | | | | | | | | | | | | |
| RNGN 320900 | RNGN 106 | 31.75 | 9.52 | • | | | | | | | | | | | | | | | | | | | |
| RNGN 0807MO | | 8.00 | 7.94 | • | | | | | | | | | | | | | | | | | | | |
| RNGN 1007MO | | 10.00 | 7.94 | • | | | | | | | | | | | | | | | | | | | |
| RNGN 1207MO | | 12.00 | 7.94 | • | | | | | | | | | | | | | | | | | | | |

CERAMIC

CERMET

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PCD

TOOL
HOLDER

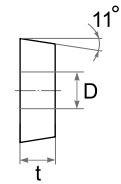
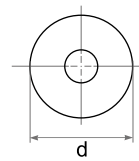
MILLING
CUTTER

TURNING INSERT

PART.
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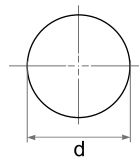
TURNING
&
MILLING

RPGA



| Type | | Dimensions (mm) | | | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 | |
|-------------|----------|-----------------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|--|
| ISO | ASA | d | t | D | | | | | | | | | | | | | | | | | | | | |
| RNGA 120400 | RNGA 430 | 12.70 | 4.76 | 5.16 | • | | | | | | | | | | | | | | | | | | | |
| RNGA 120700 | RNGA 450 | 12.70 | 7.94 | 5.16 | • | | | | | | | | | | | | | | | | | | | |

RPGN



| Type | | Dimensions (mm) | | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 | |
|-------------|----------|-----------------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|---|
| ISO | ASA | d | t | | | | | | | | | | | | | | | | | | | | |
| RPGN 090300 | RPGN 320 | 9.52 | 3.18 | • | • | | | | | | | | | | | | | | • | • | | | |
| RPGN 090400 | RPGN 330 | 9.52 | 4.76 | • | • | • | | | | | | | | | | | | | | | | | |
| RPGN 120300 | RPGN 420 | 12.70 | 3.18 | | | | | | | | | | | | | | | | | | | | |
| RPGN 120400 | RPGN 430 | 12.70 | 4.76 | • | • | | | | | | | | | | • | | | | • | • | • | • | • |
| RPGN 120700 | RPGN 450 | 12.70 | 7.94 | • | • | | | | | | | | | | | | | | • | • | | | |
| RPGN 150700 | RPGN 550 | 15.87 | 7.94 | | | | | | | | | | | | | | | | | | | | |
| RPGN 190700 | RPGN 650 | 19.05 | 7.94 | | • | | | | | | | | | | | | | | | | | | |

CERAMIC

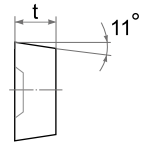
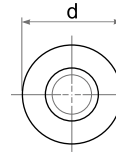
CERMET

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PCD

TOOL
HOLDER

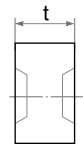
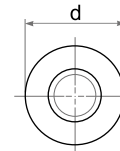
MILLING
CUTTER

RPGX .. DP



| Type | | Dimensions (mm) | | | | | | | | | | | | | | | | | | | | | | |
|--------------|------------|-----------------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|--|--|
| ISO | ASA | d | t | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 | | |
| RPGX 1204 DP | RPGX 43 DP | 12.70 | 4.76 | | | | | | | | | | | | | | | | • | • | | | | |
| RPGX 1207 DP | RPGX 45 DP | 12.70 | 7.94 | | | | | | | | | | | | | | | | • | • | | | | |

RNGX .. DP



| Type | | Dimensions (mm) | | | | | | | | | | | | | | | | | | | | | | |
|--------------|------------|-----------------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|--|--|
| ISO | ASA | d | t | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 | | |
| RNGX 1207 DP | RNGX 45 DP | 12.70 | 7.94 | | | | | | | | | | | | | | | • | • | • | | | | |

CERAMIC

CERMET

PCBN
/
PCD

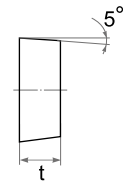
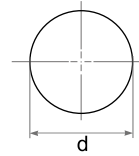
TOOL
HOLDER

MILLING
CUTTER

TURNING INSERT

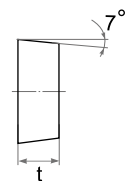
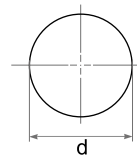
PART.
A

RBGN



| Type | | Dimensions (mm) | | NEW NEW | | | | | | | | | | | | | | | | | | | |
|-------------|----------|-----------------|------|---------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|--|
| ISO | ASA | d | t | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 | |
| RBGN 060300 | RBGN 220 | 6.35 | 3.18 | | • | | | | | | | | | | | | | | | | | | |
| RBGN 060400 | RBGN 230 | 6.35 | 4.76 | | • | | | | | | | | | | | | | | | | | | |
| RBGN 090300 | RBGN 320 | 9.52 | 3.18 | • | | | | | | | | | | | | | | | | | | | |
| RBGN 090400 | RBGN 330 | 9.52 | 4.76 | • | | | | | | | | | | | | | | | | | | | |
| RBGN 120400 | RBGN 430 | 12.70 | 4.76 | • | • | • | | | | | | | | | • | | | | | | • | | |
| RBGN 120600 | RBGN 440 | 12.70 | 6.35 | • | | | | | | | | | | | | | | | | | | | |
| RBGN 120700 | RBGN 450 | 12.70 | 7.94 | • | • | | | | | | | | | • | • | | | • | • | • | | | |
| RBGN 0604MO | | 6.00 | 4.76 | | • | | | | | | | | | | | | | | | | | | |
| RBGN 0804MO | | 8.00 | 4.76 | | • | | | | | | | | | | | | | | | | | | |
| RBGN 1007MO | | 10.00 | 7.94 | • | | | | | | | | | | | | • | | | | | | | |
| RBGN 1207MO | | 12.00 | 7.94 | | | | | | | | | | | | | | | | | | | | |
| RBGN 1607MO | | 16.00 | 7.94 | | | | | | | | | | | | | | | | | | | | |

RCGN



| Type | | Dimensions (mm) | | NEW NEW | | | | | | | | | | | | | | | | | | | |
|-------------|--|-----------------|-------|---------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|--|
| ISO | | d | t | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 | |
| RCGN 060400 | | 6.35 | 4.76 | • | • | | | | | | | | • | | | | | • | • | | | | |
| RCGN 060600 | | 6.35 | 6.35 | • | • | • | | | | | | | • | | | | | • | • | | | | |
| RCGN 060700 | | 6.35 | 7.94 | • | • | • | | | | | • | | | | | | | • | • | | | | |
| RCGN 070400 | | 7.94 | 4.76 | | • | | | | | | | | | | | | | | | | | | |
| RCGN 090700 | | 9.52 | 7.94 | • | • | • | | | | | | | • | | | | | • | • | | | | |
| RCGN 120700 | | 12.70 | 7.94 | • | • | • | | | | | • | | • | | | | | • | • | | | | |
| RCGN 151000 | | 15.87 | 10.00 | • | • | • | | | | | • | | • | | | | | • | • | | | | |
| RCGN 191000 | | 19.05 | 10.00 | • | • | • | | | | | • | | • | | | | | • | • | | | | |
| RCGN 251200 | | 25.40 | 12.70 | • | • | • | | | | | • | | • | | | | | • | • | | | | |

CERAMIC

CERMET

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PCD

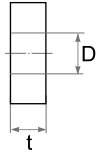
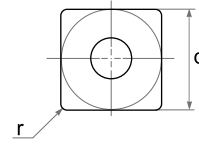
TOOL
HOLDER

MILLING
CUTTER

TURNING INSERT

TURNING
&
MILLING

SNGA

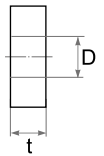
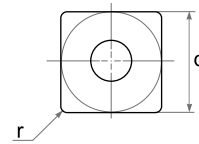


| Type | | Dimensions (mm) | | | | NEW NEW | | | | | | | | | | | | | | | | | | | |
|-------------|----------|-----------------|------|-----|------|---------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|---|
| ISO | ASA | d | t | r | D | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 | |
| SNGA 090304 | SNGA 321 | 9.52 | 3.18 | 0.4 | 3.81 | • | • | | | | | | | | | | | | | | | | | | |
| SNGA 090308 | SNGA 322 | 9.52 | 3.18 | 0.8 | 3.81 | • | • | | | | | | | | | | | | | | | | | | |
| SNGA 090312 | SNGA 323 | 9.52 | 3.18 | 1.2 | 3.81 | • | • | | | | | | | | | | | | | | | | | | |
| SNGA 090404 | SNGA 331 | 9.52 | 4.76 | 0.4 | 3.81 | | | | | | | | | | | | | | | | | | | | |
| SNGA 090408 | SNGA 332 | 9.52 | 4.76 | 0.8 | 3.81 | | | | | | | | | | | | | | | | | | | | |
| SNGA 090412 | SNGA 333 | 9.52 | 4.76 | 1.2 | 3.81 | | | | | | | | | | | | | | | | | | | | |
| SNGA 090416 | SNGA 334 | 9.52 | 4.76 | 1.6 | 3.81 | | | | | | | | | | | | • | | | | | • | | | |
| SNGA 120404 | SNGA 431 | 12.70 | 4.76 | 0.4 | 5.16 | • | | • | | | | • | | | • | | | | | | | | | | |
| SNGA 120408 | SNGA 432 | 12.70 | 4.76 | 0.8 | 5.16 | • | • | • | | | • | • | | | • | • | | • | | | • | • | | • | • |
| SNGA 120412 | SNGA 433 | 12.70 | 4.76 | 1.2 | 5.16 | • | • | • | | | | • | • | | • | • | • | | • | • | • | • | • | | |
| SNGA 120416 | SNGA 434 | 12.70 | 4.76 | 1.6 | 5.16 | • | | | | | | • | | | • | | | | | • | • | • | | | |
| SNGA 120708 | SNGA 452 | 12.70 | 7.94 | 0.8 | 5.16 | • | | | | | | | | | | | | | | | | | | | |
| SNGA 120712 | SNGA 453 | 12.70 | 7.94 | 1.2 | 5.16 | • | | | | | | | | | • | • | | | | | | | | | |
| SNGA 120716 | SNGA 454 | 12.70 | 7.94 | 1.6 | 5.16 | • | | | | | | | • | | • | • | | | | • | • | | | | |
| SNGA 150608 | SNGA 542 | 15.87 | 6.35 | 0.8 | 6.35 | | • | | | | | | | | | | | | | | | | | | |
| SNGA 150612 | SNGA 543 | 15.87 | 6.35 | 1.2 | 6.35 | • | • | | | | | | | | | | | | | | | | | | |
| SNGA 150616 | SNGA 544 | 15.87 | 6.35 | 1.6 | 6.35 | | • | | | | | | | | | | | | | | | | | | |
| SNGA 190612 | SNGA 643 | 19.05 | 6.35 | 1.2 | 7.94 | • | | | | | | | | | • | • | | | | | | | | | |
| SNGA 190616 | SNGA 644 | 19.05 | 6.35 | 1.6 | 7.94 | | | | | | | | | | | | | | | | | | | | |

CERAMIC

CERMET

SNMA



| Type | | Dimensions (mm) | | | | NEW NEW | | | | | | | | | | | | | | | | | | | |
|-------------|----------|-----------------|------|-----|------|---------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|--|
| ISO | ASA | d | t | r | D | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 | |
| SNMA 120408 | SNMA 432 | 12.70 | 4.76 | 0.8 | 5.16 | | | | | | | | | | | | • | | • | | | • | | | |
| SNMA 120412 | SNMA 433 | 12.70 | 4.76 | 1.2 | 5.16 | | | | | | | | | | | • | • | | • | • | • | • | | | |
| SNMA 120416 | SNMA 434 | 12.70 | 4.76 | 1.6 | 5.16 | | | | | | | | | | | • | • | | | | | • | | | |
| SNMA 150616 | SNMA 544 | 15.87 | 6.35 | 1.6 | 6.35 | | | | | | | | | | | • | • | | | | | • | | | |

PCBN
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PCD

TOOL
HOLDER

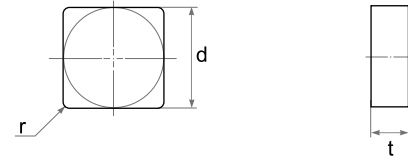
MILLING
CUTTER

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PART.

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SNGN



| Type | | Dimensions (mm) | | | NEW NEW | | | | | | | | | | | | | | | | | | | |
|-------------|----------|-----------------|------|-----|---------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|---|
| ISO | ASA | d | t | r | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 | |
| SNGN 090304 | SNGN 321 | 9.52 | 3.18 | 0.4 | • | • | | | | | | | | | | | | | | | | | | |
| SNGN 090308 | SNGN 322 | 9.52 | 3.18 | 0.8 | • | • | • | | | | • | | | • | | • | | | | | | • | | |
| SNGN 090312 | SNGN 323 | 9.52 | 3.18 | 1.2 | • | • | | | | | | | | | | | | | | | | | | |
| SNGN 090404 | SNGN 331 | 9.52 | 4.76 | 0.4 | | | | | | | | | | | | | | | | | | | | |
| SNGN 090408 | SNGN 332 | 9.52 | 4.76 | 0.8 | • | | | | | | | | | | | • | | | | | | • | | |
| SNGN 090412 | SNGN 333 | 9.52 | 4.76 | 1.2 | | | | | | | | • | | | | • | | | | | | • | | |
| SNGN 120404 | SNGN 431 | 12.70 | 4.76 | 0.4 | • | | | | | | | | | | • | | | | | | | | | |
| SNGN 120408 | SNGN 432 | 12.70 | 4.76 | 0.8 | • | • | • | • | • | • | • | | | • | • | • | | | • | • | • | • | • | • |
| SNGN 120412 | SNGN 433 | 12.70 | 4.76 | 1.2 | • | • | • | • | • | | • | | • | • | • | • | | • | • | • | • | • | • | • |
| SNGN 120416 | SNGN 434 | 12.70 | 4.76 | 1.6 | • | • | | | • | | • | | • | • | • | • | • | | • | • | • | • | • | • |
| SNGN 120420 | SNGN 435 | 12.70 | 4.76 | 2.0 | • | | | | | | | | | • | • | • | • | | | | | • | | |
| SNGN 120604 | SNGN 441 | 12.70 | 6.35 | 0.4 | | | | | | | | | | | | | | | | | | | | |
| SNGN 120608 | SNGN 442 | 12.70 | 6.35 | 0.8 | • | | | | | | | | | | | | | | | | | | | |
| SNGN 120612 | SNGN 443 | 12.70 | 6.35 | 1.2 | • | | | | | | | | | | | | | | | | | | | |
| SNGN 120616 | SNGN 444 | 12.70 | 6.35 | 1.6 | • | | | | | | | | | | | | | | | | | | | |
| SNGN 120704 | SNGN 451 | 12.70 | 7.94 | 0.4 | | • | | | | | | | | | | • | | | | | | • | | |
| SNGN 120708 | SNGN 452 | 12.70 | 7.94 | 0.8 | • | • | • | • | | | | • | | • | • | • | | | • | • | • | • | • | • |
| SNGN 120712 | SNGN 453 | 12.70 | 7.94 | 1.2 | • | • | • | • | | | • | • | | • | • | • | • | • | • | • | • | • | • | • |
| SNGN 120716 | SNGN 454 | 12.70 | 7.94 | 1.6 | • | • | • | • | | | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| SNGN 120720 | SNGN 455 | 12.70 | 7.94 | 2.0 | • | • | • | | | | • | • | | • | • | • | | | | | | • | | |
| SNGN 150404 | SNGN 531 | 15.87 | 4.76 | 0.4 | | • | | | | | | | | | | | | | | | | | | |
| SNGN 150408 | SNGN 532 | 15.87 | 4.76 | 0.8 | | • | | | | | | | | | | | | | | | | | | |
| SNGN 150412 | SNGN 533 | 15.87 | 4.76 | 1.2 | • | | | | | | | • | | | • | • | | | | | | • | | |
| SNGN 150416 | SNGN 534 | 15.87 | 4.76 | 1.6 | • | | | | | | | | | | • | | | | | | | | | |
| SNGN 150708 | SNGN 552 | 15.87 | 7.94 | 0.8 | • | | | | | | | | | | | | | | | | | | | |
| SNGN 150712 | SNGN 553 | 15.87 | 7.94 | 1.2 | • | • | | | | | • | • | | • | • | • | | | | | | • | | |
| SNGN 150716 | SNGN 554 | 15.87 | 7.94 | 1.6 | • | | | | | | | • | • | • | • | • | • | • | | | | • | | |
| SNGN 190608 | SNGN 642 | 19.05 | 6.35 | 0.8 | | | | | | | | | | | | | | | | | | | | |
| SNGN 190612 | SNGN 643 | 19.05 | 6.35 | 1.2 | • | | | | | | | | | | • | | • | | | • | • | • | | |
| SNGN 190616 | SNGN 644 | 19.05 | 6.35 | 1.6 | • | | | | | | | | | | • | | | | • | • | | | • | • |
| SNGN 190712 | SNGN 653 | 19.05 | 7.94 | 1.2 | • | | | | | | | | | | | | | | | | | | | |
| SNGN 190716 | SNGN 654 | 19.05 | 7.94 | 1.6 | • | • | • | • | | | • | • | | • | • | • | | | • | • | • | | | |
| SNGN 190720 | SNGN 655 | 19.05 | 7.94 | 2.0 | • | | | | | | | • | | • | | | | | | | | | | |
| SNGN 250720 | SNGN 854 | 25.40 | 7.94 | 2.0 | • | | | | | | | | | | • | | | | | | | | | |
| SNGN 250724 | SNGN 856 | 25.40 | 7.94 | 2.4 | • | • | | | | | | | | | • | • | | | | | | | | |
| SNGN 250924 | SNGN 866 | 25.40 | 9.52 | 2.4 | • | | • | • | | | | • | | • | • | • | | | • | • | • | | | |

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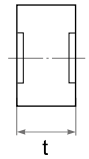
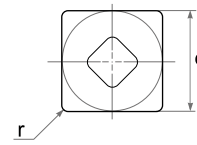
PCBN
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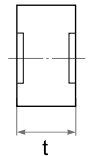
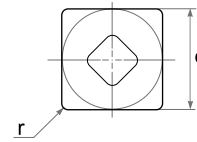
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SNGX



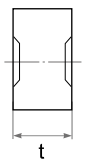
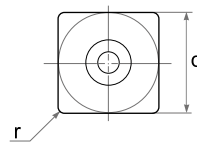
| Type | | Dimensions (mm) | | | | | | | | | | | | | | | | | | | | | | |
|-------------|----------|-----------------|------|-----|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|--|
| ISO | ASA | d | t | r | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 | |
| SNGX 120408 | SNGX 432 | 12.70 | 4.76 | 0.8 | | | | | | | | | | | | • | | | | | | • | | |
| SNGX 120412 | SNGX 433 | 12.70 | 4.76 | 1.2 | | | | | | | | | | | | • | | | | | | • | | |
| SNGX 120416 | SNGX 434 | 12.70 | 4.76 | 1.6 | | | | | | | | | | | | • | | | | | | • | | |
| SNGX 120708 | SNGX 452 | 12.70 | 7.94 | 0.8 | • | | | | | | | | | | • | | • | | | | | | | |
| SNGX 120712 | SNGX 453 | 12.70 | 7.94 | 1.2 | • | • | | | | | | | | | • | • | • | | • | • | • | | | |
| SNGX 120716 | SNGX 454 | 12.70 | 7.94 | 1.6 | | | | | | | | | | | • | • | • | • | • | • | • | | | |
| SNGX 150708 | SNGX 552 | 15.87 | 7.94 | 0.8 | • | • | | | | | | | | | • | | • | | | | | | | |
| SNGX 150712 | SNGX 553 | 15.87 | 7.94 | 1.2 | • | • | | | | | | | | | • | | • | | • | • | • | | | |
| SNGX 150716 | SNGX 554 | 15.87 | 7.94 | 1.6 | | | | | | | | | | | • | • | • | | | | | • | | |

SNMX



| Type | | Dimensions (mm) | | | | | | | | | | | | | | | | | | | | | | |
|-------------|----------|-----------------|------|-----|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|--|
| ISO | ASA | d | t | r | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 | |
| SNMX 120712 | SNMX 453 | 12.70 | 7.94 | 1.2 | | | | | | | | | | | • | • | • | • | • | • | • | | | |
| SNMX 120716 | SNMX 454 | 12.70 | 7.94 | 1.6 | | | | | | | | | | | | • | | | | | | • | | |

SNMX .. RD



| Type | | Dimensions (mm) | | | | | | | | | | | | | | | | | | | | | | |
|----------------|-------------|-----------------|------|-----|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|--|
| ISO | ASA | d | t | r | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 | |
| SNMX 120716 RD | SNMX 454 RD | 12.70 | 7.94 | 1.6 | | | | | | | | | | | • | | | • | | | | | | |

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CERMET

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PCD

TOOL
HOLDER

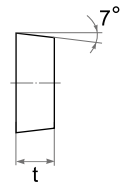
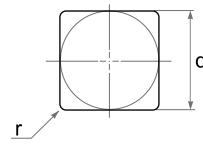
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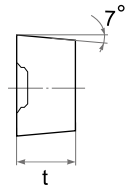
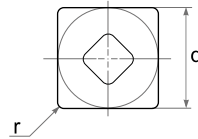
TURNING
&
MILLING

SCGN



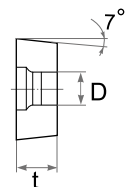
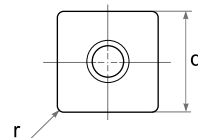
| Type | | Dimensions (mm) | | | Material | | | | | | | | | | | | | | | | | | | |
|-------------|----------|-----------------|------|-----|----------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|--|
| ISO | ASA | d | t | r | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 | |
| SCGN 090412 | SCGN 333 | 9.52 | 4.76 | 1.2 | • | | | | | | | | | | | • | | | | | | • | | |
| SCGN 090416 | SCGN 334 | 9.52 | 4.76 | 1.6 | • | | | | | | | | | | | | | | | | | | | |
| SCGN 120404 | SCGN 431 | 12.70 | 4.76 | 0.4 | | • | | | | | | | | | | | | | | | | | | |
| SCGN 120408 | SCGN 432 | 12.70 | 4.76 | 0.8 | • | • | | | | | | | | | | | | | | | | | | |
| SCGN 120412 | SCGN 433 | 12.70 | 4.76 | 1.2 | | | | | | | | | • | | • | • | | • | • | • | • | • | | |
| SCGN 120416 | SCGN 434 | 12.70 | 4.76 | 1.6 | • | • | | | | | | | | | | | | | | | | | | |

SCGX



| Type | | Dimensions (mm) | | | Material | | | | | | | | | | | | | | | | | | | |
|-------------|----------|-----------------|------|-----|----------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|--|
| ISO | ASA | d | t | r | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 | |
| SCGX 120408 | SCGX 432 | 12.70 | 4.76 | 0.8 | | | | | | | | | | | | | | | | | | | | |
| SCGX 120616 | SCGX 444 | 12.70 | 6.35 | 1.6 | | | | | | | | | | | | | | • | | | | | | |
| SCGX 120716 | SCGX 454 | 12.70 | 7.94 | 1.6 | | | | | | | | | | | | | | | | | | | | |

SCGW



| Type | | Dimensions (mm) | | | | Material | | | | | | | | | | | | | | | | | | |
|-------------|-------|-----------------|-----|------|-------|----------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|--|
| ISO | d | t | r | D | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 | |
| SCGW 09T304 | 9.52 | 3.97 | 0.4 | 4.40 | | | | | | | | | | | | • | | | | | | • | | |
| SCGW 09T308 | 9.52 | 3.97 | 0.8 | 4.40 | | | | | | | | | | | | • | | | | | | • | | |
| SCGW 120408 | 12.70 | 4.76 | 0.8 | 5.50 | | | | | | | | | | | | • | | | | | | • | | |

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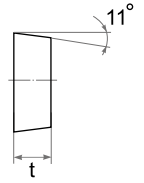
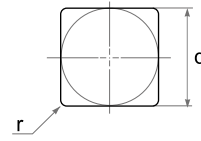
TOOL
HOLDER

MILLING
CUTTER

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TURNING
&
MILLING

SPGN



| Type | | Dimensions (mm) | | | NEW NEW | | | | | | | | | | | | | | | | | | | |
|-------------|----------|-----------------|------|-----|---|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|---|
| ISO | ASA | d | t | r | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 | |
| SPGN 090304 | SPGN 321 | 9.52 | 3.18 | 0.4 | • | • | | | | | | | | • | | | | | | | | | | |
| SPGN 090308 | SPGN 322 | 9.52 | 3.18 | 0.8 | • | • | | | | | • | | | | • | • | • | | | | | • | • | • |
| SPGN 090312 | SPGN 323 | 9.52 | 3.18 | 1.2 | • | | | | | | | | | | | | | | | | | | | |
| SPGN 120304 | SPGN 421 | 12.70 | 3.18 | 0.4 | • | • | | | | | | | | | | | | | | | | | | |
| SPGN 120308 | SPGN 422 | 12.70 | 3.18 | 0.8 | • | • | | | | • | | • | | • | | • | | | | | | • | | |
| SPGN 120312 | SPGN 423 | 12.70 | 3.18 | 1.2 | • | • | | | | | • | | | • | | • | | • | | | | • | | |
| SPGN 120404 | SPGN 431 | 12.70 | 4.76 | 0.4 | | | | | | | | | | | | | | | | | | | | |
| SPGN 120408 | SPGN 432 | 12.70 | 4.76 | 0.8 | • | • | • | | | | | | | • | | • | | | | | | • | • | • |
| SPGN 120412 | SPGN 433 | 12.70 | 4.76 | 1.2 | • | • | | | | | • | | | • | • | • | • | • | • | • | • | • | • | • |
| SPGN 120416 | SPGN 434 | 12.70 | 4.76 | 1.6 | • | • | | | | | • | | | • | • | • | • | | | | | • | • | • |
| SPGN 150408 | SPGN 532 | 15.87 | 4.76 | 0.8 | | | | | | | | | | | | | | | | | | | | |
| SPGN 150412 | SPGN 533 | 15.87 | 4.76 | 1.2 | | • | | | | | | | | | • | | | | | | | | | |
| SPGN 190412 | SPGN 633 | 19.05 | 4.76 | 1.2 | • | | | | | | | | | | | | | | | | | | | |
| SPGN 190416 | SPGN 634 | 19.05 | 4.76 | 1.6 | • | • | | | | | | | | | | • | • | | | | | • | | |

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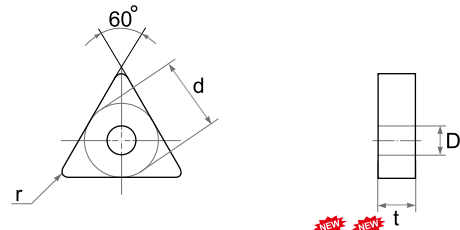
TOOL
HOLDER

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PART.
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TNGA



| Type | | Dimensions (mm) | | | | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 |
|-------------|----------|-----------------|------|-----|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|
| ISO | ASA | d | t | r | D | | | | | | | | | | | | | | | | | | | |
| TNGA 110304 | TNGA 221 | 6.35 | 3.18 | 0.4 | 2.26 | • | • | | | | | | | | | | | | | | | | | |
| TNGA 110308 | TNGA 222 | 6.35 | 3.18 | 0.8 | 2.26 | • | • | | | | | | | | | | | | | | | | | |
| TNGA 160304 | TNGA 321 | 9.52 | 3.18 | 0.4 | 3.81 | • | • | | | | | | | | | | | | | | | | | |
| TNGA 160308 | TNGA 322 | 9.52 | 3.18 | 0.8 | 3.81 | • | • | | | | | • | | • | | | | | | | | | | |
| TNGA 160312 | TNGA 323 | 9.52 | 3.18 | 1.2 | 3.81 | • | • | | | | | | | | | | | | | | | | | |
| TNGA 160404 | TNGA 331 | 9.52 | 4.76 | 0.4 | 3.81 | • | • | • | • | | • | • | | • | • | • | • | | • | • | • | | | |
| TNGA 160408 | TNGA 332 | 9.52 | 4.76 | 0.8 | 3.81 | • | • | • | • | | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| TNGA 160412 | TNGA 333 | 9.52 | 4.76 | 1.2 | 3.81 | • | • | • | • | | • | • | • | • | • | • | • | • | • | • | • | • | | |
| TNGA 160416 | TNGA 334 | 9.52 | 4.76 | 1.6 | 3.81 | • | • | • | | | | • | | • | • | • | • | • | | • | • | • | | |
| TNGA 220404 | TNGA 431 | 12.70 | 4.76 | 0.4 | 5.16 | • | • | | | | | | | • | | | | | | | | | | |
| TNGA 220408 | TNGA 432 | 12.70 | 4.76 | 0.8 | 5.16 | • | • | | | | | | | • | | • | | | • | • | • | | | |
| TNGA 220412 | TNGA 433 | 12.70 | 4.76 | 1.2 | 5.16 | • | • | | | | | | | • | | • | | | • | • | • | | | |
| TNGA 220416 | TNGA 434 | 12.70 | 4.76 | 1.6 | 5.16 | • | • | | | | | • | | • | | • | | | | | | • | | |
| TNGA 220708 | TNGA 452 | 12.70 | 7.94 | 0.8 | 5.16 | • | • | | | | | | | | | | | | | | | | | |
| TNGA 220712 | TNGA 453 | 12.70 | 7.94 | 1.2 | 5.16 | • | | | | | | | | | | | | | | | | | | |
| TNGA 270608 | TNGA 542 | 15.87 | 6.35 | 0.8 | 6.35 | | • | | | | | | | | | | | | | | | | | |
| TNGA 270612 | TNGA 543 | 15.87 | 6.35 | 1.2 | 6.35 | | • | | | | | | | | | | | | | | | | | |
| TNGA 330924 | TNGA 666 | 19.05 | 9.52 | 2.4 | 7.94 | | • | | | | | | | | | | | | | | | | | |

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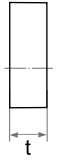
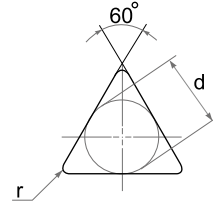
TOOL
HOLDER

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CUTTER

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&
MILLING

TNGN



| Type | | Dimensions (mm) | | | Material | | | | | | | | | | | | | | | | | | | |
|-------------|----------|-----------------|------|-----|----------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|---|
| ISO | ASA | d | t | r | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 | |
| TNGN 110304 | TNGN 221 | 6.35 | 3.18 | 0.4 | • | • | | | | | | | | • | | | | | | | | | | |
| TNGN 110308 | TNGN 222 | 6.35 | 3.18 | 0.8 | • | • | | | | | | • | | • | • | | | | | | | | | |
| TNGN 160404 | TNGN 331 | 9.52 | 4.76 | 0.4 | • | • | | | | | • | • | | • | | | | | | | | | | |
| TNGN 160408 | TNGN 332 | 9.52 | 4.76 | 0.8 | • | • | • | • | • | • | • | • | | • | • | • | | • | | | | • | | |
| TNGN 160412 | TNGN 333 | 9.52 | 4.76 | 1.2 | • | • | • | • | • | | | | | • | • | • | | | | | | • | • | • |
| TNGN 160416 | TNGN 334 | 9.52 | 4.76 | 1.6 | • | • | • | • | | | • | | | • | • | • | | | | | | • | | |
| TNGN 160704 | TNGN 351 | 9.52 | 7.94 | 0.4 | • | | | | | | | | | | | | | | | | | | | |
| TNGN 160708 | TNGN 352 | 9.52 | 7.94 | 0.8 | • | • | | | | | • | | | | • | | | | | | | | | |
| TNGN 160712 | TNGN 353 | 9.52 | 7.94 | 1.2 | • | • | | | | | | • | | • | • | | | | | | | | | |
| TNGN 160716 | TNGN 354 | 9.52 | 7.94 | 1.6 | • | • | | | | | | | | • | | | | | | | | | | |
| TNGN 220404 | TNGN 431 | 12.70 | 4.76 | 0.4 | • | | | | | | | | | | | | | | | | | | | |
| TNGN 220408 | TNGN 432 | 12.70 | 4.76 | 0.8 | • | • | | | | | | | | • | | • | | | • | | | • | • | • |
| TNGN 220412 | TNGN 433 | 12.70 | 4.76 | 1.2 | • | • | | | | | | | | • | | • | | | • | | | • | • | • |
| TNGN 220416 | TNGN 434 | 12.70 | 4.76 | 1.6 | | • | | | | | | | | • | | • | | | | | | • | • | • |
| TNGN 220708 | TNGN 452 | 12.70 | 7.94 | 0.8 | • | | | | | | | | | | | | | | | | | | | |
| TNGN 220712 | TNGN 453 | 12.70 | 7.94 | 1.2 | | • | | | | | | | | | | | | | | | | | | |
| TNGN 220716 | TNGN 454 | 12.70 | 7.94 | 1.6 | | • | | | | | | | | | | | | | | | | | | |
| TNGN 270608 | TNGN 542 | 15.87 | 6.35 | 0.8 | • | • | | | | | | | | | | | | | | | | | | |
| TNGN 270612 | TNGN 543 | 15.87 | 6.35 | 1.2 | • | • | | | | | | | | | | | | | | | | | | |
| TNGN 270616 | TNGN 544 | 15.87 | 6.35 | 1.6 | | • | | | | | | | | | | | | | • | | | | | |
| TNGN 330924 | TNGN 666 | 19.05 | 9.52 | 2.4 | | • | | | | | | | | | | | | | | | | | | |
| TNGN 440932 | TNGN 868 | 25.40 | 9.52 | 3.2 | • | • | | | | | | | | • | | | | | | | | | | |

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TOOL
HOLDER

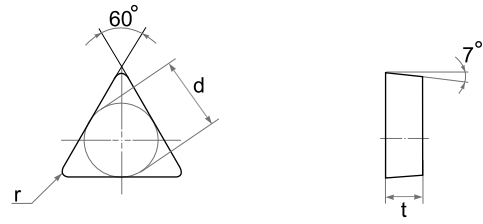
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TCUN



| Type | | Dimensions (mm) | | | | | | | | | | | | | | | | | | | | | | |
|-------------|----------|-----------------|------|-----|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|--|
| ISO | ASA | d | t | r | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 | |
| TCUN 160408 | TCUN 332 | 9.52 | 4.76 | 0.8 | | • | | | | | | | | | • | • | | | | | | • | | |
| TCUN 160412 | TCUN 333 | 9.52 | 4.76 | 1.2 | | • | | | | | | | | | • | • | | | | | | • | | |
| TCUN 160416 | TCUN 334 | 9.52 | 4.76 | 1.6 | | • | | | | | | | | | • | | | | | | | | | |

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PCD

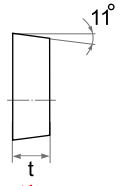
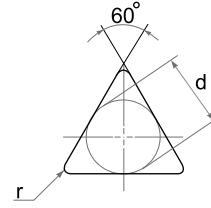
TOOL
HOLDER

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TURNING INSERT

TURNING
&
MILLING

TPGN



| Type | | Dimensions (mm) | | | NEW NEW | | | | | | | | | | | | | | | | | | | |
|-------------|----------|-----------------|-------|-----|---------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|---|
| ISO | ASA | d | t | r | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 | |
| TPGN 090204 | TPGN 731 | 5.56 | 2.38 | 0.4 | | • | | | | | | | | | | | | | | | | | | |
| TPGN 090208 | TPGN 732 | 5.56 | 2.38 | 0.8 | | • | | | | | | | | | | | | | | | | | | |
| TPGN 110304 | TPGN 221 | 6.35 | 3.18 | 0.4 | • | • | | | | • | • | | | • | | • | | | | | | • | | |
| TPGN 110308 | TPGN 222 | 6.35 | 3.18 | 0.8 | • | • | | | | | • | | | • | • | • | | | • | • | • | • | • | • |
| TPGN 160304 | TPGN 321 | 9.52 | 3.18 | 0.4 | • | • | • | | | • | • | • | | • | | • | | | | | | • | | |
| TPGN 160308 | TPGN 322 | 9.52 | 3.18 | 0.8 | • | • | | | | • | • | • | | • | • | • | • | | • | • | • | • | • | • |
| TPGN 160312 | TPGN 323 | 9.52 | 3.18 | 1.2 | • | • | | | | | | | | | | • | • | | | | | • | • | • |
| TPGN 160404 | TPGN 331 | 9.52 | 4.76 | 0.4 | • | | • | | | | | | | | | | | | | | | | | |
| TPGN 160408 | TPGN 332 | 9.52 | 4.76 | 0.8 | • | • | | | | | | | | | | | | | • | • | | | | |
| TPGN 160412 | TPGN 333 | 9.52 | 4.76 | 1.2 | • | | | | | | | | | | | | | | • | • | | | | |
| TPGN 160416 | TPGN 334 | 9.52 | 4.76 | 1.6 | • | | | | | | | | | | | | | | | | | | | |
| TPGN 220404 | TPGN 431 | 12.70 | 4.76 | 0.4 | • | • | | | | | | | | | | | | | | | | | | |
| TPGN 220408 | TPGN 432 | 12.70 | 4.76 | 0.8 | • | • | | | | | | | | • | | | | | | | | | • | • |
| TPGN 220412 | TPGN 433 | 12.70 | 4.76 | 1.2 | • | • | | | | | | | | | • | • | | | | | | • | | |
| TPGN 220416 | TPGN 434 | 12.70 | 4.76 | 1.6 | • | • | • | | | | | | | | | | | | | | | | | |
| TPGN 220712 | TPGN 453 | 12.70 | 7.94 | 1.2 | | | | | | | | | | | | | | | | | | | | |
| TPGN 220716 | TPGN 454 | 12.70 | 7.94 | 1.6 | | | | | | | | | | | | | | | | | | | | |
| TPGN 271232 | TPGN 588 | 15.87 | 12.70 | 3.2 | | • | | | | | | | | | | | | | | | | | | |

CERAMIC

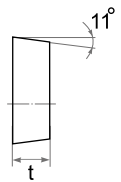
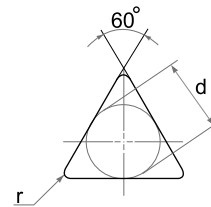
CERMET

PCBN
/
PCD

TOOL
HOLDER

MILLING
CUTTER

TPUN

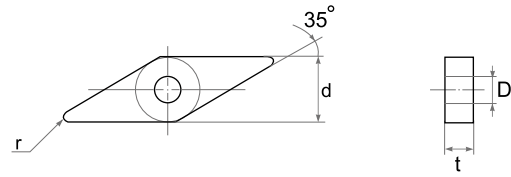


| Type | | Dimensions (mm) | | | NEW NEW | | | | | | | | | | | | | | | | | | | |
|-------------|----------|-----------------|------|-----|---------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|--|
| ISO | ASA | d | t | r | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 | |
| TPUN 110308 | TPUN 222 | 6.35 | 3.18 | 0.8 | | | | | | | | | | | | • | | | | | | • | | |
| TPUN 110312 | TPUN 223 | 6.35 | 3.18 | 1.2 | | | | | | | | | | | | • | | | | | | • | | |

TURNING INSERT

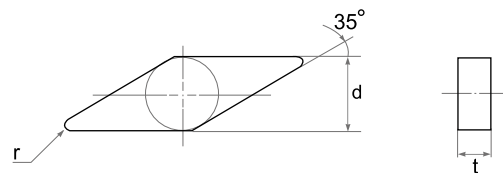
PART.
A

VNGA



| Type | | Dimensions (mm) | | | | NEW NEW | | | | | | | | | | | | | | | | | | | |
|-------------|----------|-----------------|------|-----|------|---------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|--|
| ISO | ASA | d | t | r | D | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 | |
| VNGA 160404 | VNGA 331 | 9.52 | 4.76 | 0.4 | 3.81 | • | • | • | | | • | | | | • | | | | | | | | | | |
| VNGA 160408 | VNGA 332 | 9.52 | 4.76 | 0.8 | 3.81 | • | • | • | • | • | • | | | • | • | • | • | • | | • | • | • | | | |
| VNGA 160412 | VNGA 333 | 9.52 | 4.76 | 1.2 | 3.81 | • | • | • | • | | | | | • | • | • | • | • | | | | • | | | |
| VNGA 160604 | VNGA 341 | 9.52 | 6.35 | 0.4 | 3.81 | • | • | | | | | | | | | | | | | | | | | | |
| VNGA 160608 | VNGA 342 | 9.52 | 6.35 | 0.8 | 3.81 | • | • | | | | | | | | | | | | | | | | | | |
| VNGA 160612 | VNGA 343 | 9.52 | 6.35 | 1.2 | 3.81 | • | • | | | | | | | | | | | | | | | | | | |
| VNGA 220404 | VNGA 431 | 12.70 | 4.76 | 0.4 | 5.16 | • | • | | | | | | | | | | | | | | | | | | |
| VNGA 220408 | VNGA 432 | 12.70 | 4.76 | 0.8 | 5.16 | • | • | | | | | | | | | | • | | | | | | • | | |
| VNGA 220412 | VNGA 433 | 12.70 | 4.76 | 1.2 | 5.16 | • | • | | | | | | | | | | • | | | | | | • | | |
| VNGA 220424 | VNGA 436 | 12.70 | 4.76 | 2.4 | 5.16 | | | | | | | | | | | | | | | | | | • | • | |

VNGN



| Type | | Dimensions (mm) | | | | NEW NEW | | | | | | | | | | | | | | | | | | | |
|-------------|----------|-----------------|------|-----|---|---------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|--|
| ISO | ASA | d | t | r | D | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 | |
| VNGN 160404 | VNGN 331 | 9.52 | 4.76 | 0.4 | | | • | | | | | | | | | | | | | | | | | | |
| VNGN 160408 | VNGN 332 | 9.52 | 4.76 | 0.8 | | | • | | | | | | | | | | | | | | | | | | |
| VNGN 160704 | VNGN 351 | 9.52 | 7.94 | 0.4 | | | • | | | | | | | | | | | | | | | | | | |
| VNGN 160708 | VNGN 352 | 9.52 | 7.94 | 0.8 | | | • | | | | | | | | | | | | | | | | | | |
| VNGN 160712 | VNGN 353 | 9.52 | 7.94 | 1.2 | | | | | | | | | | | | | | | | | | | | | |
| VNGN 160716 | VNGN 354 | 9.52 | 7.94 | 1.6 | | | | | | | | | | | | | | | | | | | | | |

CERAMIC

CERMET

PCBN
/
PCD

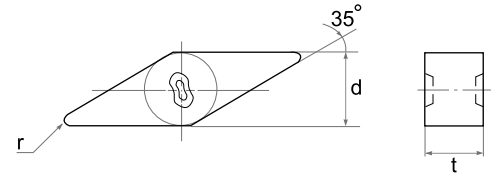
TOOL
HOLDER

MILLING
CUTTER

TURNING INSERT

TURNING
&
MILLING

VNGX



| Type | | Dimensions (mm) | | | NEW NEW | | | | | | | | | | | | | | | | | | | |
|-------------|----------|-----------------|------|-----|---|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|--|
| ISO | ASA | d | t | r | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 | |
| VNGX 160708 | VNGX 352 | 9.52 | 7.94 | 0.8 | | • | | | | | | • | | | | • | | | | | | • | | |
| VNGX 160712 | VNGX 353 | 9.52 | 7.94 | 1.2 | | • | | | | | | • | | | | • | | • | | | | • | | |
| VNGX 160716 | VNGX 354 | 9.52 | 7.94 | 1.6 | | | | | | | | | | | | • | | | | | | • | | |

CERAMIC

CERMET

PCBN
/
PCD

TOOL
HOLDER

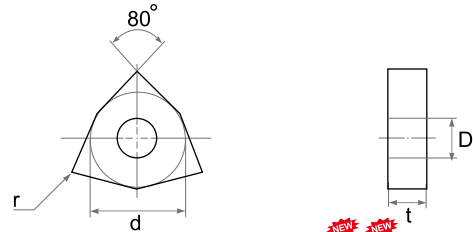
MILLING
CUTTER

TURNING INSERT

PART.
A

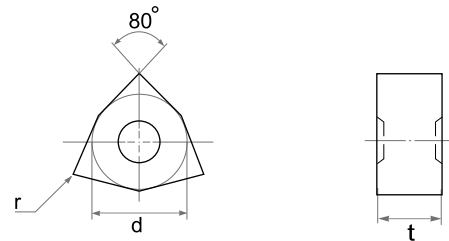
TURNING
&
MILLING

WNGA



| Type | | Dimensions (mm) | | | | | | | | | | | | | | | | | | | | | | | |
|--------------------|-----------------|-----------------|------|-----|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|---|
| ISO | ASA | d | t | r | D | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 | |
| WNGA 080404 | WNGA 431 | 12.70 | 4.76 | 0.4 | 5.16 | • | • | • | | | | | | | | | | | | | | | | | |
| WNGA 080408 | WNGA 432 | 12.70 | 4.76 | 0.8 | 5.16 | • | • | • | | | | | | | • | • | • | • | • | • | • | • | • | • | • |
| WNGA 080412 | WNGA 433 | 12.70 | 4.76 | 1.2 | 5.16 | • | • | • | | | | | | | • | • | • | • | • | • | • | • | • | | |

WNGX



| Type | | Dimensions (mm) | | | | | | | | | | | | | | | | | | | | | | |
|--------------------|-----------------|-----------------|------|-----|--|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|
| ISO | ASA | d | t | r | | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 |
| WNGX 080708 | WNGX 452 | 12.70 | 7.94 | 0.8 | | | | | | | | | | | | | • | | | | | • | | |
| WNGX 080712 | WNGX 453 | 12.70 | 7.94 | 1.2 | | | | | | | | | | | • | | • | • | • | • | • | • | • | |
| WNGX 080716 | WNGX 454 | 12.70 | 7.94 | 1.6 | | | | | | | | | | | | | • | | | | | • | | |

CERAMIC

CERMET

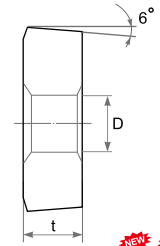
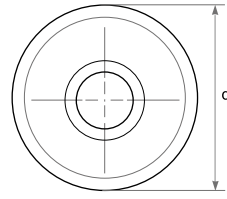
PCBN
/
PCD

TOOL
HOLDER

MILLING
CUTTER

ROLL TURNING INSERT

CDH



| Type | | Dimensions (mm) | | | | | | | | | | | | | | | | | | | | | | |
|------------|---------|-----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|--|
| ISO | ASA | d | t | D | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 | |
| CDH 120600 | CDH 22 | 12.70 | 6.35 | 3.18 | • | • | • | | | | | | | | | | | | | | | | | |
| CDH 120900 | CDH 23 | 12.70 | 9.52 | 3.18 | • | | | | | | | | | | | | | | | | | | | |
| CDH 190900 | CDH 33 | 19.05 | 9.52 | 6.35 | • | • | • | • | | | | | | • | | | | | | | | | | |
| CDH 191200 | CDH 34 | 19.05 | 12.70 | 6.35 | • | | | | | | | | | | | | | | | | | | | |
| CDH 251200 | CDH 42 | 25.40 | 12.70 | 6.75 | • | • | • | | | | | • | | • | | | | | | | | | | |
| CDH 251900 | CDH 43 | 25.40 | 19.05 | 6.75 | • | | | | | | | • | | • | | | | | | | | | | |
| CDH 320900 | CDH 515 | 31.75 | 9.52 | 10.00 | • | • | | | | | | • | | • | • | | | | | | | | | |
| CDH 321900 | CDH 53 | 31.75 | 19.05 | 10.00 | • | • | • | • | | | | • | | • | • | | | | | | | | | |
| CDH 381100 | | 38.10 | 11.11 | 9.93 | • | | | | | | | | | | | | | | | | | | | |

CERAMIC

CERMET

PCBN
/
PCD

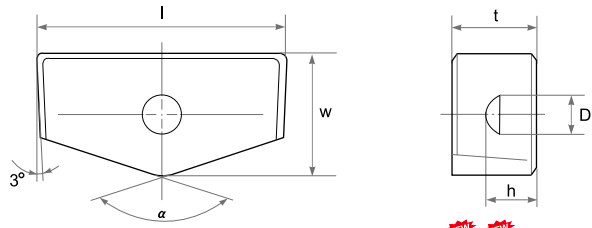
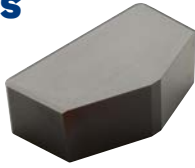
TOOL
HOLDER

MILLING
CUTTER

ROLL TURNING INSERT

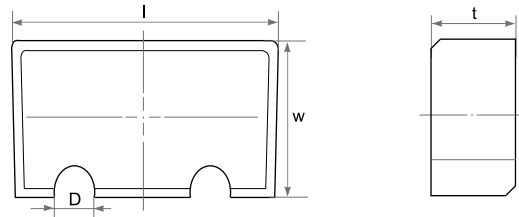
PART.
A

F-Series



| Type | Dimensions (mm) | | | | | | | | | | | | | | | | | | | | | | | | | |
|----------------|-----------------|-------|-------|------|------|----------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|--|
| ISO | l | w | t | D | h | α | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 | |
| F 13941 | 32.00 | 19.05 | 12.00 | 6.50 | 6.00 | 120° | • | • | | | | | | • | | • | • | | | | | | | | | |
| F 10537 | 44.50 | 25.40 | 14.20 | 6.50 | 7.00 | 120° | • | • | | | | | | • | | • | • | | | | | | | | | |

F-Series



| Type | Dimensions (mm) | | | | | | | | | | | | | | | | | | | | | | | |
|------------------|-----------------|-------|-------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|--|
| ISO | l | w | t | D | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 | |
| F 10537 V | 44.00 | 26.00 | 15.00 | 5.00 | • | • | | | | | | • | | | | | | | | | | | | |

CERAMIC

CERMET

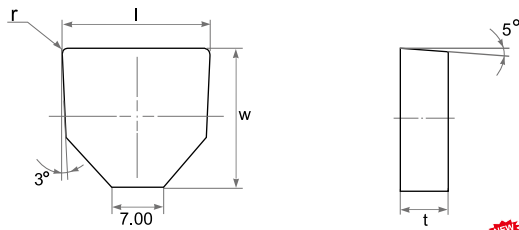
PCBN
/
PCD

TOOL
HOLDER

MILLING
CUTTER

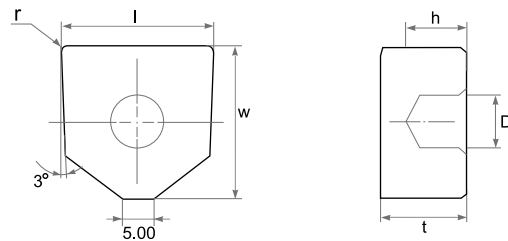
ROLL TURNING INSERT

F-Series



| Type | Dimensions (mm) | | | | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 |
|-----------------|-----------------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|
| ISO | l | t | r | w | | | | | | | | | | | | | | | | | | | |
| F 250723 | 25.00 | 7.94 | 1.20 | 23.00 | | • | | | | | | | | | | | | | | | | | |

F-Series



| Type | Dimensions (mm) | | | | | | | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 |
|--------------------|-----------------|-------|------|-------|------|-------|--|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|
| ISO | l | t | r | w | D | h | | | | | | | | | | | | | | | | | | | | |
| F 251425 | 25.00 | 14.40 | 2.40 | 25.40 | 9.17 | 10.00 | | | | | | | | | | | • | | | | | | | | | |
| F251425 H65 | 25.40 | 14.40 | 2.40 | 25.40 | 6.50 | 10.00 | | | | | | | | | | | • | | | | | | | | | |

CERAMIC

CERMET

PCBN
/
PCD

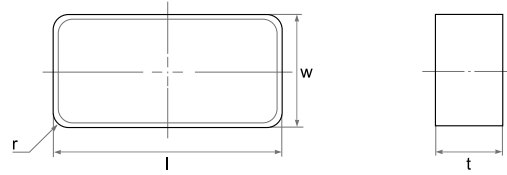
TOOL
HOLDER

MILLING
CUTTER

ROLL TURNING INSERT

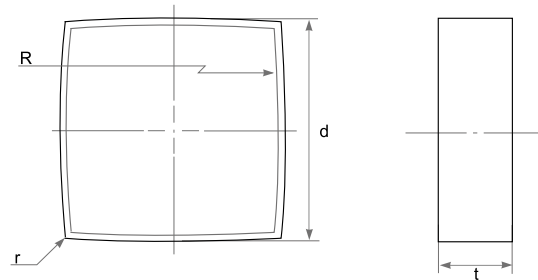
PART.
A

LNJ



| Type | Dimensions (mm) | | | | NEW NEW | | | | | | | | | | | | | | | | | | | | |
|-----------------|-----------------|-------|-------|-----|----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|--|
| | ISO | l | w | t | r | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 | |
| LNJ 5464 | 25.40 | 15.87 | 9.52 | 1.6 | • | • | | | | | | | | | | | | | | | | | | | |
| LNJ 5568 | 31.75 | 15.87 | 9.52 | 3.2 | | | | | | | | | | | • | | | | | | | | | | |
| LNJ 6588 | 31.75 | 19.05 | 12.70 | 3.2 | • | • | • | • | | | | • | | • | • | | | | | | | | | | |
| LNJ 6688 | 38.10 | 19.05 | 12.70 | 3.2 | • | • | • | • | | | | • | | • | • | | | | | • | • | | • | | |
| LNJ 6898 | 48.10 | 21.05 | 12.70 | 3.2 | | | | | | | | | | | • | | | | | | | | | | |

SNGN3812R



| Type | Dimensions (mm) | | | | NEW NEW | | | | | | | | | | | | | | | | | | | | |
|-------------------|-----------------|-------|-----|-----|----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|--|
| | ISO | d | t | r | R | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 | |
| SNGN 3812R | 38.10 | 12.70 | 0.4 | 114 | • | • | • | | | | | | | | | | | | | | | | | | |

CERAMIC

CERMET

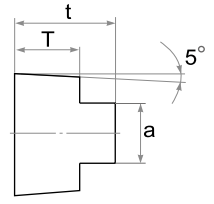
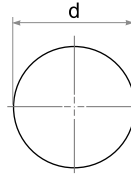
PCBN
/
PCD

TOOL
HOLDER

MILLING
CUTTER

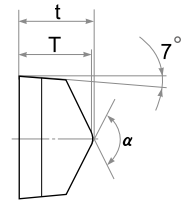
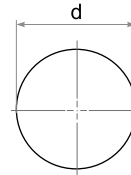
ROLL TURNING INSERT

RBGX



| Type | Dimensions (mm) | | | | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 |
|-----------------|-----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|
| | ISO | d | t | T | | | | | | | | | | | | | | | | | | | |
| RBGX 06T | 6.00 | 5.00 | 3.00 | 3.00 | • | • | | | | | | | | | | | | | | | | | |
| RBGX 08T | 8.00 | 6.50 | 4.00 | 4.00 | • | • | | | | | | | | | | | | | | | | | |
| RBGX 10T | 10.00 | 9.00 | 6.00 | 6.00 | | • | | | | | | | | | | | | | | | | | |
| RBGX 12T | 12.00 | 9.00 | 6.00 | 6.00 | • | • | | | | | | | | | | | | | | | | | |
| RBGX 16T | 16.00 | 13.00 | 8.00 | 8.00 | • | • | | | | | | | | | | | | | | | | | |
| RBGX 20T | 20.00 | 15.00 | 10.00 | 10.00 | • | • | • | • | | | | | | | | | | | | | | | |
| RBGX 26T | 26.00 | 15.00 | 10.00 | 14.00 | • | • | | | | | | | | | | | | | | | | | |

RCGX



| Type | Dimensions (mm) | | | | | | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 |
|--------------------|-----------------|-------|-------|-------|------|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|
| | ISO | ASA | d | t | T | α | | | | | | | | | | | | | | | | | | | |
| RCGX 060400 | RCGX 102 | 6.35 | 4.76 | 4.57 | 120° | • | • | | | | | | | | | | | | | | • | • | | • | • |
| RCGX 060600 | RCGX 102 | 6.35 | 6.35 | 6.20 | 120° | • | • | • | • | | | | | | | | | | | | • | • | | | |
| RCGX 060700 | RCGX 102 | 6.35 | 7.94 | 7.70 | 120° | • | • | • | • | | | | | | • | | | | | | • | • | | | |
| RCGX 090700 | RCGX 103 | 9.52 | 7.94 | 7.70 | 120° | • | • | • | • | | • | | | | • | | | | | | • | • | | • | • |
| RCGX 120700 | RCGX 104 | 12.70 | 7.94 | 7.70 | 120° | • | • | • | • | | • | | | | • | | | | | | • | • | | • | • |
| RCGX 151000 | RCGX 105 | 15.87 | 10.00 | 9.77 | 120° | • | • | • | • | | | | | | • | | | | | | • | • | | | |
| RCGX 191000 | RCGX 106 | 19.05 | 10.00 | 9.77 | 120° | • | • | • | • | | | | | | • | | | | | | • | • | | | |
| RCGX 251200 | RCGX 108 | 25.40 | 12.00 | 11.85 | 140° | • | • | • | • | | | | | | • | | | | | | • | • | | | |

CERAMIC

CERMET

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TOOL
HOLDER

MILLING
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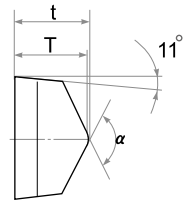
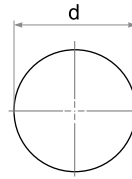
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PART.

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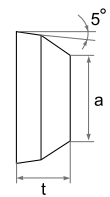
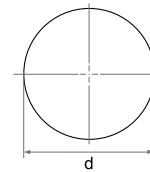
TURNING
&
MILLING

RPGX



| Type | | Dimensions (mm) | | | | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 |
|-------------|----------|-----------------|------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|
| ISO | ASA | d | t | T | α | | | | | | | | | | | | | | | | | | | |
| RPGX 060400 | RPGX 102 | 6.35 | 4.76 | 4.57 | 120° | | | | | | | | | | | | | | | | | | • | • |
| RPGX 090700 | RPGX 103 | 9.52 | 7.94 | 7.70 | 120° | | | | | | | | | | | | | | | • | • | | • | • |
| RPGX 120700 | RPGX 104 | 12.70 | 7.94 | 7.70 | 120° | | | | | | | | | | | | | | | • | • | | • | • |

RXGX



| Type | | Dimensions (mm) | | | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 | |
|-------------|--|-----------------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|--|
| ISO | | d | t | a | | | | | | | | | | | | | | | | | | | | |
| RXGX 1207MO | | 12.00 | 7.94 | 6.90 | | • | | | | | | | | | | | | | | | | | | |
| RXGX 1608MO | | 16.00 | 8.00 | 9.50 | | | • | | | | | • | | | | | | | | | | | | |
| RXGX 2508MO | | 25.00 | 8.00 | 18.20 | • | | | | | | | • | | | | | | | | | | | | |

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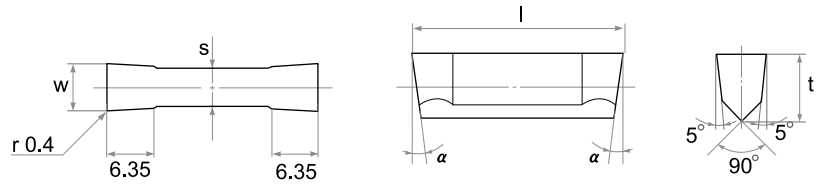
TOOL
HOLDER

MILLING
CUTTER

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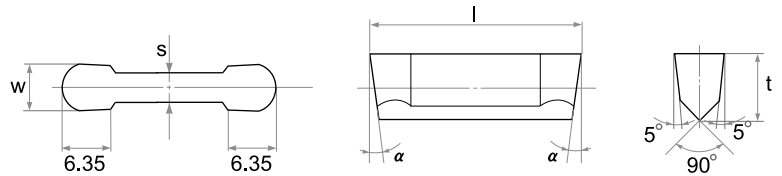
TURNING
&
MILLING

SYBF



| Type | Dimensions (mm) | | | | | NEW NEW | | | | | | | | | | | | | | | | | | | | |
|------------------|-----------------|------|------|------|------|----------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|--|
| | ISO | l | w | t | s | α | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 | |
| SYBF 3228 | 28.58 | 3.18 | 6.35 | 2.69 | 6.35 | 5.0° | • | • | | | | | | | | | | | | | | | | | | |
| SYBF 4828 | 28.58 | 4.78 | 6.35 | 3.66 | 6.35 | 5.0° | • | • | | | | | | | | | | | | | | | | | | |
| SYBF 5528 | 28.58 | 5.54 | 6.35 | 3.66 | 6.35 | 5.0° | | | | | | | | | | | | | | | | | | | | |
| SYBF 6428 | 28.58 | 6.35 | 8.56 | 5.13 | 6.35 | 7.0° | • | • | | | | | | | | | | | | | | | | | | |
| SYBF 7928 | 28.58 | 7.93 | 8.56 | 5.13 | 6.35 | 7.0° | • | • | | | | | | | | | | | | | | | | | | |
| SYBF 9528 | 28.58 | 9.53 | 8.56 | 6.99 | 6.35 | 7.0° | | | | | | | | | | | | | | | | | | | | |

SYBR



| Type | Dimensions (mm) | | | | | NEW NEW | | | | | | | | | | | | | | | | | | | | |
|------------------|-----------------|------|------|------|------|----------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|--|
| | ISO | l | w | t | s | α | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 | |
| SYBR 3228 | 28.58 | 3.18 | 6.35 | 2.69 | 6.35 | 5.0° | • | • | | | | | | | | | | | | | | | | | | |
| SYBR 4828 | 28.58 | 4.78 | 6.35 | 3.66 | 6.35 | 5.0° | • | • | | | | | | | | | | | | | | | | | | |
| SYBR 5528 | 28.58 | 5.54 | 6.35 | 3.66 | 6.35 | 5.0° | | | | | | | | | | | | | | | | | | | | |
| SYBR 6428 | 28.58 | 6.35 | 8.56 | 5.13 | 6.35 | 7.0° | • | • | | | | | | | | | | | | | | | | | | |
| SYBR 7928 | 28.58 | 7.93 | 8.56 | 5.13 | 6.35 | 7.0° | • | • | | | | | | | | | | | | | | | | | | |
| SYBR 9528 | 28.58 | 9.53 | 8.56 | 6.99 | 6.35 | 7.0° | | | | | | | | | | | | | | | | | | | | |

CERAMIC

CERMET

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PCD

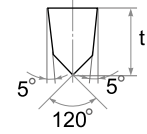
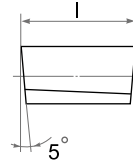
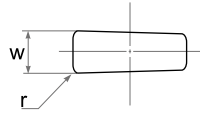
TOOL
HOLDER

MILLING
CUTTER

GROOVING INSERT

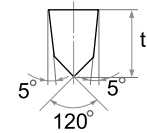
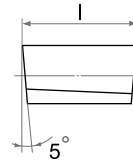
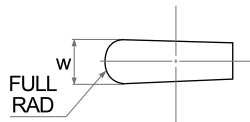
PART.
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SGF



| Type | Dimensions (mm) | | | | | | | | | | | | | | | | | | | | | | | |
|----------|-----------------|-------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|--|
| | l | w | t | r | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 | |
| SGF 4012 | 12.00 | 4.00 | 5.00 | 0.50 | • | • | | | | | | • | | | | • | | | | | | • | | |
| SGF 5012 | 12.00 | 5.00 | 5.00 | 0.80 | • | • | | | | | | • | | | | • | | | | | | • | | |
| SGF 6015 | 15.00 | 6.00 | 7.50 | 0.80 | • | • | | | | | | • | | | | | | | | | | | | |
| SGF 7015 | 15.00 | 7.00 | 7.50 | 0.80 | • | • | | | | | | • | | | | | | | | | | | | |
| SGF 8015 | 15.00 | 8.00 | 7.50 | 0.80 | • | • | | | | | | • | | | | | | | | | | | | |
| SGF 1015 | 15.00 | 10.00 | 7.50 | 0.80 | • | • | | | | | | • | | | | | | | | | | | | |

SGR



| Type | Dimensions (mm) | | | | | | | | | | | | | | | | | | | | | | |
|----------|-----------------|-------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|--|
| | l | w | t | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 | |
| SGR 4012 | 12.00 | 4.00 | 5.00 | • | • | | | | | | • | | | | • | | | | | | • | | |
| SGR 5012 | 12.00 | 5.00 | 5.00 | • | • | | | | | | • | | | | • | | | | | | • | | |
| SGR 6015 | 15.00 | 6.00 | 7.50 | • | • | | | | | | • | | | | | | | | | | | | |
| SGR 7015 | 15.00 | 7.00 | 7.50 | • | • | | | | | | • | | | | | | | | | | | | |
| SGR 8015 | 15.00 | 8.00 | 7.50 | • | • | | | | | | • | | | | | | | | | | | | |
| SGR 1015 | 15.00 | 10.00 | 7.50 | • | • | | | | | | • | | | | | | | | | | | | |

CERAMIC

CERMET

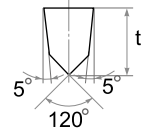
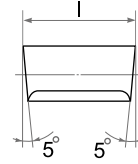
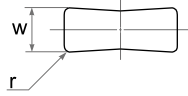
PCBN
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TOOL
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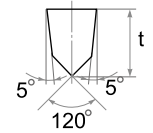
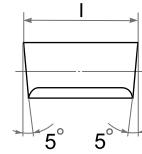
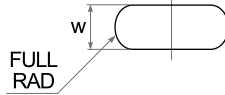
GROOVING INSERT

SSF



| Type | Dimensions (mm) | | | | | | | | | | | | | | | | | | | | | | | | |
|-----------------|-----------------|-------|------|------|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|--|
| | ISO | l | w | t | r | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 | |
| SSF 4012 | 12.00 | 4.00 | 5.00 | 0.80 | • | • | | | | | | | • | | | | | | | | | | | | |
| SSF 5012 | 12.00 | 5.00 | 5.00 | 0.80 | • | • | | | | | | | • | | | | | | | | | | | | |
| SSF 6015 | 15.00 | 6.00 | 7.50 | 0.80 | • | • | | | | | | | • | | | | | | | | | | | | |
| SSF 7015 | 15.00 | 7.00 | 7.50 | 0.80 | • | • | | | | | | | | | | | | | | | | | | | |
| SSF 8015 | 15.00 | 8.00 | 7.50 | 0.80 | • | • | | | | | | | | | | | | | | | | | | | |
| SSF 1015 | 15.00 | 10.00 | 7.50 | 0.80 | • | • | | | | | | | | | | | | | | | | | | | |

SSR



| Type | Dimensions (mm) | | | | | | | | | | | | | | | | | | | | | | | |
|-----------------|-----------------|-------|------|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|--|
| | ISO | l | w | t | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 | |
| SSR 4012 | 12.00 | 4.00 | 5.00 | • | • | | | | | | | • | | | | • | | | | | | • | | |
| SSR 5012 | 12.00 | 5.00 | 5.00 | • | • | | | | | | | • | | | | • | | | | | | • | | |
| SSR 6015 | 15.00 | 6.00 | 7.50 | • | • | | | | | | | • | | | | | | | | | | | | |
| SSR 7015 | 15.00 | 7.00 | 7.50 | • | • | | | | | | | • | | | | | | | | | | | | |
| SSR 8015 | 15.00 | 8.00 | 7.50 | • | • | | | | | | | • | | | | | | | | | | | | |
| SSR 1015 | 15.00 | 10.00 | 7.50 | • | • | | | | | | | • | | | | | | | | | | | | |

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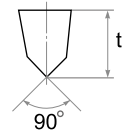
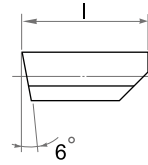
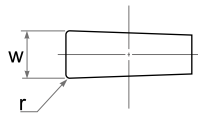
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PART.

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WFC



| Type | Dimensions (mm) | | | | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 |
|--------------|-----------------|-------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|
| | ISO | l | w | t | | | | | | | | | | | | | | | | | | | |
| WFC 094050-A | 12.70 | 2.388 | 4.75 | 0.40 | | | | | | | | | | | | | | | | | | | |
| WFC 094050-B | 12.70 | 2.388 | 4.75 | 0.80 | | | | | | | | | | | | | | | | | | | |
| WFC 125050-A | 12.70 | 3.175 | 4.75 | 0.40 | | | | | | | | | | | | | | | | | | | |
| WFC 125050-B | 12.70 | 3.175 | 4.75 | 0.80 | | | | | | | | | | | | | | | | | | | |
| WFC 156050-A | 12.70 | 3.962 | 4.75 | 0.40 | | | | | | | | | | | | | | | | | | | |
| WFC 156050-B | 12.70 | 3.962 | 4.75 | 0.80 | | | | | | | | | | | | | | | | | | | |
| WFC 187050-A | 12.70 | 4.750 | 4.75 | 0.40 | | | | | | | | | | | | | | | | | | | |
| WFC 187050-B | 12.70 | 4.750 | 4.75 | 0.80 | | | | | | | | | | | | | | | | | | | |
| WFC 218075-A | 19.05 | 5.537 | 6.35 | 0.40 | | | | | | | | | | | | | | | | | | | |
| WFC 218075-B | 19.05 | 5.537 | 6.35 | 0.80 | | | | | | | | | | | | | | | | | | | |
| WFC 250075-A | 19.05 | 6.350 | 6.35 | 0.40 | | | | | | | | | | | | | | | | | | | |
| WFC 250075-B | 19.05 | 6.350 | 6.35 | 0.80 | | | | | | | | | | | | | | | | | | | |
| WFC 250075-C | 19.05 | 6.350 | 6.35 | 1.20 | | | | | | | | | | | | | | | | | | | |
| WFC 281075-A | 19.05 | 7.137 | 6.35 | 0.40 | | | | | | | | | | | | | | | | | | | |
| WFC 281075-B | 19.05 | 7.137 | 6.35 | 0.80 | | | | | | | | | | | | | | | | | | | |
| WFC 281075-C | 19.05 | 7.137 | 6.35 | 1.20 | | | | | | | | | | | | | | | | | | | |
| WFC 312100-A | 25.40 | 7.925 | 8.56 | 0.40 | | | | | | | | | | | | | | | | | | | |
| WFC 312100-B | 25.40 | 7.925 | 8.56 | 0.80 | | | | | | | | | | | | | | | | | | | |
| WFC 312100-C | 25.40 | 7.925 | 8.56 | 1.20 | | | | | | | | | | | | | | | | | | | |
| WFC 312100-D | 25.40 | 7.925 | 8.56 | 1.60 | | | | | | | | | | | | | | | | | | | |
| WFC 344100-A | 25.40 | 8.738 | 8.56 | 0.40 | | | | | | | | | | | | | | | | | | | • |
| WFC 344100-B | 25.40 | 8.738 | 8.56 | 0.80 | | | | | | | | | | | | | | | | | | | |
| WFC 344100-C | 25.40 | 8.738 | 8.56 | 1.20 | | | | | | | | | | | | | | | | | | | |
| WFC 344100-D | 25.40 | 8.738 | 8.56 | 1.60 | | | | | | | | | | | | | | | | | | | |
| WFC 375100-A | 25.40 | 9.525 | 8.56 | 0.40 | | | | | | | | | | | | | | | | | | | |
| WFC 375100-B | 25.40 | 9.525 | 8.56 | 0.80 | | | | | | | | | | | | | | | | | | | |
| WFC 375100-C | 25.40 | 9.525 | 8.56 | 1.20 | | | | | | | | | | | | | | | | | | | |
| WFC 375100-D | 25.40 | 9.525 | 8.56 | 1.60 | | | | | | | | | | | | | | | | | | | • |

*The above inserts WFC Series are available only Whisker grade.

TURNING
&
MILLING

CERAMIC

CERMET

PCBN
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PCD

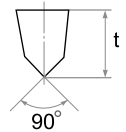
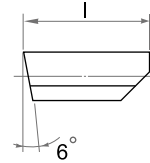
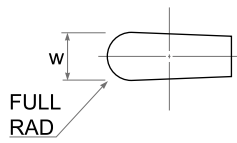
TOOL
HOLDER

MILLING
CUTTER

GROOVING INSERT

TURNING
&
MILLING

WRC



| Type | Dimensions (mm) | | | | | | | | | | | | | | | | | | | | | | | | |
|-------------------|-----------------|-------|------|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|--|---|
| | ISO | l | w | t | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 | | |
| WRC 094050 | 12.70 | 2.388 | 4.75 | | | | | | | | | | | | | | | | | | | | | | |
| WRC 125050 | 12.70 | 3.175 | 4.75 | | | | | | | | | | | | | | | | | | | | | | • |
| WRC 156050 | 12.70 | 3.962 | 4.75 | | | | | | | | | | | | | | | | | | | | | | |
| WRC 187050 | 12.70 | 4.750 | 4.75 | | | | | | | | | | | | | | | | | | | | | | |
| WRC 218075 | 19.05 | 5.537 | 6.35 | | | | | | | | | | | | | | | | | | | | | | |
| WRC 250075 | 19.05 | 6.350 | 6.35 | | | | | | | | | | | | | | | | | | | | | | |
| WRC 281075 | 19.05 | 7.137 | 6.35 | | | | | | | | | | | | | | | | | | | | | | |
| WRC 312100 | 25.40 | 7.925 | 8.56 | | | | | | | | | | | | | | | | | | | | | | |
| WRC 344100 | 25.40 | 8.738 | 8.56 | | | | | | | | | | | | | | | | | | | | | | |
| WRC 375100 | 25.40 | 9.525 | 8.56 | | | | | | | | | | | | | | | | | | | | | | |

*The above inserts WRC Series are available only Whisker grade.

CERAMIC

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TOOL
HOLDER

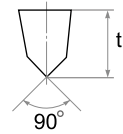
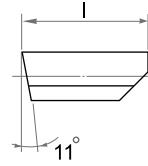
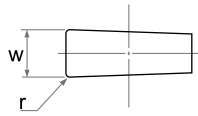
MILLING
CUTTER

GROOVING INSERT

PART.

A

WFP



| Type | Dimensions (mm) | | | | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 | | |
|--------------|-----------------|-------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|---|---|
| | ISO | l | w | t | | | | | | | | | | | | | | | | | | | | r | |
| WFP 094050-A | 12.70 | 2.388 | 4.75 | 0.40 | | | | | | | | | | | | | | | | | | | | • | |
| WFP 094050-B | 12.70 | 2.388 | 4.75 | 0.80 | | | | | | | | | | | | | | | | | | | | | |
| WFP 125050-A | 12.70 | 3.175 | 4.75 | 0.40 | | | | | | | | | | | | | | | | | | | | | • |
| WFP 125050-B | 12.70 | 3.175 | 4.75 | 0.80 | | | | | | | | | | | | | | | | | | | | | • |
| WFP 156050-A | 12.70 | 3.962 | 4.75 | 0.40 | | | | | | | | | | | | | | | | | | | | | • |
| WFP 156050-B | 12.70 | 3.962 | 4.75 | 0.80 | | | | | | | | | | | | | | | | | | | | | • |
| WFP 187050-A | 12.70 | 4.750 | 4.75 | 0.40 | | | | | | | | | | | | | | | | | | | • | • | |
| WFP 187050-B | 12.70 | 4.750 | 4.75 | 0.80 | | | | | | | | | | | | | | | | | | | • | • | |
| WFP 218075-A | 19.05 | 5.537 | 6.35 | 0.40 | | | | | | | | | | | | | | | | | | | • | • | |
| WFP 218075-B | 19.05 | 5.537 | 6.35 | 0.80 | | | | | | | | | | | | | | | | | | | | | |
| WFP 250075-A | 19.05 | 6.350 | 6.35 | 0.40 | | | | | | | | | | | | | | | | | | | • | • | |
| WFP 250075-B | 19.05 | 6.350 | 6.35 | 0.80 | | | | | | | | | | | | | | | | | | | • | • | |
| WFP 250075-C | 19.05 | 6.350 | 6.35 | 1.20 | | | | | | | | | | | | | | | | | | | • | • | |
| WFP 281075-A | 19.05 | 7.137 | 6.35 | 0.40 | | | | | | | | | | | | | | | | | | | • | • | |
| WFP 281075-B | 19.05 | 7.137 | 6.35 | 0.80 | | | | | | | | | | | | | | | | | | | | | |
| WFP 281075-C | 19.05 | 7.137 | 6.35 | 1.20 | | | | | | | | | | | | | | | | | | | | | |
| WFP 312100-A | 25.40 | 7.925 | 8.56 | 0.40 | | | | | | | | | | | | | | | | | | | | | • |
| WFP 312100-B | 25.40 | 7.925 | 8.56 | 0.80 | | | | | | | | | | | | | | | | | | | | | • |
| WFP 312100-C | 25.40 | 7.925 | 8.56 | 1.20 | | | | | | | | | | | | | | | | | | | | | • |
| WFP 312100-D | 25.40 | 7.925 | 8.56 | 1.60 | | | | | | | | | | | | | | | | | | | | | |
| WFP 344100-A | 25.40 | 8.738 | 8.56 | 0.40 | | | | | | | | | | | | | | | | | | | | | |
| WFP 344100-B | 25.40 | 8.738 | 8.56 | 0.80 | | | | | | | | | | | | | | | | | | | | | |
| WFP 344100-C | 25.40 | 8.738 | 8.56 | 1.20 | | | | | | | | | | | | | | | | | | | | | |
| WFP 344100-D | 25.40 | 8.738 | 8.56 | 1.60 | | | | | | | | | | | | | | | | | | | | | |
| WFP 375100-A | 25.40 | 9.525 | 8.56 | 0.40 | | | | | | | | | | | | | | | | | | | | | |
| WFP 375100-B | 25.40 | 9.525 | 8.56 | 0.80 | | | | | | | | | | | | | | | | | | | | | • |
| WFP 375100-C | 25.40 | 9.525 | 8.56 | 1.20 | | | | | | | | | | | | | | | | | | | | | |
| WFP 375100-D | 25.40 | 9.525 | 8.56 | 1.60 | | | | | | | | | | | | | | | | | | | | | • |

*The above inserts WFP Series are available only Whisker grade.

TURNING
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MILLING

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CERMET

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PCD

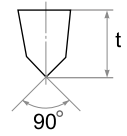
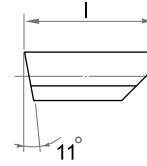
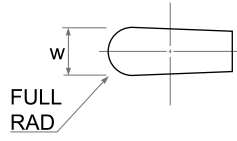
TOOL
HOLDER

MILLING
CUTTER

GROOVING INSERT

TURNING
&
MILLING

WRP



| Type | Dimensions (mm) | | | | | | | | | | | | | | | | | | | | | | | |
|-------------------|-----------------|-------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|---|---|
| | l | w | t | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 | | |
| WRP 094050 | 12.70 | 2.388 | 4.75 | | | | | | | | | | | | | | | | | | | | | |
| WRP 125050 | 12.70 | 3.175 | 4.75 | | | | | | | | | | | | | | | | | | | | | • |
| WRP 156050 | 12.70 | 3.962 | 4.75 | | | | | | | | | | | | | | | | | | | | | • |
| WRP 187050 | 12.70 | 4.750 | 4.75 | | | | | | | | | | | | | | | | | | | | | • |
| WRP 218075 | 19.05 | 5.537 | 6.35 | | | | | | | | | | | | | | | | | | | • | • | |
| WRP 250075 | 19.05 | 6.350 | 6.35 | | | | | | | | | | | | | | | | | | | • | • | |
| WRP 281075 | 19.05 | 7.137 | 6.35 | | | | | | | | | | | | | | | | | | | • | • | |
| WRP 312100 | 25.40 | 7.925 | 8.56 | | | | | | | | | | | | | | | | | | | • | • | |
| WRP 344100 | 25.40 | 8.738 | 8.56 | | | | | | | | | | | | | | | | | | | | | |
| WRP 375100 | 25.40 | 9.525 | 8.56 | | | | | | | | | | | | | | | | | | | | | • |

*The above inserts WRP Series are available only Whisker grade.

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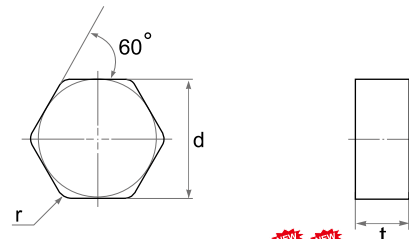
MILLING INSERT

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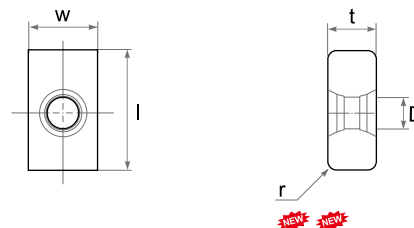
TURNING
&
MILLING

HNEN



| Type | Dimensions (mm) | | | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 | |
|-----------------------|-----------------|------|-----|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|---|
| | ISO | d | t | | | | | | | | | | | | | | | | | | | | r |
| HNEN 090520 | 16.20 | 5.56 | 2.0 | | | | | | | | | | | • | • | | | | | • | | | |
| HNEN 090530 | 16.20 | 5.56 | 3.0 | | | | | | | | | | | • | • | | | | | • | | | |
| HNEN 0905 ANSN | 15.87 | 5.64 | 0.8 | | | | | | | | | | | • | • | | • | | | • | | | |

LNE



| Type | Dimensions (mm) | | | | | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 |
|-------------------|-----------------|------|------|------|-----|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|
| | ISO | l | w | t | D | | | | | | | | | | | | | | | | | | | |
| LNE 040904 | 15.87 | 9.52 | 4.76 | 4.41 | 0.4 | | | | | | | | | | | • | • | | | | | • | | |
| LNE 040908 | 15.87 | 9.52 | 4.76 | 4.41 | 0.8 | | | | | | | | | | | • | • | | | | | • | | |
| LNE 040912 | 15.87 | 9.52 | 4.76 | 4.41 | 1.2 | | | | | | | | | | | • | • | | | | | • | | |
| LNE 1007 | 15.67 | 9.52 | 6.35 | 4.10 | 1.2 | | | | | | | | | | | • | • | | | | | • | | |

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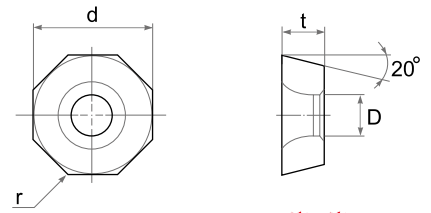
TOOL
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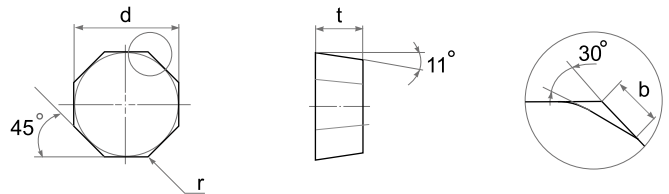
TURNING
&
MILLING

OEGB



| Type | Dimensions (mm) | | | | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 |
|--------------------|-----------------|------|------|-----|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|
| | ISO | d | t | D | | | | | | | | | | | | | | | | | | | |
| OEGB 070408 | 15.87 | 4.76 | 5.18 | 0.8 | | | | | | | | | | | | • | | | | | • | | |
| OEGB 070416 | 15.87 | 4.76 | 5.18 | 1.6 | | | | | | | | | | | • | • | | • | | | • | | |
| OEGB 070516 | 15.87 | 5.13 | 5.18 | 1.6 | | | | | | | | | | | • | • | | | | | • | | |

OPEN



| Type | Dimensions (mm) | | | | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 |
|-----------------------|-----------------|------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|
| | ISO | d | t | r | | | | | | | | | | | | | | | | | | | |
| OPEN 050408 TR | 13.97 | 4.76 | 0.80 | 2.10 | | | | | | | | | | | | • | | | | | • | | |
| OPEN 050608 TR | 13.97 | 6.35 | 0.80 | 2.10 | | | | | | | | | | | | • | | • | | | • | | |

CERAMIC

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PCD

TOOL
HOLDER

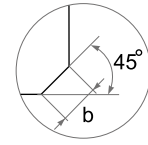
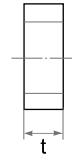
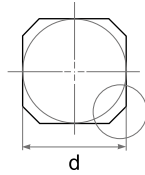
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CUTTER

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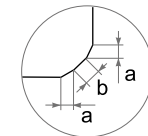
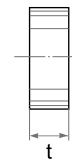
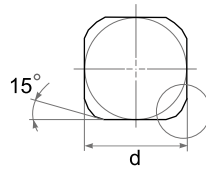
TURNING
&
MILLING

SNCN



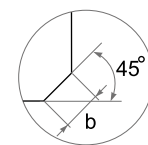
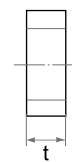
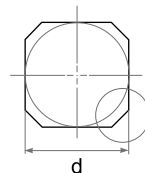
| Type | | Dimensions (mm) | | | | | | | | | | | | | | | | | | | | | | |
|---------------------|-------------------|-----------------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|--|
| ISO | ASA | d | t | b | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 | |
| SNCN 1204 AN | SNCN 43 AN | 12.70 | 4.76 | 2.50 | | | | | | | | | | | | • | | | | | | • | | |
| SNCN 1204 ZN | SNCN 43 ZN | 12.70 | 4.76 | 1.10 | | | | | | | | | | | | • | | | | | | • | | |

SNCN .. ENTN



| Type | | Dimensions (mm) | | | | | | | | | | | | | | | | | | | | | | | |
|-----------------------|---------------------|-----------------|------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|--|
| ISO | ASA | d | t | a | b | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 | |
| SNCN 1204 ENTN | SNCN 43 ENTN | 12.70 | 4.76 | 1.40 | 1.00 | | | | | | | | | | | • | • | • | | | | | • | | |
| SNCN 1504 ENTN | SNCN 53 ENTN | 15.87 | 4.76 | 1.40 | 1.00 | | | | | | | | | | | • | • | • | | | | | • | | |

SNGN .. ING



| Type | | Dimensions (mm) | | | | | | | | | | | | | | | | | | | | | | |
|----------------------|--------------------|-----------------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|--|
| ISO | ASA | d | t | b | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 | |
| SNGN 1204 ING | SNGN 43 ING | 12.70 | 4.76 | 1.50 | | | | | | | | | | | | • | • | | | | | • | | |
| SNGN 1904 ING | SNGN 63 ING | 19.05 | 4.76 | 2.50 | | | | | | | | | | | | • | • | | | | | • | | |

CERAMIC

CERMET

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PCD

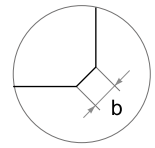
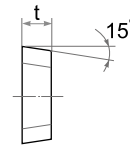
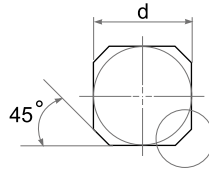
TOOL
HOLDER

MILLING
CUTTER

MILLING INSERT

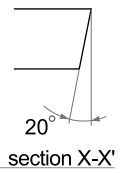
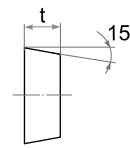
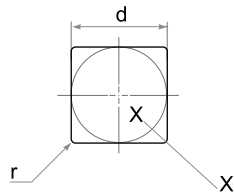
TURNING
&
MILLING

SDCN



| Type | | Dimensions (mm) | | | | | | | | | | | | | | | | | | | | | | |
|--------------------------|------------------------|-----------------|------|-----|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|--|
| ISO | ASA | d | t | b | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 | |
| SDCN 1203 AETN 12 | SDCN 42 AETN 12 | 12.70 | 3.18 | 1.2 | | | | | | | | | | | | • | | | | | | • | | |
| SDCN 1203 AETN | SDCN 42 AETN | 12.70 | 3.18 | 2.0 | | | | | | | | | | | | • | | | | | | • | | |
| SDCN 1504 AETN | SDCN 53 AETN | 15.87 | 4.76 | 2.0 | | | | | | | | | | | | • | | | | | | • | | |

SDCN .. T



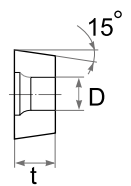
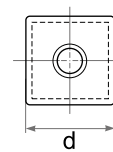
| Type | | Dimensions (mm) | | | | | | | | | | | | | | | | | | | | | | |
|------------------------|---------------------|-----------------|------|-----|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|--|
| ISO | ASA | d | t | r | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 | |
| SDCN 120408 T20 | SDCN 432 T20 | 12.70 | 4.76 | 0.8 | | | | | | | | | | | | • | | | | | | • | | |
| SDCN 120412 T20 | SDCN 433 T20 | 12.70 | 4.76 | 1.2 | | | | | | | | | | | | • | | | | | | • | | |

CERAMIC

CERMET

PCBN
/
PCD

SDCW



| Type | | Dimensions (mm) | | | | | | | | | | | | | | | | | | | | | | |
|-----------------------|---------------------|-----------------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|--|
| ISO | ASA | d | t | D | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 | |
| SDCW 1204 PDSR | SDCW 43 PDSR | 12.70 | 4.76 | 4.40 | | | | | | | | | | | | • | | • | | | | • | | |

TOOL
HOLDER

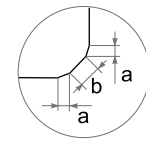
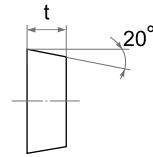
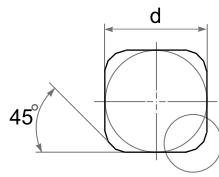
MILLING
CUTTER

MILLING INSERT

PART.
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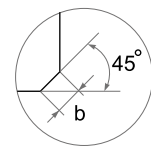
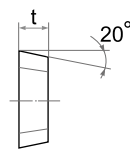
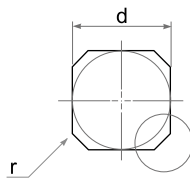
TURNING
&
MILLING

SEAN



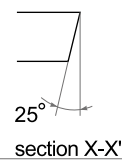
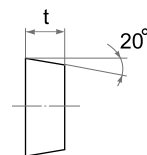
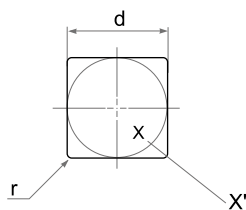
| Type | | Dimensions (mm) | | | | | | | | | | | | | | | | | | | | | | | |
|----------------|--------------|-----------------|------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|--|
| ISO | ASA | d | t | a | b | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 | |
| SEAN 1203 AFTN | SEAN 42 AFTN | 12.70 | 3.18 | 0.50 | 1.80 | | | | | | | | | | | • | • | • | | | | | • | | |
| SEAN 1504 AFTN | SEAN 53 AFTN | 12.70 | 4.76 | 0.70 | 2.00 | | | | | | | | | | | • | • | • | | | | | • | | |

SEAN .. NW



| Type | | Dimensions (mm) | | | | | | | | | | | | | | | | | | | | | | | |
|-------------------|-----------------|-----------------|------|------|-----|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|--|
| ISO | ASA | d | t | b | r | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 | |
| SEAN 1203 NWAFTN | SEAN 42 NWAFTN | 12.70 | 3.18 | 2.40 | 0.4 | | | | | | | | | | | • | | | | | | | | | |
| SEAN 1204 AFTNW25 | SEAN 43 AFTNW25 | 12.70 | 4.76 | 2.50 | 1.2 | | | | | | | | | | | | | • | | | | | • | | |

SEAN .. T



| Type | | Dimensions (mm) | | | | | | | | | | | | | | | | | | | | | | |
|-----------------|--------------|-----------------|------|-----|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|--|
| ISO | ASA | d | t | r | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 | |
| SEAN 120412 T25 | SEAN 433 T25 | 12.70 | 4.76 | 1.2 | | | | | | | | | | | | | • | | | • | | • | | |
| SEAN 120416 T25 | SEAN 434 T25 | 12.70 | 4.76 | 1.6 | | | | | | | | | | | | | • | | | • | | • | | |

CERAMIC

CERMET

PCBN
/
PCD

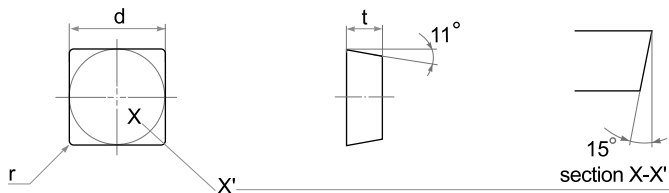
TOOL
HOLDER

MILLING
CUTTER

MILLING INSERT

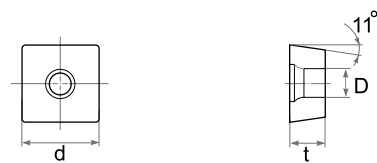
TURNING
&
MILLING

SPCN .. T



| Type | | Dimensions (mm) | | | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 |
|-----------------|--------------|-----------------|------|-----|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|
| ISO | ASA | d | t | r | | | | | | | | | | | | | | | | | | | |
| SPCN 120412 T15 | SPCN 433 T15 | 12.70 | 4.76 | 1.2 | | | | | | | | | | | | • | | | | | • | | |
| SPCN 120416 T15 | SPCN 434 T15 | 12.70 | 4.76 | 1.6 | | | | | | | | | | | | • | | | | | • | | |

SPCW



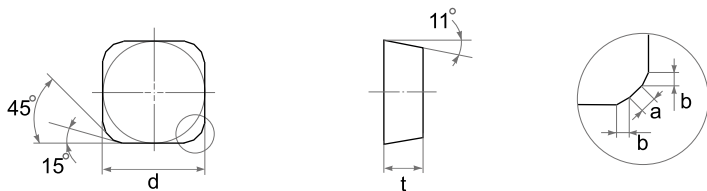
| Type | | Dimensions (mm) | | | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 |
|-------------|-------------|-----------------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|
| ISO | ASA | d | t | D | | | | | | | | | | | | | | | | | | | |
| SPCW 10T3ZX | SPCW 10T3ZX | 10.00 | 3.97 | 3.52 | | | | | | | | | | | | • | | | | | • | | |

CERAMIC

CERMET

PCBN
/
PCD

SPEN



| Type | | Dimensions (mm) | | | | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 |
|----------------|--------------|-----------------|------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|
| ISO | ASA | d | t | a | b | | | | | | | | | | | | | | | | | | | |
| SPEN 1206 APTN | SPEN 44 APTN | 12.70 | 6.35 | 1.20 | 1.20 | | | | | | | | | | | | • | | • | | | • | | |

TOOL
HOLDER

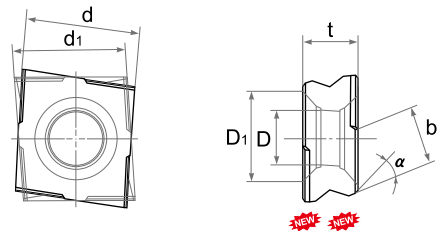
MILLING
CUTTER

MILLING INSERT

PART.
A

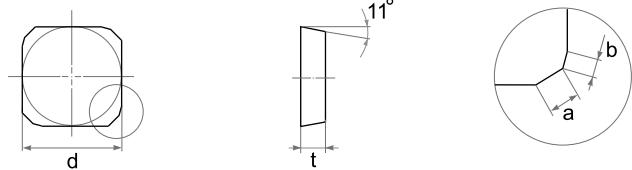
TURNING
&
MILLING

SPHX



| Type | | Dimensions (mm) | | | | | | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 |
|------------------|--|-----------------|----------------|------|------|----------------|----|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|
| ISO | | d | d ₁ | t | D | D ₁ | α | b | | | | | | | | | | | | | | | | | | |
| SPHX 1205NR 480T | | 11.67 | 11.33 | 5.50 | 5.10 | 8.41 | 45 | 8.0 | | | | | | | | | | | • | | • | | | • | | |
| SPHX 1205NL 480T | | 11.67 | 11.33 | 5.50 | 5.10 | 8.41 | 45 | 8.0 | | | | | | | | | | | | | | | | | | |
| SPHX 1205ER 855T | | 12.09 | 11.33 | 5.50 | 5.10 | 8.41 | 35 | 5.50 | | | | | | | | | | | • | | • | | | • | | |
| SPHX 1205EL 855T | | 12.09 | 11.33 | 5.50 | 5.10 | 8.41 | 35 | 5.50 | | | | | | | | | | | • | | | | | • | | |
| SPHX 15T6NR 880T | | 14.58 | 14.33 | 6.60 | 6.10 | 10.18 | 45 | 8.80 | | | | | | | | | | | • | | • | | | • | | |
| SPHX 15T6ER 865T | | 15.50 | 14.33 | 6.60 | 6.10 | 10.18 | 35 | 6.50 | | | | | | | | | | | • | | • | | | • | | |

SPKN



| Type | | Dimensions (mm) | | | | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 | |
|----------------|--------------|-----------------|------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|---|
| ISO | ASA | d | t | a | b | | | | | | | | | | | | | | | | | | | | |
| SPKN 1203 EDTR | SPKN 42 EDTR | 12.70 | 3.18 | 1.40 | 1.00 | | | | | | | | | | | | • | • | | | | | | • | • |
| SPKN 1504 EDTR | SPKN 53 EDTR | 15.87 | 4.76 | 1.40 | 1.00 | | | | | | | | | | | | • | • | | | | | | • | • |

CERAMIC

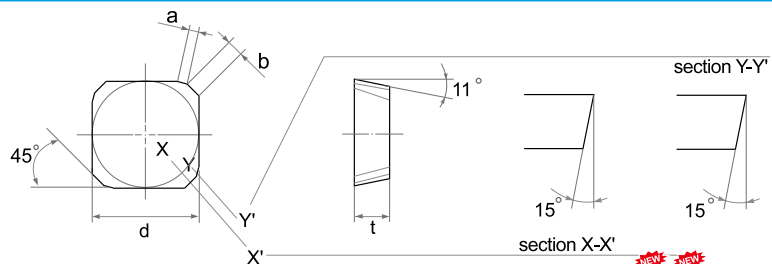
CERMET

PCBN
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PCD

TOOL
HOLDER

MILLING
CUTTER

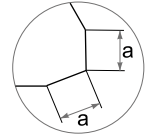
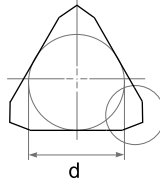
SPKN .. SP



| Type | | Dimensions (mm) | | | | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 |
|------------------|----------------|-----------------|------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|
| ISO | ASA | d | t | a | b | | | | | | | | | | | | | | | | | | | |
| SPKN 1204SP EDTR | SPKN 43SP EDTR | 12.70 | 4.76 | 1.10 | 1.30 | | | | | | | | | | | | • | | | | | | • | |

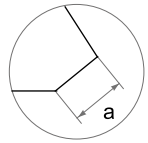
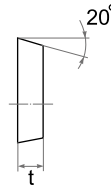
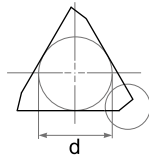
MILLING INSERT

TNCN



| Type | | Dimensions (mm) | | | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 |
|---------------|-------------|-----------------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|
| ISO | ASA | d | t | a | | | | | | | | | | | | | | | | | | | |
| TNCN 2204 ANT | TNCN 43 ANT | 12.70 | 4.76 | 2.60 | | | | | | | | | | | • | • | | | | | • | | |

TEKN



| Type | | Dimensions (mm) | | | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 |
|----------------|--------------|-----------------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|
| ISO | ASA | d | t | a | | | | | | | | | | | | | | | | | | | |
| TEKN 1603 PFTR | TEKN 32 PFTR | 9.52 | 3.18 | 1.40 | | | | | | | | | | | • | • | | | | | | • | |
| TEKN 2204 PFTR | TEKN 43 PFTR | 12.70 | 4.76 | 2.10 | | | | | | | | | | | • | • | | | | | • | | |

CERAMIC

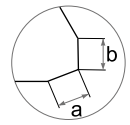
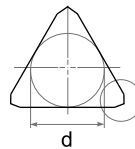
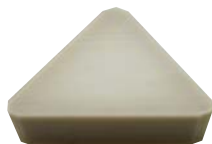
CERMET

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TOOL
HOLDER

MILLING
CUTTER

TPKN

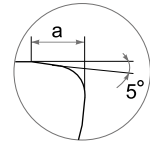
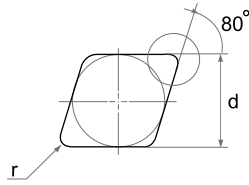


| Type | | Dimensions (mm) | | | | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 |
|----------------|--------------|-----------------|------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|
| ISO | ASA | d | t | a | b | | | | | | | | | | | | | | | | | | | |
| TPKN 1603 PDTR | TPKN 32 PDTR | 9.52 | 3.18 | 1.20 | 1.00 | | | | | | | | | | • | • | • | | | | | • | | |
| TPKN 2204 PDTR | TPKN 43 PDTR | 12.70 | 4.76 | 1.40 | 0.70 | | | | | | | | | | • | • | • | | | | | • | | |

WIPER(ZZ) INSERT

PART.
A

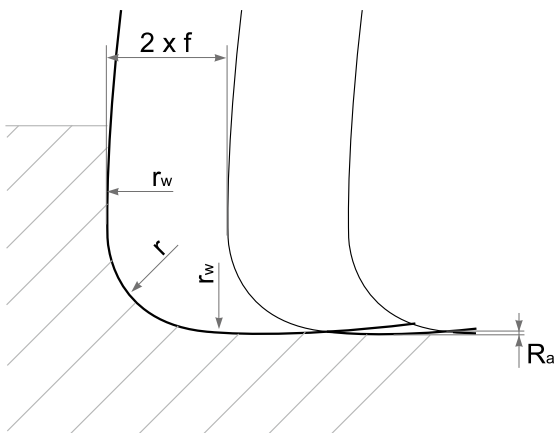
CNGN .. AZ



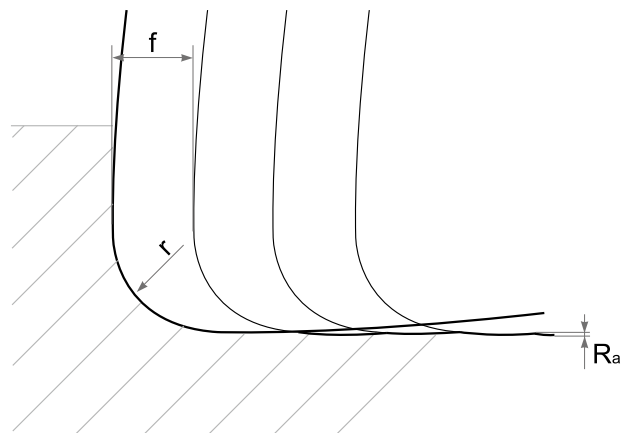
| Type | | Dimensions (mm) | | | | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 |
|--------------|------------|-----------------|------|-----|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|
| ISO | ASA | d | t | r | a | | | | | | | | | | | | | | | | | | | |
| CNGN 1204 AZ | CNGN 43 AZ | 12.70 | 4.76 | 1.0 | 1.60 | | • | | | | | | | | | | • | | | | | • | | |

ADVANTAGE OF WIPER INSERT

f : feed (mm)
 r : corner radius
 r_w : wiper radius (large radius)
 R_a : surface finish



Wiper Insert



Standard Insert

CERAMIC

CERMET

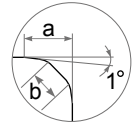
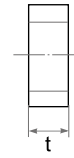
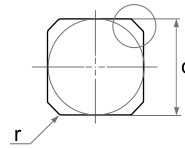
PCBN
/
PCD

TOOL
HOLDER

MILLING
CUTTER

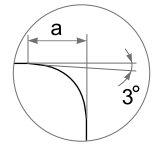
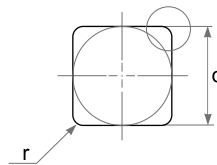
WIPER INSERT

SNCN .. ZZT



| Type | | Dimensions (mm) | | | | | | | | | | | | | | | | | | | | | | |
|----------------------|--------------------|-----------------|------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|
| ISO | ASA | d | t | a | b | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 |
| SNCN 0904 ZZT | SNCN 33 ZZT | 9.52 | 4.76 | 1.30 | 1.10 | | | | | | | | | | | | • | • | | | | • | | |
| SNCN 1204 ZZT | SNCN 43 ZZT | 12.70 | 4.76 | 3.25 | 1.10 | | • | | | | | | | | | | • | • | | | | • | | |

SNCN .. GZ

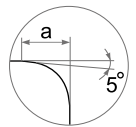
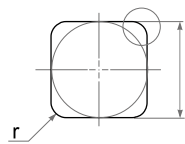


| Type | | Dimensions (mm) | | | | | | | | | | | | | | | | | | | | | | |
|---------------------|-------------------|-----------------|------|-----|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|
| ISO | ASA | d | t | r | a | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 |
| SNCN 0904 GZ | SNCN 33 GZ | 9.52 | 4.76 | 0.8 | 1.00 | | | | | | | | | | | | • | | | | | • | | |

CERAMIC

CERMET

SNCN .. KZ



| Type | | Dimensions (mm) | | | | | | | | | | | | | | | | | | | | | | |
|---------------------|-------------------|-----------------|------|-----|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|
| ISO | ASA | d | t | r | a | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 |
| SNCN 1204 KZ | SNCN 43 KZ | 12.70 | 4.76 | 1.2 | 1.80 | | | | | | | | | | | | • | | | | | • | | |

PCBN
/
PCD

TOOL
HOLDER

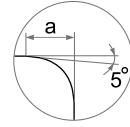
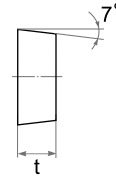
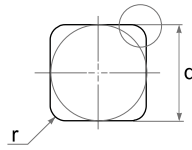
MILLING
CUTTER

WIPER INSERT

PART.
A

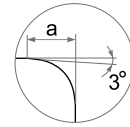
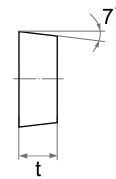
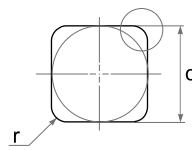
TURNING
&
MILLING

SCGN .. WZ



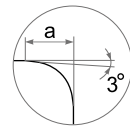
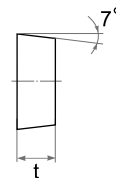
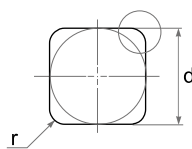
| Type | | Dimensions (mm) | | | | | | | | | | | | | | | | | | | | | | |
|--------------|------------|-----------------|------|-----|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|
| ISO | ASA | d | t | r | a | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 |
| SCGN 0904 WZ | SCGN 33 WZ | 9.52 | 4.76 | 0.8 | 1.60 | | | | | | | | | | | | • | | | | | • | | |
| SCGN 1204 WZ | SCGN 43 WZ | 12.70 | 4.76 | 0.8 | 1.60 | | | | | | | | | | | | • | | | | | • | | |

SCGN .. XZ



| Type | | Dimensions (mm) | | | | | | | | | | | | | | | | | | | | | | |
|--------------|------------|-----------------|------|-----|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|
| ISO | ASA | d | t | r | a | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 |
| SCGN 0904 XZ | SCGN 33 XZ | 9.52 | 4.76 | 0.8 | 1.20 | | | | | | | | | | | | • | | | | | • | | |
| SCGN 1204 XZ | SCGN 43 XZ | 12.70 | 4.76 | 0.8 | 1.20 | | | | | | | | | | | | • | | | | | • | | |

SCGN .. ZZ



| Type | | Dimensions (mm) | | | | | | | | | | | | | | | | | | | | | | |
|--------------|------------|-----------------|------|-----|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|
| ISO | ASA | d | t | r | a | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 |
| SCGN 0904 ZZ | SCGN 33 ZZ | 9.52 | 4.76 | 0.8 | 1.00 | | | | | | | | | | | | • | | | | | • | | |
| SCGN 1204 ZZ | SCGN 43 ZZ | 12.70 | 4.76 | 0.8 | 1.00 | | | | | | | | | | | | • | | | | | • | | |

CERAMIC

CERMET

PCBN
/
PCD

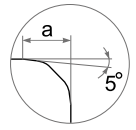
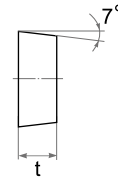
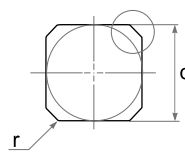
TOOL
HOLDER

MILLING
CUTTER

WIPER INSERT

TURNING
&
MILLING

SCGN .. MZ



| Type | | Dimensions (mm) | | | | NEW NEW | | | | | | | | | | | | | | | | | | |
|--------------|------------|-----------------|------|-----|------|---|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|
| ISO | ASA | d | t | r | a | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 |
| SCGN 0904 MZ | SCGN 33 MZ | 9.52 | 4.76 | 0.8 | 1.80 | | | | | | | | | | | | • | | | | | • | | |
| SCGN 1204 MZ | SCGN 43 MZ | 12.70 | 4.76 | 0.8 | 1.80 | | | | | | | | | | | | • | | | | | • | | |

CERAMIC

CERMET

PCBN
/
PCD

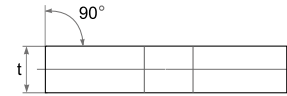
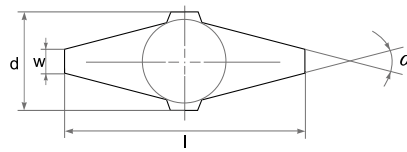
TOOL
HOLDER

MILLING
CUTTER

SPECIAL INSERT

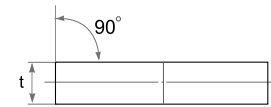
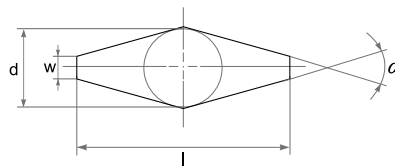
PART.
A

SVW



| Type | | Dimensions (mm) | | | | | NEW NEW | | | | | | | | | | | | | | | | | | |
|------------------|-------|-----------------|------|------|------|-------|---------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|--|
| ISO | l | α | d | t | w | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 | |
| SVW 38260 | 26.00 | 38° | 11.5 | 7.94 | 2.23 | | | | | | | | • | | | | | | | | | | | | |
| SVW 38320 | 32.00 | 38° | 14.5 | 7.94 | 3.22 | | | | | | | | • | | | | | | | | | | | | |
| SVW 34400 | 40.00 | 34° | 18.5 | 7.94 | 5.07 | | | | | | | | • | | | | | | | | | | | | |

GVGN



| Type | | Dimensions (mm) | | | | | NEW NEW | | | | | | | | | | | | | | | | | | |
|-------------------|-------|-----------------|-------|------|------|-------|---------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|--|
| ISO | l | α | d | t | w | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 | |
| GVGN 38320 | 32.00 | 38° | 13.46 | 7.94 | 3.22 | | | | | | | | • | | | | | | | | | | | | |
| GVGN 38335 | 33.50 | 38° | 13.28 | 8.00 | 3.06 | | | | | | | | • | | | | | | | | | | | | |
| GVGN 36340 | 34.00 | 36° | 13.59 | 7.94 | 3.25 | | | | | | | | • | | | | | | | | | | | | |
| GVGN 38360 | 36.00 | 38° | 17.38 | 7.94 | 5.98 | | | | | | | | • | | | | | | | | | | | | |
| GVGN 34360 | 36.00 | 34° | 17.42 | 7.94 | 7.22 | | | | | | | | • | | | | | | | | | | | | |

CERAMIC

CERMET

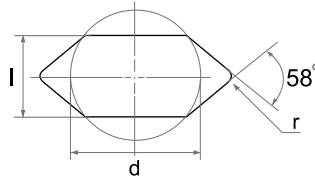
PCBN
/
PCD

TOOL
HOLDER

MILLING
CUTTER

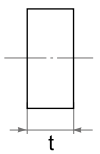
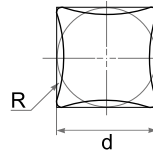
SPECIAL INSERT

SZT 5810



| Type | Dimensions (mm) | | | | | | | | | | | | | | | | | | | | | | | | |
|-------------------|-----------------|-------|------|-----|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|--|
| | ISO | d | l | t | r | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 | |
| SZT 581004 | 14.70 | 10.00 | 7.94 | 0.4 | • | • | | | | | | | | | | | | | | | | | | | |
| SZT 581008 | 14.70 | 10.00 | 7.94 | 0.8 | • | • | | | | | | | | | | | | | | | | | | | |
| SZT 581012 | 14.70 | 10.00 | 7.94 | 1.2 | • | • | | | | | | | | | | | | | | | | | | | |

SNMX



| Type | Dimensions (mm) | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------------|-----------------|-------|------|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|--|--|
| | ISO | d | t | R | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 | | |
| SNMX 121007 | 12.70 | 10.00 | 7.0 | | | | | | | | | • | | | | | | | | | | | | | |
| SNMX 121009 | 12.70 | 10.00 | 9.0 | | | | | | | | | • | | | | | | | | | | | | | |
| SNMX 121012 | 12.70 | 10.00 | 12.0 | | | | | | | | | • | | | | | | | | | | | | | |
| SNMX 121015 | 12.70 | 10.00 | 15.0 | | | | | | | | | • | | | | | | | | | | | | | |
| SNMX 121020 | 12.70 | 10.00 | 20.0 | | | | | | | | | • | | | | | | | | | | | | | |
| SNMX 121025 | 12.70 | 10.00 | 25.0 | | | | | | | | | • | | | | | | | | | | | | | |
| SNMX 121030 | 12.70 | 10.00 | 30.0 | | | | | | | | | • | | | | | | | | | | | | | |
| SNMX 121040 | 12.70 | 10.00 | 40.0 | | | | | | | | | • | | | | | | | | | | | | | |
| SNMX 121050 | 12.70 | 10.00 | 50.0 | | | | | | | | | • | | | | | | | | | | | | | |

CERAMIC

CERMET

PCBN
/
PCD

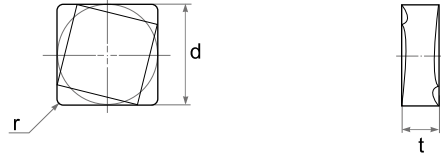
TOOL
HOLDER

MILLING
CUTTER

SPECIAL INSERT

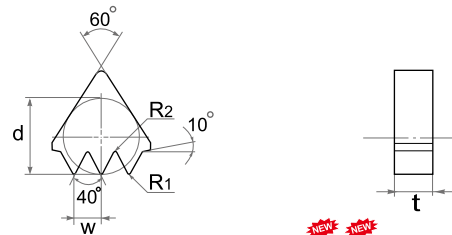
PART.
A

SNGF



| Type | | Dimensions (mm) | | | | | | | | | | | | | | | | | | | | | | |
|--------------------|-----------------|-----------------|------|-----|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|--|
| ISO | ASA | d | t | r | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 | |
| SNGF 120412 | SNGF 433 | 12.70 | 4.76 | 1.2 | | | | | | | | | | | | • | | | | | | • | | |

INGN



| Type | | Dimensions (mm) | | | | | | | | | | | | | | | | | | | | | | | |
|-------------------------|--|-----------------|------|------|----------------|----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|
| ISO | | d | t | w | R ₁ | R ₂ | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 |
| INGN 160435 F303 | | 9.52 | 4.76 | 3.56 | 0.5 | 0.3 | | | | | | | | • | | | | | | | | | | | |
| INGN 160435 F304 | | 9.52 | 4.76 | 3.56 | 0.5 | 0.4 | | | | | | | | • | | | | | | | | | | | |
| INGN 220435 F403 | | 12.70 | 4.76 | 3.56 | 0.5 | 0.3 | | | | | | | | • | | | | | | | | | | | |
| INGN 220435 F404 | | 12.70 | 4.76 | 3.56 | 0.5 | 0.4 | | | | | | | | • | | | | | | | | | | | |

CERAMIC

CERMET

PCBN
/
PCD

TOOL
HOLDER

MILLING
CUTTER

C E R M E T



Turning A 84

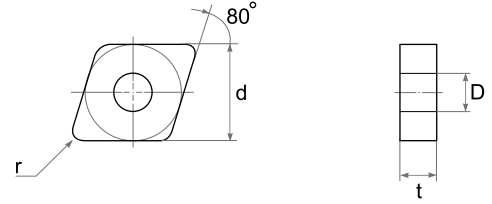
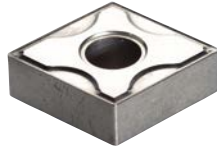
Milling A 95

Special A 100

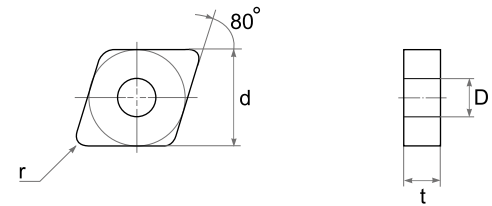


TURNING INSERT

CNMG



| Type | | Dimensions (mm) | | | | Cermet (TiCN) | | | | Cermet (PVD) | | | |
|----------------------|-------------------|-----------------|------|-----|------|---------------|-------|-------|-------|--------------|-------|-------|-------|
| ISO | ASA | d | t | r | D | TX510 | TX515 | TX520 | TX530 | TX910 | TX915 | TX920 | TX930 |
| CNMG 120404SF | CNMG 431SF | 12.70 | 4.76 | 0.4 | 5.16 | • | • | • | | | | | |
| CNMG 120408SF | CNMG 432SF | 12.70 | 4.76 | 0.8 | 5.16 | • | • | • | | | | • | |
| CNMG 120412SF | CNMG 433SF | 12.70 | 4.76 | 1.2 | 5.16 | | | | | | | | |



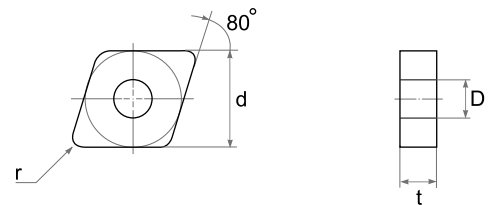
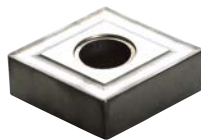
| Type | | Dimensions (mm) | | | | Cermet (TiCN) | | | | Cermet (PVD) | | | |
|----------------------|-------------------|-----------------|------|-----|------|---------------|-------|-------|-------|--------------|-------|-------|-------|
| ISO | ASA | d | t | r | D | TX510 | TX515 | TX520 | TX530 | TX910 | TX915 | TX920 | TX930 |
| CNMG 120404SY | CNMG 431SY | 12.70 | 4.76 | 0.4 | 5.16 | • | • | • | • | | | • | |
| CNMG 120408SY | CNMG 432SY | 12.70 | 4.76 | 0.8 | 5.16 | | • | • | • | | | • | |
| CNMG 120412SY | CNMG 433SY | 12.70 | 4.76 | 1.2 | 5.16 | | • | • | | | | • | |

CERAMIC

CERMET

PCBN
/
PCD

TOOL
HOLDER



| Type | | Dimensions (mm) | | | | Cermet (TiCN) | | | | Cermet (PVD) | | | |
|----------------------|-------------------|-----------------|------|-----|------|---------------|-------|-------|-------|--------------|-------|-------|-------|
| ISO | ASA | d | t | r | D | TX510 | TX515 | TX520 | TX530 | TX910 | TX915 | TX920 | TX930 |
| CNMG 120404SG | CNMG 431SG | 12.70 | 4.76 | 0.4 | 5.16 | • | • | • | | | | | |
| CNMG 120408SG | CNMG 432SG | 12.70 | 4.76 | 0.8 | 5.16 | • | • | • | | | | | |
| CNMG 120412SG | CNMG 433SG | 12.70 | 4.76 | 1.2 | 5.16 | | | • | | | • | | |

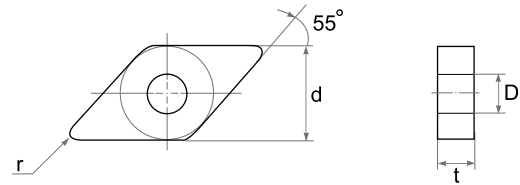
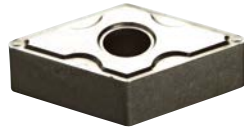
MILLING
CUTTER

TURNING INSERT

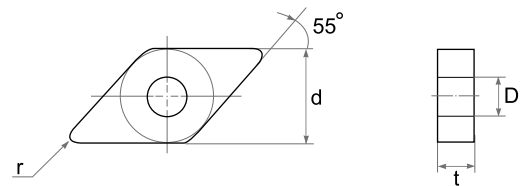
PART.
A

TURNING
&
MILLING

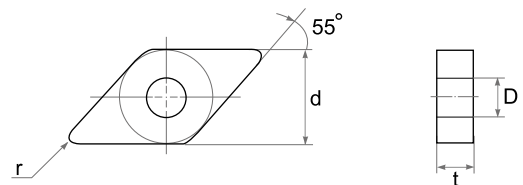
DNMG



| Type | | Dimensions (mm) | | | | Cermet (TiCN) | | | | Cermet (PVD) | | | |
|----------------------|-------------------|-----------------|------|-----|------|---------------|-------|-------|-------|--------------|-------|-------|-------|
| ISO | ASA | d | t | r | D | TX510 | TX515 | TX520 | TX530 | TX910 | TX915 | TX920 | TX930 |
| DNMG 150404SF | DNMG 431SF | 12.70 | 4.76 | 0.4 | 5.16 | | • | • | | | | • | |
| DNMG 150408SF | DNMG 432SF | 12.70 | 4.76 | 0.8 | 5.16 | • | • | • | | | | • | |
| DNMG 150412SF | DNMG 433SF | 12.70 | 4.76 | 1.2 | 5.16 | | • | • | | | | | • |
| DNMG 150604SF | DNMG 441SF | 12.70 | 6.35 | 0.4 | 5.16 | | • | • | | | | | |
| DNMG 150608SF | DNMG 442SF | 12.70 | 6.35 | 0.8 | 5.16 | | • | • | | | | | |
| DNMG 150612SF | DNMG 443SF | 12.70 | 6.35 | 1.2 | 5.16 | | • | | | | | | |



| Type | | Dimensions (mm) | | | | Cermet (TiCN) | | | | Cermet (PVD) | | | |
|----------------------|-------------------|-----------------|------|-----|------|---------------|-------|-------|-------|--------------|-------|-------|-------|
| ISO | ASA | d | t | r | D | TX510 | TX515 | TX520 | TX530 | TX910 | TX915 | TX920 | TX930 |
| DNMG 150404SY | DNMG 431SY | 12.70 | 4.76 | 0.4 | 5.16 | | • | • | | | | • | |
| DNMG 150408SY | DNMG 432SY | 12.70 | 4.76 | 0.8 | 5.16 | | • | • | | | | • | |
| DNMG 150412SY | DNMG 433SY | 12.70 | 4.76 | 1.2 | 5.16 | | • | • | | | | | • |
| DNMG 150604SY | DNMG 441SY | 12.70 | 6.35 | 0.4 | 5.16 | | • | • | | | | | |
| DNMG 150608SY | DNMG 442SY | 12.70 | 6.35 | 0.8 | 5.16 | | • | • | | | | | |
| DNMG 150612SY | DNMG 443SY | 12.70 | 6.35 | 1.2 | 5.16 | | • | • | | | | | |



| Type | | Dimensions (mm) | | | | Cermet (TiCN) | | | | Cermet (PVD) | | | |
|----------------------|-------------------|-----------------|------|-----|------|---------------|-------|-------|-------|--------------|-------|-------|-------|
| ISO | ASA | d | t | r | D | TX510 | TX515 | TX520 | TX530 | TX910 | TX915 | TX920 | TX930 |
| DNMG 150404SG | DNMG 431SG | 12.70 | 4.76 | 0.4 | 5.16 | | • | • | | | | | |
| DNMG 150408SG | DNMG 432SG | 12.70 | 4.76 | 0.8 | 5.16 | | • | • | | | | | |
| DNMG 150412SG | DNMG 433SG | 12.70 | 4.76 | 1.2 | 5.16 | | • | • | | | | | • |
| DNMG 150604SG | DNMG 441SG | 12.70 | 6.35 | 0.4 | 5.16 | | • | • | | | | | |
| DNMG 150608SG | DNMG 442SG | 12.70 | 6.35 | 0.8 | 5.16 | | • | • | | | | | |
| DNMG 150612SG | DNMG 443SG | 12.70 | 6.35 | 1.2 | 5.16 | | • | | | | | | |

CERAMIC

CERMET

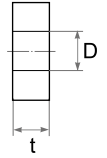
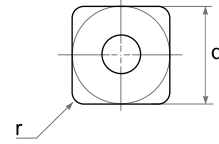
PCBN
/
PCD

TOOL
HOLDER

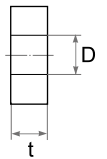
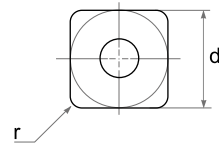
MILLING
CUTTER

TURNING INSERT

SNMG



| Type | | Dimensions (mm) | | | | Cermet (TiCN) | | | | Cermet (PVD) | | | |
|----------------------|-------------------|-----------------|------|-----|------|---------------|-------|-------|-------|--------------|-------|-------|-------|
| ISO | ASA | d | t | r | D | TX510 | TX515 | TX520 | TX530 | TX910 | TX915 | TX920 | TX930 |
| SNMG 120404SF | SNMG 431SF | 12.70 | 4.76 | 0.4 | 5.16 | | • | • | | | | | |
| SNMG 120408SF | SNMG 432SF | 12.70 | 4.76 | 0.8 | 5.16 | | • | • | | | • | | |
| SNMG 120412SF | SNMG 433SF | 12.70 | 4.76 | 1.2 | 5.16 | | • | • | | | | | |



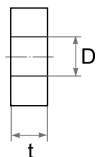
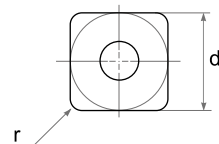
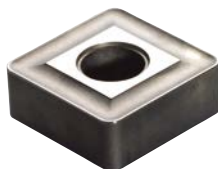
| Type | | Dimensions (mm) | | | | Cermet (TiCN) | | | | Cermet (PVD) | | | |
|----------------------|-------------------|-----------------|------|-----|------|---------------|-------|-------|-------|--------------|-------|-------|-------|
| ISO | ASA | d | t | r | D | TX510 | TX515 | TX520 | TX530 | TX910 | TX915 | TX920 | TX930 |
| SNMG 120404SY | SNMG 431SY | 12.70 | 4.76 | 0.4 | 5.16 | | • | • | • | | | • | |
| SNMG 120408SY | SNMG 432SY | 12.70 | 4.76 | 0.8 | 5.16 | | • | • | | | | • | |
| SNMG 120412SY | SNMG 433SY | 12.70 | 4.76 | 1.2 | 5.16 | | • | • | | | | | |

CERAMIC

CERMET

PCBN
/
PCD

TOOL
HOLDER



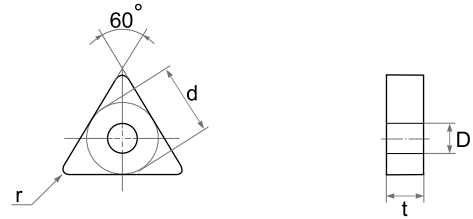
| Type | | Dimensions (mm) | | | | Cermet (TiCN) | | | | Cermet (PVD) | | | |
|----------------------|-------------------|-----------------|------|-----|------|---------------|-------|-------|-------|--------------|-------|-------|-------|
| ISO | ASA | d | t | r | D | TX510 | TX515 | TX520 | TX530 | TX910 | TX915 | TX920 | TX930 |
| SNMG 120404SG | SNMG 431SG | 12.70 | 4.76 | 0.4 | 5.16 | | • | • | | | | | |
| SNMG 120408SG | SNMG 432SG | 12.70 | 4.76 | 0.8 | 5.16 | | • | • | | | | | |
| SNMG 120412SG | SNMG 433SG | 12.70 | 4.76 | 1.2 | 5.16 | | • | • | | | | | |

MILLING
CUTTER

TURNING INSERT

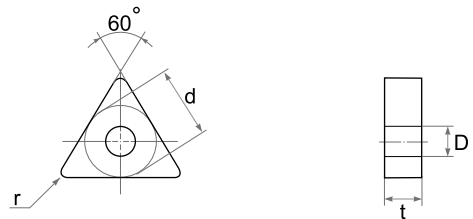
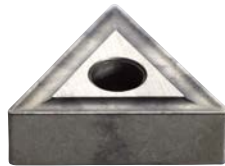
PART.
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TNMG



TURNING
&
MILLING

| Type | | Dimensions [mm] | | | | Cermet (TiCN) | | | | Cermet (PVD) | | | |
|----------------------|-------------------|-----------------|------|-----|------|---------------|-------|-------|-------|--------------|-------|-------|-------|
| ISO | ASA | d | t | r | D | TX510 | TX515 | TX520 | TX530 | TX910 | TX915 | TX920 | TX930 |
| TNMG 160404SY | TNMG 331SY | 9.52 | 4.76 | 0.4 | 3.81 | | • | • | | | | | |
| TNMG 160408SY | TNMG 332SY | 9.52 | 4.76 | 0.8 | 3.81 | | | | | | | | |
| TNMG 160412SY | TNMG 333SY | 9.52 | 4.76 | 1.2 | 3.81 | | • | • | | | | | |

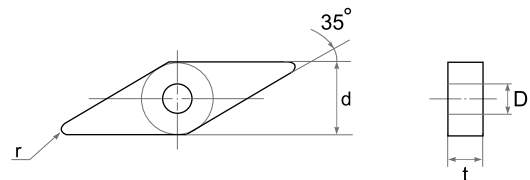


| Type | | Dimensions [mm] | | | | Cermet (TiCN) | | | | Cermet (PVD) | | | |
|----------------------|-------------------|-----------------|------|-----|------|---------------|-------|-------|-------|--------------|-------|-------|-------|
| ISO | ASA | d | t | r | D | TX510 | TX515 | TX520 | TX530 | TX910 | TX915 | TX920 | TX930 |
| TNMG 160404SG | TNMG 331SG | 9.52 | 4.76 | 0.4 | 3.81 | | • | • | | | | | |
| TNMG 160408SG | TNMG 332SG | 9.52 | 4.76 | 0.8 | 3.81 | | • | • | | | | | |
| TNMG 160412SG | TNMG 333SG | 9.52 | 4.76 | 1.2 | 3.81 | | • | • | | | | | |

CERAMIC

CERMET

VNMG



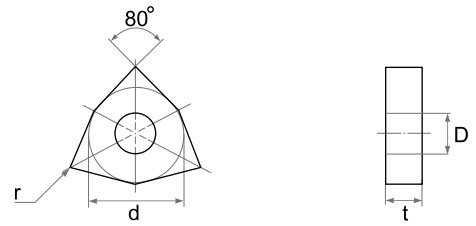
PCBN
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TOOL
HOLDER

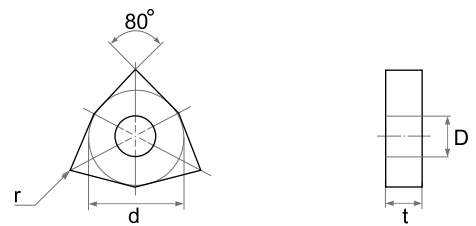
MILLING
CUTTER

| Type | | Dimensions [mm] | | | | Cermet (TiCN) | | | | Cermet (PVD) | | | |
|----------------------|-------------------|-----------------|------|-----|------|---------------|-------|-------|-------|--------------|-------|-------|-------|
| ISO | ASA | d | t | r | D | TX510 | TX515 | TX520 | TX530 | TX910 | TX915 | TX920 | TX930 |
| VNMG 160404SG | VNMG 331SG | 9.52 | 4.76 | 0.4 | 3.81 | | • | • | | | • | • | |
| VNMG 160408SG | VNMG 332SG | 9.52 | 4.76 | 0.8 | 3.81 | | • | • | | | | • | |

WNMG



| Type | | Dimensions (mm) | | | | Cermet (TiCN) | | | | Cermet (PVD) | | | |
|----------------------|-------------------|-----------------|------|-----|------|---------------|-------|-------|-------|--------------|-------|-------|-------|
| ISO | ASA | d | t | r | D | TX510 | TX515 | TX520 | TX530 | TX910 | TX915 | TX920 | TX930 |
| WNMG 080404SY | WNMG 431SY | 12.70 | 4.76 | 0.4 | 5.16 | | • | • | | | • | • | |
| WNMG 080408SY | WNMG 432SY | 12.70 | 4.76 | 0.8 | 5.16 | | • | • | | | • | • | |



| Type | | Dimensions (mm) | | | | Cermet (TiCN) | | | | Cermet (PVD) | | | |
|----------------------|-------------------|-----------------|------|-----|------|---------------|-------|-------|-------|--------------|-------|-------|-------|
| ISO | ASA | d | t | r | D | TX510 | TX515 | TX520 | TX530 | TX910 | TX915 | TX920 | TX930 |
| WNMG 080404SG | WNMG 431SG | 12.70 | 4.76 | 0.4 | 5.16 | | • | • | | | • | | |
| WNMG 080408SG | WNMG 432SG | 12.70 | 4.76 | 0.8 | 5.16 | | • | • | | | | | |
| WNMG 080412SG | WNMG 433SG | 12.70 | 4.76 | 1.2 | 5.16 | | • | • | | | | | |

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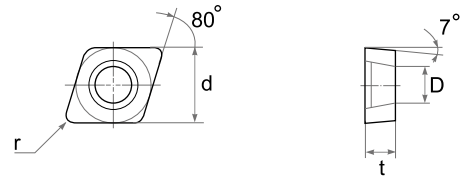
TOOL
HOLDER

MILLING
CUTTER

TURNING INSERT

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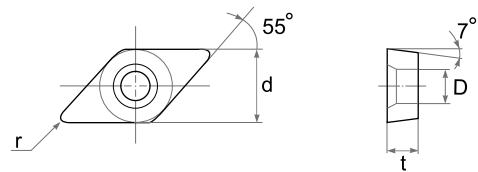
CCMT



TURNING
&
MILLING

| Type | Dimensions (mm) | | | | Cermet (TiCN) | | | | Cermet (PVD) | | | | |
|--------------------|-----------------|------|-----|------|---------------|-------|-------|-------|--------------|-------|-------|-------|-------|
| | ISO | d | t | r | D | TX510 | TX515 | TX520 | TX530 | TX910 | TX915 | TX920 | TX930 |
| CCMT 09T304 | 9.52 | 3.97 | 0.4 | 4.40 | • | • | • | | | | • | | |
| CCMT 09T308 | 9.52 | 3.97 | 0.8 | 4.40 | • | • | • | | | | | | |

DCGW



| Type | Dimensions (mm) | | | | Cermet (TiCN) | | | | Cermet (PVD) | | | | |
|--------------------|-----------------|------|-----|------|---------------|-------|-------|-------|--------------|-------|-------|-------|-------|
| | ISO | d | t | r | D | TX510 | TX515 | TX520 | TX530 | TX910 | TX915 | TX920 | TX930 |
| DCGW 090304 | 8.50 | 3.18 | 0.4 | 3.60 | | | • | | | | | | |
| DCGW 11T304 | 9.52 | 3.97 | 0.4 | 4.40 | | | • | | | | | | |

CERAMIC

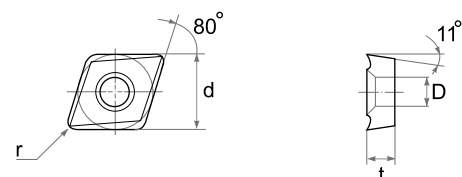
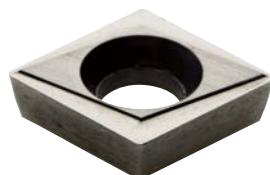
CERMET

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PCD

TOOL
HOLDER

MILLING
CUTTER

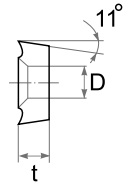
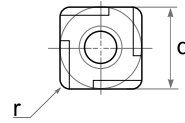
CPGT



| Type | | Dimensions (mm) | | | | Cermet (TiCN) | | | | Cermet (PVD) | | | |
|--------------------|-----------------|-----------------|------|-----|------|---------------|-------|-------|-------|--------------|-------|-------|-------|
| ISO | ASA | d | t | r | D | TX510 | TX515 | TX520 | TX530 | TX910 | TX915 | TX920 | TX930 |
| CPGT 090304 | CPGT 321 | 9.52 | 3.18 | 0.4 | 4.50 | • | • | • | | | | | |
| CPGT 090308 | CPGT 322 | 9.52 | 3.18 | 0.8 | 4.50 | • | • | • | | | | | |

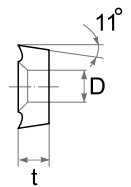
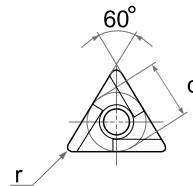
TURNING INSERT

SPGT



| Type | | Dimensions (mm) | | | | Cermet (TiCN) | | | | Cermet (PVD) | | | |
|----------------|-------------|-----------------|------|-----|------|---------------|-------|-------|-------|--------------|-------|-------|-------|
| ISO | ASA | d | t | r | D | TX510 | TX515 | TX520 | TX530 | TX910 | TX915 | TX920 | TX930 |
| SPGT 090304R/L | SPGT 321R/L | 9.52 | 3.18 | 0.4 | 3.40 | • | • | | | | | | |
| SPGT 090308R/L | SPGT 322R/L | 9.52 | 3.18 | 0.8 | 3.40 | • | • | | | | | | |

TPGT



| Type | | Dimensions (mm) | | | | Cermet (TiCN) | | | | Cermet (PVD) | | | |
|----------------|--------------|-----------------|------|-----|------|---------------|-------|-------|-------|--------------|-------|-------|-------|
| ISO | ASA | d | t | r | D | TX510 | TX515 | TX520 | TX530 | TX910 | TX915 | TX920 | TX930 |
| TPGT 110302R/L | TPGT 2205R/L | 6.35 | 3.18 | 0.2 | 3.56 | • | • | • | | | | | |
| TPGT 110304R/L | TPGT 221R/L | 6.35 | 3.18 | 0.4 | 3.56 | • | • | • | | | | | |
| TPGT 110308R/L | TPGT 222R/L | 6.35 | 3.18 | 0.8 | 3.56 | • | • | | | | | | |
| TPGT 160304R/L | TPGT 321R/L | 9.52 | 3.18 | 0.4 | 4.46 | • | • | • | | | | | |
| TPGT 160308R/L | TPGT 322R/L | 9.52 | 3.18 | 0.8 | 4.46 | • | • | • | | | | | |
| TPGT 160404R/L | TPGT 331R/L | 9.52 | 4.76 | 0.4 | 4.40 | • | • | • | | | | | |
| TPGT 160408R/L | TPGT 332R/L | 9.52 | 4.76 | 0.8 | 4.40 | • | • | • | | | | | |

CERAMIC

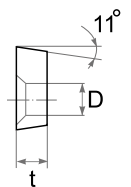
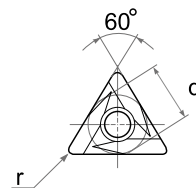
CERMET

PCBN
/
PCD

TOOL
HOLDER

MILLING
CUTTER

TPGT .. KC

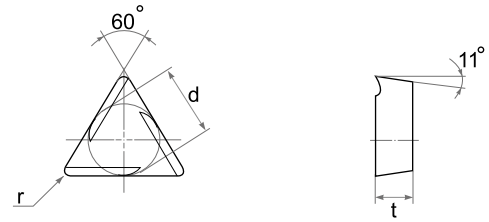


| Type | Dimensions (mm) | | | | Cermet (TiCN) | | | | Cermet (PVD) | | | |
|---------------|-----------------|------|-----|------|---------------|-------|-------|-------|--------------|-------|-------|-------|
| ISO | d | t | r | D | TX510 | TX515 | TX520 | TX530 | TX910 | TX915 | TX920 | TX930 |
| TPGT 110304KC | 6.35 | 3.18 | 0.4 | 3.56 | | | • | | | | | |

TURNING INSERT

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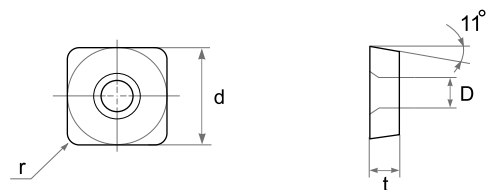
TPGR



TURNING
&
MILLING

| Type | Dimensions (mm) | | | Cermet (TiCN) | | | | Cermet (PVD) | | | | |
|------------------|-----------------|------|-----|---------------|-------|-------|-------|--------------|-------|-------|-------|-------|
| | ISO | d | t | r | TX510 | TX515 | TX520 | TX530 | TX910 | TX915 | TX920 | TX930 |
| TPGR 110302R/L | 6.35 | 3.18 | 0.2 | | • | | | | | | | |
| TPGR 110304R/L | 6.35 | 3.18 | 0.4 | | • | | | | | | | |
| TPGR 110308R/L | 6.35 | 3.18 | 0.8 | | | | | | | | | |
| TPGR 160302R/L | 9.52 | 3.18 | 0.2 | | • | | | | | | | |
| TPGR 160304R/L | 9.52 | 3.18 | 0.4 | | • | | • | | | | | |
| TPGR 160308R/L | 9.52 | 3.18 | 0.8 | | • | | | | | | | |
| TPGR 220404K-R/L | 12.70 | 4.76 | 0.4 | | • | | • | | | | | |
| TPGR 220408K-R/L | 12.70 | 4.76 | 0.8 | | • | | | | | | | |
| TPGR 220412K-R/L | 12.70 | 4.76 | 1.2 | | • | | | | | | | |

SPMW



CERAMIC

CERMET

PCBN
/
PCD

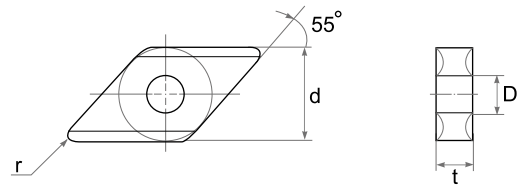
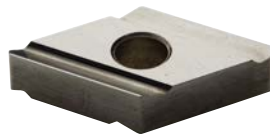
TOOL
HOLDER

MILLING
CUTTER

| Type | Dimensions (mm) | | | | Cermet (TiCN) | | | | Cermet (PVD) | | | | |
|---------------|-----------------|------|-----|-----|---------------|-------|-------|-------|--------------|-------|-------|-------|-------|
| | ISO | d | t | r | D | TX510 | TX515 | TX520 | TX530 | TX910 | TX915 | TX920 | TX930 |
| SPMW 090304HS | 9.52 | 3.18 | 0.4 | 3.4 | | • | • | | | | | | |
| SPMW 090308HS | 9.52 | 3.18 | 0.8 | 3.4 | | • | • | | | | | | |
| SPMW 090304HL | 9.52 | 3.18 | 0.4 | 4.6 | | • | • | | | | | | |
| SPMW 090308HL | 9.52 | 3.18 | 0.8 | 4.6 | | • | • | | | | | | |

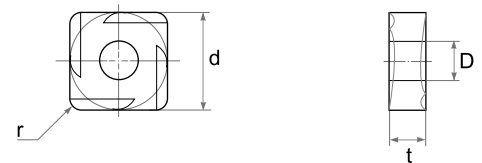
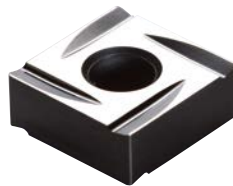
TURNING INSERT

DNGG



| Type | | Dimensions (mm) | | | | Cermet (TiCN) | | | | Cermet (PVD) | | | |
|-----------------------|--------------------|-----------------|------|-----|------|---------------|-------|-------|-------|--------------|-------|-------|-------|
| ISO | ASA | d | t | r | D | TX510 | TX515 | TX520 | TX530 | TX910 | TX915 | TX920 | TX930 |
| DNGG 150404R/L | DNGG 431R/L | 12.70 | 4.76 | 0.4 | 5.16 | | • | • | | | | • | |
| DNGG 150408R/L | DNGG 432R/L | 12.70 | 4.76 | 0.8 | 5.16 | | • | • | | | | | |
| DNGG 150604R/L | DNGG 441R/L | 12.70 | 6.35 | 0.4 | 5.16 | | • | • | | | | | |
| DNGG 150608R/L | DNGG 442R/L | 12.70 | 6.35 | 0.8 | 5.16 | | • | • | | | | | |

SNGG



| Type | | Dimensions (mm) | | | | Cermet (TiCN) | | | | Cermet (PVD) | | | |
|-----------------------|--------------------|-----------------|------|-----|------|---------------|-------|-------|-------|--------------|-------|-------|-------|
| ISO | ASA | d | t | r | D | TX510 | TX515 | TX520 | TX530 | TX910 | TX915 | TX920 | TX930 |
| SNGG 120404R/L | SNGG 431R/L | 12.70 | 4.76 | 0.4 | 5.16 | | • | • | | | | | |
| SNGG 120408R/L | SNGG 432R/L | 12.70 | 4.76 | 0.8 | 5.16 | | • | • | | | | | |
| SNGG 120412R/L | SNGG 433R/L | 12.70 | 4.76 | 1.2 | 5.16 | | | | | | | | |

CERAMIC

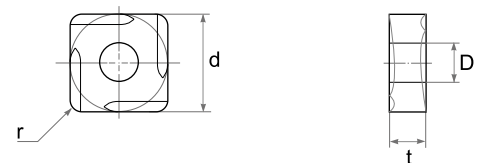
CERMET

PCBN
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PCD

TOOL
HOLDER

MILLING
CUTTER

SNGL



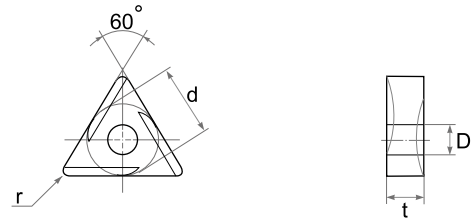
| Type | | Dimensions (mm) | | | Cermet (TiCN) | | | | Cermet (PVD) | | | |
|-----------------------|--|-----------------|------|-----|---------------|-------|-------|-------|--------------|-------|-------|-------|
| ISO | | d | t | r | TX510 | TX515 | TX520 | TX530 | TX910 | TX915 | TX920 | TX930 |
| SNGL 070204R/L | | 7.14 | 2.38 | 0.4 | • | | | | | | | |

TURNING INSERT

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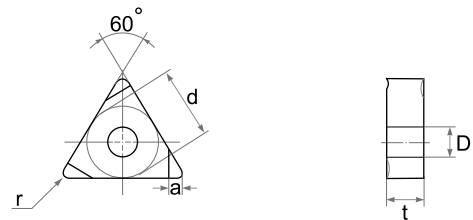
TURNING
&
MILLING

TNGG



| Type | | Dimensions (mm) | | | | Cermet (TiCN) | | | | Cermet (PVD) | | | |
|----------------|--------------|-----------------|------|-----|------|---------------|-------|-------|-------|--------------|-------|-------|-------|
| ISO | ASA | d | t | r | D | TX510 | TX515 | TX520 | TX530 | TX910 | TX915 | TX920 | TX930 |
| TNGG 160402R/L | TNGG 3302R/L | 9.52 | 4.76 | 0.2 | 3.81 | | ● | ● | ● | | | | |
| TNGG 160404R/L | TNGG 331R/L | 9.52 | 4.76 | 0.4 | 3.81 | ● | ● | ● | ● | | | | |
| TNGG 160408R/L | TNGG 332R/L | 9.52 | 4.76 | 0.8 | 3.81 | ● | ● | ● | | | | | |
| TNGG 220404R/L | TNGG 431R/L | 12.70 | 4.76 | 0.4 | 5.16 | | ● | ● | | | | | |
| TNGG 220408R/L | TNGG 432R/L | 12.70 | 4.76 | 0.8 | 5.16 | | ● | ● | | | | | |

TNGG .. FS

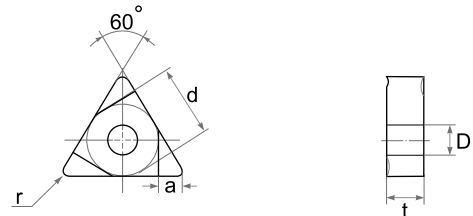


| Type | Dimensions (mm) | | | | | Cermet (TiCN) | | | | Cermet (PVD) | | | |
|-------------------|-----------------|------|-----|------|------|---------------|-------|-------|-------|--------------|-------|-------|-------|
| ISO | d | t | r | D | a | TX510 | TX515 | TX520 | TX530 | TX910 | TX915 | TX920 | TX930 |
| TNGG 160402R/L-FS | 9.52 | 4.76 | 0.2 | 3.81 | 1.28 | | ● | ● | | | | | |
| TNGG 160404R/L-FS | 9.52 | 4.76 | 0.4 | 3.81 | 1.28 | | ● | ● | | | | ● | |
| TNGG 160408R/L-FS | 9.52 | 4.76 | 0.8 | 3.81 | 1.28 | | ● | ● | | | | | |

CERAMIC

CERMET

TNGG .. F



| Type | Dimensions (mm) | | | | | Cermet (TiCN) | | | | Cermet (PVD) | | | |
|------------------|-----------------|------|-----|------|------|---------------|-------|-------|-------|--------------|-------|-------|-------|
| ISO | d | t | r | D | a | TX510 | TX515 | TX520 | TX530 | TX910 | TX915 | TX920 | TX930 |
| TNGG 160402R/L-F | 9.52 | 4.76 | 0.2 | 3.81 | 2.50 | | ● | ● | | | | | |
| TNGG 160404R/L-F | 9.52 | 4.76 | 0.4 | 3.81 | 2.50 | | ● | ● | | | | ● | |
| TNGG 160408R/L-F | 9.52 | 4.76 | 0.8 | 3.81 | 2.50 | | ● | ● | | | | | |

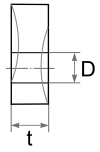
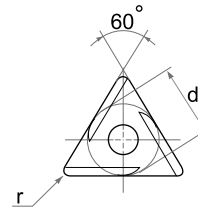
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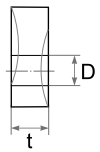
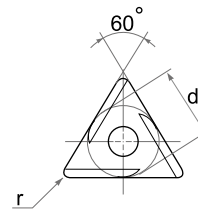
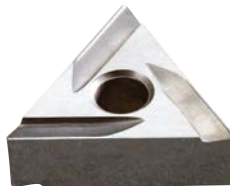
TURNING INSERT

TNMG .. 2G



| Type | | Dimensions (mm) | | | | Cermet (TiCN) | | | | Cermet (PVD) | | | |
|--------------------------|-----------------------|-----------------|------|-----|------|---------------|-------|-------|-------|--------------|-------|-------|-------|
| ISO | ASA | d | t | r | D | TX510 | TX515 | TX520 | TX530 | TX910 | TX915 | TX920 | TX930 |
| TNMG 160404R/L 2G | TNMG 331R/L 2G | 9.52 | 4.76 | 0.4 | 3.81 | • | • | • | • | | | • | |
| TNMG 160408R/L 2G | TNMG 332R/L 2G | 9.52 | 4.76 | 0.8 | 3.81 | | • | • | | | | • | |

TNMG .. RM



| Type | | Dimensions (mm) | | | | Cermet (TiCN) | | | | Cermet (PVD) | | | |
|-----------------------|--------------------|-----------------|------|-----|------|---------------|-------|-------|-------|--------------|-------|-------|-------|
| ISO | ASA | d | t | r | D | TX510 | TX515 | TX520 | TX530 | TX910 | TX915 | TX920 | TX930 |
| TNMG 160404 RM | TNMG 331 RM | 9.52 | 4.76 | 0.4 | 3.81 | | • | • | | | | | |

CERAMIC

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TOOL
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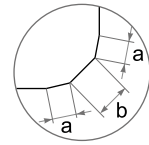
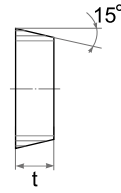
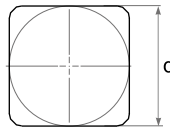
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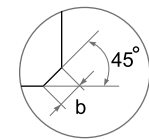
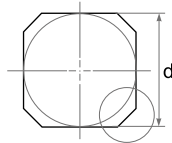
TURNING
&
MILLING

SDCN



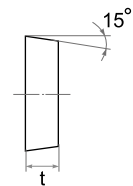
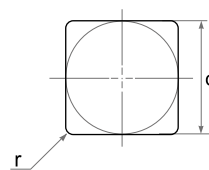
| Type | | Dimensions (mm) | | | | Cermet (TiCN) | | | | Cermet (PVD) | | | |
|--------------------|------------------|-----------------|------|------|------|---------------|-------|-------|-------|--------------|-------|-------|-------|
| ISO | ASA | d | t | a | b | TX510 | TX515 | TX520 | TX530 | TX910 | TX915 | TX920 | TX930 |
| SDCN 1203MT | SDCN 42MT | 12.70 | 3.18 | 0.50 | 1.40 | | | • | • | | | | |
| SDCN 1504MT | SDCN 53MT | 15.87 | 4.76 | 0.50 | 1.40 | | | | • | | | | |

SDKN



| Type | | Dimensions (mm) | | | Cermet (TiCN) | | | | Cermet (PVD) | | | |
|----------------------|--------------------|-----------------|------|------|---------------|-------|-------|-------|--------------|-------|-------|-------|
| ISO | ASA | d | t | r | TX510 | TX515 | TX520 | TX530 | TX910 | TX915 | TX920 | TX930 |
| SDKN 1203AETN | SDKN 42AETN | 12.70 | 3.18 | 2.00 | | | • | • | | | | |
| SDKN 1504AETN | SDKN 53AETN | 15.87 | 4.76 | 2.00 | | | • | • | | | | |

SDEN



| Type | Dimensions (mm) | | | Cermet (TiCN) | | | | Cermet (PVD) | | | |
|----------------------|-----------------|------|-----|---------------|-------|-------|-------|--------------|-------|-------|-------|
| ISO | d | t | r | TX510 | TX515 | TX520 | TX530 | TX910 | TX915 | TX920 | TX930 |
| SDEN 150404FN | 15.87 | 4.76 | 0.4 | | | • | • | | | | |

CERAMIC

CERMET

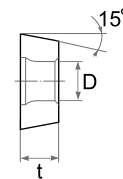
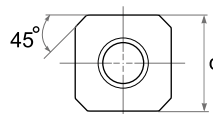
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HOLDER

MILLING
CUTTER

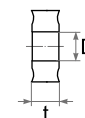
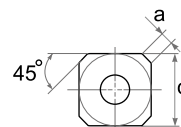
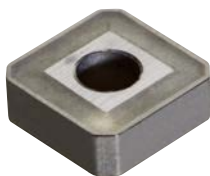
MILLING INSERT

SDEW



| Type | | Dimensions (mm) | | | Cermet (TiCN) | | | | Cermet (PVD) | | | |
|---------------------|-------------------|-----------------|------|------|---------------|-------|-------|-------|--------------|-------|-------|-------|
| ISO | ASA | d | t | D | TX510 | TX515 | TX520 | TX530 | TX910 | TX915 | TX920 | TX930 |
| SDEW 1204AZT | SDEW 43AZT | 12.70 | 4.76 | 5.20 | | | ○ | ● | | | | |

SNK

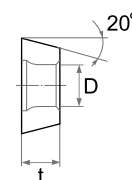
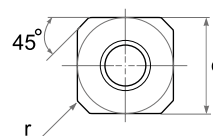


| Type | | Dimensions (mm) | | | | Cermet (TiCN) | | | | Cermet (PVD) | | | |
|--------------------|------------------|-----------------|------|------|------|---------------|-------|-------|-------|--------------|-------|-------|-------|
| ISO | ASA | d | t | D | a | TX510 | TX515 | TX520 | TX530 | TX910 | TX915 | TX920 | TX930 |
| SNK 0903AEN | SNK 32AEN | 9.52 | 3.18 | 3.81 | 1.40 | | ● | | | | | | |

CERAMIC

CERMET

SEHW



| Type | | Dimensions (mm) | | | | Cermet (TiCN) | | | | Cermet (PVD) | | | |
|----------------------|-------------------|-----------------|------|------|-----|---------------|-------|-------|-------|--------------|-------|-------|-------|
| ISO | ASA | d | t | D | r | TX510 | TX515 | TX520 | TX530 | TX910 | TX915 | TX920 | TX930 |
| SEHW 120408AE | SEHW 432AE | 12.70 | 4.76 | 5.50 | 0.8 | | | | ● | | | | ● |

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TOOL
HOLDER

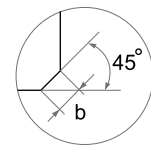
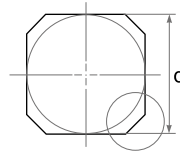
MILLING
CUTTER

MILLING INSERT

PART.
A

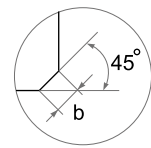
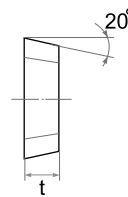
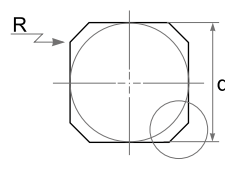
TURNING
&
MILLING

SEKN



| Type | | Dimensions (mm) | | | Cermet (TiCN) | | | | Cermet (PVD) | | | |
|----------------|--------------|-----------------|------|------|---------------|-------|-------|-------|--------------|-------|-------|-------|
| ISO | ASA | d | t | b | TX510 | TX515 | TX520 | TX530 | TX910 | TX915 | TX920 | TX930 |
| SEKN 1203 AFTN | SEKN 42 AFTN | 12.70 | 3.18 | 2.00 | | • | • | • | | | | • |
| SEKN 1504 AFTN | SEKN 53 AFTN | 15.87 | 4.76 | 2.00 | | | • | • | | | | • |

SEKN .. R



| Type | | Dimensions (mm) | | | | Cermet (TiCN) | | | | Cermet (PVD) | | | |
|------------------|---------------|-----------------|------|------|-----|---------------|-------|-------|-------|--------------|-------|-------|-------|
| ISO | ASA | d | t | b | R | TX510 | TX515 | TX520 | TX530 | TX910 | TX915 | TX920 | TX930 |
| SEKN 120308 AFTN | SEKN 432 AFTN | 12.70 | 3.18 | 2.00 | 0.8 | | | • | • | | | | |
| SEKN 150408 AFTN | SEKN 532 AFTN | 15.87 | 4.76 | 2.00 | 0.8 | | | | | | | | |

CERAMIC

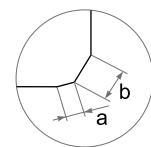
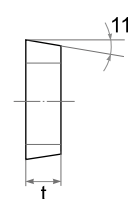
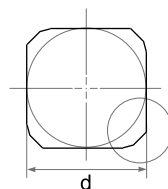
CERMET

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HOLDER

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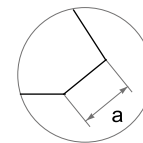
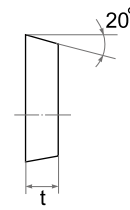
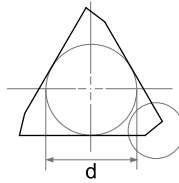
SPKN



| Type | | Dimensions (mm) | | | | Cermet (TiCN) | | | | Cermet (PVD) | | | |
|-----------------|---------------|-----------------|------|------|------|---------------|-------|-------|-------|--------------|-------|-------|-------|
| ISO | ASA | d | t | a | b | TX510 | TX515 | TX520 | TX530 | TX910 | TX915 | TX920 | TX930 |
| SPKN 1203EDTR/L | SPKN 42EDTR/L | 12.70 | 3.18 | 1.00 | 1.40 | | | • | • | | | | |
| SPKN 1504EDTR/L | SPKN 53EDTR/L | 15.87 | 4.76 | 1.00 | 1.40 | | | • | • | | | | |

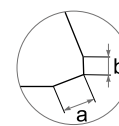
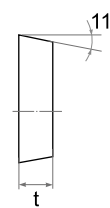
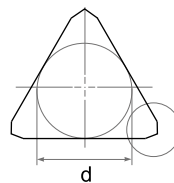
MILLING INSERT

TEKN



| Type | | Dimensions (mm) | | | Cermet (TiCN) | | | | Cermet (PVD) | | | |
|-----------------|---------------|-----------------|------|------|---------------|-------|-------|-------|--------------|-------|-------|-------|
| ISO | ASA | d | t | a | TX510 | TX515 | TX520 | TX530 | TX910 | TX915 | TX920 | TX930 |
| TEKN 1603PETR/L | TEKN 32PETR/L | 9.52 | 3.18 | 1.40 | | | ○ | ● | | | | |
| TEKN 2204PETR/L | TEKN 43PETR/L | 12.70 | 4.76 | 2.00 | | | ○ | ● | | | | |
| TEKN 1603PEER/L | TEKN 32PEER/L | 9.52 | 3.18 | 1.40 | | | ○ | ● | | | | |
| TEKN 2204PEER/L | TEKN 43PEER/L | 12.70 | 4.76 | 2.00 | | | ○ | ● | | | | |

TPKN



| Type | | Dimensions (mm) | | | | Cermet (TiCN) | | | | Cermet (PVD) | | | |
|-----------------|---------------|-----------------|------|------|------|---------------|-------|-------|-------|--------------|-------|-------|-------|
| ISO | ASA | d | t | a | b | TX510 | TX515 | TX520 | TX530 | TX910 | TX915 | TX920 | TX930 |
| TPKN 1603PDTR/L | TPKN 32PDTR/L | 9.52 | 3.18 | 1.20 | 1.00 | | | ● | ● | | | | |
| TPKN 2204PDTR/L | TPKN 43PDTR/L | 12.70 | 4.76 | 1.40 | 0.70 | | | ● | ● | | | | |

CERAMIC

CERMET

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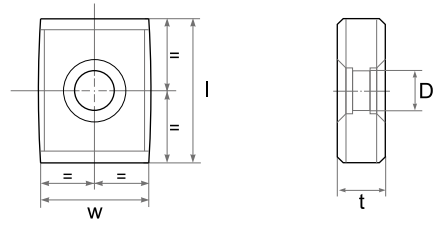
TOOL
HOLDER

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MILLING INSERT

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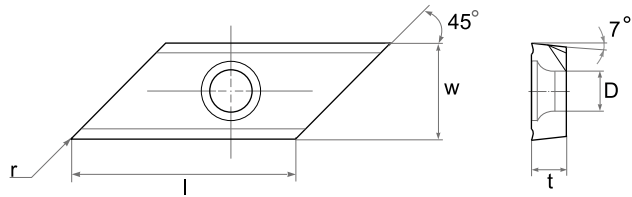
YCE



| Type | Dimensions (mm) | | | | Cermet (TiCN) | | | | Cermet (PVD) | | | | |
|-------------------|-----------------|-------|------|------|---------------|-------|-------|-------|--------------|-------|-------|-------|-------|
| | ISO | l | w | t | D | TX510 | TX515 | TX520 | TX530 | TX910 | TX915 | TX920 | TX930 |
| YCE 434-01 | 19.05 | 14.29 | 6.35 | 5.25 | | • | • | | | | | | |

TURNING
&
MILLING

XCET



| Type | Dimensions (mm) | | | | | Cermet (TiCN) | | | | Cermet (PVD) | | | | |
|-----------------------|-----------------|-------|------|------|-----|---------------|-------|-------|-------|--------------|-------|-------|-------|-------|
| | ISO | l | w | t | D | r | TX510 | TX515 | TX520 | TX530 | TX910 | TX915 | TX920 | TX930 |
| XCET 310404 ER | 22.00 | 12.70 | 4.50 | 5.60 | 0.4 | | | • | | | | | • | |
| XCET 310408 ER | 22.00 | 12.70 | 4.50 | 5.60 | 0.8 | | | • | | | | | | |

CERAMIC

CERMET

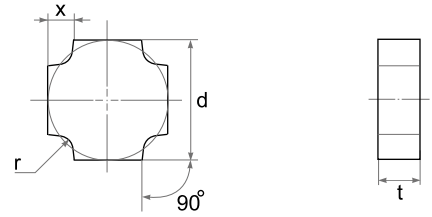
PCBN
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PCD

TOOL
HOLDER

MILLING
CUTTER

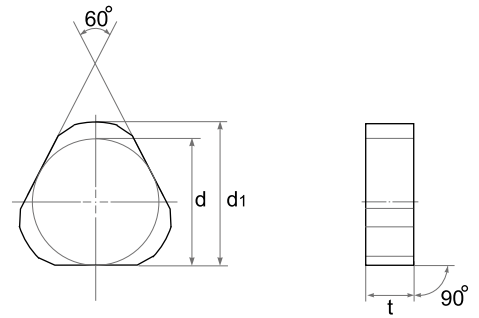
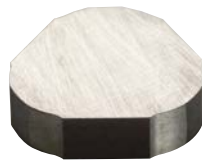
SPECIAL INSERT

BSN



| Type | Dimensions (mm) | | | | Cermet (TiCN) | | | | Cermet (PVD) | | | |
|-------------------|-----------------|------|------|-----|---------------|-------|-------|-------|--------------|-------|-------|-------|
| ISO | d | x | t | r | TX510 | TX515 | TX520 | TX530 | TX910 | TX915 | TX920 | TX930 |
| BSN 090306 | 9.52 | 2.00 | 3.18 | 0.6 | | | • | | | | | |
| BSN 090310 | 9.52 | 2.57 | 3.18 | 1.0 | | | • | | | | | |
| BSN 120406 | 12.70 | 2.14 | 4.76 | 0.6 | | | • | | | | | |
| BSN 120410 | 12.70 | 2.40 | 4.76 | 1.0 | | | • | | | | | |
| BSN 120415 | 12.70 | 3.00 | 4.76 | 1.5 | • | | • | | | | | |
| BSN 120420 | 12.70 | 3.45 | 4.76 | 2.0 | | | • | | | | | |
| BSN 150525 | 15.87 | 4.00 | 5.56 | 2.5 | | | • | | | | | |
| BSN 150530 | 15.87 | 4.70 | 5.56 | 3.0 | | | • | | | | | |

BTN



| Type | Dimensions (mm) | | | Cermet (TiCN) | | | | Cermet (PVD) | | | |
|-----------------|-----------------|----------------|------|---------------|-------|-------|-------|--------------|-------|-------|-------|
| ISO | d | d ₁ | t | TX510 | TX515 | TX520 | TX530 | TX910 | TX915 | TX920 | TX930 |
| BTN 1464 | 12.70 | 14.60 | 4.76 | | | • | | | | | |
| BTN 1714 | 15.87 | 17.10 | 4.76 | • | • | • | | | | | |
| BTN 2116 | 19.05 | 21.10 | 6.00 | | | • | | | | | |
| BTN 2416 | 22.22 | 24.10 | 6.00 | | | • | | | | | |
| BTN 2718 | 25.40 | 27.10 | 8.80 | | | • | | | | | |

CERAMIC

CERMET

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PCD

TOOL
HOLDER

MILLING
CUTTER

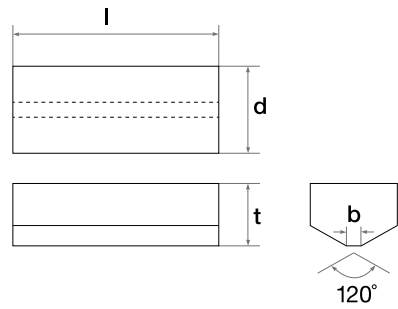
SPECIAL INSERT

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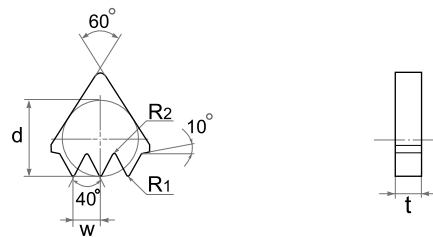
TURNING
&
MILLING

GBF



| Type | Dimensions [mm] | | | | Cermet (TiCN) | | | | Cermet (PVD) | | | | |
|---------------------|-----------------|-------|------|-----|---------------|-------|-------|-------|--------------|-------|-------|-------|-------|
| | ISO | d | l | t | b | TX510 | TX515 | TX520 | TX530 | TX910 | TX915 | TX920 | TX930 |
| GBF 127250 B | 12.70 | 25.00 | 8.00 | 2.3 | | | • | | | | | | |
| GBF 150250 B | 15.00 | 25.00 | 9.50 | 2.3 | | | • | | | | | | |
| GBF 200300 B | 20.00 | 30.00 | 9.50 | 2.5 | | | • | | | | | | |

INGN



| Type | Dimensions [mm] | | | | | Cermet (TiCN) | | | | Cermet (PVD) | | | | |
|-------------------------|-----------------|------|------|-----|----------------|----------------|-------|-------|-------|--------------|-------|-------|-------|-------|
| | ISO | d | t | w | R ₁ | R ₂ | TX510 | TX515 | TX520 | TX530 | TX910 | TX915 | TX920 | TX930 |
| INGN 160435 F303 | 9.52 | 4.76 | 3.56 | 0.5 | 0.3 | | | • | | | | | | |
| INGN 160435 F304 | 9.52 | 4.76 | 3.56 | 0.5 | 0.4 | | | • | | | | • | | |
| INGN 220435 F403 | 12.70 | 4.76 | 3.56 | 0.5 | 0.3 | | | | | | | | | |
| INGN 220435 F404 | 12.70 | 4.76 | 3.56 | 0.5 | 0.4 | | | | | | | | | |

CERAMIC

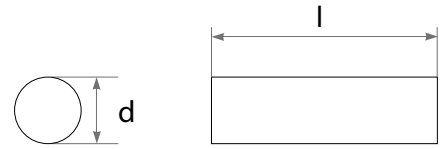
CERMET

PCBN
/
PCD

TOOL
HOLDER

MILLING
CUTTER

RBAR



| Type | Dimensions (mm) | | Cermet (TiCN) | | | | Cermet (PVD) | | | | |
|-------------|-----------------|------|---------------|-------|-------|-------|--------------|-------|-------|-------|-------|
| | ISO | d | l | TX510 | TX515 | TX520 | TX530 | TX910 | TX915 | TX920 | TX930 |
| RBAR 2230 B | | 30.8 | 22.8 | | | | • | | | | |
| RBAR 2507 B | | 7.8 | 25.8 | | | | • | | | | |
| RBAR 2508 B | | 8.8 | 25.8 | | | | • | | | | |
| RBAR 2509 B | | 9.8 | 25.8 | | | | • | | | | |
| RBAR 2510 B | | 10.8 | 25.8 | | | | • | | | | |
| RBAR 2511 B | | 11.8 | 25.8 | | | | • | | | | |
| RBAR 2512 B | | 12.8 | 25.8 | | | | • | | | | |
| RBAR 2513 B | | 13.8 | 25.8 | | | | • | | | | |
| RBAR 2514 B | | 14.8 | 25.8 | | | | • | | | | |
| RBAR 2515 B | | 15.8 | 25.8 | | | | • | | | | |
| RBAR 2516 B | | 16.8 | 25.8 | | | | • | | | | |
| RBAR 2517 B | | 17.8 | 25.8 | | | | • | | | | |
| RBAR 2518 B | | 18.8 | 25.8 | | | | • | | | | |
| RBAR 2519 B | | 19.8 | 25.8 | | | | • | | | | |
| RBAR 2520 B | | 20.8 | 25.8 | | | | • | | | | |
| RBAR 2521 B | | 21.8 | 25.8 | | | | • | | | | |
| RBAR 2525 B | | 25.8 | 25.8 | | | | • | | | | |
| RBAR 2530 B | | 30.8 | 25.8 | | | | • | | | | |
| RBAR 2535 B | | 35.8 | 25.8 | | | | • | | | | |
| RBAR 2640 B | | 40.8 | 26.8 | | | | • | | | | |
| RBAR 2950 B | | 50.8 | 29.8 | | | | • | | | | |
| RBAR 3007 B | | 7.8 | 30.8 | | | | • | | | | |
| RBAR 3008 B | | 8.8 | 30.8 | | | | • | | | | |
| RBAR 3009 B | | 9.8 | 30.8 | | | | • | | | | |
| RBAR 3010 B | | 10.8 | 30.8 | | | | • | | | | |
| RBAR 3011 B | | 11.8 | 30.8 | | | | • | | | | |
| RBAR 3012 B | | 12.8 | 30.8 | | | | • | | | | |
| RBAR 3013 B | | 13.8 | 30.8 | | | | • | | | | |
| RBAR 3014 B | | 14.8 | 30.8 | | | | • | | | | |
| RBAR 3016 B | | 16.8 | 30.8 | | | | • | | | | |
| RBAR 3017 B | | 17.8 | 30.8 | | | | • | | | | |
| RBAR 3018 B | | 18.8 | 30.8 | | | | • | | | | |
| RBAR 3019 B | | 19.8 | 30.8 | | | | • | | | | |
| RBAR 3025 B | | 25.8 | 30.8 | | | | • | | | | |
| RBAR 3040 B | | 40.8 | 30.8 | | | | • | | | | |
| RBAR 3045 B | | 45.8 | 30.8 | | | | • | | | | |
| RBAR 3050 B | | 50.8 | 30.8 | | | | • | | | | |
| RBAR 3507 B | | 7.8 | 35.8 | | | | • | | | | |

CERAMIC

CERMET

PCBN
/
PCD

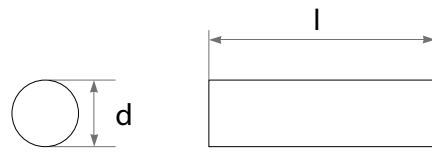
TOOL
HOLDER

MILLING
CUTTER

BLANK

PART.
A

RBAR



TURNING
&
MILLING

| Type | Dimensions [mm] | | Cermet (TiCN) | | | | Cermet (PVD) | | | | |
|-------------|-----------------|------|---------------|-------|-------|-------|--------------|-------|-------|-------|-------|
| | ISO | d | l | TX510 | TX515 | TX520 | TX530 | TX910 | TX915 | TX920 | TX930 |
| RBAR 3508 B | | 8.8 | 35.8 | | | | • | | | | |
| RBAR 3509 B | | 9.8 | 35.8 | | | | • | | | | |
| RBAR 3510 B | | 10.8 | 35.8 | | | | • | | | | |
| RBAR 3511 B | | 11.8 | 35.8 | | | | • | | | | |
| RBAR 3512 B | | 12.8 | 35.8 | | | | • | | | | |
| RBAR 3513 B | | 13.8 | 35.8 | | | | • | | | | |
| RBAR 3514 B | | 14.8 | 35.8 | | | | • | | | | |
| RBAR 3515 B | | 15.8 | 35.8 | | | | • | | | | |
| RBAR 3516 B | | 16.8 | 35.8 | | | | • | | | | |
| RBAR 3517 B | | 17.8 | 35.8 | | | | • | | | | |
| RBAR 3518 B | | 18.8 | 35.8 | | | | • | | | | |
| RBAR 3519 B | | 19.8 | 35.8 | | | | • | | | | |
| RBAR 3520 B | | 20.8 | 35.8 | | | | • | | | | |
| RBAR 3521 B | | 21.8 | 35.8 | | | | • | | | | |
| RBAR 3523 B | | 23.8 | 35.8 | | | | • | | | | |
| RBAR 3525 B | | 25.8 | 35.8 | | | | • | | | | |
| RBAR 3526 B | | 26.8 | 35.8 | | | | • | | | | |
| RBAR 3530 B | | 30.8 | 35.8 | | | | • | | | | |
| RBAR 3535 B | | 35.8 | 35.8 | | | | • | | | | |
| RBAR 3540 B | | 40.8 | 35.8 | | | | • | | | | |
| RBAR 3550 B | | 50.8 | 35.8 | | | | • | | | | |
| RBAR 3555 B | | 55.8 | 35.8 | | | | • | | | | |
| RBAR 3560 B | | 60.8 | 35.8 | | | | • | | | | |
| RBAR 3565 B | | 65.8 | 35.8 | | | | • | | | | |
| RBAR 3570 B | | 70.8 | 35.8 | | | | • | | | | |
| RBAR 4030 B | | 30.8 | 40.8 | | | | • | | | | |
| RBAR 4042 B | | 42.8 | 40.8 | | | | • | | | | |
| RBAR 4045 B | | 45.8 | 40.8 | | | | • | | | | |
| RBAR 4050 B | | 50.8 | 40.8 | | | | • | | | | |
| RBAR 4060 B | | 60.8 | 40.8 | | | | • | | | | |
| RBAR 4070 B | | 70.8 | 40.8 | | | | • | | | | |
| RBAR 4080 B | | 80.8 | 40.8 | | | | • | | | | |
| RBAR 4090 B | | 90.8 | 40.8 | | | | • | | | | |
| RBAR 5055 B | | 55.8 | 50.8 | | | | • | | | | |
| RBAR 5060 B | | 60.8 | 50.8 | | | | • | | | | |

CERAMIC

CERMET

PCBN
/
PCD

TOOL
HOLDER

MILLING
CUTTER

SBAR



| Type | Dimensions (mm) | | | Cermet (TiCN) | | | | Cermet (PVD) | | | | |
|--------------|-----------------|-------|-------|---------------|-------|-------|-------|--------------|-------|-------|-------|-------|
| | ISO | l | w | t | TX510 | TX510 | TX510 | TX510 | TX910 | TX915 | TX920 | TX930 |
| SBAR 040825 | 26.11 | 8.89 | 5.30 | | | | • | | | | | |
| SBAR 041608 | 16.67 | 4.75 | 8.10 | | | | • | | | | | |
| SBAR 050518 | 18.01 | 5.15 | 5.00 | | | | • | | | | | |
| SBAR 050620 | 22.35 | 4.95 | 6.30 | | | | • | | | | | |
| SBAR 056440 | 47.31 | 6.78 | 5.50 | | | | • | | | | | |
| SBAR 060331 | 34.75 | 5.94 | 6.35 | | | | • | | | | | |
| SBAR 121985 | 19.10 | 12.67 | 8.50 | | | | • | | | | | |
| SBAR 122025 | 25.50 | 1.40 | 2.20 | | | | • | | | | | |
| SBAR 122525 | 25.50 | 1.40 | 2.70 | | | | • | | | | | |
| SBAR 1295632 | 12.90 | 5.60 | 3.20 | | | | • | | | | | |
| SBAR 151985 | 19.10 | 15.30 | 8.50 | | | | • | | | | | |
| SBAR 163025 | 29.82 | 3.47 | 1.60 | | | | • | | | | | |
| SBAR 163315 | 15.62 | 3.41 | 1.60 | | | | • | | | | | |
| SBAR 163815 | 16.67 | 4.75 | 1.60 | | | | • | | | | | |
| SBAR 173815 | 15.06 | 3.69 | 1.70 | | | | • | | | | | |
| SBAR 203530 | 29.59 | 3.44 | 2.00 | | | | • | | | | | |
| SBAR 204035 | 34.53 | 3.94 | 2.00 | | | | • | | | | | |
| SBAR 704035 | 34.78 | 3.97 | 7.00 | | | | • | | | | | |
| SBAR 224816 | 16.67 | 4.72 | 2.20 | | | | • | | | | | |
| SBAR 255022 | 22.18 | 4.92 | 2.50 | | | | • | | | | | |
| SBAR 256035 | 34.49 | 5.89 | 2.50 | | | | • | | | | | |
| SBAR 306035 | 34.75 | 6.00 | 3.00 | | | | • | | | | | |
| SBAR 324850 | 3.60 | 5.10 | 50.00 | | | | • | | | | | |
| SBAR 326650 | 3.60 | 7.00 | 50.00 | | | | • | | | | | |
| SBAR 345022 | 22.35 | 4.95 | 3.40 | | | | • | | | | | |
| SBAR 327025 | 24.44 | 7.09 | 3.35 | | | | • | | | | | |
| SBAR 325075 | 71.94 | 14.39 | 3.20 | | | | • | | | | | |
| SBAR 327050 | 50.00 | 7.00 | 3.20 | | | | • | | | | | |
| SBAR 368950 | 50.40 | 8.92 | 3.60 | | | | • | | | | | |
| SBAR 328550 | 50.03 | 8.85 | 3.20 | | | | • | | | | | |
| SBAR 607050 | 50.40 | 8.92 | 6.50 | | | | • | | | | | |
| SBAR 638232 | 32.72 | 8.99 | 6.30 | | | | • | | | | | |
| SBAR 202525 | 25.40 | 2.70 | 2.20 | | | | • | | | | | |
| SBAR 224035 | 34.53 | 3.94 | 2.20 | | | | • | | | | | |
| SBAR 368232 | 32.72 | 8.99 | 3.60 | | | | • | | | | | |

CERAMIC

CERMET

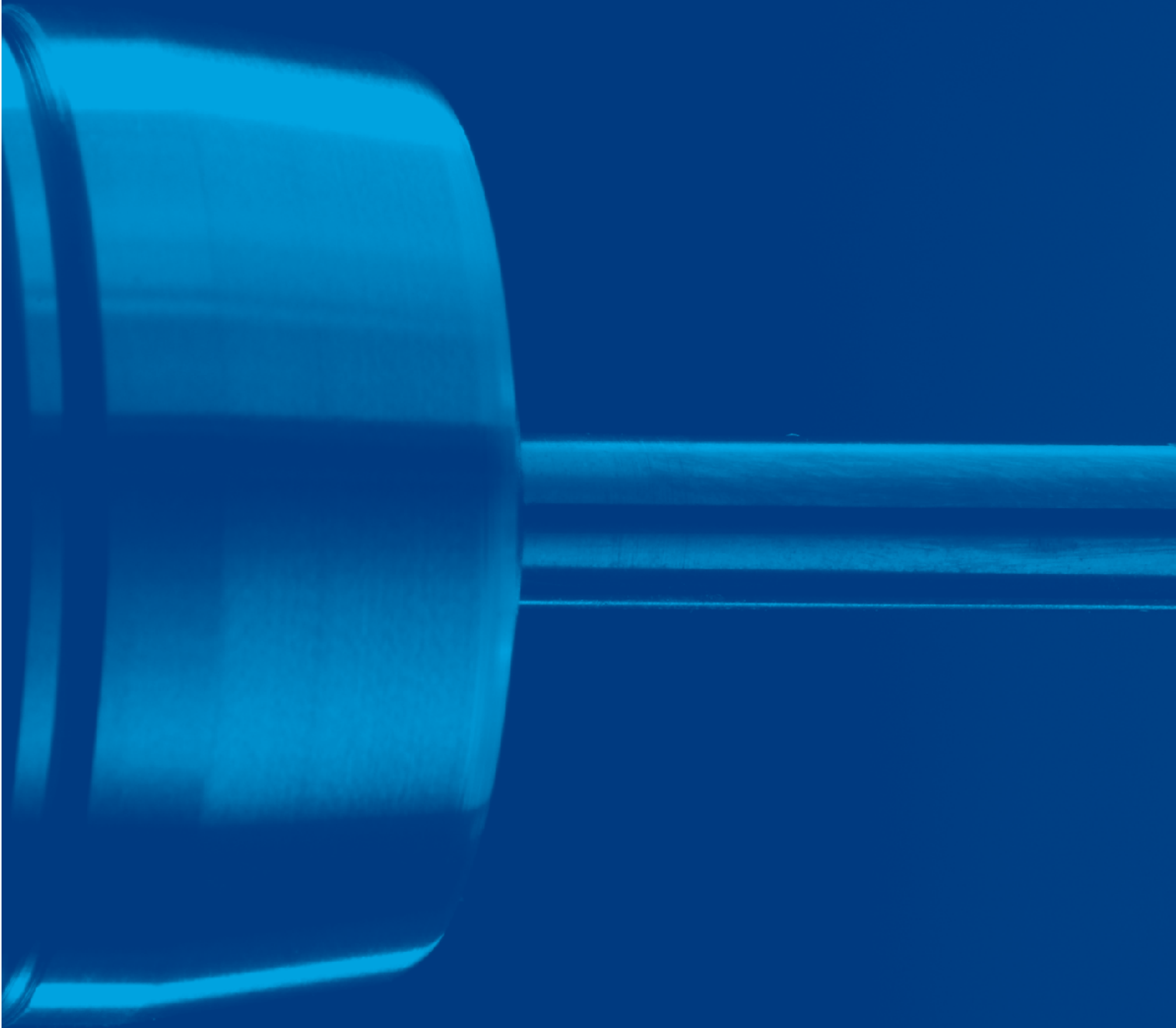
PCBN
/
PCD

TOOL
HOLDER

MILLING
CUTTER

MEMO

PCBN / PCD



PCBN A 108

- STANDARD A 108

- Mini Tip A 112

- Full Face A 115

- Solid A 116

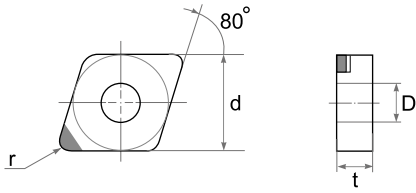
PCD A 118

- STANDARD A 118

Special A 124

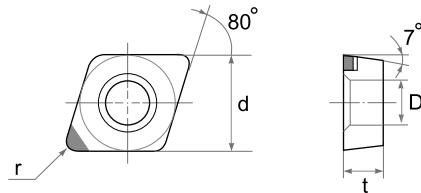


CNGA



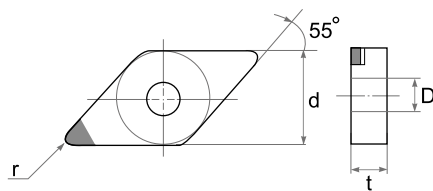
| Type | | Dimensions (mm) | | | | | | | |
|----------------|--------------|-----------------|------|-----|------|----------|----------|----------|----------|
| ISO | ASA | d | t | r | D | SBN 1000 | SBN 2000 | SBN 3000 | SBN 4000 |
| CNGA 120402 R1 | CNGA 4302 R1 | 12.70 | 4.76 | 0.2 | 5.16 | | | | |
| CNGA 120404 R1 | CNGA 431 R1 | 12.70 | 4.76 | 0.4 | 5.16 | • | • | | |
| CNGA 120408 R1 | CNGA 432 R1 | 12.70 | 4.76 | 0.8 | 5.16 | • | • | • | • |
| CNGA 120412 R1 | CNGA 433 R1 | 12.70 | 4.76 | 1.2 | 5.16 | • | • | • | • |

CCGW



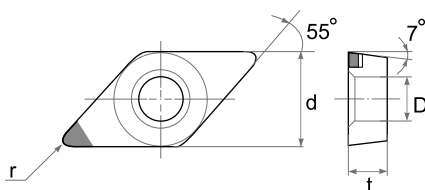
| Type | | Dimensions (mm) | | | | | | | |
|----------------|--|-----------------|------|-----|------|----------|----------|----------|----------|
| ISO | | d | t | r | D | SBN 1000 | SBN 2000 | SBN 3000 | SBN 4000 |
| CCGW 060202 R1 | | 6.35 | 2.38 | 0.2 | 2.80 | | • | | |
| CCGW 060204 R1 | | 6.35 | 2.38 | 0.4 | 2.80 | • | • | | |
| CCGW 060208 R1 | | 6.35 | 2.38 | 0.8 | 2.80 | | | | |
| CCGW 09T304 R1 | | 9.52 | 3.97 | 0.4 | 4.40 | • | • | • | • |
| CCGW 09T308 R1 | | 9.52 | 3.97 | 0.8 | 4.40 | • | • | • | • |

DNGA



| Type | | Dimensions (mm) | | | | | | | |
|----------------|-------------|-----------------|------|-----|------|----------|----------|----------|----------|
| ISO | ASA | d | t | r | D | SBN 1000 | SBN 2000 | SBN 3000 | SBN 4000 |
| DNGA 150404 R1 | DNGA 431 R1 | 12.70 | 4.76 | 0.4 | 5.16 | • | • | • | |
| DNGA 150408 R1 | DNGA 432 R1 | 12.70 | 4.76 | 0.8 | 5.16 | • | • | • | • |
| DNGA 150412 R1 | DNGA 433 R1 | 12.70 | 4.76 | 1.2 | 5.16 | • | • | • | • |
| DNGA 150604 R1 | DNGA 441 R1 | 12.70 | 6.35 | 0.4 | 5.16 | • | • | • | |
| DNGA 150608 R1 | DNGA 442 R1 | 12.70 | 6.35 | 0.8 | 5.16 | • | • | • | • |
| DNGA 150612 R1 | DNGA 443 R1 | 12.70 | 6.35 | 1.2 | 5.16 | • | • | • | • |

DCGW



| Type | | Dimensions (mm) | | | | | | | |
|----------------|--|-----------------|------|-----|------|----------|----------|----------|----------|
| ISO | | d | t | r | D | SBN 1000 | SBN 2000 | SBN 3000 | SBN 4000 |
| DCGW 070202 R1 | | 6.35 | 2.38 | 0.2 | 2.80 | | • | | |
| DCGW 070204 R1 | | 6.35 | 2.38 | 0.4 | 2.80 | • | • | • | |
| DCGW 070208 R1 | | 6.35 | 2.38 | 0.8 | 2.80 | • | • | • | • |
| DCGW 11T302 R1 | | 9.52 | 3.97 | 0.2 | 4.40 | | • | | |
| DCGW 11T304 R1 | | 9.52 | 3.97 | 0.4 | 4.40 | • | • | • | |
| DCGW 11T308 R1 | | 9.52 | 3.97 | 0.8 | 4.40 | • | • | • | • |

CERAMIC

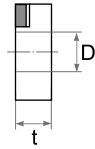
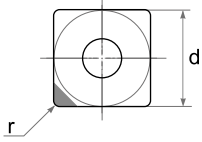
CERMET

PCBN
/
PCD

TOOL
HOLDER

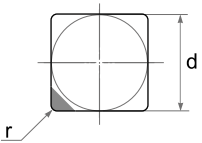
MILLING
CUTTER

SNGA



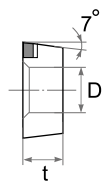
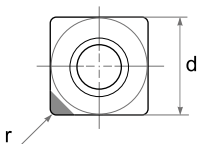
| Type | | Dimensions (mm) | | | | | | | |
|-----------------------|--------------------|-----------------|------|-----|------|----------|----------|----------|----------|
| ISO | ASA | d | t | r | D | SBN 1000 | SBN 2000 | SBN 3000 | SBN 4000 |
| SNGA 090304 R1 | SNGA 321 R1 | 9.52 | 3.18 | 0.4 | 3.81 | | | | |
| SNGA 120404 R1 | SNGA 431 R1 | 12.70 | 4.76 | 0.4 | 5.16 | • | • | | |
| SNGA 120408 R1 | SNGA 432 R1 | 12.70 | 4.76 | 0.8 | 5.16 | • | • | • | • |
| SNGA 120412 R1 | SNGA 433 R1 | 12.70 | 4.76 | 1.2 | 5.16 | • | • | • | • |

SNGN



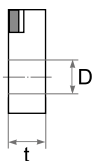
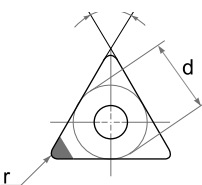
| Type | | Dimensions (mm) | | | | | | |
|-----------------------|--------------------|-----------------|------|-----|----------|----------|----------|----------|
| ISO | ASA | d | t | r | SBN 1000 | SBN 2000 | SBN 3000 | SBN 4000 |
| SNGN 090304 R1 | SNGN 321 R1 | 9.52 | 3.18 | 0.4 | | | | |
| SNGN 090308 R1 | SNGN 322 R1 | 9.52 | 3.18 | 0.8 | | | | |
| SNGN 090312 R1 | SNGN 323 R1 | 9.52 | 3.18 | 1.2 | | | | |
| SNGN 120404 R1 | SNGN 431 R1 | 12.70 | 4.76 | 0.4 | • | • | | |
| SNGN 120408 R1 | SNGN 432 R1 | 12.70 | 4.76 | 0.8 | • | • | • | • |
| SNGN 120412 R1 | SNGN 433 R1 | 12.70 | 4.76 | 1.2 | • | • | • | • |

SCGW



| Type | | Dimensions (mm) | | | | | | | |
|-----------------------|--|-----------------|------|-----|------|----------|----------|----------|----------|
| ISO | | d | t | r | D | SBN 1000 | SBN 2000 | SBN 3000 | SBN 4000 |
| SCGW 09T304 R1 | | 9.52 | 3.97 | 0.4 | 4.40 | • | • | | |
| SCGW 09T308 R1 | | 9.52 | 3.97 | 0.8 | 4.40 | • | • | • | • |

TNGA



| Type | | Dimensions (mm) | | | | | | | |
|-----------------------|---------------------|-----------------|------|-----|------|----------|----------|----------|----------|
| ISO | ASA | d | t | r | D | SBN 1000 | SBN 2000 | SBN 3000 | SBN 4000 |
| TNGA 160402 R1 | TNGA 3302 R1 | 9.52 | 4.76 | 0.2 | 3.81 | • | • | | |
| TNGA 160404 R1 | TNGA 331 R1 | 9.52 | 4.76 | 0.4 | 3.81 | • | • | | |
| TNGA 160408 R1 | TNGA 332 R1 | 9.52 | 4.76 | 0.8 | 3.81 | • | • | • | • |
| TNGA 160412 R1 | TNGA 333 R1 | 9.52 | 4.76 | 1.2 | 3.81 | • | • | | |

CERAMIC

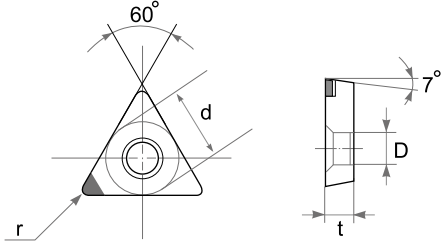
CERMET

PCBN
/
PCD

TOOL
HOLDER

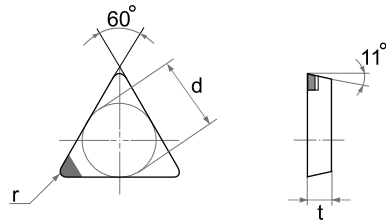
MILLING
CUTTER

TCGW



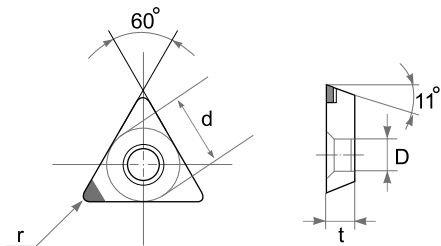
| Type | Dimensions (mm) | | | | | | | |
|-----------------------|-----------------|------|-----|------|----------|----------|----------|----------|
| ISO | d | t | r | D | SBN 1000 | SBN 2000 | SBN 3000 | SBN 4000 |
| TCGW 090204 R1 | 5.56 | 2.38 | 0.4 | 2.50 | • | • | | |
| TCGW 090208 R1 | 5.56 | 2.38 | 0.8 | 2.50 | • | • | • | • |
| TCGW 110202 R1 | 6.35 | 2.38 | 0.2 | 2.80 | | • | | |
| TCGW 110204 R1 | 6.35 | 2.38 | 0.4 | 2.80 | • | • | | |
| TCGW 110208 R1 | 6.35 | 2.38 | 0.8 | 2.80 | • | • | • | • |
| TCGW 16T304 R1 | 9.52 | 3.97 | 0.4 | 4.40 | • | • | | |
| TCGW 16T308 R1 | 9.52 | 3.97 | 0.8 | 4.40 | • | • | • | • |

TPGN



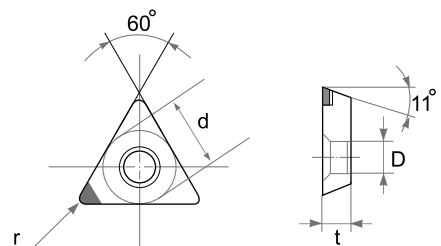
| Type | | Dimensions (mm) | | | | | | |
|-----------------------|--------------------|-----------------|------|-----|----------|----------|----------|----------|
| ISO | ASA | d | t | r | SBN 1000 | SBN 2000 | SBN 3000 | SBN 4000 |
| TPGN 110304 R1 | TPGN 221 R1 | 6.35 | 3.18 | 0.4 | • | • | | |
| TPGN 110308 R1 | TPGN 222 R1 | 6.35 | 3.18 | 0.8 | • | • | • | • |
| TPGN 110312 R1 | TPGN 223 R1 | 6.35 | 3.18 | 1.2 | | | | |
| TPGN 160304 R1 | TPGN 321 R1 | 9.52 | 3.18 | 0.4 | • | • | | |
| TPGN 160308 R1 | TPGN 322 R1 | 9.52 | 3.18 | 0.8 | • | • | • | • |
| TPGN 160312 R1 | TPGN 323 R1 | 9.52 | 3.18 | 1.2 | | | | |

TPGB



| Type | | Dimensions (mm) | | | | | | | |
|-----------------------|---------------------|-----------------|------|-----|------|----------|----------|----------|----------|
| ISO | ASA | d | t | r | D | SBN 1000 | SBN 2000 | SBN 3000 | SBN 4000 |
| TPGB 080202 R1 | TPGB 6302 R1 | 4.76 | 2.38 | 0.2 | 2.40 | | | | |
| TPGB 090204 R1 | TPGB 731 R1 | 5.56 | 2.38 | 0.4 | 2.50 | • | • | | |
| TPGB 110302 R1 | TPGB 2202 R1 | 6.35 | 3.18 | 0.2 | 3.30 | | | | |
| TPGB 110304 R1 | TPGB 221 R1 | 6.35 | 3.18 | 0.4 | 3.30 | | | | |
| TPGB 110308 R1 | TPGB 222 R1 | 6.35 | 3.18 | 0.8 | 3.30 | | | | |

TPGW



| Type | | Dimensions (mm) | | | | | | | |
|-----------------------|--------------------|-----------------|------|-----|------|----------|----------|----------|----------|
| ISO | ASA | d | t | r | D | SBN 1000 | SBN 2000 | SBN 3000 | SBN 4000 |
| TPGW 160304 R1 | TPGW 321 R1 | 9.52 | 3.18 | 0.4 | 4.40 | | | | |
| TPGW 160308 R1 | TPGW 322 R1 | 9.52 | 3.18 | 0.8 | 4.40 | | | | |

CERAMIC

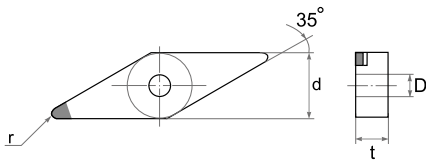
CERMET

PCBN
/
PCD

TOOL
HOLDER

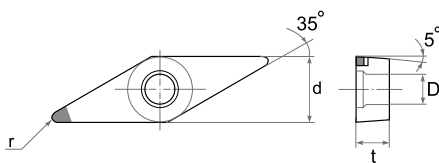
MILLING
CUTTER

VNGA



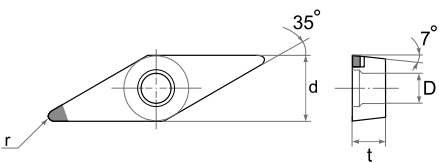
| Type | | Dimensions (mm) | | | | | | | |
|-----------------------|--------------------|-----------------|------|-----|------|----------|----------|----------|----------|
| ISO | ASA | d | t | r | D | SBN 1000 | SBN 2000 | SBN 3000 | SBN 4000 |
| VNGA 160404 R1 | VNGA 331 R1 | 9.52 | 4.76 | 0.4 | 3.18 | • | • | | |
| VNGA 160408 R1 | VNGA 332 R1 | 9.52 | 4.76 | 0.8 | 3.18 | • | • | • | • |

VBGW



| Type | | Dimensions (mm) | | | | | | | |
|-----------------------|---------------------|-----------------|------|-----|------|----------|----------|----------|----------|
| ISO | ASA | d | t | r | D | SBN 1000 | SBN 2000 | SBN 3000 | SBN 4000 |
| VBGW 110302 R1 | VBGW 2202 R1 | 6.35 | 3.18 | 0.2 | 2.80 | | | | |
| VBGW 110304 R1 | VBGW 221 R1 | 6.35 | 3.18 | 0.4 | 2.80 | | | | |
| VBGW 160404 R1 | VBGW 331 R1 | 9.52 | 4.76 | 0.4 | 4.40 | • | • | | |
| VBGW 160408 R1 | VBGW 332 R1 | 9.52 | 4.76 | 0.8 | 4.40 | • | • | • | • |

VCGW



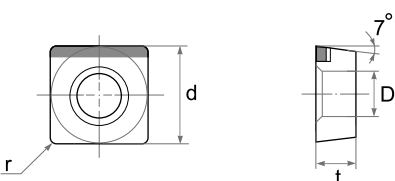
| Type | | Dimensions (mm) | | | | | | | |
|-----------------------|---------------------|-----------------|------|-----|------|----------|----------|----------|----------|
| ISO | ASA | d | t | r | D | SBN 1000 | SBN 2000 | SBN 3000 | SBN 4000 |
| VCGW 110302 R1 | VCGW 2202 R1 | 6.35 | 3.18 | 0.2 | 2.80 | | | | |
| VCGW 110304 R1 | VCGW 221 R1 | 6.35 | 3.18 | 0.4 | 2.80 | | | | |
| VCGW 160404 R1 | VCGW 331 R1 | 9.52 | 4.76 | 0.4 | 4.40 | • | • | | |
| VCGW 160408 R1 | VCGW 332 R1 | 9.52 | 4.76 | 0.8 | 4.40 | • | • | • | • |

CERAMIC

CERMET

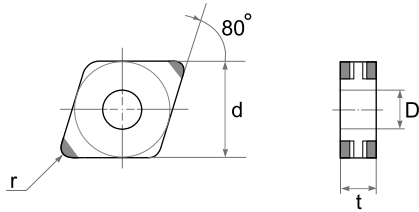
PCBN
/
PCDTOOL
HOLDERMILLING
CUTTER

SCGW .. FS



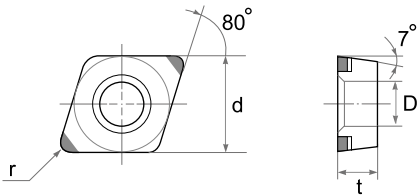
| Type | Dimensions (mm) | | | | | | | |
|-----------------------|-----------------|------|-----|------|----------|----------|----------|----------|
| ISO | d | t | r | D | SBN 1000 | SBN 2000 | SBN 3000 | SBN 4000 |
| SCGW 09T304 FS | 9.52 | 3.97 | 0.4 | 4.40 | • | | | |
| SCGW 09T308 FS | 9.52 | 3.97 | 0.8 | 4.40 | | | | |
| SCGW 120404 FS | 12.70 | 4.76 | 0.4 | 5.60 | | | | |
| SCGW 120408 FS | 12.70 | 4.76 | 0.8 | 5.60 | • | | | |

CNGA



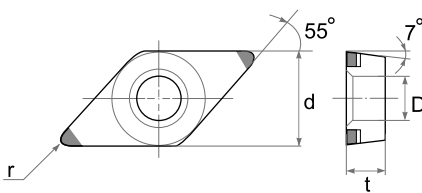
| Type | | Dimensions (mm) | | | | | | | |
|----------------|-------------|-----------------|------|-----|------|----------|----------|----------|----------|
| ISO | ASA | d | t | r | D | SBN 1000 | SBN 2000 | SBN 3000 | SBN 4000 |
| CNGA 120404 M1 | CNGA 431 M1 | 12.70 | 4.76 | 0.4 | 5.16 | | | | |
| CNGA 120404 M2 | CNGA 431 M2 | 12.70 | 4.76 | 0.4 | 5.16 | | | • | • |
| CNGA 120404 M4 | CNGA 431 M4 | 12.70 | 4.76 | 0.4 | 5.16 | | | | |
| CNGA 120408 M1 | CNGA 432 M1 | 12.70 | 4.76 | 0.8 | 5.16 | | | | |
| CNGA 120408 M2 | CNGA 432 M2 | 12.70 | 4.76 | 0.8 | 5.16 | | | • | • |
| CNGA 120408 M4 | CNGA 432 M4 | 12.70 | 4.76 | 0.8 | 5.16 | | | | |

CCGW



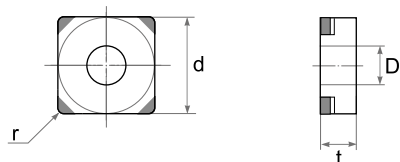
| Type | | Dimensions (mm) | | | | | | | |
|----------------|--|-----------------|------|-----|------|----------|----------|----------|----------|
| ISO | | d | t | r | D | SBN 1000 | SBN 2000 | SBN 3000 | SBN 4000 |
| CCGW 09T304 M1 | | 9.52 | 3.97 | 0.4 | 4.40 | | | | |
| CCGW 09T304 M2 | | 9.52 | 3.97 | 0.4 | 4.40 | | | • | • |
| CCGW 09T308 M1 | | 9.52 | 3.97 | 0.8 | 4.40 | | | | |
| CCGW 09T308 M2 | | 9.52 | 3.97 | 0.8 | 4.40 | | | • | • |

DCGW



| Type | | Dimensions (mm) | | | | | | | |
|----------------|--|-----------------|------|-----|------|----------|----------|----------|----------|
| ISO | | d | t | r | D | SBN 1000 | SBN 2000 | SBN 3000 | SBN 4000 |
| DCGW 11T302 M1 | | 9.52 | 3.97 | 0.2 | 4.40 | | | | |
| DCGW 11T302 M2 | | 9.52 | 3.97 | 0.2 | 4.40 | | | | |
| DCGW 11T304 M1 | | 9.52 | 3.97 | 0.4 | 4.40 | | | | |
| DCGW 11T304 M2 | | 9.52 | 3.97 | 0.4 | 4.40 | | | • | • |
| DCGW 11T308 M1 | | 9.52 | 3.97 | 0.8 | 4.40 | | | | |
| DCGW 11T308 M2 | | 9.52 | 3.97 | 0.8 | 4.40 | | | • | • |

SNGA



| Type | | Dimensions (mm) | | | | | | | |
|----------------|-------------|-----------------|------|-----|------|----------|----------|----------|----------|
| ISO | ASA | d | t | r | D | SBN 1000 | SBN 2000 | SBN 3000 | SBN 4000 |
| SNGA 120404 M1 | SNGA 431 M1 | 12.70 | 4.76 | 0.4 | 5.16 | | | | |
| SNGA 120404 M2 | SNGA 431 M2 | 12.70 | 4.76 | 0.4 | 5.16 | | | | |
| SNGA 120404 M4 | SNGA 431 M4 | 12.70 | 4.76 | 0.4 | 5.16 | | | | |
| SNGA 120408 M1 | SNGA 432 M1 | 12.70 | 4.76 | 0.8 | 5.16 | | | | |
| SNGA 120408 M2 | SNGA 432 M2 | 12.70 | 4.76 | 0.8 | 5.16 | | | • | • |
| SNGA 120408 M4 | SNGA 432 M4 | 12.70 | 4.76 | 0.8 | 5.16 | | | • | • |

CERAMIC

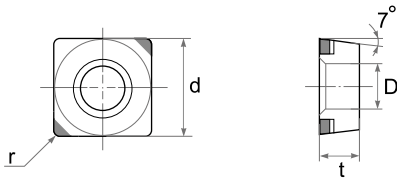
CERMET

PCBN
/
PCD

TOOL
HOLDER

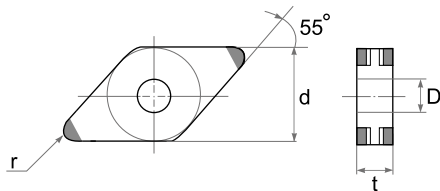
MILLING
CUTTER

SCGW



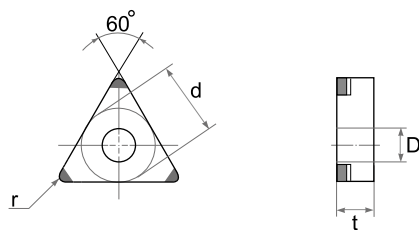
| Type | | Dimensions (mm) | | | | | | | |
|-----------------------|--|-----------------|------|-----|------|----------|----------|----------|----------|
| ISO | | d | t | r | D | SBN 1000 | SBN 2000 | SBN 3000 | SBN 4000 |
| SCGW 09T304 M1 | | 9.52 | 3.97 | 0.4 | 4.40 | | | | |
| SCGW 09T304 M2 | | 9.52 | 3.97 | 0.4 | 4.40 | | | | |
| SCGW 09T308 M1 | | 9.52 | 3.97 | 0.8 | 4.40 | | | | |
| SCGW 09T308 M2 | | 9.52 | 3.97 | 0.8 | 4.40 | | | | |

DNGA



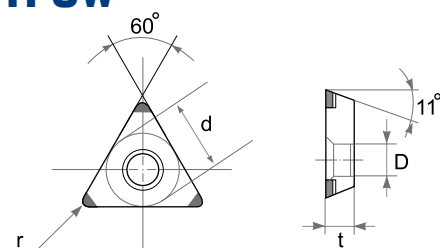
| Type | | Dimensions (mm) | | | | | | | |
|-----------------------|--------------------|-----------------|------|-----|------|----------|----------|----------|----------|
| ISO | ASA | d | t | r | D | SBN 1000 | SBN 2000 | SBN 3000 | SBN 4000 |
| DNGA 150404 M1 | DNGA 431 M1 | 12.70 | 4.76 | 0.4 | 5.16 | | | | |
| DNGA 150404 M2 | DNGA 431 M2 | 12.70 | 4.76 | 0.4 | 5.16 | | | | |
| DNGA 150404 M4 | DNGA 431 M4 | 12.70 | 4.76 | 0.4 | 5.16 | | | | |
| DNGA 150408 M1 | DNGA 432 M1 | 12.70 | 4.76 | 0.8 | 5.16 | | | | |
| DNGA 150408 M2 | DNGA 432 M2 | 12.70 | 4.76 | 0.8 | 5.16 | | | • | • |
| DNGA 150408 M4 | DNGA 432 M4 | 12.70 | 4.76 | 0.8 | 5.16 | | | • | • |
| DNGA 150604 M1 | DNGA 441 M1 | 12.70 | 6.35 | 0.4 | 5.16 | | | | |
| DNGA 150604 M2 | DNGA 441 M2 | 12.70 | 6.35 | 0.4 | 5.16 | | | | |
| DNGA 150604 M4 | DNGA 441 M4 | 12.70 | 6.35 | 0.4 | 5.16 | | | | |
| DNGA 150608 M1 | DNGA 442 M1 | 12.70 | 6.35 | 0.8 | 5.16 | | | | |
| DNGA 150608 M2 | DNGA 442 M2 | 12.70 | 6.35 | 0.8 | 5.16 | | | | |
| DNGA 150608 M4 | DNGA 442 M4 | 12.70 | 6.35 | 0.8 | 5.16 | | | | |

TNGA



| Type | | Dimensions (mm) | | | | | | | |
|-----------------------|--------------------|-----------------|------|-----|------|----------|----------|----------|----------|
| ISO | ASA | d | t | r | D | SBN 1000 | SBN 2000 | SBN 3000 | SBN 4000 |
| TNGA 160404 M1 | TNGA 331 M1 | 9.52 | 4.76 | 0.4 | 3.81 | | | | |
| TNGA 160404 M3 | TNGA 331 M3 | 9.52 | 4.76 | 0.4 | 3.81 | | | | |
| TNGA 160408 M1 | TNGA 332 M1 | 9.52 | 4.76 | 0.8 | 3.81 | | | | |
| TNGA 160408 M3 | TNGA 332 M3 | 9.52 | 4.76 | 0.8 | 3.81 | | | • | • |

TPGW



| Type | | Dimensions (mm) | | | | | | | |
|-----------------------|--------------------|-----------------|------|-----|------|----------|----------|----------|----------|
| ISO | ASA | d | t | r | D | SBN 1000 | SBN 2000 | SBN 3000 | SBN 4000 |
| TPGW 160304 M1 | TPGW 321 M1 | 9.52 | 3.18 | 0.4 | 4.40 | | | | |
| TPGW 160304 M3 | TPGW 321 M3 | 9.52 | 3.18 | 0.4 | 4.40 | | | | |
| TPGW 160308 M1 | TPGW 322 M1 | 9.52 | 3.18 | 0.8 | 4.40 | | | | |
| TPGW 160308 M3 | TPGW 322 M3 | 9.52 | 3.18 | 0.8 | 4.40 | | | • | • |

CERAMIC

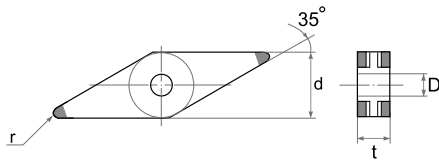
CERMET

PCBN
/
PCD

TOOL
HOLDER

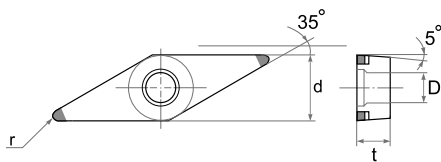
MILLING
CUTTER

VNGA



| Type | | Dimensions (mm) | | | | | | | |
|----------------|-------------|-----------------|------|-----|------|----------|----------|----------|----------|
| ISO | ASA | d | t | r | D | SBN 1000 | SBN 2000 | SBN 3000 | SBN 4000 |
| VNGA 160404 M1 | VNGA 331 M1 | 9.52 | 4.76 | 0.4 | 3.18 | | | | |
| VNGA 160404 M2 | VNGA 331 M2 | 9.52 | 4.76 | 0.4 | 3.18 | | | | |
| VNGA 160404 M4 | VNGA 331 M4 | 9.52 | 4.76 | 0.4 | 3.18 | | | | |
| VNGA 160408 M1 | VNGA 332 M1 | 9.52 | 4.76 | 0.8 | 3.18 | | | | |
| VNGA 160408 M2 | VNGA 332 M2 | 9.52 | 4.76 | 0.8 | 3.18 | | | • | • |
| VNGA 160408 M4 | VNGA 332 M4 | 9.52 | 4.76 | 0.8 | 3.18 | | | • | • |

VBGW



| Type | | Dimensions (mm) | | | | | | | |
|----------------|-------------|-----------------|------|-----|------|----------|----------|----------|----------|
| ISO | ASA | d | t | r | D | SBN 1000 | SBN 2000 | SBN 3000 | SBN 4000 |
| VBGW 160404 M1 | VBGW 331 M1 | 9.52 | 4.76 | 0.4 | 4.40 | | | | |
| VBGW 160404 M2 | VBGW 331 M2 | 9.52 | 4.76 | 0.4 | 4.40 | | | • | • |
| VBGW 160408 M1 | VBGW 332 M1 | 9.52 | 4.76 | 0.8 | 4.40 | | | | |
| VBGW 160408 M2 | VBGW 332 M2 | 9.52 | 4.76 | 0.8 | 4.40 | | | • | • |

CERAMIC

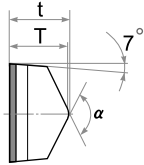
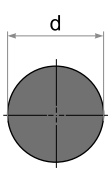
CERMET

PCBN
/
PCD

TOOL
HOLDER

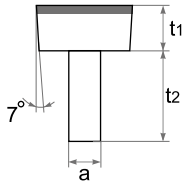
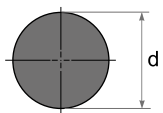
MILLING
CUTTER

RCGX



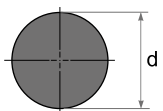
| Type | | Dimensions (mm) | | | | | | | |
|----------------------|-------------------|-----------------|------|------|----------|----------|----------|----------|----------|
| ISO | ASA | d | t | T | α | SBN 1000 | SBN 2000 | SBN 3000 | SBN 4000 |
| RCGX 060600 F | RCGX 102 F | 6.35 | 6.35 | 6.20 | 120° | • | | | |
| RCGX 090700 F | RCGX 103 F | 9.52 | 7.94 | 7.70 | 120° | • | | | |
| RCGX 120700 F | RCGX 104 F | 12.70 | 7.94 | 7.70 | 120° | • | | | |

RCGX



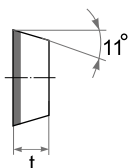
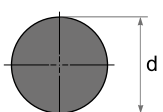
| Type | Dimensions (mm) | | | | | | | |
|--------------------|-----------------|----------------|----------------|------|----------|----------|----------|----------|
| ISO | d | t ₁ | t ₂ | a | SBN 1000 | SBN 2000 | SBN 3000 | SBN 4000 |
| RCGX 060D F | 6.35 | 5.00 | 8.35 | 3.00 | • | | | |
| RCGX 090D F | 9.52 | 6.00 | 20.00 | 4.00 | • | | | |
| RCGX 120D F | 12.70 | 6.00 | 20.00 | 5.88 | • | | | |

RNGN



| Type | | Dimensions (mm) | | | | | |
|----------------------|-------------------|-----------------|------|----------|----------|----------|----------|
| ISO | ASA | d | t | SBN 1000 | SBN 2000 | SBN 3000 | SBN 4000 |
| RNGN 090300 F | RNGN 320 F | 9.52 | 3.18 | • | | | |
| RNGN 120400 F | RNGN 430 F | 12.70 | 4.76 | • | | | |

RPGN



| Type | | Dimensions (mm) | | | | | |
|----------------------|-------------------|-----------------|------|----------|----------|----------|----------|
| ISO | ASA | d | t | SBN 1000 | SBN 2000 | SBN 3000 | SBN 4000 |
| RPGN 090300 F | RPGN 320 F | 9.52 | 3.18 | • | | | |
| RPGN 120300 F | RPGN 420 F | 12.70 | 3.18 | • | | | |
| RPGN 120400 F | RPGN 430 F | 12.70 | 4.76 | • | | | |

CERAMIC

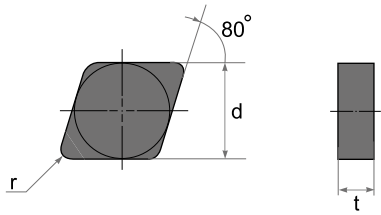
CERMET

PCBN
/
PCD

TOOL
HOLDER

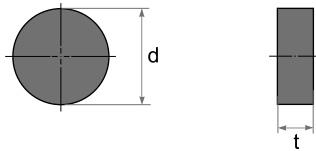
MILLING
CUTTER

CNGN



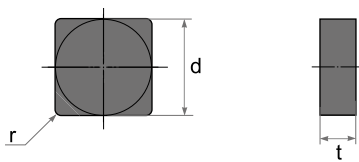
| Type | | Dimensions (mm) | | | SBN 5000 |
|--------------|-----------|-----------------|------|-----|----------|
| ISO | ASA | d | t | r | |
| CNGN 090308S | CNGN 322S | 9.52 | 3.18 | 0.8 | |
| CNGN 090312S | CNGN 323S | 9.52 | 3.18 | 1.2 | |
| CNGN 090316S | CNGN 324S | 9.52 | 3.18 | 1.6 | |
| CNGN 120408S | CNGN 432S | 12.70 | 4.76 | 0.8 | • |
| CNGN 120412S | CNGN 433S | 12.70 | 4.76 | 1.2 | • |
| CNGN 120416S | CNGN 434S | 12.70 | 4.76 | 1.6 | • |

RNGN



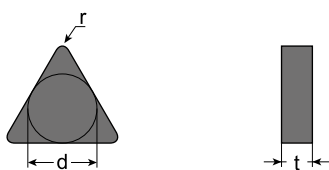
| Type | | Dimensions (mm) | | SBN 5000 |
|--------------|-----------|-----------------|------|----------|
| ISO | ASA | d | t | |
| RNGN 090300S | RNGN 320S | 9.52 | 3.18 | • |
| RNGN 120300S | RNGN 420S | 12.70 | 3.18 | • |
| RNGN 120400S | RNGN 430S | 12.70 | 4.76 | • |

SNGN



| Type | | Dimensions (mm) | | | SBN 5000 |
|--------------|-----------|-----------------|------|-----|----------|
| ISO | ASA | d | t | r | |
| SNGN 090308S | SNGN 322S | 9.52 | 3.18 | 0.8 | • |
| SNGN 090312S | SNGN 323S | 9.52 | 3.18 | 1.2 | • |
| SNGN 090316S | SNGN 324S | 9.52 | 3.18 | 1.6 | |
| SNGN 120308S | SNGN 422S | 12.70 | 3.18 | 0.8 | |
| SNGN 120312S | SNGN 423S | 12.70 | 3.18 | 1.2 | |
| SNGN 120316S | SNGN 424S | 12.70 | 3.18 | 1.6 | |
| SNGN 120408S | SNGN 432S | 12.70 | 4.76 | 0.8 | • |
| SNGN 120412S | SNGN 433S | 12.70 | 4.76 | 1.2 | • |
| SNGN 120416S | SNGN 434S | 12.70 | 4.76 | 1.6 | • |

TNGN



| Type | | Dimensions (mm) | | | SBN 5000 |
|--------------|-----------|-----------------|------|-----|----------|
| ISO | ASA | d | t | r | |
| TNGN 110308S | TNGN 222S | 6.35 | 3.18 | 0.8 | • |
| TNGN 110312S | TNGN 223S | 6.35 | 3.18 | 1.2 | • |
| TNGN 160408S | TNGN 332S | 9.52 | 4.76 | 0.8 | • |
| TNGN 160412S | TNGN 333S | 9.52 | 4.76 | 1.2 | • |
| TNGN 160416S | TNGN 334S | 9.52 | 4.76 | 1.6 | |

CERAMIC

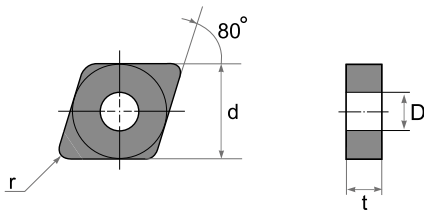
CERMET

PCBN
/
PCD

TOOL
HOLDER

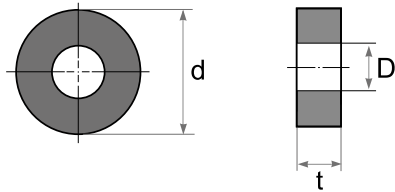
MILLING
CUTTER

CNGA



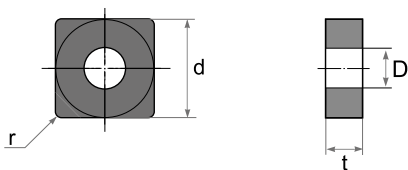
| Type | | Dimensions (mm) | | | | SBN 5000 |
|-------------|----------|-----------------|------|-----|------|----------|
| ISO | ASA | d | t | r | D | |
| CNGA 090308 | CNGA 322 | 9.52 | 3.18 | 0.8 | 3.81 | |
| CNGA 090312 | CNGA 323 | 9.52 | 3.18 | 1.2 | 3.81 | |
| CNGA 090316 | CNGA 324 | 9.52 | 3.18 | 1.6 | 3.81 | |
| CNGA 120408 | CNGA 432 | 12.7 | 4.76 | 0.8 | 5.16 | • |
| CNGA 120412 | CNGA 433 | 12.7 | 4.76 | 1.2 | 5.16 | • |
| CNGA 120416 | CNGA 434 | 12.7 | 4.76 | 1.6 | 5.16 | • |

RNGA



| Type | | Dimensions (mm) | | | | SBN 5000 |
|-------------|-------------|-----------------|------|---|------|----------|
| ISO | ASA | d | t | r | D | |
| RNGA 060300 | RNGA 060300 | 6.35 | 3.18 | - | 2.26 | |
| RNGA 060400 | RNGA 060400 | 6.35 | 4.76 | - | 2.26 | |
| RNGA 090300 | RNGA 090300 | 9.52 | 3.18 | - | 3.81 | |
| RNGA 120300 | RNGA 120300 | 12.7 | 3.18 | - | 5.16 | |
| RNGA 120400 | RNGA 120400 | 12.7 | 4.76 | - | 5.16 | • |

SNGA



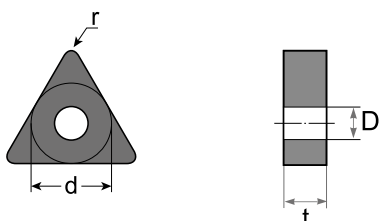
| Type | | Dimensions (mm) | | | | SBN 5000 |
|-------------|----------|-----------------|------|-----|------|----------|
| ISO | ASA | d | t | r | D | |
| SNGA 090308 | SNGA 322 | 9.52 | 3.18 | 0.8 | 3.81 | |
| SNGA 090312 | SNGA 323 | 9.52 | 3.18 | 1.2 | 3.81 | |
| SNGA 090316 | SNGA 324 | 9.52 | 3.18 | 1.6 | 3.81 | |
| SNGA 120308 | SNGA 422 | 9.52 | 3.18 | 0.8 | 5.16 | |
| SNGA 120312 | SNGA 423 | 9.52 | 3.18 | 1.2 | 5.16 | |
| SNGA 120316 | SNGA 424 | 9.52 | 3.18 | 1.6 | 5.16 | |
| SNGA 120408 | SNGA 432 | 12.7 | 4.76 | 0.8 | 5.16 | • |
| SNGA 120412 | SNGA 433 | 12.7 | 4.76 | 1.2 | 5.16 | • |
| SNGA 120416 | SNGA 434 | 12.7 | 4.76 | 1.6 | 5.16 | • |

CERAMIC

CERMET

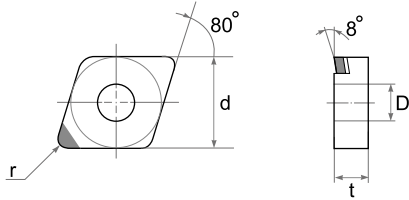
PCBN
/
PCDTOOL
HOLDERMILLING
CUTTER

TNGA



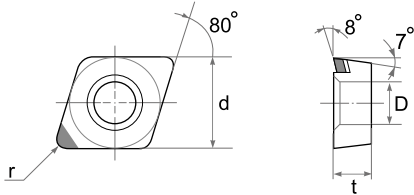
| Type | | Dimensions (mm) | | | | SBN 5000 |
|-------------|----------|-----------------|------|-----|------|----------|
| ISO | ASA | d | t | r | D | |
| TNGA 110308 | TNGA 222 | 6.35 | 3.18 | 0.8 | 2.26 | |
| TNGA 110312 | TNGA 223 | 6.35 | 3.18 | 1.2 | 2.26 | |
| TNGA 110316 | TNGA 224 | 6.35 | 3.18 | 1.6 | 2.26 | |
| TNGA 160408 | TNGA 332 | 9.52 | 4.76 | 0.8 | 3.81 | • |
| TNGA 160412 | TNGA 333 | 9.52 | 4.76 | 1.2 | 3.81 | • |
| TNGA 160416 | TNGA 334 | 9.52 | 4.76 | 1.6 | 3.81 | • |

CNGA



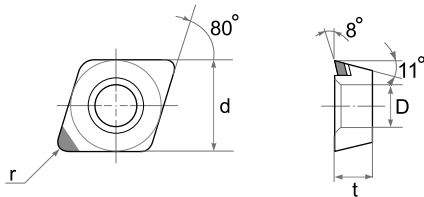
| Type | | Dimensions (mm) | | | | | | |
|-----------------------|--------------------|-----------------|------|-----|------|----------|----------|----------|
| ISO | ASA | d | t | r | D | SPD 1000 | SPD 2000 | SPD 3000 |
| CNGA 120404 R1 | CNGA 431 R1 | 12.70 | 4.76 | 0.4 | 5.16 | | • | |
| CNGA 120408 R1 | CNGA 432 R1 | 12.70 | 4.76 | 0.8 | 5.16 | • | • | |
| CNGA 120412 R1 | CNGA 433 R1 | 12.70 | 4.76 | 1.2 | 5.16 | | | |

CCGW



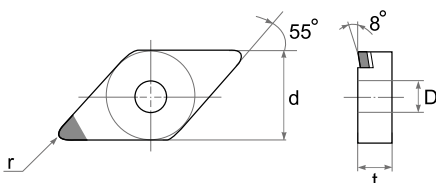
| Type | | Dimensions (mm) | | | | | | |
|-----------------------|--|-----------------|------|-----|------|----------|----------|----------|
| ISO | | d | t | r | D | SPD 1000 | SPD 2000 | SPD 3000 |
| CCGW 060202 R1 | | 6.35 | 2.38 | 0.2 | 2.80 | | | |
| CCGW 060204 R1 | | 6.35 | 2.38 | 0.4 | 2.80 | | • | |
| CCGW 060208 R1 | | 6.35 | 2.38 | 0.8 | 2.80 | | • | |
| CCGW 09T302 R1 | | 9.52 | 3.97 | 0.2 | 4.40 | | | |
| CCGW 09T304 R1 | | 9.52 | 3.97 | 0.4 | 4.40 | • | • | |
| CCGW 09T308 R1 | | 9.52 | 3.97 | 0.8 | 4.40 | | • | |
| CCGW 120404 R1 | | 12.70 | 4.76 | 0.4 | 5.50 | | • | |
| CCGW 120408 R1 | | 12.70 | 4.76 | 0.8 | 5.50 | | • | |
| CCGW 120412 R1 | | 12.70 | 4.76 | 1.2 | 5.50 | | | |

CPGW



| Type | | Dimensions (mm) | | | | | | |
|-----------------------|--|-----------------|------|-----|------|----------|----------|----------|
| ISO | | d | t | r | D | SPD 1000 | SPD 2000 | SPD 3000 |
| CPGW 080204 R1 | | 7.94 | 2.38 | 0.4 | 3.40 | | | |
| CPGW 080208 R1 | | 7.94 | 2.38 | 0.8 | 3.40 | | | |
| CPGW 080212 R1 | | 7.94 | 2.38 | 1.2 | 3.40 | | | |
| CPGW 090304 R1 | | 9.525 | 3.18 | 0.4 | 4.40 | | | |
| CPGW 090308 R1 | | 9.525 | 3.18 | 0.8 | 4.40 | | | |
| CPGW 090312 R1 | | 9.525 | 3.18 | 1.2 | 4.40 | | | |

DNGA



| Type | | Dimensions (mm) | | | | | | |
|-----------------------|--------------------|-----------------|------|-----|------|----------|----------|----------|
| ISO | ASA | d | t | r | D | SPD 1000 | SPD 2000 | SPD 3000 |
| DNGA 150404 R1 | DNGA 431 R1 | 12.70 | 4.76 | 0.4 | 5.16 | • | • | |
| DNGA 150408 R1 | DNGA 432 R1 | 12.70 | 4.76 | 0.8 | 5.16 | • | • | |
| DNGA 150412 R1 | DNGA 433 R1 | 12.70 | 4.76 | 1.2 | 5.16 | | • | |
| DNGA 150604 R1 | DNGA 441 R1 | 12.70 | 6.35 | 0.4 | 5.16 | • | • | |
| DNGA 150608 R1 | DNGA 442 R1 | 12.70 | 6.35 | 0.8 | 5.16 | • | • | |
| DNGA 150612 R1 | DNGA 443 R1 | 12.70 | 6.35 | 1.2 | 5.16 | | • | |

CERAMIC

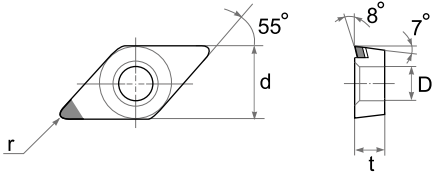
CERMET

PCBN
/
PCD

TOOL
HOLDER

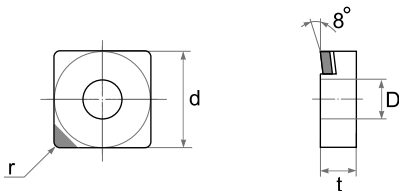
MILLING
CUTTER

DCGW



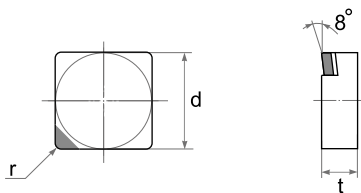
| Type | Dimensions (mm) | | | | | | |
|-----------------------|-----------------|------|-----|------|----------|----------|----------|
| ISO | d | t | r | D | SPD 1000 | SPD 2000 | SPD 3000 |
| DCGW 070202 R1 | 6.35 | 2.38 | 0.2 | 2.80 | | | |
| DCGW 070204 R1 | 6.35 | 2.38 | 0.4 | 2.80 | • | • | |
| DCGW 070208 R1 | 6.35 | 2.38 | 0.8 | 2.80 | | • | |
| DCGW 11T302 R1 | 9.52 | 3.97 | 0.2 | 4.40 | | | |
| DCGW 11T304 R1 | 9.52 | 3.97 | 0.4 | 4.40 | • | • | |
| DCGW 11T308 R1 | 9.52 | 3.97 | 0.8 | 4.40 | | • | |

SNGA



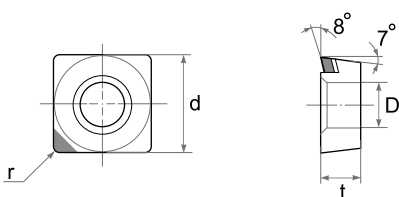
| Type | | Dimensions (mm) | | | | | | |
|-----------------------|--------------------|-----------------|------|-----|------|----------|----------|----------|
| ISO | ASA | d | t | r | D | SPD 1000 | SPD 2000 | SPD 3000 |
| SNGA 120404 R1 | SNGA 431 R1 | 12.70 | 4.76 | 0.4 | 5.16 | • | • | |
| SNGA 120408 R1 | SNGA 432 R1 | 12.70 | 4.76 | 0.8 | 5.16 | | • | |
| SNGA 120412 R1 | SNGA 433 R1 | 12.70 | 4.76 | 1.2 | 5.16 | | | |

SNGN



| Type | | Dimensions (mm) | | | | | | |
|-----------------------|--------------------|-----------------|------|-----|------|----------|----------|----------|
| ISO | ASA | d | t | r | D | SPD 1000 | SPD 2000 | SPD 3000 |
| SNGN 120404 R1 | SNGN 431 R1 | 12.70 | 4.76 | 0.4 | 5.16 | • | • | |
| SNGN 120408 R1 | SNGN 432 R1 | 12.70 | 4.76 | 0.8 | 5.16 | | • | |
| SNGN 120412 R1 | SNGN 433 R1 | 12.70 | 4.76 | 1.2 | 5.16 | | | |

SCGW



| Type | Dimensions (mm) | | | | | | |
|-----------------------|-----------------|------|-----|------|----------|----------|----------|
| ISO | d | t | r | D | SPD 1000 | SPD 2000 | SPD 3000 |
| SCGW 09T304 R1 | 9.52 | 3.97 | 0.4 | 4.40 | • | • | |
| SCGW 09T308 R1 | 9.52 | 3.97 | 0.8 | 4.40 | | • | |
| SCGW 09T312 R1 | 9.52 | 3.97 | 1.2 | 4.40 | | | |
| SCGW 120402 R1 | 12.70 | 4.76 | 0.2 | 5.50 | | | |
| SCGW 120404 R1 | 12.70 | 4.76 | 0.4 | 5.50 | • | • | |
| SCGW 120408 R1 | 12.70 | 4.76 | 0.8 | 5.50 | | • | |

CERAMIC

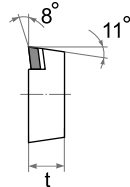
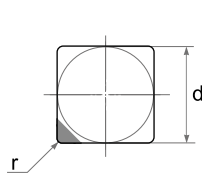
CERMET

PCBN
/
PCD

TOOL
HOLDER

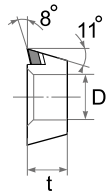
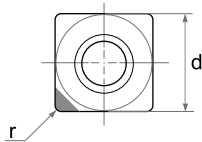
MILLING
CUTTER

SPGN



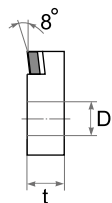
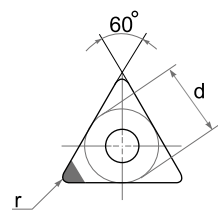
| Type | | Dimensions (mm) | | | | | |
|----------------|-------------|-----------------|------|-----|----------|----------|----------|
| ISO | ASA | d | t | r | SPD 1000 | SPD 2000 | SPD 3000 |
| SPGN 090304 R1 | SPGN 321 R1 | 9.52 | 3.18 | 0.4 | | | |
| SPGN 090308 R1 | SPGN 322 R1 | 9.52 | 3.18 | 0.8 | | • | |
| SPGN 120304 R1 | SPGN 421 R1 | 12.70 | 3.18 | 0.4 | | | |
| SPGN 120308 R1 | SPGN 422 R1 | 12.70 | 3.18 | 0.8 | | • | |

SPGW



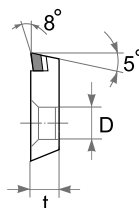
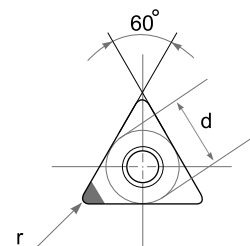
| Type | | Dimensions (mm) | | | | | |
|----------------|--------------|-----------------|------|-----|----------|----------|----------|
| ISO | ASA | d | t | r | SPD 1000 | SPD 2000 | SPD 3000 |
| SPGW 090302 R1 | SPGW 3202 R1 | 9.52 | 3.18 | 0.2 | | | |
| SPGW 090304 R1 | SPGW 321 R1 | 9.52 | 3.18 | 0.4 | | | |
| SPGW 090308 R1 | SPGW 322 R1 | 9.52 | 3.18 | 0.8 | | | |

TNGA



| Type | | Dimensions (mm) | | | | | | |
|----------------|--------------|-----------------|------|-----|------|----------|----------|----------|
| ISO | ASA | d | t | r | D | SPD 1000 | SPD 2000 | SPD 3000 |
| TNGA 160402 R1 | TNGA 3302 R1 | 9.52 | 4.76 | 0.2 | 3.81 | | • | |
| TNGA 160404 R1 | TNGA 331 R1 | 9.52 | 4.76 | 0.4 | 3.81 | • | • | |
| TNGA 160408 R1 | TNGA 332 R1 | 9.52 | 4.76 | 0.8 | 3.81 | | • | |
| TNGA 160412 R1 | TNGA 333 R1 | 9.52 | 4.76 | 1.2 | 3.81 | | | |

TBGW



| Type | Dimensions (mm) | | | | | | |
|----------------|-----------------|------|-----|------|----------|----------|----------|
| ISO | d | t | r | D | SPD 1000 | SPD 2000 | SPD 3000 |
| TBGW 060102 R1 | 3.97 | 1.59 | 0.2 | 2.80 | | | |
| TBGW 060104 R1 | 3.97 | 1.59 | 0.4 | 2.80 | | | |

CERAMIC

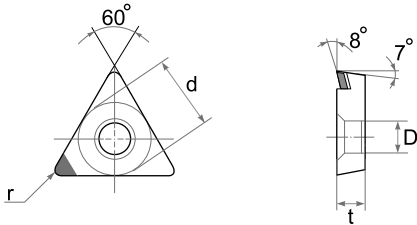
CERMET

PCBN
/
PCD

TOOL
HOLDER

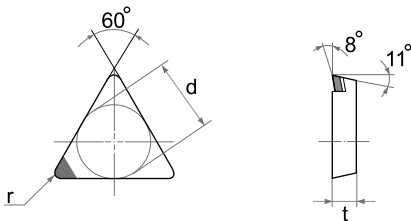
MILLING
CUTTER

TCGW



| Type | Dimensions (mm) | | | | | | |
|-----------------------|-----------------|------|-----|-----|----------|----------|----------|
| ISO | d | t | r | D | SPD 1000 | SPD 2000 | SPD 3000 |
| TCGW 090202 R1 | 5.56 | 2.38 | 0.2 | 2.5 | | | |
| TCGW 090204 R1 | 5.56 | 2.38 | 0.4 | 2.5 | • | • | |
| TCGW 090208 R1 | 5.56 | 2.38 | 0.8 | 2.5 | | • | |
| TCGW 110202 R1 | 6.35 | 2.38 | 0.2 | 2.8 | | | |
| TCGW 110204 R1 | 6.35 | 2.38 | 0.4 | 2.8 | • | • | |
| TCGW 110208 R1 | 6.35 | 2.38 | 0.8 | 2.8 | | • | |
| TCGW 16T302 R1 | 9.52 | 3.97 | 0.2 | 4.4 | | | |
| TCGW 16T304 R1 | 9.52 | 3.97 | 0.4 | 4.4 | • | • | |
| TCGW 16T308 R1 | 9.52 | 3.97 | 0.8 | 4.4 | | • | |

TPGN



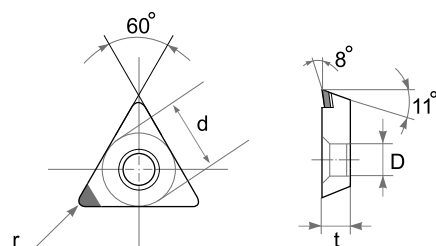
| Type | | Dimensions (mm) | | | | | |
|-----------------------|---------------------|-----------------|------|-----|----------|----------|----------|
| ISO | ASA | d | t | r | SPD 1000 | SPD 2000 | SPD 3000 |
| TPGN 090204 R1 | TPGN 721 R1 | 5.56 | 2.38 | 0.4 | | | |
| TPGN 090208 R1 | TPGN 732 R1 | 5.56 | 2.38 | 0.8 | | | |
| TPGN 110302 R1 | TPGN 2202 R1 | 6.35 | 3.18 | 0.2 | • | • | • |
| TPGN 110304 R1 | TPGN 221 R1 | 6.35 | 3.18 | 0.4 | • | • | • |
| TPGN 110308 R1 | TPGN 222 R1 | 6.35 | 3.18 | 0.8 | • | • | • |
| TPGN 160302 R1 | TPGN 3202 R1 | 9.52 | 3.18 | 0.2 | • | • | • |
| TPGN 160304 R1 | TPGN 321 R1 | 9.52 | 3.18 | 0.4 | • | • | • |
| TPGN 160308 R1 | TPGN 322 R1 | 9.52 | 3.18 | 0.8 | • | • | • |

CERAMIC

CERMET

PCBN
/
PCD

TPGB

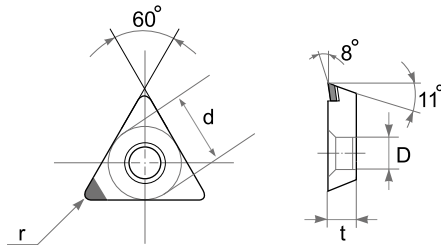


| Type | Dimensions (mm) | | | | | | |
|-----------------------|-----------------|------|-----|------|----------|----------|----------|
| ISO | d | t | r | D | SPD 1000 | SPD 2000 | SPD 3000 |
| TPGB 080204 R1 | 4.76 | 2.38 | 0.4 | 2.40 | | | |
| TPGB 080208 R1 | 4.76 | 2.38 | 0.8 | 2.40 | | | |
| TPGB 090204 R1 | 5.56 | 2.38 | 0.4 | 2.50 | | | |
| TPGB 090208 R1 | 5.56 | 2.38 | 0.8 | 2.50 | | | |
| TPGB 110304 R1 | 6.35 | 3.18 | 0.4 | 3.30 | | • | |
| TPGB 110308 R1 | 6.35 | 3.18 | 0.8 | 3.30 | | • | |

TOOL
HOLDER

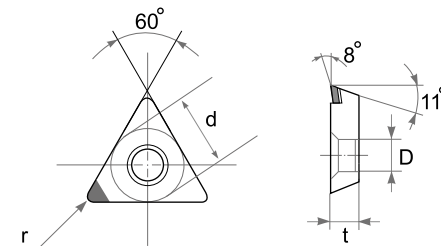
MILLING
CUTTER

TPGW



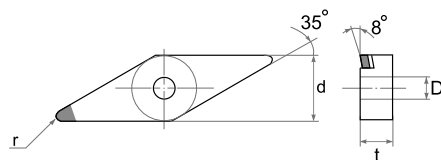
| Type | Dimensions (mm) | | | | | | |
|-----------------------|-----------------|------|-----|------|----------|----------|----------|
| ISO | d | t | r | D | SPD 1000 | SPD 2000 | SPD 3000 |
| TPGW 080202 R1 | 4.76 | 2.38 | 0.2 | 2.40 | | • | |
| TPGW 080204 R1 | 4.76 | 2.38 | 0.4 | 2.40 | | • | |
| TPGW 110302 R1 | 6.35 | 3.18 | 0.2 | 3.30 | | | |
| TPGW 110304 R1 | 6.35 | 3.18 | 0.4 | 3.30 | | • | |
| TPGW 110308 R1 | 6.35 | 3.18 | 0.8 | 3.30 | | | |
| TPGW 160404 R1 | 9.52 | 4.76 | 0.4 | 3.81 | | | |
| TPGW 160408 R1 | 9.52 | 4.76 | 0.8 | 3.81 | | | |

TPGT



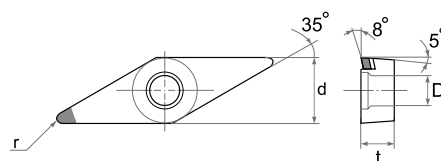
| Type | Dimensions (mm) | | | | | | |
|-----------------------|-----------------|------|-----|------|----------|----------|----------|
| ISO | d | t | r | D | SPD 1000 | SPD 2000 | SPD 3000 |
| TPGT 110302 R1 | 6.35 | 3.18 | 0.2 | 3.40 | | | |
| TPGT 110304 R1 | 6.35 | 3.18 | 0.4 | 3.40 | | | |

VNGA



| Type | | Dimensions (mm) | | | | | | |
|-----------------------|--------------------|-----------------|------|-----|------|----------|----------|----------|
| ISO | ASA | d | t | r | D | SPD 1000 | SPD 2000 | SPD 3000 |
| VNGA 160404 R1 | VNGA 331 R1 | 9.52 | 4.76 | 0.4 | 3.18 | • | • | |
| VNGA 160408 R1 | VNGA 332 R1 | 9.52 | 4.76 | 0.8 | 3.18 | | • | |

VBGW



| Type | | Dimensions (mm) | | | | | | |
|-----------------------|---------------------|-----------------|------|-----|------|----------|----------|----------|
| ISO | ASA | d | t | r | D | SPD 1000 | SPD 2000 | SPD 3000 |
| VBGW 110302 R1 | VBGW 2202 R1 | 6.35 | 3.18 | 0.2 | 3.40 | | | |
| VBGW 110304 R1 | VBGW 221 R1 | 6.35 | 3.18 | 0.4 | 3.40 | | | |
| VBGW 110308 R1 | VBGW 222 R1 | 6.35 | 3.18 | 0.8 | 3.40 | | | |
| VBGW 160402 R1 | VBGW 3302 R1 | 9.52 | 4.76 | 0.2 | 4.40 | | | |
| VBGW 160404 R1 | VBGW 331 R1 | 9.52 | 4.76 | 0.4 | 4.40 | • | • | |
| VBGW 160408 R1 | VBGW 332 R1 | 9.52 | 4.76 | 0.8 | 4.40 | | • | |
| VBGW 160412 R1 | VBGW 333 R1 | 9.52 | 4.76 | 1.2 | 4.40 | | | |

CERAMIC

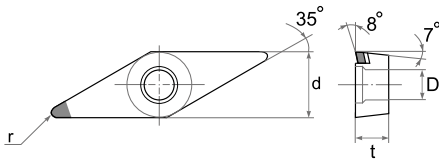
CERMET

PCBN
/
PCD

TOOL
HOLDER

MILLING
CUTTER

VCGW



| Type | | Dimensions (mm) | | | | | | |
|----------------|--------------|-----------------|------|-----|------|-------------|-------------|-------------|
| ISO | ASA | d | t | r | D | SPD 1000 | SPD 2000 | SPD 3000 |
| VCGW 110302 R1 | VCGW 2202 R1 | 6.35 | 3.18 | 0.2 | 2.80 | • | | |
| VCGW 110304 R1 | VCGW 221 R1 | 6.35 | 3.18 | 0.4 | 3.40 | • | | |
| VCGW 110308 R1 | VCGW 222 R1 | 6.35 | 3.18 | 0.8 | 3.40 | | | |
| VCGW 160404 R1 | VCGW 331 R1 | 9.52 | 4.76 | 0.4 | 4.40 | | | |
| VCGW 160408 R1 | VCGW 332 R1 | 9.52 | 4.76 | 0.8 | 4.40 | | | |
| VCGW 160412 R1 | VCGW 333 R1 | 9.52 | 4.76 | 1.2 | 4.40 | | | |

CERAMIC

CERMET

PCBN
/
PCDTOOL
HOLDERMILLING
CUTTER

NOTCH BITE

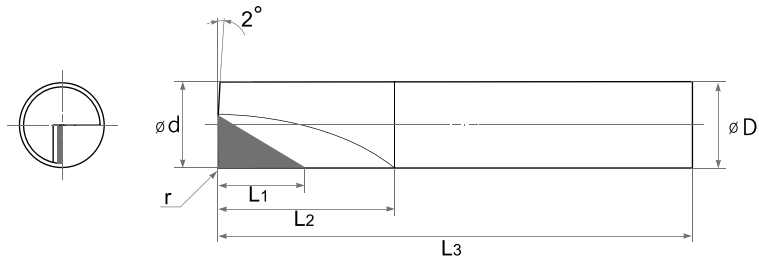
| Type | Dimensions (mm) | | | | | SBN1000 | SPD3000 |
|-------------------|-----------------|------|------|------|------|---------|---------|
| | A | B | C | D | L | | |
| BITE SD-10 | 0.80 | 3.0 | 2.50 | 4.0 | 8.6 | | |
| BITE SD-13 | 0.80 | 3.5 | 3.50 | 4.5 | 11.5 | | |
| BITE SD-16 | 1.00 | 5.0 | 4.00 | 6.0 | 14.4 | | |
| BITE SD-19 | 1.00 | 6.0 | 4.50 | 8.0 | 16.5 | | |
| BITE SD-22 | 1.20 | 10.0 | 6.00 | 10.0 | 21.0 | | |
| BITE SD-25 | 1.60 | 10.0 | 6.00 | 10.0 | 24.0 | | |
| BITE SD-29 | 1.70 | 11.3 | 6.00 | 10.0 | 28.5 | | |
| BITE SD-32 | 1.70 | 11.3 | 6.00 | 10.0 | 30.0 | | |
| BITE SD-35 | 2.02 | 12.5 | 6.00 | 10.0 | 33.0 | | |
| BITE SD-38 | 2.39 | 15.0 | 6.50 | 10.0 | 36.0 | | |
| BITE SD-51 | 4.28 | 20.0 | 8.00 | 10.0 | 49.0 | | |
| BITE SD-57 | 2.92 | 22.0 | 8.00 | 10.0 | 56.0 | | |

CERAMIC

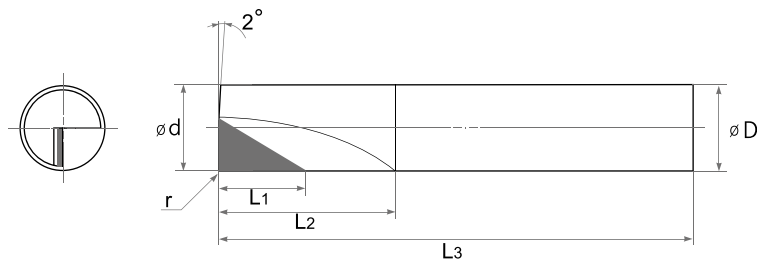
CERMET

PCBN
/
PCDTOOL
HOLDERMILLING
CUTTER

SFE .. 1C



SFE .. 2C



| Type | Dimensions (mm) | | | | | | PCBN | | | | PCD | | |
|--------------|-----------------|------|------|----------------|----------------|----------------|------|----------|----------|----------|----------|----------|----------|
| | ISO | d | D | L ₁ | L ₂ | L ₃ | r | SBN 1000 | SBN 2000 | SBN 3000 | SBN 4000 | SPD 1000 | SPD 2000 |
| SFE 650-2C | 6.0 | 6.0 | 4.0 | 12.0 | 50.0 | 0.20 | | | | | | • | |
| SFE 680-2C | 6.0 | 6.0 | 6.0 | 16.0 | 80.0 | 0.20 | | | | | | • | |
| SFE 860-2C | 8.0 | 8.0 | 7.0 | 16.0 | 60.0 | 0.20 | | | | | | • | |
| SFE 8120-2C | 8.0 | 8.0 | 9.0 | 20.0 | 120.0 | 0.40 | | | | | | • | |
| SFE 1070-2C | 10.0 | 10.0 | 9.0 | 20.0 | 70.0 | 0.40 | | | | | | • | |
| SFE 10120-2C | 10.0 | 10.0 | 12.0 | 25.0 | 120.0 | 0.80 | | | | | | • | |
| SFE 1270-2C | 12.0 | 12.0 | 12.0 | 25.0 | 70.0 | 0.80 | | | | | | • | |
| SFE 12120-2C | 12.0 | 12.0 | 16.0 | 30.0 | 120.0 | 1.00 | | | | | | • | |
| SFE 16100-2C | 16.0 | 16.0 | 16.0 | 25.0 | 100.0 | 0.80 | | | | | | • | |
| SFE 16150-2C | 16.0 | 16.0 | 20.0 | 30.0 | 150.0 | 1.00 | | | | | | • | |
| SFE 18100-2C | 18.0 | 18.0 | 20.0 | 30.0 | 100.0 | 0.80 | | | | | | • | |
| SFE 18200-2C | 18.0 | 18.0 | 24.0 | 35.0 | 200.0 | 1.20 | | | | | | • | |
| SFE 20100-2C | 20.0 | 20.0 | 24.0 | 35.0 | 100.0 | 0.80 | | | | | | • | |
| SFE 20200-2C | 20.0 | 20.0 | 28.0 | 40.0 | 200.0 | 1.20 | | | | | | • | |

CERAMIC

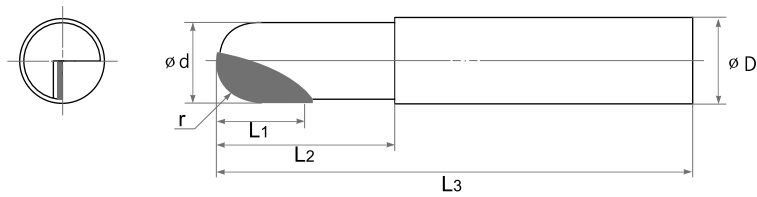
CERMET

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/
PCD

TOOL
HOLDER

MILLING
CUTTER

SBE .. 1C



| Type | Dimensions (mm) | | | | | | PCBN | | | | PCD | | |
|--------------|-----------------|------|----------------|----------------|----------------|-----|----------|----------|----------|----------|----------|----------|----------|
| ISO | d | D | L ₁ | L ₂ | L ₃ | r | SBN 1000 | SBN 2000 | SBN 3000 | SBN 4000 | SPD 1000 | SPD 2000 | SPD 3000 |
| SBE 250-1C | 2.0 | 4.0 | 4.0 | 12.0 | 50.0 | 1.0 | | | | | | | |
| SBE 280-1C | 2.0 | 4.0 | 4.0 | 16.0 | 80.0 | 1.0 | | | | | | | |
| SBE 350-1C | 3.0 | 4.0 | 4.0 | 16.0 | 50.0 | 1.5 | | | | | | • | |
| SBE 380-1C | 3.0 | 4.0 | 6.0 | 30.0 | 80.0 | 1.5 | | | | | | | |
| SBE 450-1C | 4.0 | 4.0 | 4.0 | 16.0 | 50.0 | 2.0 | | | | | | • | |
| SBE 480-1C | 4.0 | 4.0 | 6.0 | 40.0 | 80.0 | 2.0 | | | | | | | |
| SBE 650-1C | 6.0 | 6.0 | 6.0 | 20.0 | 50.0 | 3.0 | | | | | | • | |
| SBE 6100-1C | 6.0 | 6.0 | 8.0 | 50.0 | 100.0 | 3.0 | | | | | | | |
| SBE 860-1C | 8.0 | 8.0 | 8.0 | 30.0 | 60.0 | 4.0 | | | | | | • | |
| SBE 8120-1C | 8.0 | 8.0 | 10.0 | 60.0 | 120.0 | 4.0 | | | | | | | |
| SBE 1080-1C | 10.0 | 10.0 | 10.0 | 30.0 | 80.0 | 5.0 | | | | | | • | |
| SBE 10160-1C | 10.0 | 10.0 | 12.0 | 60.0 | 160.0 | 5.0 | | | | | | | |
| SBE 12100-1C | 12.0 | 12.0 | 12.0 | 40.0 | 100.0 | 6.0 | | | | | | | |
| SBE 12200-1C | 12.0 | 12.0 | 16.0 | 80.0 | 200.0 | 6.0 | | | | | | | |
| SBE 16160-1C | 16.0 | 16.0 | 16.0 | 60.0 | 160.0 | 8.0 | | | | | | | |
| SBE 16250-1C | 16.0 | 16.0 | 20.0 | 100.0 | 250.0 | 8.0 | | | | | | | |

CERAMIC

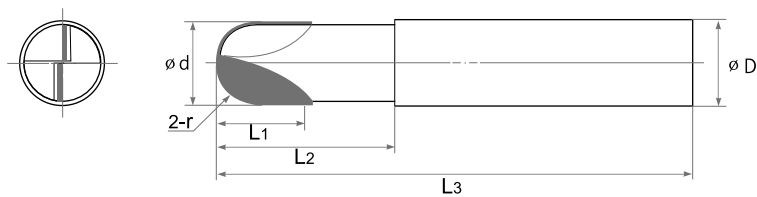
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PCD

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HOLDER

MILLING
CUTTER

SBE .. 2C



| Type | Dimensions (mm) | | | | | | PCBN | | | | PCD | | |
|--------------|-----------------|------|----------------|----------------|----------------|-----|----------|----------|----------|----------|----------|----------|----------|
| ISO | d | D | L ₁ | L ₂ | L ₃ | r | SBN 1000 | SBN 2000 | SBN 3000 | SBN 4000 | SPD 1000 | SPD 2000 | SPD 3000 |
| SBE 650-2C | 6.0 | 6.0 | 6.0 | 20.0 | 50.0 | 3.0 | | | | | | | |
| SBE 6100-2C | 6.0 | 6.0 | 8.0 | 50.0 | 100.0 | 3.0 | | | | | | | |
| SBE 860-2C | 8.0 | 8.0 | 8.0 | 30.0 | 60.0 | 4.0 | | | | | | • | |
| SBE 8120-2C | 8.0 | 8.0 | 10.0 | 60.0 | 120.0 | 4.0 | | | | | | | |
| SBE 1080-2C | 10.0 | 10.0 | 10.0 | 30.0 | 80.0 | 5.0 | | | | | | • | |
| SBE 10160-2C | 10.0 | 10.0 | 12.0 | 60.0 | 160.0 | 5.0 | | | | | | | |
| SBE 12100-2C | 12.0 | 12.0 | 12.0 | 40.0 | 100.0 | 6.0 | | | | | | | |
| SBE 12200-2C | 12.0 | 12.0 | 16.0 | 80.0 | 200.0 | 6.0 | | | | | | | |

SPECIAL

HSK - TOOL

PART.
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MILLING
CUTTER

SPECIAL

PCD ENDMILL



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PCD

TOOL
HOLDER

MILLING
CUTTER



SPECIAL

PCD DRILL / GUN REAMER

PART.
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&
MILLING



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PCBN
/
PCD

TOOL
HOLDER

MILLING
CUTTER



| | |
|-----------------------|-------|
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APPLICATION INDEX



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HRC D



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CVJN



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CVVN



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CSBF



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CSBR



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CSGF



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CSGR



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CSSF



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CSSR



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CSSR .. N



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CWF/R



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CLKN



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CFLN



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CSVN



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CGVN



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CINN



Page 177

IDENTIFICATION SYSTEM

C
1

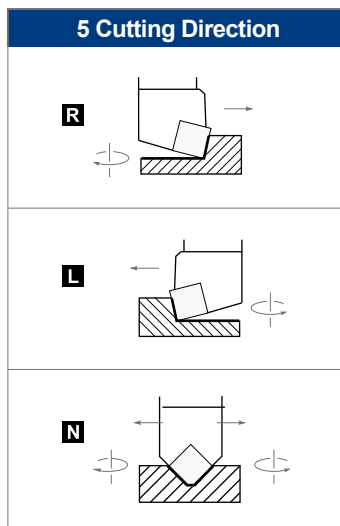
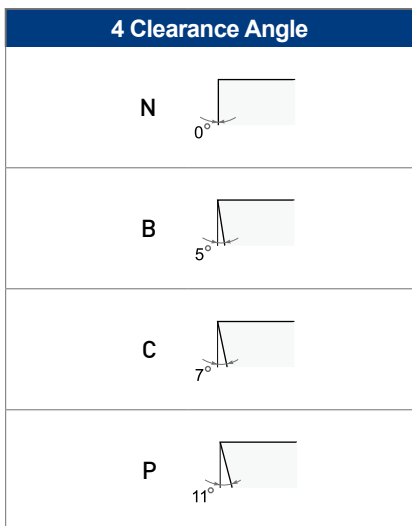
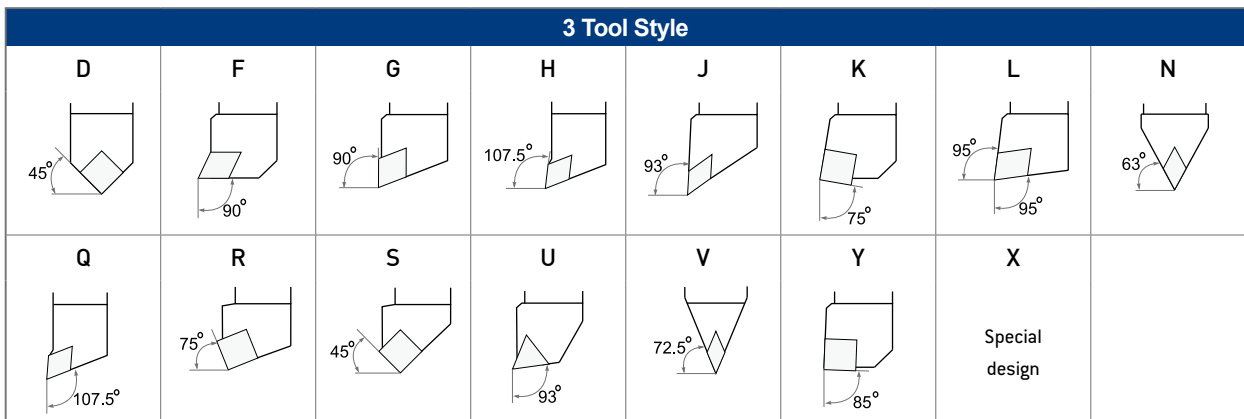
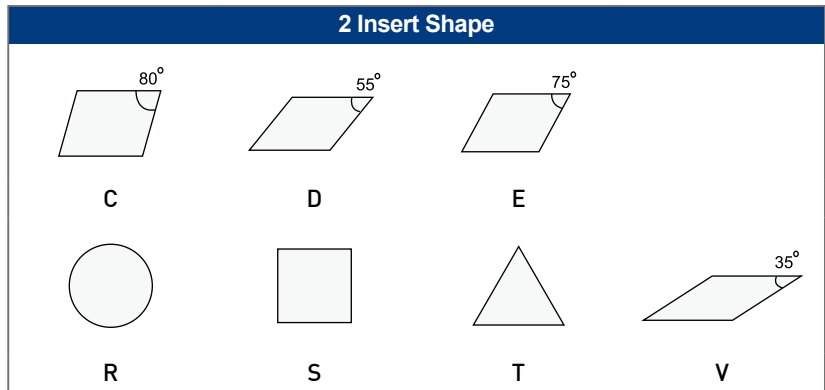
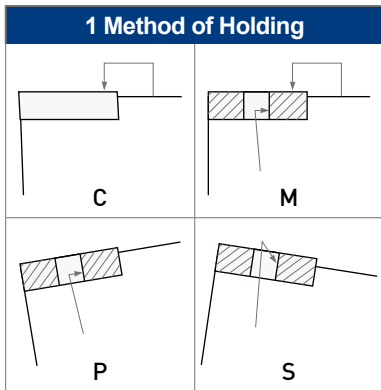
C
2

L
3

N
4

R
5

25
6



6 Tool Height (h=h₁)

| | h (mm) |
|----|--------|
| 12 | 12 |
| 16 | 16 |
| 20 | 20 |
| 25 | 25 |
| 32 | 32 |
| 40 | 40 |
| 50 | 50 |

25
7

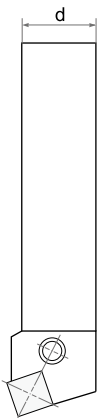
M
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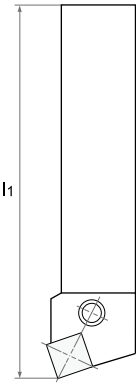
12
9





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
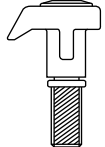
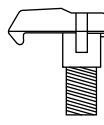
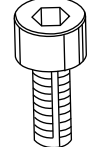
A
10


7
11

| 7 Tool Width (d) | |
|--|--------|
|  | d (mm) |
| | 12 |
| | 16 |
| | 20 |
| | 25 |
| | 32 |
| | 40 |
| | 50 |

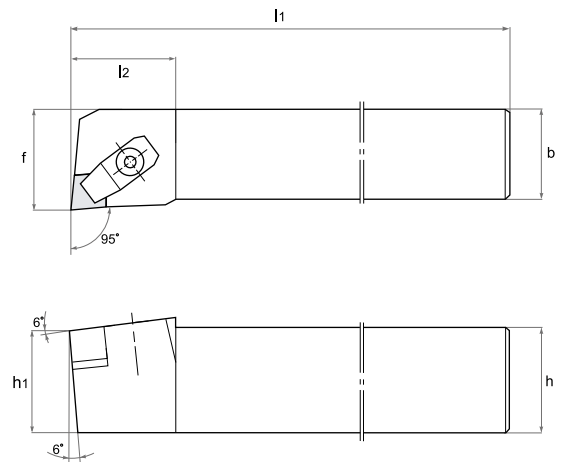
| 8 Tool Length (l ₁) | |
|--|---------------------|
|  | l ₁ (mm) |
| | D 60 |
| | E 70 |
| | F 80 |
| | H 100 |
| | K 125 |
| | M 150 |
| | N 160 |
| | P 170 |
| | R 200 |
| | S 250 |
| | T 300 |
| | U 350 |

| 9 Insert Size | | | | | | |
|------------------|---|---|---|---|---------|---------|
| Inscribed Circle |  |  |  |  | | |
| d (mm) | R, S | T (60°) | C (80°) | E (75°) | D (55°) | V (35°) |
| 5.56 | | 09 | | | | |
| 6.35 | 06 | 11 | | | | |
| 7.94 | 07 | 13 | | | | |
| 9.52 | 09 | 16 | 09 | | 11 | 16 |
| 12.70 | 12 | 22 | 12 | 13 | 15 | 22 |
| 15.87 | 15 | 27 | 16 | | 19 | |
| 19.05 | 19 | 33 | 19 | | 23 | |
| 25.40 | 25 | 44 | 25 | | 31 | |

| 10 Clamping System | | |
|---|---|---|
| A type | X type | B type |
|  |  |  |
| + | + | + |
|  |  |  |

| 11 Insert Thickness | |
|---|--------|
|  | s |
| Index | S (mm) |
| 3 | 3.18 |
| 4 | 4.76 |
| 6 | 6.35 |
| 7 | 7.94 |
| 9 | 9.52 |

CCLN



| Type | Dimensions [mm] | | | | | Stock | | Insert | Spare Parts | | | |
|---------------------------|--------------------|----|----------------|----------------|----|-------|---|-------------|---------------------|--------|------------|--------|
| | h(h ₁) | b | l ₁ | l ₂ | f | R | L | | Clamp & Clamp Screw | Shim | Shim Screw | Wrench |
| CCLNR/L 2525M12-A4 | 25 | 25 | 150 | 35 | 32 | • | • | CNGN1204 | UH1 | SHCN4A | BM510 | LW4 |
| CCLNR/L 2525M12-A7 | 25 | 25 | 150 | 35 | 32 | • | • | CNGN1207 | UH1 | SHCN4A | BM510 | LW4 |
| CCLNR/L 2525M12-X7 | 25 | 25 | 150 | 35 | 32 | • | • | CNG(V)X1207 | UH5 | SHCN4A | BM510 | LW4 |
| CCLNR/L 3225P12-A4 | 32 | 25 | 170 | 35 | 32 | • | • | CNGN1204 | UH1 | SHCN4A | BM510 | LW4 |
| CCLNR/L 3225P12-A7 | 32 | 25 | 170 | 35 | 32 | • | • | CNGN1207 | UH1 | SHCN4A | BM510 | LW4 |
| CCLNR/L 3225P12-X7 | 32 | 25 | 170 | 35 | 32 | • | • | CNG(V)X1207 | UH5 | SHCN4A | BM510 | LW4 |
| CCLNR/L 3225P16-X7 | 32 | 25 | 170 | 35 | 32 | • | | CNG(V)X1607 | UH5 | SHCN5A | FM510 | LW4 |
| CCLNR/L 3225P16-A7 | 32 | 25 | 170 | 35 | 32 | | | CNGN1607 | UH1 | SHCN5A | FM510 | LW4 |
| CCLNR/L 4040S19-A7 | 40 | 40 | 250 | 60 | 50 | | | CNGN1907 | UH4 | SHCN6A | FM615 | LW6 |
| CCLNR/L 5050T25-A9 | 50 | 50 | 300 | 65 | 60 | | | CNGN2509 | UH25 | SHCN8 | FM815 | LW6 |

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| Spare parts | | | | | | | | | | | | | |
|---------------------|-----|-----|------|--------|--------|--------|-------|------------|-------|-------|-------|--------|-----|
| Clamp & Clamp Screw | | | | Shim | | | | Shim Screw | | | | Wrench | |
| | | | | | | | | | | | | | |
| UH1 | UH4 | UH5 | UH25 | SHCN4A | SHCN5A | SHCN6A | SHCN8 | BM510 | FM510 | FM615 | FM815 | LW4 | LW6 |

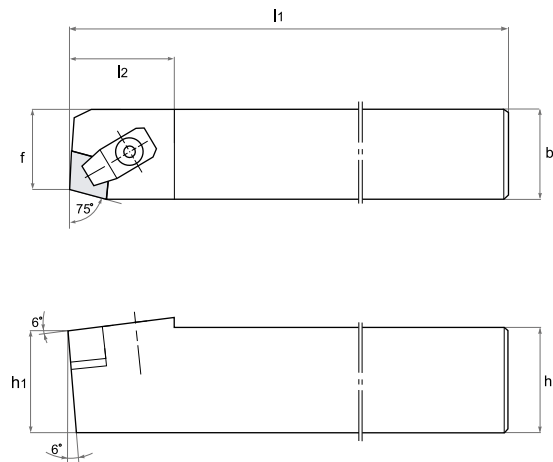
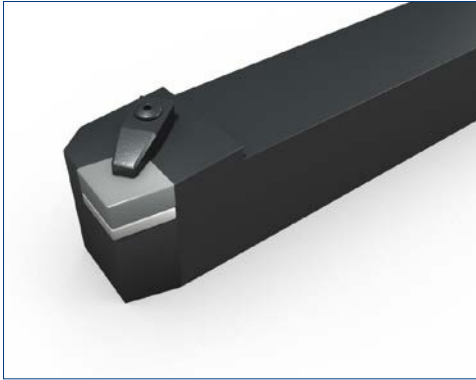
| CNGN | CNGX | CNVX |
|---------|---------|---------|
| | | |
| Page 26 | Page 28 | Page 28 |

EXTERNAL TOOLHOLDER

PART.
A

TURNING
&
MILLING

CCBN



| Type | Dimensions (mm) | | | | | Stock | | Insert | Spare Parts | | | |
|--------------------|--------------------|----|----------------|----------------|----|-------|---|-------------|---------------------|--------|------------|--------|
| | h(h ₁) | b | l ₁ | l ₂ | f | R | L | | Clamp & Clamp Screw | Shim | Shim Screw | Wrench |
| CCBNR/L 2525M12-A4 | 25 | 25 | 150 | 35 | 22 | | • | CNGN1204 | UH1 | SHCN4A | BM510 | LW4 |
| CCBNR/L 2525M12-A7 | 25 | 25 | 150 | 35 | 22 | • | | CNGN1207 | UH1 | SHCN4A | BM510 | LW4 |
| CCBNR/L 2525M12-X7 | 25 | 25 | 150 | 35 | 22 | | | CNG(V)X1207 | UH5 | SHCN4A | BM510 | LW4 |
| CCBNR/L 3225P12-A4 | 32 | 25 | 170 | 35 | 22 | | | CNGN1204 | UH1 | SHCN4A | BM510 | LW4 |
| CCBNR/L 3225P12-A7 | 32 | 25 | 170 | 35 | 22 | | | CNGN1207 | UH1 | SHCN4A | BM510 | LW4 |
| CCBNR/L 3225P12-X7 | 32 | 25 | 170 | 35 | 22 | | | CNG(V)X1207 | UH5 | SHCN4A | BM510 | LW4 |
| CCBNR/L 3225P16-A7 | 32 | 25 | 170 | 35 | 27 | | | CNGN1607 | UH1 | SHCN5A | FM510 | LW4 |
| CCBNR/L 3225P16-X7 | 32 | 25 | 170 | 35 | 27 | | | CNG(V)X1607 | UH5 | SHCN5A | FM510 | LW4 |
| CCBNR/L 4040S19-A7 | 40 | 40 | 250 | 60 | 36 | | | CNGN1907 | UH4 | SHCN6A | FM615 | LW6 |
| CCBNR/L 5050T25-A9 | 50 | 50 | 300 | 65 | 45 | | | CNGN2509 | UH25 | SHCN8 | FM815 | LW6 |

| Spare parts | | | | | | | | | | | | | |
|---------------------|-----|-----|------|--------|--------|--------|-------|------------|------|-------|-------|--------|-----|
| Clamp & Clamp Screw | | | | Shim | | | | Shim Screw | | | | Wrench | |
| | | | | | | | | | | | | | |
| UH1 | UH4 | UH5 | UH25 | SHCN4A | SHCN5A | SHCN6A | SHCN8 | BM510 | FM51 | FM615 | FM815 | LW4 | LW6 |

| CNGN | CNGX | CNVX |
|---------|---------|---------|
| | | |
| Page 26 | Page 28 | Page 28 |

CERAMIC

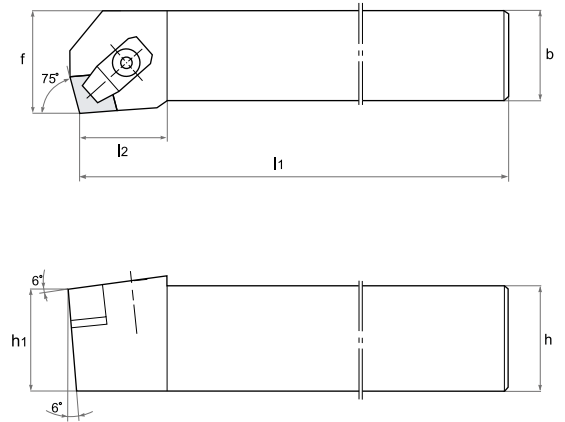
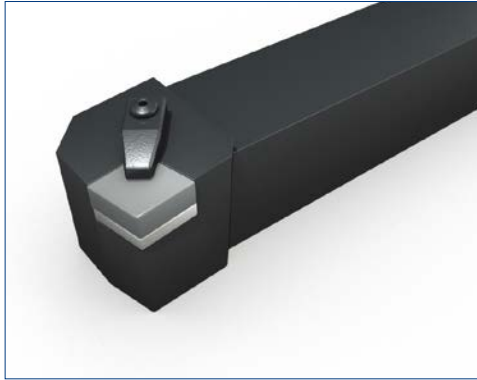
CERMET

PCBN
/
PCD

TOOL
HOLDER

MILLING
CUTTER

CCKN



| Type | Dimensions [mm] | | | | | Stock | | Insert | Spare Parts | | | |
|--------------------|---------------------|----|----------------|----------------|----|-------|---|-------------|---------------------|--------|------------|--------|
| | h [h ₁] | b | l ₁ | l ₂ | f | R | L | | Clamp & Clamp Screw | Shim | Shim Screw | Wrench |
| CCKNR/L 2525M12-A4 | 25 | 25 | 150 | 29 | 32 | | | CNGN1204 | UH1 | SHCN4A | BM510 | LW4 |
| CCKNR/L 2525M12-A7 | 25 | 25 | 150 | 29 | 32 | • | • | CNGN1207 | UH1 | SHCN4A | BM510 | LW4 |
| CCKNR/L 2525M12-X7 | 25 | 25 | 150 | 29 | 32 | • | • | CNG(V)X1207 | UH5 | SHCN4A | BM510 | LW4 |
| CCKNR/L 3225P12-A4 | 32 | 25 | 170 | 29 | 32 | | | CNGN1204 | UH1 | SHCN4A | BM510 | LW4 |
| CCKNR/L 3225P12-A7 | 32 | 25 | 170 | 29 | 32 | | • | CNGN1207 | UH1 | SHCN4A | BM510 | LW4 |
| CCKNR/L 3225P12-X7 | 32 | 25 | 170 | 29 | 32 | • | • | CNG(V)X1207 | UH5 | SHCN4A | BM510 | LW4 |

| Spare parts | | | | | |
|---------------------|-----|--------|--|------------|--------|
| Clamp & Clamp Screw | | Shim | | Shim Screw | Wrench |
| | | | | | |
| UH1 | UH5 | SHCN4A | | BM510 | LW4 |

CERAMIC

CERMET

PCBN
/
PCD

TOOL
HOLDER

MILLING
CUTTER

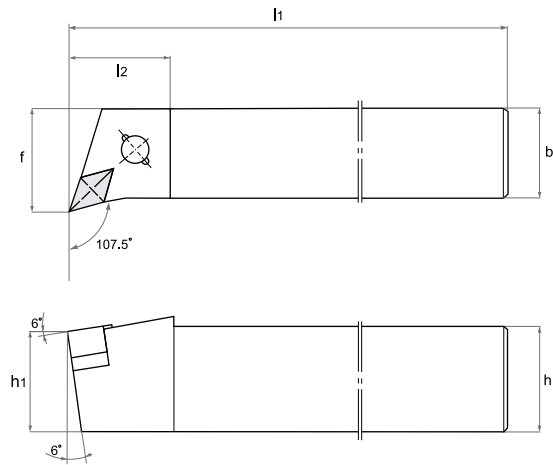
| CNGN | CNGX | CNVX |
|---------|---------|---------|
| | | |
| Page 26 | Page 28 | Page 28 |

EXTERNAL TOOLHOLDER

PART.
A

TURNING
&
MILLING

CDHN



| Type | Dimensions (mm) | | | | | Stock | | Insert | Spare Parts | | | |
|--------------------|--------------------|----|----------------|----------------|----|-------|---|----------|---------------------|--------|------------|--------|
| | h(h ₁) | b | l ₁ | l ₂ | f | R | L | | Clamp & Clamp Screw | Shim | Shim Screw | Wrench |
| CDHNR/L 2525M15-A4 | 25 | 25 | 150 | 33 | 32 | • | | DNGN1504 | UH1 | SHDN4A | BM510 | LW4 |
| CDHNR/L 2525M15-A7 | 25 | 25 | 150 | 33 | 32 | • | • | DNGN1507 | UH1 | SHDN4A | BM510 | LW4 |
| CDHNR/L 2525M12-X7 | 25 | 25 | 150 | 30 | 32 | | | DNGX1207 | UH5 | SHDN3A | TM3507 | LW4 |
| CDHNR/L 2525M15-X7 | 25 | 25 | 150 | 33 | 32 | | | DNGX1507 | UH5 | SHDN4A | BM510 | LW4 |
| CDHNR/L 3225P15-A4 | 32 | 25 | 170 | 33 | 32 | | | DNGN1504 | UH1 | SHDN4A | BM510 | LW4 |
| CDHNR/L 3225P15-A7 | 32 | 25 | 170 | 33 | 32 | | | DNGN1507 | UH1 | SHDN4A | BM510 | LW4 |
| CDHNR/L 3225P12-X7 | 32 | 25 | 170 | 30 | 32 | | | DNGX1207 | UH5 | SHDN3A | TM3507 | LW4 |
| CDHNR/L 3225P15-X7 | 32 | 25 | 170 | 33 | 32 | | | DNGX1507 | UH5 | SHDN4A | BM510 | LW4 |

| Spare parts | | | | | | |
|---------------------|-----|--------|--------|------------|-------|--------|
| Clamp & Clamp Screw | | Shim | | Shim Screw | | Wrench |
| | | | | | | |
| UH1 | UH5 | SHDN3A | SHDN4A | TM3507 | BM510 | LW4 |

CERAMIC

CERMET

PCBN
/
PCD

TOOL
HOLDER

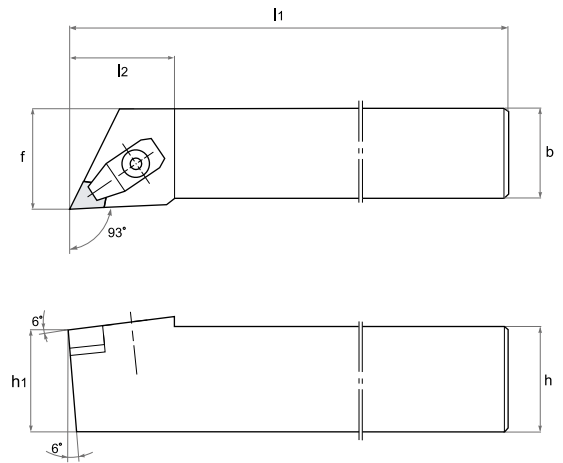
MILLING
CUTTER



EXTERNAL TOOLHOLDER

TURNING
&
MILLING

CDJN



| Type | Dimensions [mm] | | | | | Stock | | Insert | Spare Parts | | | |
|--------------------|--------------------|----|----------------|----------------|----|-------|---|----------|---------------------|--------|------------|--------|
| | h(h ₁) | b | l ₁ | l ₂ | f | R | L | | Clamp & Clamp Screw | Shim | Shim Screw | Wrench |
| CDJNR/L 2525M15-A4 | 25 | 25 | 150 | 38 | 32 | • | | DNGN1504 | UH1 | SHDN4A | BM510 | LW4 |
| CDJNR/L 2525M15-A7 | 25 | 25 | 150 | 38 | 32 | • | • | DNGN1507 | UH1 | SHDN4A | BM510 | LW4 |
| CDJNR/L 2525M12-X7 | 25 | 25 | 150 | 38 | 32 | • | • | DNGX1207 | UH5 | SHDN3A | TM3507 | LW4 |
| CDJNR/L 2525M15-X7 | 25 | 25 | 150 | 38 | 32 | | • | DNGX1507 | UH5 | SHDN4A | BM510 | LW4 |
| CDJNR/L 3225P15-A4 | 32 | 25 | 170 | 38 | 32 | | | DNGN1504 | UH1 | SHDN4A | BM510 | LW4 |
| CDJNR/L 3225P15-A7 | 32 | 25 | 170 | 38 | 32 | • | • | DNGN1507 | UH1 | SHDN4A | BM510 | LW4 |
| CDJNR/L 3225P12-X7 | 32 | 25 | 170 | 38 | 32 | | • | DNGX1207 | UH5 | SHDN3A | TM3507 | LW4 |
| CDJNR/L 3225P15-X7 | 32 | 25 | 170 | 38 | 32 | • | | DNGX1507 | UH5 | SHDN4A | BM510 | LW4 |

CERAMIC

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TOOL
HOLDER

MILLING
CUTTER

| Spare parts | | | | | | |
|---------------------|-----|--------|--------|------------|-------|--------|
| Clamp & Clamp Screw | | Shim | | Shim Screw | | Wrench |
| | | | | | | |
| UH1 | UH5 | SHDN3A | SHDN4A | TM3507 | BM510 | LW4 |

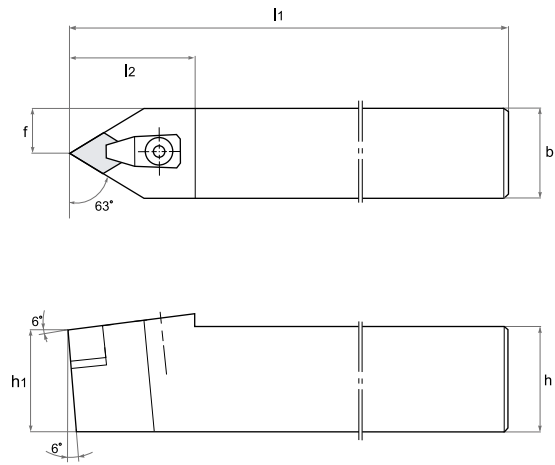
| DNGN | DNGX |
|---------|---------|
| | |
| Page 33 | Page 34 |

EXTERNAL TOOLHOLDER





PART.
A

TURNING
&
MILLING

CDNN



| Type | Dimensions (mm) | | | | | Stock | Insert | Spare Parts | | | |
|------------------------|--------------------|----|----------------|----------------|------|-------|----------|---------------------|--------|------------|--------|
| | h(h ₁) | b | l ₁ | l ₂ | f | | | Clamp & Clamp Screw | Shim | Shim Screw | Wrench |
| CDNN 2525M15-A4 | 25 | 25 | 150 | 40 | 12.5 | | DNGN1504 | UH1 | SHDN4A | BM510 | LW4 |
| CDNN 2525M15-A7 | 25 | 25 | 150 | 40 | 12.5 | | DNGN1507 | UH1 | SHDN4A | BM510 | LW4 |
| CDNN 4025M15-A7 | 40 | 25 | 150 | 40 | 12.5 | | DNGN1507 | UH1 | SHDN4A | BM510 | LW4 |

| Spare parts | | | |
|---|---|---|---|
| Clamp & Clamp Screw | Shim | Shim Screw | Wrench |
|  |  |  |  |
| UH1 | SHDN4A | BM510 | LW4 |

CERAMIC

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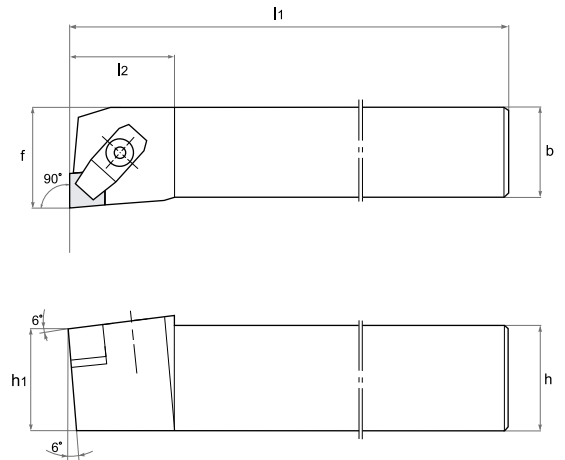
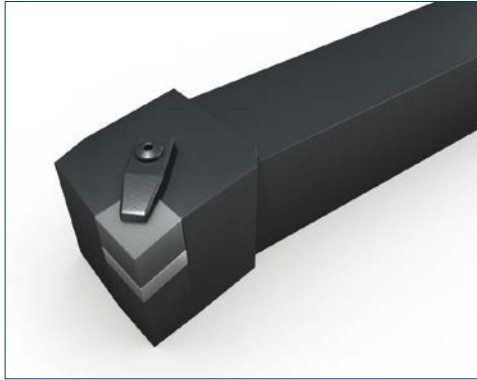
MILLING
CUTTER

DNGN



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CEFN



| Type | Dimensions [mm] | | | | | Stock | | Insert | Spare Parts | | | |
|---------------------------|--------------------|----|----------------|----------------|----|-------|---|----------|---------------------|--------|------------|--------|
| | h(h ₁) | b | l ₁ | l ₂ | f | R | L | | Clamp & Clamp Screw | Shim | Shim Screw | Wrench |
| CEFNR/L 2525M13-A7 | 25 | 25 | 150 | 29 | 32 | | | ENGN1307 | UH1 | SHEN4A | BM510 | LW4 |
| CEFNR/L 3225P13-A7 | 32 | 25 | 170 | 29 | 32 | | | ENGN1307 | UH1 | SHEN4A | BM510 | LW4 |

| Spare parts | | | |
|---------------------|--------|------------|--------|
| Clamp & Clamp Screw | Shim | Shim Screw | Wrench |
| | | | |
| UH1 | SHEN4A | BM510 | LW4 |

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MILLING
CUTTER

ENGN



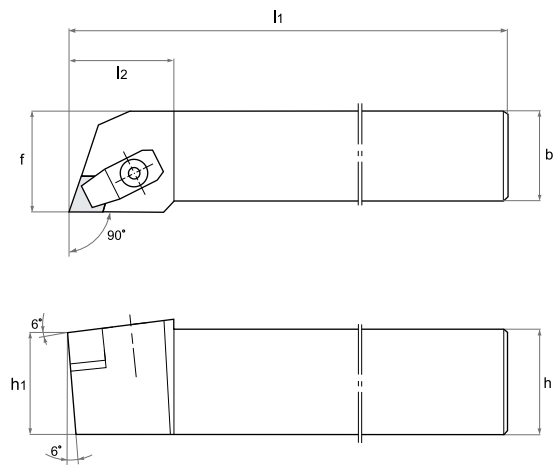
Page 35

EXTERNAL TOOLHOLDER





PART.
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TURNING
&
MILLING

CEGN



| Type | Dimensions (mm) | | | | | Stock | | Insert | Spare Parts | | | |
|---------------------------|--------------------|----|----------------|----------------|----|-------|---|---------|---------------------|--------|------------|--------|
| | h(h ₁) | b | l ₁ | l ₂ | f | R | L | | Clamp & Clamp Screw | Shim | Shim Screw | Wrench |
| CEGNR/L 2525M13-A7 | 25 | 25 | 150 | 23 | 32 | | | ENG1307 | UH1 | SHEN4A | BM510 | LW4 |
| CEGNR/L 3225P13-A7 | 32 | 25 | 170 | 23 | 32 | • | • | ENG1307 | UH1 | SHEN4A | BM510 | LW4 |

| Spare parts | | | |
|---|---|---|---|
| Clamp & Clamp Screw | Shim | Shim Screw | Wrench |
|  |  |  |  |
| UH1 | SHEN4A | BM510 | LW4 |

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HOLDER

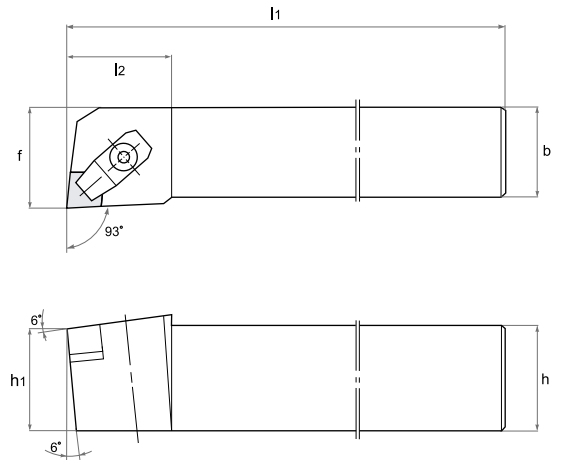
MILLING
CUTTER

ENGN







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CEJN



| Type | Dimensions [mm] | | | | | Stock | | Insert | Spare Parts | | | |
|---------------------------|--------------------|----|----------------|----------------|----|-------|---|----------|---------------------|--------|------------|--------|
| | h(h ₁) | b | l ₁ | l ₂ | f | R | L | | Clamp & Clamp Screw | Shim | Shim Screw | Wrench |
| CEJNR/L 2525M13-A7 | 25 | 25 | 150 | 30 | 32 | • | • | ENGN1307 | UH1 | SHEN4A | BM510 | LW4 |
| CEJNR/L 3225P13-A7 | 32 | 25 | 170 | 30 | 32 | | | ENGN1307 | UH1 | SHEN4A | BM510 | LW4 |

| Spare parts | | | |
|---|---|--|---|
| Clamp & Clamp Screw | Shim | Shim Screw | Wrench |
|  |  |  |  |
| UH1 | SHEN4A | BM510 | LW4 |

CERAMIC

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CUTTER

ENGN

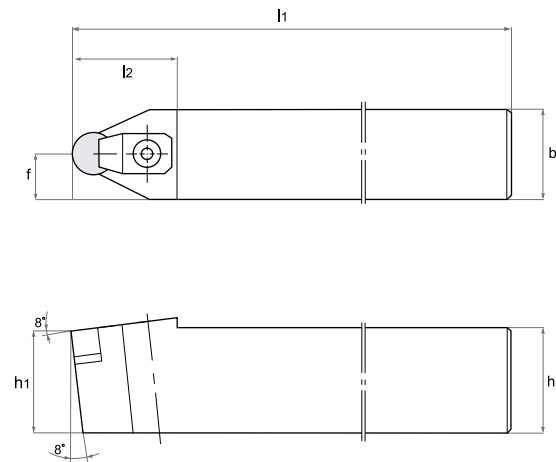


EXTERNAL TOOLHOLDER

PART.
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&
MILLING

CRDN



| Type | Dimensions (mm) | | | | | Stock | Insert | Spare Parts | | | |
|------------------|--------------------|----|----------------|----------------|------|-------|----------|---------------------|--------|------------|--------|
| | h(h ₁) | b | l ₁ | l ₂ | f | | | Clamp & Clamp Screw | Shim | Shim Screw | Wrench |
| CRDNN 2525M09-A4 | 25 | 25 | 150 | 32 | 12.5 | ● | RNGN0904 | UH1 | SHRN3A | TM3507 | LW4 |
| CRDNN 2525M09-A7 | 25 | 25 | 150 | 32 | 12.5 | ● | RNGN0907 | UH1 | SHRN3A | TM3507 | LW4 |
| CRDNN 2525M12-A4 | 25 | 25 | 150 | 32 | 12.5 | | RNGN1204 | UH1 | SHRN4A | BM510 | LW4 |
| CRDNN 2525M12-A7 | 25 | 25 | 150 | 32 | 12.5 | ● | RNGN1207 | UH1 | SHRN4A | BM510 | LW4 |
| CRDNN 2525M12-X7 | 25 | 25 | 150 | 32 | 12.5 | | RNGX1207 | UH5 | SHRN4A | BM510 | LW4 |
| CRDNN 3225P12-A4 | 32 | 25 | 170 | 32 | 12.5 | | RNGN1204 | UH1 | SHRN4A | BM510 | LW4 |
| CRDNN 3225P12-A7 | 32 | 25 | 170 | 32 | 12.5 | ● | RNGN1207 | UH1 | SHRN4A | BM510 | LW4 |
| CRDNN 3225P12-X7 | 32 | 25 | 170 | 32 | 12.5 | | RNGX1207 | UH5 | SHRN4A | BM510 | LW4 |
| CRDNN 3225P15-A7 | 32 | 25 | 170 | 32 | 12.5 | | RNGN1507 | UH1 | SHRN5A | BM510 | LW4 |
| CRDNN 3225P19-A7 | 32 | 25 | 170 | 32 | 12.5 | ● | RNGN1907 | UH4 | SHRN6 | FM512 | LW6 |

| Spare parts | | | | | | | | | | | |
|---------------------|-----|-----|--------|--------|--------|-------|------------|--------|-------|--------|-----|
| Clamp & Clamp Screw | | | Shim | | | | Shim Screw | | | Wrench | |
| | | | | | | | | | | | |
| UH1 | UH4 | UH5 | SHRN3A | SHRN4A | SHRN5A | SHRN6 | BM510 | TM3507 | FM512 | LW4 | LW6 |

| RNGN | RNGX .. DP |
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| | |
| Page 36 | Page 38 |

CERAMIC

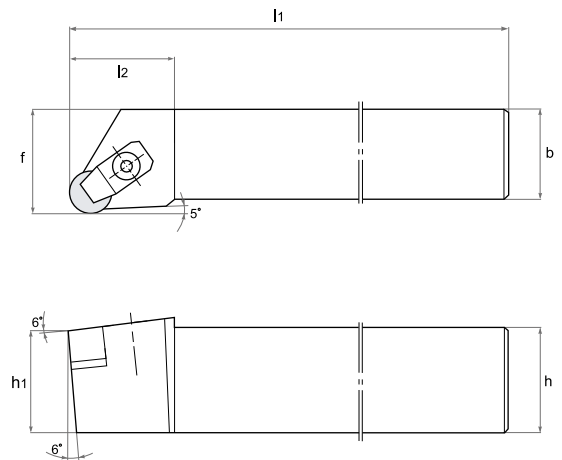
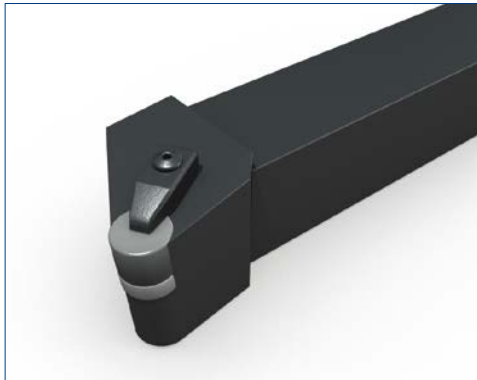
CERMET

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HOLDER

MILLING
CUTTER

CRGN



| Type | Dimensions [mm] | | | | | Stock | Insert | Spare Parts | | | |
|--------------------|---------------------|----|----------------|----------------|----|-------|----------|-------------|---------------------|--------|------------|
| | h [h ₁] | b | l ₁ | l ₂ | f | | | R | Clamp & Clamp Screw | Shim | Shim Screw |
| CRGNR/L 2525M09-A4 | 25 | 25 | 150 | 32 | 32 | | RNGN0904 | UH1 | SHRN3A | TM3507 | LW4 |
| CRGNR/L 2525M09-A7 | 25 | 25 | 150 | 32 | 32 | ● | RNGN0907 | UH1 | SHRN3A | TM3507 | LW4 |
| CRGNR/L 2525M12-A4 | 25 | 25 | 150 | 35 | 32 | ● | RNGN1204 | UH1 | SHRN4A | BM510 | LW4 |
| CRGNR/L 2525M12-A7 | 25 | 25 | 150 | 35 | 32 | ● | RNGN1207 | UH1 | SHRN4A | BM510 | LW4 |
| CRGNR/L 2525M12-X7 | 25 | 25 | 150 | 35 | 32 | ● | RNGX1207 | UH5 | SHRN4A | BM510 | LW4 |
| CRGNR/L 3225P12-A4 | 32 | 25 | 170 | 35 | 32 | ● | RNGN1204 | UH1 | SHRN4A | BM510 | LW4 |
| CRGNR/L 3225P12-A7 | 32 | 25 | 170 | 35 | 32 | ● | RNGN1207 | UH1 | SHRN4A | BM510 | LW4 |
| CRGNR/L 3225P12-X7 | 32 | 25 | 170 | 35 | 32 | | RNGX1207 | UH5 | SHRN4A | BM510 | LW4 |
| CRGNR/L 3225P15-A7 | 32 | 25 | 170 | 37 | 32 | ● | RNGN1507 | UH1 | SHRN5A | BM510 | LW4 |
| CRGNR/L 3225P19-A7 | 32 | 25 | 170 | 45 | 32 | ● | RNGN1907 | UH4 | SHRN6 | FM512 | LW6 |

CERAMIC

CERMET

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TOOL
HOLDER

MILLING
CUTTER

| Spare parts | | | | | | | | | | | |
|---------------------|-----|-----|--------|--------|--------|-------|------------|--------|-------|--------|-----|
| Clamp & Clamp Screw | | | Shim | | | | Shim Screw | | | Wrench | |
| | | | | | | | | | | | |
| UH1 | UH4 | UH5 | SHRN3A | SHRN4A | SHRN5A | SHRN6 | BM510 | TM3507 | FM512 | LW4 | LW6 |

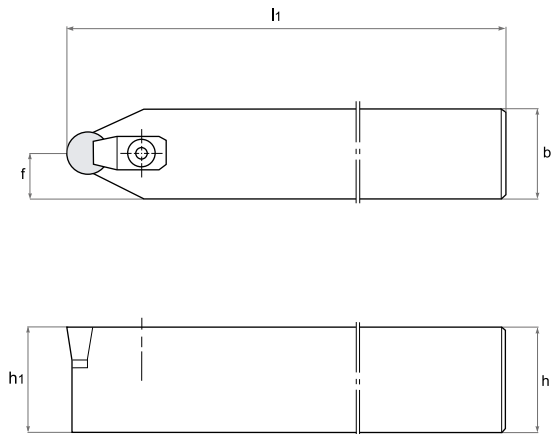
| RNGN | RNGX .. DP |
|---------|------------|
| | |
| Page 36 | Page 38 |

EXTERNAL TOOLHOLDER

PART.
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TURNING
&
MILLING

CRDB



| Type | Dimensions (mm) | | | | Stock | Insert | Spare Parts | | | |
|-----------------|--------------------|----|----------------|------|-------|---------|---------------------|--------|------------|--------|
| | h(h ₁) | b | l ₁ | f | | | Clamp & Clamp Screw | Shim | Shim Screw | Wrench |
| CRDBN 2525M12-A | 25 | 25 | 150 | 12.5 | ● | RBGX12T | UH1 | SHRB12 | SH3015 | LW4 |
| CRDBN 2525M16-A | 25 | 25 | 150 | 12.5 | ● | RBGX16T | UH1 | SHRB16 | SH3515 | LW4 |
| CRDBN 3232P12-A | 32 | 32 | 170 | 16 | ● | RBGX12T | UH1 | SHRB12 | SH3015 | LW4 |
| CRDBN 3232P16-A | 32 | 32 | 170 | 16 | ● | RBGX16T | UH1 | SHRB16 | SH3515 | LW4 |
| CRDBN 3232P20-A | 32 | 32 | 170 | 16 | | RBGX20T | UH4 | SHRB20 | SH5015 | LW6 |
| CRDBN 3232P26-A | 32 | 32 | 170 | 16 | | RBGX26T | UH4 | SHRB26 | SH6015 | LW6 |

| Spare parts | | | | | | | | | | | |
|---------------------|-----|--------|--------|--------|--------|------------|--------|--------|--------|--------|-----|
| Clamp & Clamp Screw | | Shim | | | | Shim Screw | | | | Wrench | |
| | | | | | | | | | | | |
| UH1 | UH4 | SHRB12 | SHRB16 | SHRB20 | SHRB26 | SH3015 | SH3515 | SH5015 | SH6015 | LW4 | LW6 |

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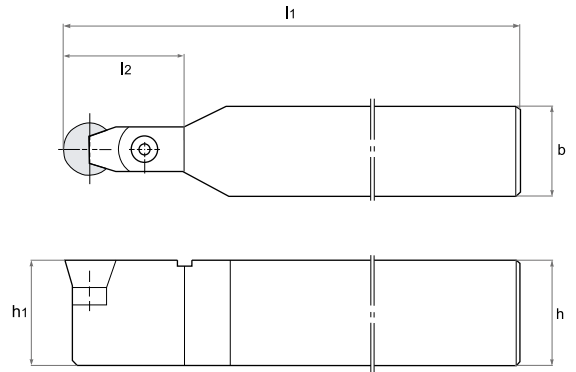
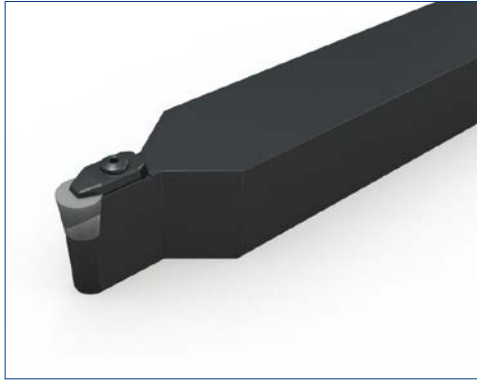
MILLING
CUTTER

RBGX



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CRDC



| Type | Dimensions [mm] | | | | Stock | Insert | Spare Parts | | | |
|-------------------|--------------------|----|----------------|----------------|-------|----------|---------------------|---------|------------|--------|
| | h(h ₁) | b | l ₁ | l ₂ | | | Clamp & Clamp Screw | Shim | Shim Screw | Wrench |
| CRDCN 3225P06-A4 | 32 | 25 | 170 | 20 | ● | RCGX0604 | CLRC6 | SHRC102 | - | LW3 |
| CRDCN 3225P06-A6 | 32 | 25 | 170 | 20 | ● | RCGX0606 | CLRC6 | SHRC102 | - | LW3 |
| CRDCN 3225P06-A7 | 32 | 25 | 170 | 20 | ● | RCGX0607 | CLRC6 | SHRC102 | - | LW3 |
| CRDCN 3225P09-A7 | 32 | 25 | 170 | 20 | ● | RCGX0907 | CLRC9 | SHRC103 | FM315 | LW4 |
| CRDCN 3225P12-A7 | 32 | 25 | 170 | 20 | ● | RCGX1207 | UH1 | SHRC104 | FM415 | LW4 |
| CRDCN 5040T12-A7 | 50 | 40 | 300 | 30 | ● | RCGX1207 | UH1 | SHRC104 | FM415 | LW4 |
| CRDCN 5040T15-A10 | 50 | 40 | 300 | 35 | ● | RCGX1510 | UH1 | SHRC105 | FM415 | LW4 |
| CRDCN 5040T19-A10 | 50 | 40 | 300 | 45 | | RCGX1910 | UH4 | SHRC106 | FM415 | LW6 |
| CRDCN 5040T25-A12 | 50 | 40 | 300 | 50 | | RCGX2512 | UH25 | SHRC108 | FM615 | LW6 |

CERAMIC

| Spare parts | | | | | | | | | | |
|---------------------|-------|------|---------|---------|---------|------------|-------|--------|-----|-----|
| Clamp & Clamp Screw | | | Shim | | | Shim Screw | | Wrench | | |
| | | | | | | | | | | |
| CLRC6 | CLRC9 | UH25 | SHRC102 | SHRC103 | SHRC104 | FM210 | FM315 | LW3 | LW4 | LW6 |
| UH1 | UH4 | | SHRC105 | SHRC106 | SHRC108 | FM415 | FM615 | | | |

CERMET

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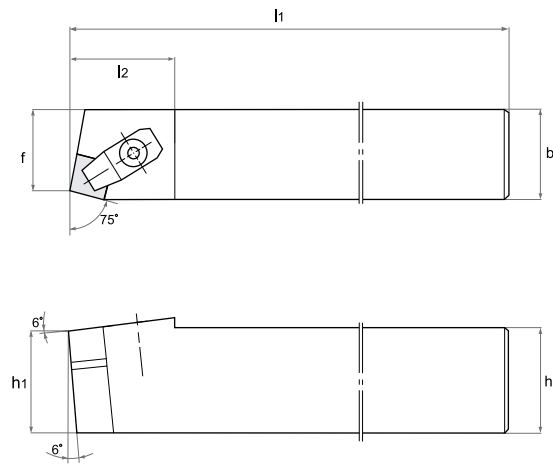
MILLING
CUTTER

EXTERNAL TOOLHOLDER

PART.
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TURNING
&
MILLING

CSBN



| Type | Dimensions (mm) | | | | | Stock | | Insert | Spare Parts | | | |
|--------------------|--------------------|----|----------------|----------------|----|-------|---|----------|---------------------|--------|------------|--------|
| | h(h ₁) | b | l ₁ | l ₂ | f | R | L | | Clamp & Clamp Screw | Shim | Shim Screw | Wrench |
| CSBNR/L 2525M12-A4 | 25 | 25 | 150 | 34 | 22 | • | • | SNGN1204 | UH1 | SHSN4A | BM510 | LW4 |
| CSBNR/L 2525M12-A7 | 25 | 25 | 150 | 34 | 22 | • | • | SNGN1207 | UH1 | SHSN4A | BM510 | LW4 |
| CSBNR/L 2525M12-X7 | 25 | 25 | 150 | 34 | 22 | • | | SNGX1207 | UH5 | SHSN4A | BM510 | LW4 |
| CSBNR/L 2525M15-A7 | 25 | 25 | 150 | 34 | 22 | | | SNGN1507 | UH1 | SHSN5A | FM512 | LW4 |
| CSBNR/L 2525M15-X7 | 25 | 25 | 150 | 40 | 22 | | | SNGX1507 | UH5 | SHSN5A | FM512 | LW4 |
| CSBNR/L 3225P12-A7 | 32 | 25 | 170 | 34 | 22 | • | • | SNGN1207 | UH1 | SHSN4A | BM510 | LW4 |
| CSBNR/L 3225P12-X7 | 32 | 25 | 170 | 34 | 22 | • | | SNGX1207 | UH5 | SHSN4A | BM510 | LW4 |
| CSBNR/L 3225P15-A7 | 32 | 25 | 170 | 40 | 22 | • | | SNGN1507 | UH1 | SHSN5A | FM512 | LW4 |
| CSBNR/L 3225P15-X7 | 32 | 25 | 170 | 40 | 22 | | | SNGX1507 | UH5 | SHSN5A | FM512 | LW4 |
| CSBNR/L 4040S19-A7 | 40 | 40 | 250 | 54 | 35 | | | SNGN1907 | UH4 | SHSN6A | FM612 | LW6 |
| CSBNR/L 5050T25-A9 | 50 | 50 | 300 | 65 | 45 | | | SNGN2509 | UH25 | SHSN8 | FM815 | LW6 |

| Spare parts | | | | | | | | | | | |
|---------------------|-----|-----|------|------------------|-----------------|------------|----------------|-------|--------|-----|--|
| Clamp & Clamp Screw | | | | Shim | | Shim Screw | | | Wrench | | |
| | | | | | | | | | | | |
| UH1 | UH4 | UH5 | UH25 | SHSN4A SHSN6A | SHSN5A SHSN8 | BM510 | FM512 FM815 | FM612 | LW4 | LW6 | |

| SNGN | SNGX |
|---------|---------|
| | |
| Page 41 | Page 42 |

CERAMIC

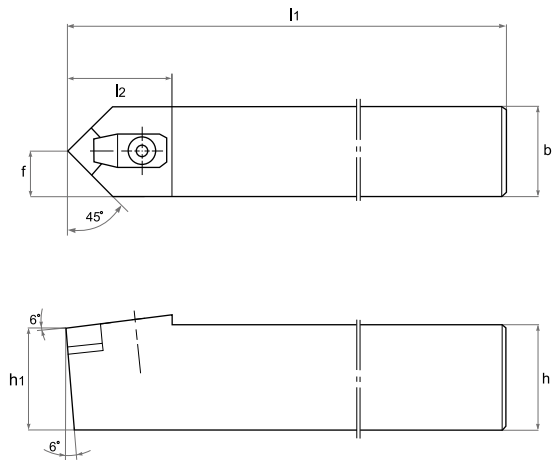
CERMET

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TOOL
HOLDER

MILLING
CUTTER

CSDN



| Type | Dimensions [mm] | | | | | Stock | Insert | Spare Parts | | | |
|-------------------------|--------------------|----|----------------|----------------|------|-------|----------|-------------|---------------------|-------|------------|
| | h(h ₁) | b | l ₁ | l ₂ | f | | | R | Clamp & Clamp Screw | Shim | Shim Screw |
| CSDNN 2525M12-A4 | 25 | 25 | 150 | 35 | 12.5 | ● | SNGN1204 | UH1 | SHSN4A | BM510 | LW4 |
| CSDNN 2525M12-A7 | 25 | 25 | 150 | 35 | 12.5 | ● | SNGN1207 | UH1 | SHSN4A | BM510 | LW4 |
| CSDNN 2525M12-X7 | 25 | 25 | 150 | 35 | 12.5 | | SNGX1207 | UH5 | SHSN4A | BM510 | LW4 |
| CSDNN 2525M15-A7 | 25 | 25 | 150 | 38 | 12.5 | | SNGN1507 | UH1 | SHSN5A | FM512 | LW4 |
| CSDNN 2525M15-X7 | 25 | 25 | 150 | 38 | 12.5 | | SNGX1507 | UH5 | SHSN5A | FM512 | LW4 |
| CSDNN 3225P12-A7 | 32 | 25 | 170 | 35 | 12.5 | ● | SNGN1207 | UH1 | SHSN4A | BM510 | LW4 |
| CSDNN 3225P12-X7 | 32 | 25 | 170 | 35 | 12.5 | | SNGX1207 | UH5 | SHSN4A | BM510 | LW4 |
| CSDNN 3225P15-A7 | 32 | 25 | 170 | 38 | 12.5 | ● | SNGN1507 | UH1 | SHSN5A | FM512 | LW4 |
| CSDNN 3225P15-X7 | 32 | 25 | 170 | 38 | 12.5 | | SNGX1507 | UH5 | SHSN5A | FM512 | LW4 |
| CSDNN 4040S19-A7 | 40 | 40 | 250 | 60 | 20 | ● | SNGN1907 | UH4 | SHSN6A | FM612 | LW6 |
| CSDNN 5050T25-A9 | 50 | 50 | 300 | 60 | 25 | ● | SNGN2509 | UH25 | SHSN8 | FM815 | LW6 |

CERAMIC

CERMET

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TOOL
HOLDER

MILLING
CUTTER

| Spare parts | | | | | | | | | | |
|---------------------|-----|-----|------|------------------|-----------------|------------|----------------|-------|--------|-----|
| Clamp & Clamp Screw | | | | Shim | | Shim Screw | | | Wrench | |
| | | | | | | | | | | |
| UH1 | UH4 | UH5 | UH25 | SHSN4A SHSN6A | SHSN5A SHSN8 | BM510 | FM512 FM815 | FM612 | LW4 | LW6 |

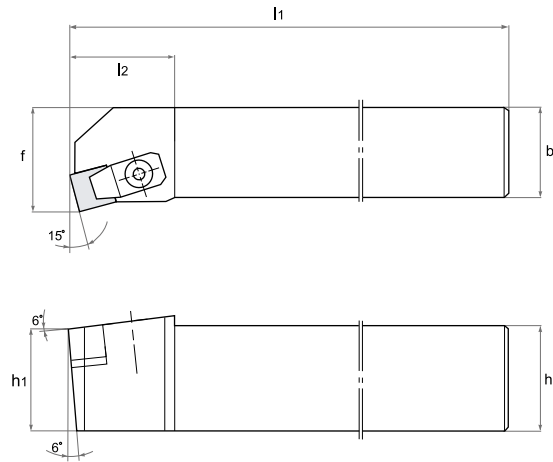
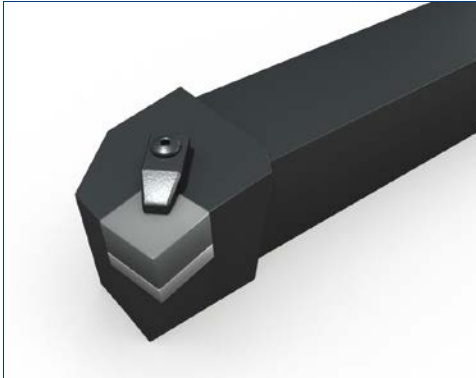
| SNGN | SNGX |
|---------|---------|
| | |
| Page 41 | Page 42 |

EXTERNAL TOOLHOLDER

PART.
A

TURNING
&
MILLING

CSKN



| Type | Dimensions (mm) | | | | | Stock | | Insert | Spare Parts | | | |
|--------------------|--------------------|----|----------------|----------------|----|-------|---|----------|---------------------|--------|------------|--------|
| | h(h _i) | b | l ₁ | l ₂ | f | R | L | | Clamp & Clamp Screw | Shim | Shim Screw | Wrench |
| CSKNR/L 2525M12-A4 | 25 | 25 | 150 | 34 | 32 | | | SNGN1204 | UH1 | SHSN4A | BM510 | LW4 |
| CSKNR/L 2525M12-A7 | 25 | 25 | 150 | 34 | 32 | • | • | SNGN1207 | UH1 | SHSN4A | BM510 | LW4 |
| CSKNR/L 2525M12-X7 | 25 | 25 | 150 | 34 | 32 | • | • | SNGX1207 | UH5 | SHSN4A | BM510 | LW4 |
| CSKNR/L 2525M15-A7 | 25 | 25 | 150 | 40 | 32 | | | SNGN1507 | UH1 | SHSN5A | FM512 | LW4 |
| CSKNR/L 2525M15-X7 | 25 | 25 | 150 | 40 | 32 | | | SNGX1507 | UH5 | SHSN5A | FM512 | LW4 |
| CSKNR/L 3225P12-A7 | 32 | 25 | 170 | 34 | 32 | | | SNGN1207 | UH1 | SHSN4A | BM510 | LW4 |
| CSKNR/L 3225P12-X7 | 32 | 25 | 170 | 34 | 32 | | • | SNGX1207 | UH5 | SHSN4A | BM510 | LW4 |
| CSKNR/L 3225P15-A7 | 32 | 25 | 170 | 40 | 32 | • | • | SNGN1507 | UH1 | SHSN5A | FM512 | LW4 |
| CSKNR/L 3225P15-X7 | 32 | 25 | 170 | 40 | 32 | | | SNGX1507 | UH5 | SHSN5A | FM512 | LW4 |

| Spare parts | | | | | | |
|---------------------|-----|--------|--------|------------|-------|--------|
| Clamp & Clamp Screw | | Shim | | Shim Screw | | Wrench |
| | | | | | | |
| UH1 | UH5 | SHSN4A | SHSN5A | BM510 | FM512 | LW4 |

| SNGN | SNGX |
|---------|---------|
| | |
| Page 41 | Page 42 |

CERAMIC

CERMET

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PCD

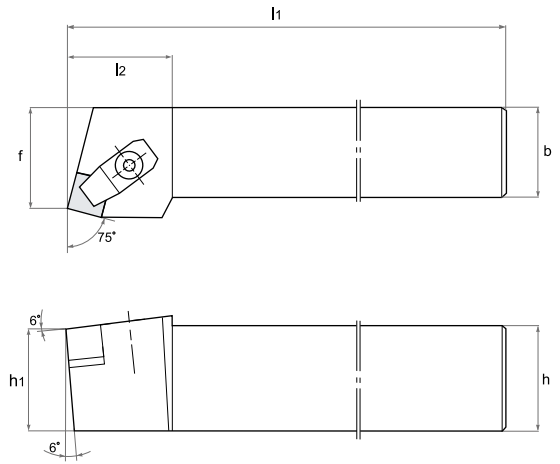
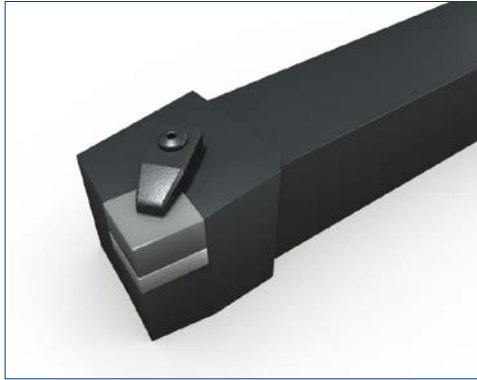
TOOL
HOLDER

MILLING
CUTTER

EXTERNAL TOOLHOLDER

TURNING
&
MILLING

CSRNR



| Type | Dimensions [mm] | | | | | Stock | | Insert | Spare Parts | | | |
|--------------------|--------------------|----|----------------|----------------|----|-------|---|----------|---------------------|--------|------------|--------|
| | h(h ₁) | b | l ₁ | l ₂ | f | R | L | | Clamp & Clamp Screw | Shim | Shim Screw | Wrench |
| CSRNR/L 2525M12-A4 | 25 | 25 | 150 | 32 | 27 | • | • | SNGN1204 | UH1 | SHSN4A | BM510 | LW4 |
| CSRNR/L 2525M12-A7 | 25 | 25 | 150 | 32 | 27 | • | • | SNGN1207 | UH1 | SHSN4A | BM510 | LW4 |
| CSRNR/L 2525M12-X7 | 25 | 25 | 150 | 32 | 27 | • | | SNGX1207 | UH5 | SHSN4A | BM510 | LW4 |
| CSRNR/L 2525M15-A7 | 25 | 25 | 150 | 34 | 27 | | | SNGN1507 | UH1 | SHSN5A | FM512 | LW4 |
| CSRNR/L 2525M15-X7 | 25 | 25 | 150 | 34 | 27 | | | SNGX1507 | UH5 | SHSN5A | FM512 | LW4 |
| CSRNR/L 3225P12-A7 | 32 | 25 | 170 | 32 | 27 | | | SNGN1207 | UH1 | SHSN4A | BM510 | LW4 |
| CSRNR/L 3225P12-X7 | 32 | 25 | 170 | 32 | 27 | | | SNGX1207 | UH5 | SHSN4A | BM510 | LW4 |
| CSRNR/L 3225P15-A7 | 32 | 25 | 170 | 34 | 27 | • | • | SNGN1507 | UH1 | SHSN5A | FM512 | LW4 |
| CSRNR/L 3225P15-X7 | 32 | 25 | 170 | 34 | 27 | • | | SNGX1507 | UH5 | SHSN5A | FM512 | LW4 |
| CSRNR/L 4040S19-A7 | 40 | 40 | 250 | 54 | 43 | | | SNGN1907 | UH4 | SHSN6A | FM612 | LW6 |
| CSRNR/L 5050T25-A9 | 50 | 50 | 300 | 70 | 53 | | | SNGN2509 | UH25 | SHSN8 | FM815 | LW6 |

CERAMIC

CERMET

PCBN
/
PCD

TOOL
HOLDER

MILLING
CUTTER

| Spare parts | | | | | | | | | | |
|---------------------|-----|-----|------|------------------|-----------------|------------|----------------|-------|--------|-----|
| Clamp & Clamp Screw | | | | Shim | | Shim Screw | | | Wrench | |
| | | | | | | | | | | |
| UH1 | UH4 | UH5 | UH25 | SHSN4A SHSN6A | SHSN5A SHSN8 | BM510 | FM512 FM815 | FM612 | LW4 | LW6 |

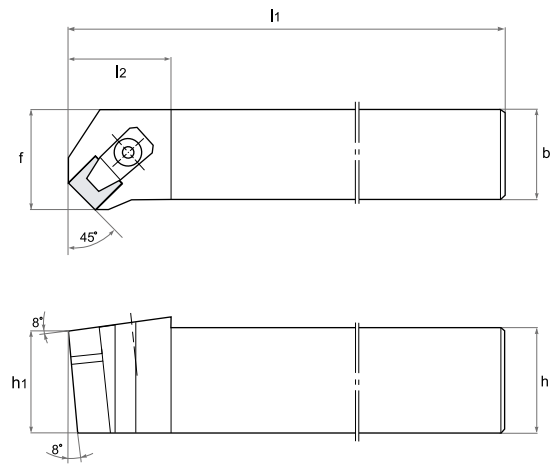
| SNGN | SNGX |
|---------|---------|
| | |
| Page 41 | Page 42 |

EXTERNAL TOOLHOLDER

PART.
A

TURNING
&
MILLING

CSSNR



| Type | Dimensions (mm) | | | | | Stock | | Insert | Spare Parts | | | |
|--------------------|--------------------|----|----------------|----------------|----|-------|---|----------|---------------------|--------|------------|--------|
| | h(h _i) | b | l ₁ | l ₂ | f | R | L | | Clamp & Clamp Screw | Shim | Shim Screw | Wrench |
| CSSNR/L 2525M12-A4 | 25 | 25 | 150 | 35 | 32 | | | SNGN1204 | UH1 | SHSN4A | BM510 | LW4 |
| CSSNR/L 2525M12-A7 | 25 | 25 | 150 | 35 | 32 | • | • | SNGN1207 | UH1 | SHSN4A | BM510 | LW4 |
| CSSNR/L 2525M12-X7 | 25 | 25 | 150 | 35 | 32 | | • | SNGX1207 | UH5 | SHSN4A | BM510 | LW4 |
| CSSNR/L 2525M15-A7 | 25 | 25 | 150 | 37 | 32 | • | | SNGN1507 | UH1 | SHSN5A | FM512 | LW4 |
| CSSNR/L 2525M15-X7 | 25 | 25 | 150 | 37 | 32 | | | SNGX1507 | UH5 | SHSN5A | FM512 | LW4 |
| CSSNR/L 3225P12-A7 | 32 | 25 | 170 | 35 | 32 | • | | SNGN1207 | UH1 | SHSN4A | BM510 | LW4 |
| CSSNR/L 3225P12-X7 | 32 | 25 | 170 | 35 | 32 | | | SNGX1207 | UH5 | SHSN4A | BM510 | LW4 |
| CSSNR/L 3225P15-A7 | 32 | 25 | 170 | 37 | 32 | | | SNGN1507 | UH1 | SHSN5A | FM512 | LW4 |
| CSSNR/L 3225P15-X7 | 32 | 25 | 170 | 37 | 32 | | | SNGX1507 | UH5 | SHSN5A | FM512 | LW4 |

| Spare parts | | | | | | |
|---------------------|-----|--------|--------|------------|-------|--------|
| Clamp & Clamp Screw | | Shim | | Shim Screw | | Wrench |
| | | | | | | |
| UH1 | UH5 | SHSN4A | SHSN5A | BM510 | FM512 | LW4 |

| SNGN | SNGX |
|---------|---------|
| | |
| Page 41 | Page 42 |

CERAMIC

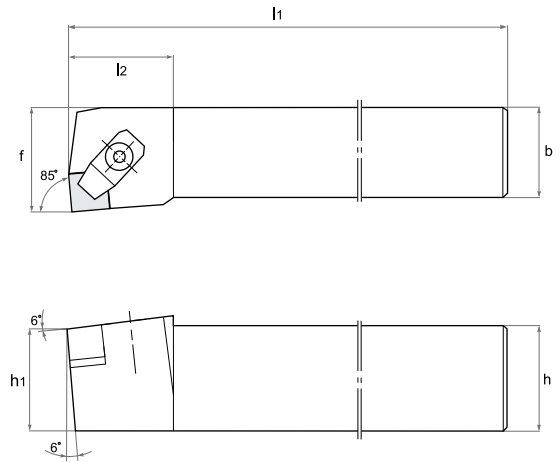
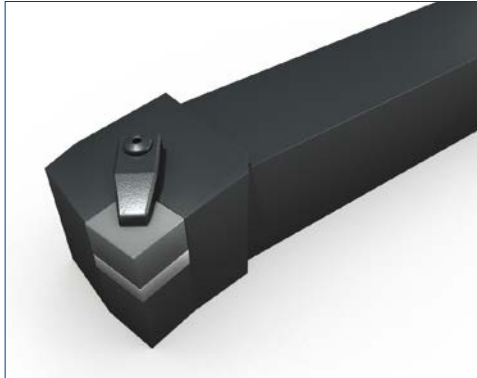
CERMET

PCBN
/
PCD

TOOL
HOLDER

MILLING
CUTTER

CSYN



| Type | Dimensions [mm] | | | | | Stock | | Insert | Spare Parts | | | |
|---------------------------|--------------------|----|----------------|----------------|----|-------|---|----------|---------------------|--------|------------|--------|
| | h(h ₁) | b | l ₁ | l ₂ | f | R | L | | Clamp & Clamp Screw | Shim | Shim Screw | Wrench |
| CSYNR/L 2525M12-A4 | 25 | 25 | 150 | 27 | 32 | • | | SNGN1204 | UH1 | SHSN4A | BM510 | LW4 |
| CSYNR/L 2525M12-A7 | 25 | 25 | 150 | 27 | 32 | • | | SNGN1207 | UH1 | SHSN4A | BM510 | LW4 |
| CSYNR/L 2525M12-X7 | 25 | 25 | 150 | 27 | 32 | | | SNGX1207 | UH5 | SHSN4A | BM510 | LW4 |
| CSYNR/L 2525M15-A7 | 25 | 25 | 150 | 27 | 32 | | | SNGN1507 | UH1 | SHSN5A | FM512 | LW4 |
| CSYNR/L 2525M15-X7 | 25 | 25 | 150 | 27 | 32 | | | SNGX1507 | UH5 | SHSN5A | FM512 | LW4 |
| CSYNR/L 3225P12-A7 | 32 | 25 | 170 | 27 | 32 | | | SNGN1207 | UH1 | SHSN4A | BM510 | LW4 |
| CSYNR/L 3225P12-X7 | 32 | 25 | 170 | 27 | 32 | | | SNGX1207 | UH5 | SHSN4A | BM510 | LW4 |
| CSYNR/L 3225P15-A7 | 32 | 25 | 170 | 27 | 32 | | | SNGN1507 | UH1 | SHSN5A | FM512 | LW4 |
| CSYNR/L 3225P15-X7 | 32 | 25 | 170 | 27 | 32 | | | SNGX1507 | UH5 | SHSN5A | FM512 | LW4 |

CERAMIC

CERMET

PCBN
/
PCD

TOOL
HOLDER

MILLING
CUTTER

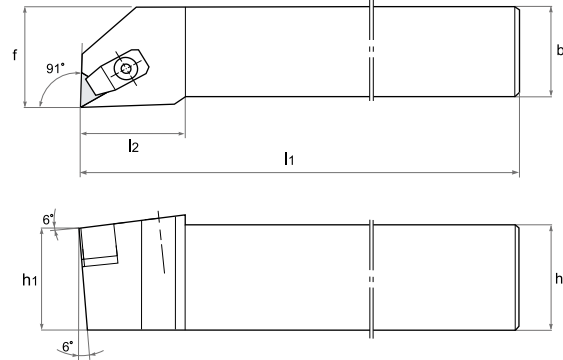
| Spare parts | | | | | | |
|---------------------|-----|--------|--------|------------|-------|--------|
| Clamp & Clamp Screw | | Shim | | Shim Screw | | Wrench |
| | | | | | | |
| UH1 | UH5 | SHSN4A | SHSN5A | BM510 | FM512 | LW4 |

| SNGN | SNGX |
|---------|---------|
| | |
| Page 41 | Page 42 |

EXTERNAL TOOLHOLDER







PART.
A

CTFN



TURNING
&
MILLING

| Type | Dimensions (mm) | | | | | Stock | | Insert | Spare Parts | | | |
|--------------------|--------------------|----|----------------|----------------|----|-------|---|----------|---------------------|--------|------------|--------|
| | h(h ₁) | b | l ₁ | l ₂ | f | R | L | | Clamp & Clamp Screw | Shim | Shim Screw | Wrench |
| CTFNR/L 2525M16-A4 | 25 | 25 | 150 | 29 | 32 | | | TNGN1604 | UH1 | SHTN3A | BM408 | LW4 |
| CTFNR/L 2525M16-A7 | 25 | 25 | 150 | 29 | 32 | | | TNGN1607 | UH1 | SHTN3A | BM408 | LW4 |
| CTFNR/L 2525M22-A4 | 25 | 25 | 150 | 32 | 32 | | | TNGN2204 | UH1 | SHTN4 | FM410 | LW4 |
| CTFNR/L 2525M22-A7 | 25 | 25 | 150 | 32 | 32 | • | | TNGN2207 | UH1 | SHTN4 | FM410 | LW4 |
| CTFNR/L 3225P16-A4 | 32 | 25 | 170 | 29 | 32 | | | TNGN1604 | UH1 | SHTN3A | BM408 | LW4 |
| CTFNR/L 3225P16-A7 | 32 | 25 | 170 | 29 | 32 | | | TNGN1607 | UH1 | SHTN3A | BM408 | LW4 |
| CTFNR/L 3225P22-A4 | 32 | 25 | 170 | 32 | 32 | | | TNGN2204 | UH1 | SHTN4 | FM410 | LW4 |
| CTFNR/L 3225P22-A7 | 32 | 25 | 170 | 32 | 32 | | | TNGN2207 | UH1 | SHTN4 | FM410 | LW4 |

| Spare parts | | | | | |
|---|---|---|---|---|---|
| Clamp & Clamp Screw | Shim | | Shim Screw | | Wrench |
|  |  |  |  |  |  |
| UH1 | SHTN3A | SHTN4A | BM408 | FM410 | LW4 |

CERAMIC

CERMET

PCBN
/
PCD

TOOL
HOLDER

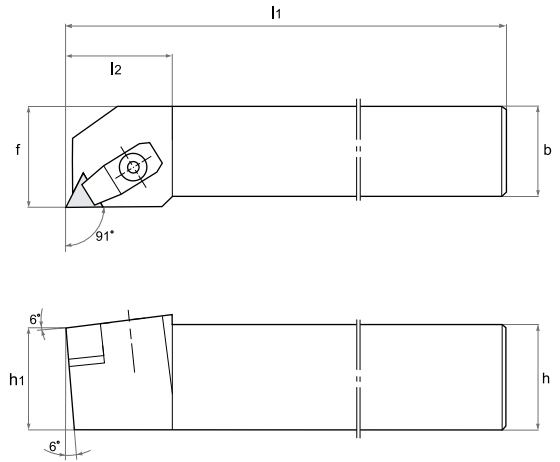
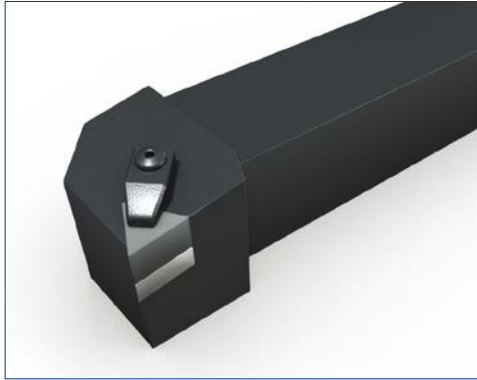
MILLING
CUTTER

TNGN



Page 46

CTGN



| Type | Dimensions [mm] | | | | | Stock | | Insert | Spare Parts | | | |
|--------------------|---------------------|----|----------------|----------------|----|-------|---|----------|---------------------|--------|------------|--------|
| | h [h ₁] | b | l ₁ | l ₂ | f | R | L | | Clamp & Clamp Screw | Shim | Shim Screw | Wrench |
| CTGNR/L 2525M16-A4 | 25 | 25 | 150 | 26 | 32 | • | • | TNGN1604 | UH1 | SHTN3A | BM408 | LW4 |
| CTGNR/L 2525M16-A7 | 25 | 25 | 150 | 26 | 32 | | • | TNGN1607 | UH1 | SHTN3A | BM408 | LW4 |
| CTGNR/L 2525M22-A4 | 25 | 25 | 150 | 26 | 32 | • | | TNGN2204 | UH1 | SHTN4 | FM410 | LW4 |
| CTGNR/L 2525M22-A7 | 25 | 25 | 150 | 26 | 32 | | | TNGN2207 | UH1 | SHTN4 | FM410 | LW4 |
| CTGNR/L 3225P16-A4 | 32 | 25 | 170 | 26 | 32 | • | • | TNGN1604 | UH1 | SHTN3A | BM408 | LW4 |
| CTGNR/L 3225P16-A7 | 32 | 25 | 170 | 26 | 32 | | | TNGN1607 | UH1 | SHTN3A | BM408 | LW4 |
| CTGNR/L 3225P22-A4 | 32 | 25 | 170 | 26 | 32 | | | TNGN2204 | UH1 | SHTN4 | FM410 | LW4 |
| CTGNR/L 3225P22-A7 | 32 | 25 | 170 | 26 | 32 | | | TNGN2207 | UH1 | SHTN4 | FM410 | LW4 |






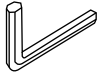
CERAMIC

CERMET

PCBN
/
PCD

TOOL
HOLDER

MILLING
CUTTER

| Spare parts | | | | | |
|---|---|---|---|---|---|
| Clamp & Clamp Screw | Shim | | Shim Screw | | Wrench |
|  |  |  |  |  |  |
| UH1 | SHTN3A | SHTN4A | BM408 | FM410 | LW4 |

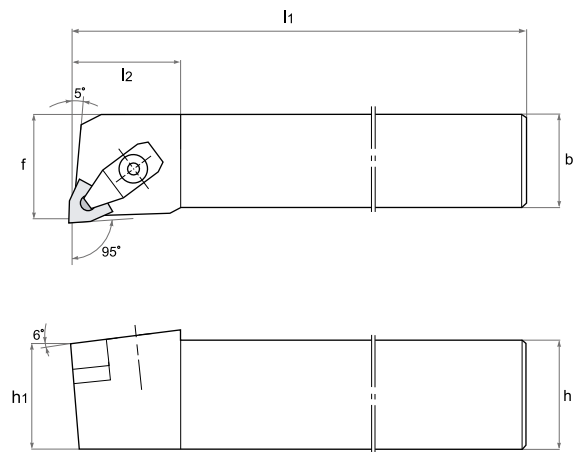
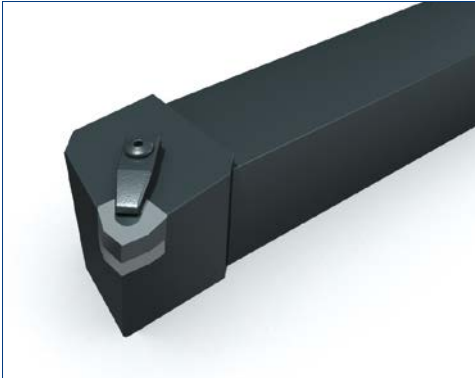


EXTERNAL TOOLHOLDER





PART.
A

TURNING
&
MILLING

CWLN



| Type | Dimensions (mm) | | | | | Stock | | Insert | Spare Parts | | | |
|-------------------|--------------------|----|----------------|----------------|----|-------|---|----------|---------------------|--------|------------|--------|
| | h(h ₁) | b | l ₁ | l ₂ | f | R | L | | Clamp & Clamp Screw | Shim | Shim Screw | Wrench |
| CWLN/L 2525M08-X7 | 25 | 25 | 150 | 28 | 32 | • | • | WNGX0807 | UH5 | SHWN4A | TM4010 | LW4 |
| CWLN/L 3225M08-X7 | 32 | 25 | 150 | 28 | 32 | • | • | WNGX0807 | UH5 | SHWN4A | TM4010 | LW4 |

| Spare parts | | | |
|---|---|---|---|
| Clamp & Clamp Screw | Shim | Shim Screw | Wrench |
|  |  |  |  |
| UH5 | SHWN4A | TM4010 | LW4 |

CERAMIC

CERMET

PCBN
/
PCD

TOOL
HOLDER

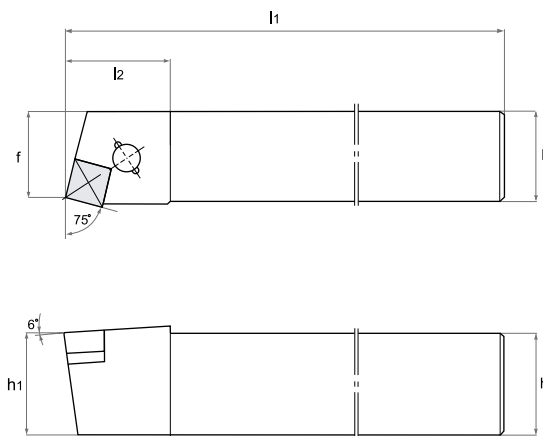
MILLING
CUTTER

WNGX



Page 51

CSRC



| Type | Dimensions [mm] | | | | | Stock | | Insert | Spare Parts | | | |
|---------------------------|--------------------|----|----------------|----------------|----|-------|---|----------|---------------------|--------|------------|--------|
| | h(h ₁) | b | l ₁ | l ₂ | f | R | L | | Clamp & Clamp Screw | Shim | Shim Screw | Wrench |
| CSRCR/L 2525M12-A4 | 25 | 25 | 150 | 32 | 27 | • | | SCGN1204 | UH1 | SHSC4A | SP3 | LW4 |
| CSRCR/L 3225P12-A4 | 32 | 25 | 170 | 32 | 27 | | | SCGN1204 | UH1 | SHSC4A | SP3 | LW4 |

| Spare parts | | | |
|---------------------|--------|------------|--------|
| Clamp & Clamp Screw | Shim | Shim Screw | Wrench |
| | | | |
| UH1 | SHSC4A | SP3 | LW4 |

CERAMIC

CERMET

PCBN
/
PCD

TOOL
HOLDER

MILLING
CUTTER

SCGN



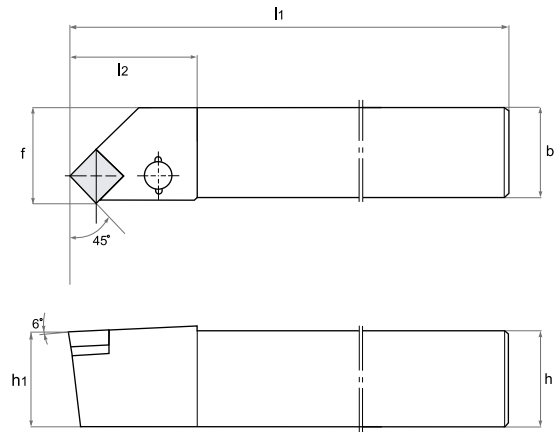
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EXTERNAL TOOLHOLDER

PART.
A

TURNING
&
MILLING

CSSC



| Type | Dimensions (mm) | | | | | Stock | | Insert | Spare Parts | | | |
|--------------------|--------------------|----|----------------|----------------|----|-------|---|----------|---------------------|--------|------------|--------|
| | h(h ₁) | b | l ₁ | l ₂ | f | R | L | | Clamp & Clamp Screw | Shim | Shim Screw | Wrench |
| CSSCR/L 2525M12-A4 | 25 | 25 | 150 | 35 | 32 | • | | SCGN1204 | UH1 | SHSC4A | SP3 | LW4 |
| CSSCR/L 2525M12-A6 | 25 | 25 | 150 | 35 | 32 | | | SCGN1206 | UH1 | SHSC4A | SP3 | LW4 |
| CSSCR/L 3225P12-A4 | 32 | 25 | 170 | 35 | 32 | | | SCGN1204 | UH1 | SHSC4A | SP3 | LW4 |
| CSSCR/L 3225P12-A6 | 32 | 25 | 170 | 35 | 32 | | | SCGN1206 | UH1 | SHSC4A | SP3 | LW4 |

| Spare parts | | | |
|---------------------|--------|------------|--------|
| Clamp & Clamp Screw | Shim | Shim Screw | Wrench |
| | | | |
| UH1 | SHSC4A | SP3 | LW4 |

CERAMIC

CERMET

PCBN
/
PCD

TOOL
HOLDER

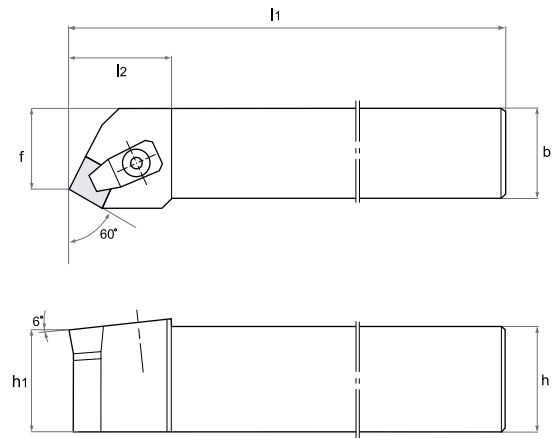
MILLING
CUTTER

SCGN



Page 43

CSTP



| Type | Dimensions [mm] | | | | | Stock | | Insert | Spare Parts | | | |
|---------------------------|---------------------|----|----------------|----------------|----|-------|---|----------|---------------------|--------|------------|--------|
| | h [h ₁] | b | l ₁ | l ₂ | f | R | L | | Clamp & Clamp Screw | Shim | Shim Screw | Wrench |
| CSTPR/L 2020K09-A3 | 20 | 20 | 125 | 24 | 17 | | | SPGN0903 | UH1 | SHSC3A | SP3 | LW4 |
| CSTPR/L 2020K12-A3 | 20 | 20 | 125 | 30 | 17 | | | SPGN1203 | UH1 | SHSC4A | SP3 | LW4 |
| CSTPR/L 2020K12-A4 | 20 | 20 | 125 | 30 | 17 | | | SPGN1204 | UH1 | SHSC4A | SP3 | LW4 |
| CSTPR/L 2525M12-A3 | 25 | 25 | 150 | 30 | 22 | | | SPGN1203 | UH1 | SHSC4A | SP3 | LW4 |
| CSTPR/L 2525M12-A4 | 25 | 25 | 150 | 30 | 22 | | | SPGN1204 | UH1 | SHSC4A | SP3 | LW4 |

| Spare parts | | | | |
|---------------------|--------|--------|------------|--------|
| Clamp & Clamp Screw | Shim | | Shim Screw | Wrench |
| | | | | |
| UH1 | SHSC3A | SHSC4A | SP3 | LW4 |

CERAMIC

CERMET

PCBN
/
PCD

TOOL
HOLDER

MILLING
CUTTER

SPGN



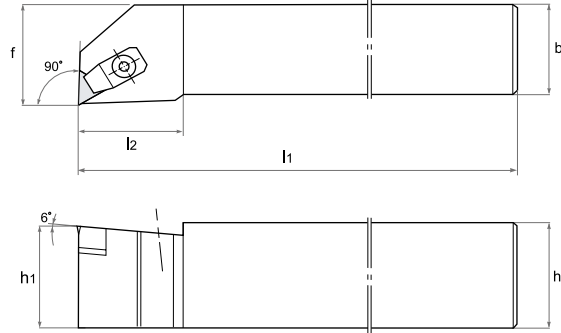
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EXTERNAL TOOLHOLDER





PART.
A

TURNING
&
MILLING

CTFP



| Type | Dimensions (mm) | | | | | Stock | | Insert | Spare Parts | | | |
|--------------------|--------------------|----|----------------|----------------|----|-------|---|----------|---------------------|--------|------------|--------|
| | h(h ₁) | b | l ₁ | l ₂ | f | R | L | | Clamp & Clamp Screw | Shim | Shim Screw | Wrench |
| CTFPR/L 2020K16-A3 | 20 | 20 | 125 | 20 | 25 | | | TPGN1603 | UH1 | SHTC3A | SP3 | LW4 |
| CTFPR/L 2525M16-A3 | 25 | 25 | 150 | 20 | 32 | | | TPGN1603 | UH1 | SHTC3A | SP3 | LW4 |

| Spare parts | | | |
|---|---|---|---|
| Clamp & Clamp Screw | Shim | Shim Screw | Wrench |
|  |  |  |  |
| UH1 | SHTC3A | SP3 | LW3 LW4 |

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HOLDER

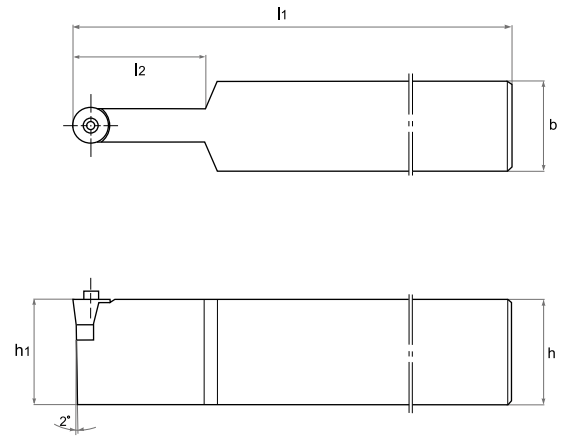
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CUTTER

TPGN



Page 48

HRCD



| Type | Dimensions [mm] | | | | Stock | Insert | Spare Parts | | |
|-------------------------|--------------------|----|----------------|----------------|-------|---------|---------------------|--------|--------|
| | h(h ₁) | b | l ₁ | l ₂ | | | Clamp & Clamp Screw | Shim | Wrench |
| HRCD 2525M12-B6 | 25 | 25 | 150 | 15 | • | CDH1206 | HB 2 | SHCD22 | LW2.5 |
| HRCD 2525M19-B9 | 25 | 25 | 150 | 15 | • | CDH1909 | HB 3 | SHCD33 | LW5 |
| HRCD 3225R19-B9 | 32 | 25 | 200 | 38 | • | CDH1909 | HB 3 | SHCD33 | LW5 |
| HRCD 4035S19-B9 | 40 | 35 | 250 | 45 | • | CDH1909 | HB 3 | SHCD33 | LW5 |
| HRCD 4035S32-B19 | 40 | 35 | 250 | 45 | | CDH3219 | HB 5 | SHCD53 | LW6 |
| HRCD 5050T32-B19 | 50 | 50 | 300 | 50 | | CDH3219 | HB 5 | SHCD53 | LW6 |

| Spare parts | | | | | | | | | |
|---------------------|-----|-----|--------|--------|--------|--------|-----|-----|--|
| Clamp & Clamp Screw | | | Shim | | | Wrench | | | |
| | | | | | | | | | |
| HB2 | HB3 | HB5 | SHCD22 | SHCD33 | SHCD53 | LW2.5 | LW5 | LW6 | |

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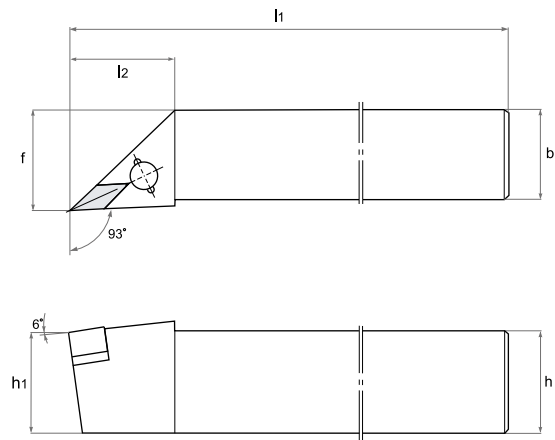


EXTERNAL TOOLHOLDER

PART.
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CVJN



| Type | Dimensions (mm) | | | | | Stock | | Insert | Spare Parts | | | |
|--------------------|--------------------|----|----------------|----------------|----|-------|---|----------|---------------------|--------|------------|--------|
| | h(h ₁) | b | l ₁ | l ₂ | f | R | L | | Clamp & Clamp Screw | Shim | Shim Screw | Wrench |
| CVJNR/L 2525M16-A4 | 25 | 25 | 150 | 41 | 32 | • | • | VNGN1604 | SM4 | SHVN3A | TM412 | LW4 |
| CVJNR/L 2525M16-X7 | 25 | 25 | 150 | 41 | 32 | • | • | VNGX1607 | SM4 | SHVN3A | TM412 | LW4 |
| CVJNR/L 3225P16-X7 | 32 | 25 | 170 | 41 | 32 | • | | VNGX1607 | SM4 | SHVN3A | TM412 | LW4 |

| Spare parts | | | |
|---------------------|--------|------------|--------|
| Clamp & Clamp Screw | Shim | Shim Screw | Wrench |
| | | | |
| SM4 | SHVN3A | TM412 | LW4 |

CERAMIC

CERMET

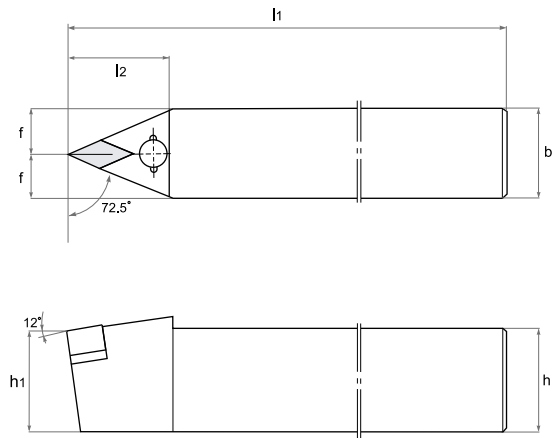
PCBN
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PCD

TOOL
HOLDER

MILLING
CUTTER

| VNGN | VNGX |
|---------|---------|
| | |
| Page 49 | Page 50 |

CVVN



| Type | Dimensions [mm] | | | | | Stock | Insert | Spare Parts | | | |
|-------------------------|---------------------|----|----------------|----------------|------|-------|----------|---------------------|--------|------------|--------|
| | h [h ₁] | b | l ₁ | l ₂ | f | | | Clamp & Clamp Screw | Shim | Shim Screw | Wrench |
| CVVNN 2525M16-A4 | 25 | 25 | 150 | 45 | 12.5 | | VNGN1604 | SM4 | SHVN3A | TM412 | LW4 |
| CVVNN 2525M16-X7 | 25 | 25 | 150 | 45 | 12.5 | | VNGX1607 | SM4 | SHVN3A | TM412 | LW4 |
| CVVNN 3225P16-X7 | 32 | 25 | 170 | 45 | 12.5 | • | VNGX1607 | SM4 | SHVN3A | TM412 | LW4 |

| Spare parts | | | |
|---------------------|--------|------------|--------|
| Clamp & Clamp Screw | Shim | Shim Screw | Wrench |
| | | | |
| SM4 | SHVN3A | TM412 | LW4 |

CERAMIC

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CUTTER

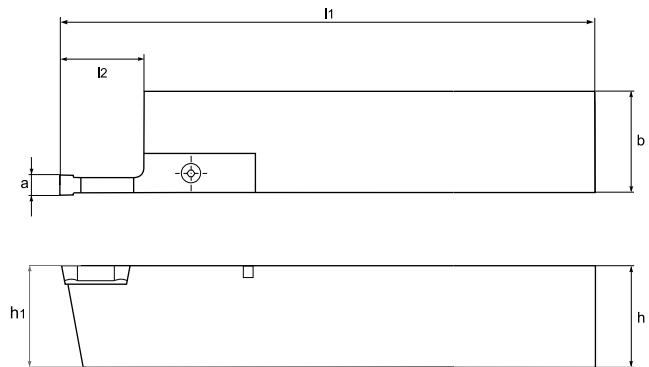
| VNGN | VNGX |
|---------|---------|
| | |
| Page 49 | Page 50 |

EXTERNAL TOOLHOLDER

PART.
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MILLING

CSBF



| Type | Dimensions (mm) | | | | | Stock | | Insert | Spare Parts | |
|-------------------|-----------------|--------------------|----|----------------|----------------|-------|---|----------|---------------------|--------|
| | a | h[h ₁] | b | l ₁ | l ₂ | R | L | | Clamp & Clamp Screw | Wrench |
| CSBF 5040P3228R/L | 3.18 | 50 | 40 | 170 | 19 | | | SYBF3228 | SGD3 / BM518 | LW3 |
| CSBF 5040P4828R/L | 4.78 | 50 | 40 | 170 | 19 | | | SYBF4828 | SGD4 / BM518 | LW4 |
| CSBF 5040P5528R/L | 5.54 | 50 | 40 | 170 | 19 | | | SYBF5528 | SGD4 / BM518 | LW4 |
| CSBF 5040P6428R/L | 6.35 | 50 | 40 | 170 | 19 | | | SYBF6428 | SGD6 / BM618 | LW4 |
| CSBF 5040P7928R/L | 7.93 | 50 | 40 | 170 | 19 | | | SYBF7928 | SGD6 / BM618 | LW4 |
| CSBF 5040P9528R/L | 9.52 | 50 | 40 | 170 | 19 | | | SYBF9528 | SGD9 / BM1018 | LW5 |

| Spare parts | | | | | | | | | | | | |
|---------------------|------|------|------|-------|-------|--------|--------|-----|-----|--|--|--|
| Clamp & Clamp Screw | | | | | | | Wrench | | | | | |
| | | | | | | | | | | | | |
| SGD3 | SGD4 | SGD6 | SGD9 | BM518 | BM618 | BM1018 | LW3 | LW4 | LW5 | | | |

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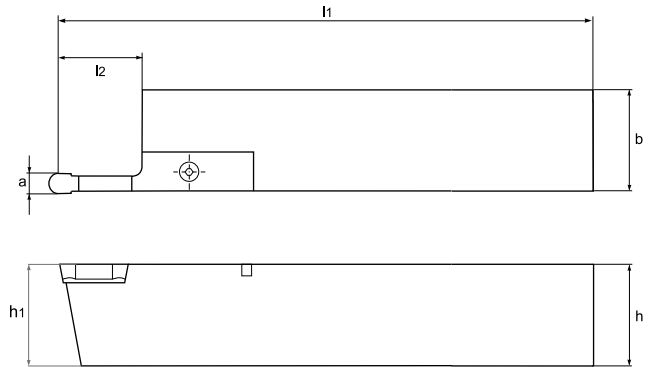
TOOL
HOLDER

MILLING
CUTTER

SYBF



CSBR



| Type | Dimensions [mm] | | | | | Stock | | Insert | Spare Parts | |
|-------------------|-----------------|--------------------|----|----------------|----------------|-------|---|----------|---------------------|--------|
| | a | h(h ₁) | b | l ₁ | l ₂ | R | L | | Clamp & Clamp Screw | Wrench |
| CSBR 5040P3228R/L | 3.18 | 50 | 40 | 170 | 19 | | | SYBR3228 | SGD3 / BM518 | LW3 |
| CSBR 5040P4828R/L | 4.78 | 50 | 40 | 170 | 19 | | | SYBR4828 | SGD4 / BM518 | LW4 |
| CSBR 5040P5528R/L | 5.54 | 50 | 40 | 170 | 19 | | | SYBR5528 | SGD4 / BM518 | LW4 |
| CSBR 5040P6428R/L | 6.35 | 50 | 40 | 170 | 19 | | | SYBR6428 | SGD6 / BM618 | LW4 |
| CSBR 5040P7928R/L | 7.93 | 50 | 40 | 170 | 19 | | | SYBR7928 | SGD6 / BM618 | LW4 |
| CSBR 5040P9528R/L | 9.52 | 50 | 40 | 170 | 19 | | | SYBR9528 | SGD9 / BM1018 | LW5 |

| Spare parts | | | | | | | | | |
|---------------------|------|------|------|-------|-------|--------|-----|-----|-----|
| Clamp & Clamp Screw | | | | | | Wrench | | | |
| | | | | | | | | | |
| SGD3 | SGD4 | SGD6 | SGD9 | BM518 | BM618 | BM1018 | LW3 | LW4 | LW5 |

CERAMIC

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SYBR

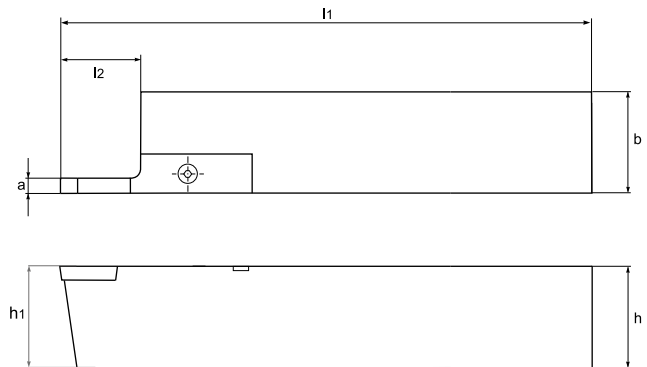
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EXTERNAL TOOLHOLDER

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CSGF



| Type | Dimensions (mm) | | | | | Stock | | Insert | Spare Parts | |
|-------------------|-----------------|--------------------|----|----------------|----------------|-------|---|---------|---------------------|--------|
| | a | h[h ₁] | b | l ₁ | l ₂ | R | L | | Clamp & Clamp Screw | Wrench |
| CSGF 3225P4012R/L | 4.0 | 32 | 25 | 170 | 19 | • | | SGF4012 | SGL4 / BM518 | LW3 |
| CSGF 3225P5012R/L | 5.0 | 32 | 25 | 170 | 19 | • | | SGF5012 | SGL5 / BM518 | LW4 |
| CSGF 3225P6015R/L | 6.0 | 32 | 25 | 170 | 19 | • | • | SGF6015 | SGL5 / BM518 | LW4 |
| CSGF 3225P7015R/L | 7.0 | 32 | 25 | 170 | 19 | • | | SGF7015 | SGL7 / BM618 | LW5 |
| CSGF 3225P8015R/L | 8.0 | 32 | 25 | 170 | 19 | • | • | SGF8015 | SGL8 / BM618 | LW5 |
| CSGF 3225P1015R/L | 10.0 | 32 | 25 | 170 | 19 | | | SGF1015 | SGL8 / BM618 | LW5 |

| Spare parts | | | | | | | | | |
|---------------------|------|------|------|--|--------|-------|-----|-----|-----|
| Clamp & Clamp Screw | | | | | Wrench | | | | |
| | | | | | | | | | |
| SGL4 | SGL5 | SGL7 | SGL8 | | BM518 | BM618 | LW3 | LW4 | LW5 |

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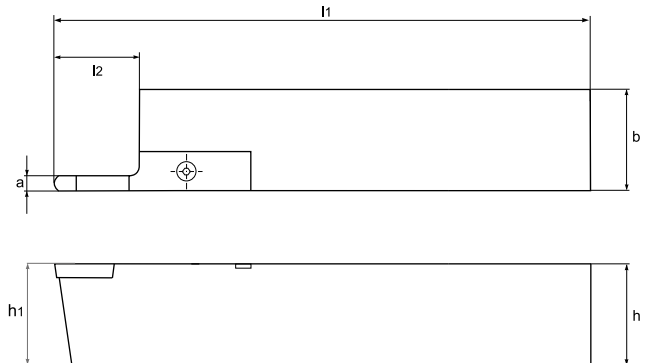
MILLING
CUTTER

SGF



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CSGR



| Type | Dimensions [mm] | | | | | Stock | | Insert | Spare Parts | |
|--------------------------|-----------------|--------------------|----|----------------|----------------|-------|---|---------|---------------------|--------|
| | a | h(h ₁) | b | l ₁ | l ₂ | R | L | | Clamp & Clamp Screw | Wrench |
| CSGR 3225P4012R/L | 4.0 | 32 | 25 | 170 | 19 | | • | SGR4012 | SGL4 / BM518 | LW3 |
| CSGR 3225P5012R/L | 5.0 | 32 | 25 | 170 | 19 | • | | SGR5012 | SGL5 / BM518 | LW4 |
| CSGR 3225P6015R/L | 6.0 | 32 | 25 | 170 | 19 | | | SGR6015 | SGL5 / BM518 | LW4 |
| CSGR 3225P7015R/L | 7.0 | 32 | 25 | 170 | 19 | | | SGR7015 | SGL7 / BM618 | LW5 |
| CSGR 3225P8015R/L | 8.0 | 32 | 25 | 170 | 19 | | | SGR8015 | SGL8 / BM618 | LW5 |
| CSGR 3225P1015R/L | 10.0 | 32 | 25 | 170 | 19 | | | SGR1015 | SGL8 / BM618 | LW5 |

| Spare parts | | | | | | | | | |
|---------------------|------|------|------|-------|-------|--------|-----|-----|--|
| Clamp & Clamp Screw | | | | | | Wrench | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| SGL4 | SGL5 | SGL7 | SGL8 | BM518 | BM618 | LW3 | LW4 | LW5 | |

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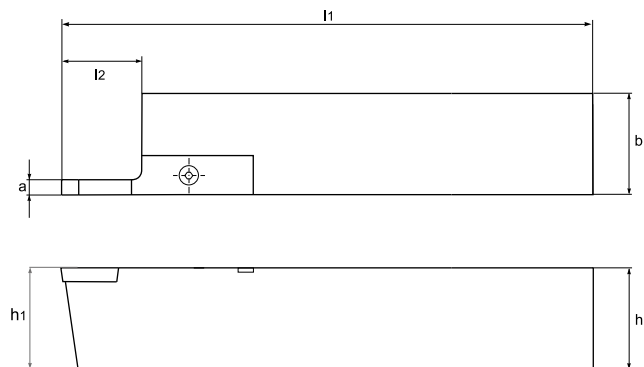


EXTERNAL TOOLHOLDER

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CSSF



| Type | Dimensions (mm) | | | | | Stock | | Insert | Spare Parts | |
|-------------------|-----------------|--------------------|----|----------------|----------------|-------|---|---------|---------------------|--------|
| | a | h[h ₁] | b | l ₁ | l ₂ | R | L | | Clamp & Clamp Screw | Wrench |
| CSSF 3225P4012R/L | 4.0 | 32 | 25 | 170 | 19 | • | • | SSF4012 | SGL4 / BM518 | LW3 |
| CSSF 3225P5012R/L | 5.0 | 32 | 25 | 170 | 19 | • | | SSF5012 | SGL5 / BM518 | LW4 |
| CSSF 3225P6015R/L | 6.0 | 32 | 25 | 170 | 19 | • | | SSF6015 | SGL5 / BM518 | LW4 |
| CSSF 3225P7015R/L | 7.0 | 32 | 25 | 170 | 19 | | | SSF7015 | SGL7 / BM618 | LW5 |
| CSSF 3225P8015R/L | 8.0 | 32 | 25 | 170 | 19 | | | SSF8015 | SGL8 / BM618 | LW5 |
| CSSF 3225P1015R/L | 10.0 | 32 | 25 | 170 | 19 | | | SSF1015 | SGL8 / BM618 | LW5 |

| Spare parts | | | | | | | | | |
|---------------------|------|------|------|-------|--------|-----|-----|-----|--|
| Clamp & Clamp Screw | | | | | Wrench | | | | |
| | | | | | | | | | |
| SGL4 | SGL5 | SGL7 | SGL8 | BM518 | BM618 | LW3 | LW4 | LW5 | |

CERAMIC

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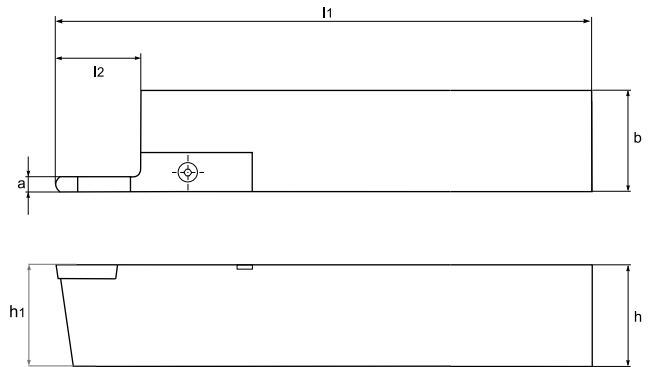
MILLING
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SSF



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CSSR



| Type | Dimensions [mm] | | | | | Stock | | Insert | Spare Parts | |
|-------------------|-----------------|--------------------|----|----------------|----------------|-------|---|---------|---------------------|--------|
| | a | h(h ₁) | b | l ₁ | l ₂ | R | L | | Clamp & Clamp Screw | Wrench |
| CSSR 3225P4012R/L | 4.0 | 32 | 25 | 170 | 19 | | | SSR4012 | SGL4 / BM518 | LW3 |
| CSSR 3225P5012R/L | 5.0 | 32 | 25 | 170 | 19 | • | | SSR5012 | SGL5 / BM518 | LW4 |
| CSSR 3225P6015R/L | 6.0 | 32 | 25 | 170 | 19 | • | | SSR6015 | SGL5 / BM518 | LW4 |
| CSSR 3225P7015R/L | 7.0 | 32 | 25 | 170 | 19 | | | SSR7015 | SGL7 / BM618 | LW5 |
| CSSR 3225P8015R/L | 8.0 | 32 | 25 | 170 | 19 | • | | SSR8015 | SGL8 / BM618 | LW5 |
| CSSR 3225P1015R/L | 10.0 | 32 | 25 | 170 | 19 | | | SSR1015 | SGL8 / BM618 | LW5 |

| Spare parts | | | | | | | | | |
|---------------------|------|------|------|-------|-------|--------|-----|-----|--|
| Clamp & Clamp Screw | | | | | | Wrench | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| SGL4 | SGL5 | SGL7 | SGL8 | BM518 | BM618 | LW3 | LW4 | LW5 | |

CERAMIC

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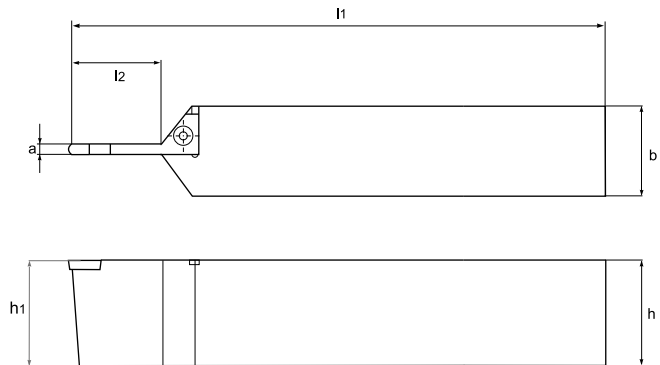
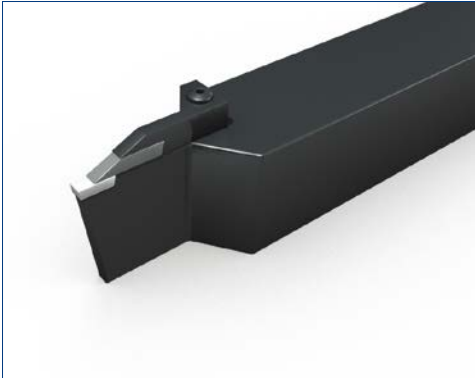


EXTERNAL TOOLHOLDER

PART.
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CSSR .. N



| Type | Dimensions (mm) | | | | | Stock | Insert | Spare Parts | |
|---------------------------|-----------------|--------------------|----|----------------|----------------|-------|---------|---------------------|--------|
| | a | h[h ₁] | b | l ₁ | l ₂ | | | Clamp & Clamp Screw | Wrench |
| CSSR 4040R4012.N5 | 4.0 | 40 | 40 | 200 | 5 | | SSR4012 | GRW4012 / BM518 | LW3 |
| CSSR 5040P4012.N19 | 4.0 | 50 | 40 | 170 | 19 | | SSR4012 | GRW4012 / BM518 | LW3 |

| Spare parts | | |
|---------------------|--------|-----|
| Clamp & Clamp Screw | Wrench | |
| | | |
| GRW4012 | BM518 | LW4 |

CERAMIC

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TOOL
HOLDER

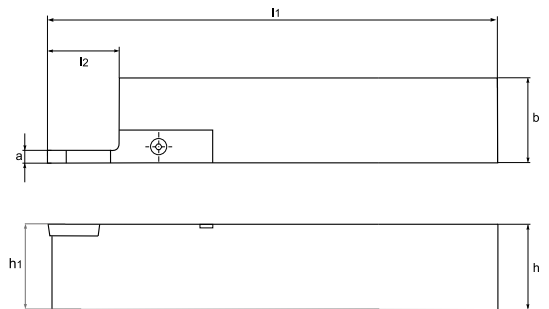
MILLING
CUTTER

SSR



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CBF/R



| Type | Dimensions (mm) | | | | | Stock | | Insert | Spare Parts | | |
|-----------------------------|-----------------|--------------------|----|----------------|----------------|-------|---|--|---------------------|--------|--------|
| | a | h(h ₁) | b | l ₁ | l ₂ | R | L | | Clamp & Clamp Screw | Spring | Wrench |
| CBF/R 2525M094050R/L | 2.3 | 25 | 25 | 150 | 19 | | | WFP094050 WRP094050 WFC094050 WRC094050 | WGL2.3 R/L & WCB6 | WCS6 | LW5 |
| CBF/R 2525M125050R/L | 3.1 | 25 | 25 | 150 | 19 | • | • | WFP125050 WRP125050 WFC125050 WRC125050 | WGL3.1 R/L & WCB6 | WCS6 | LW5 |
| CBF/R 2525M156050R/L | 3.9 | 25 | 25 | 150 | 19 | • | • | WFP156050 WRP156050 WFC156050 WRC156050 | WGL3.9 R/L & WCB6 | WCS6 | LW5 |
| CBF/R 2525M187050R/L | 4.7 | 25 | 25 | 150 | 19 | • | • | WFP187050 WRP187050 WFC187050 WRC187050 | WGL4.7 R/L & WCB6 | WCS6 | LW5 |
| CBF/R 2525M218075R/L | 5.5 | 25 | 25 | 150 | 29 | • | | WFP218075 WRP218075 WFC218075 WRC218075 | WGL5.5 R/L & WCB6 | WCS6 | LW5 |
| CBF/R 2525M250075R/L | 6.3 | 25 | 25 | 150 | 29 | • | • | WFP250075 WRP250075 WFC250075 WRC250075 | WGL6.3 R/L & WCB6 | WCS6 | LW5 |
| CBF/R 2525M281075R/L | 7.1 | 25 | 25 | 150 | 29 | | | WFP281075 WRP281075 WFC281075 WRC281075 | WGL7.1 R/L & WCB6 | WCS6 | LW5 |
| CBF/R 2525M312100R/L | 7.9 | 25 | 25 | 150 | 38 | | | WFP312100 WRP312100 WFC312100 WRC312100 | WGL7.9 R/L & WCB6 | WCS6 | LW5 |
| CBF/R 2525M344100R/L | 8.7 | 25 | 25 | 150 | 38 | | | WFP344100 WRP344100 WFC344100 WRC344100 | WGL8.7 R/L & WCB6 | WCS6 | LW5 |
| CBF/R 2525M375100R/L | 9.5 | 25 | 25 | 150 | 38 | | | WFP375100 WRP375100 WFC375100 WRC375100 | WGL9.5 R/L & WCB6 | WCS6 | LW5 |

CERAMIC

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CUTTER

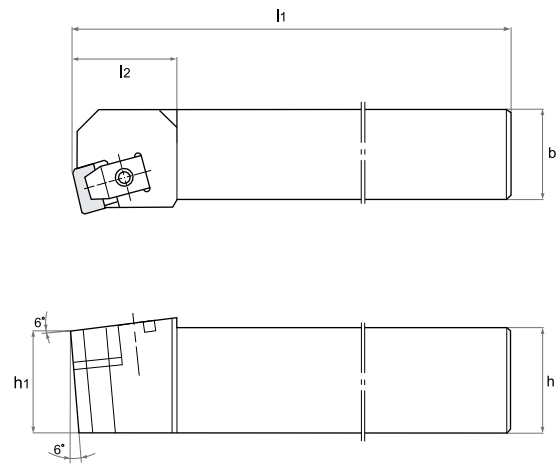
| Spare parts | | | |
|------------------------|------|--------|--------|
| Clamp & Clamp Screw | | Spring | Wrench |
| | | | |
| WGL2.3 R/L ~WGL9.5 R/L | WCB6 | WCS6 | LW5 |

SPECIAL TOOLHOLDER

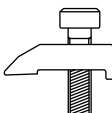
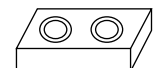


PART.
A

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| Type | Dimensions (mm) | | | | Stock | | Insert | Spare Parts | | | |
|--------------------------|--------------------|----|----------------|----------------|-------|---|---------|---------------------|--------|------------|--------|
| | h(h ₁) | b | l ₁ | l ₂ | R | L | | Clamp & Clamp Screw | Shim | Shim Screw | Wrench |
| CLKNR/L 6060V65-A | 60 | 60 | 400 | 70 | | | LNJ6588 | UH25 | SHLJ65 | BM510 | LW6 |
| CLKNR/L 6060V66-A | 60 | 60 | 400 | 70 | | | LNJ6688 | UH25 | SHLJ66 | BM510 | LW6 |

| Spare parts | | | | |
|---|---|--------|--|---|
| Clamp & Clamp Screw | Shim | | Shim Screw | Wrench |
|  |  | |  |  |
| UH25 | SHLJ65 | SHLJ66 | BM510 | LW6 |

CERAMIC

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TOOL
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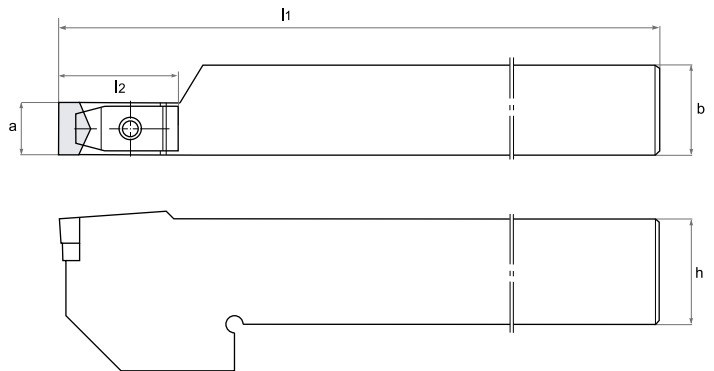
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CFLN



| Type | Dimensions [mm] | | | | | Stock | Insert | Spare Parts | | | |
|------------------------|-----------------|--------------------|----|----------------|----------------|-------|---------|-------------|---------------------|-------|------------|
| | a | h(h ₁) | b | l ₁ | l ₂ | | | R | Clamp & Clamp Screw | Shim | Shim Screw |
| CFLNN 6060U44-A | 14 | 60 | 60 | 350 | 80 | | F10537 | UH25 | SHF10 | BM510 | LW6 |
| CFLNN 5050T32-A | 12 | 50 | 50 | 300 | 75 | | F13941 | UH25 | SHF13 | BM510 | LW6 |
| CFLNN 4040R25-A | 7 | 40 | 40 | 200 | 40 | | F250723 | UH4 | SHF25 | BM510 | LW4 |

| Spare parts | | | | | | |
|---------------------|------|-------|-------|-------|------------|--------|
| Clamp & Clamp Screw | | Shim | | | Shim Screw | Wrench |
| | | | | | | |
| UH4 | UH25 | SHF10 | SHF13 | SHF25 | BM510 | LW8 |

CERAMIC

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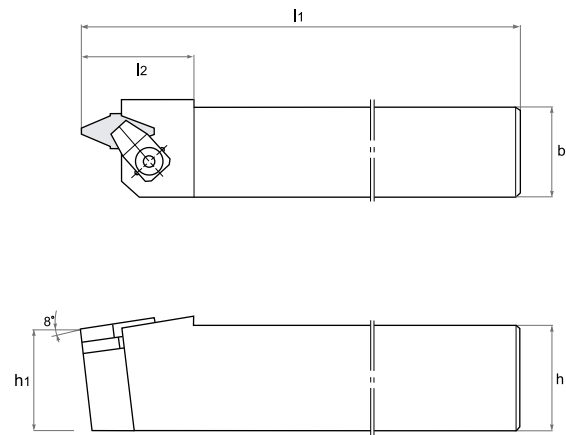
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|-----------------|-----------------|
| F-Series | F-Series |
| | |
| Page 53 | Page 54 |

SPECIAL TOOLHOLDER


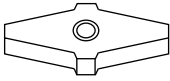


PART.
A

TURNING
&
MILLING

CSVN



| Type | Dimensions (mm) | | | | Stock | Insert | Spare Parts | | | |
|---------------------|--------------------|----|----------------|----------------|-------|----------|-------------|---------------------|-------|------------|
| | h(h ₁) | b | l ₁ | l ₂ | | | R | Clamp & Clamp Screw | Shim | Shim Screw |
| CSVNN 3232P38-A7-26 | 32 | 32 | 170 | 38 | | SVW38260 | UH1 | SHSV3826 | FM510 | LW4 |
| CSVNN 3232P38-A7-32 | 32 | 32 | 170 | 40 | | SVW38320 | UH1 | SHSV3832 | FM510 | LW4 |
| CSVNN 3232P34-A7-40 | 32 | 32 | 170 | 50 | | SVW34400 | UH1 | SHSV3440 | FM510 | LW4 |

| Spare parts | | | | | |
|---|---|----------|----------|---|---|
| Clamp & Clamp Screw | Shim | | | Shim Screw | Wrench |
|  |  | | |  |  |
| UH1 | SHSV3826 | SHSV3832 | SHSV3440 | FM510 | LW4 |

CERAMIC

CERMET

PCBN
/
PCD

TOOL
HOLDER

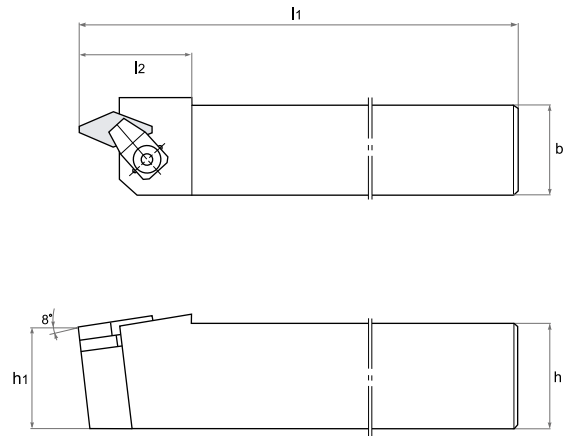
MILLING
CUTTER

SVW


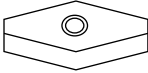




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CGVN



| Type | Dimensions [mm] | | | | Stock | Insert | Spare Parts | | | |
|----------------------------|-----------------|-----|-------|-------|-------|-----------|---------------------|----------|------------|--------|
| | $h(h_1)$ | b | l_1 | l_2 | | | Clamp & Clamp Screw | Shim | Shim Screw | Wrench |
| CGVNN 3232P38-A7-32 | 32 | 32 | 170 | 48 | | GVGN38320 | UH1 | SHGV3832 | FM510 | LW4 |
| CGVNN 3232P38-A7-33 | 32 | 32 | 170 | 46 | | GVGN38335 | UH1 | SHGV3833 | FM510 | LW4 |
| CGVNN 3232P36-A7-34 | 32 | 32 | 170 | 49 | | GVGN36340 | UH1 | SHGV3634 | FM510 | LW4 |
| CGVNN 3232P38-A7-36 | 32 | 32 | 170 | 44 | | GVGN38360 | UH1 | SHGV3836 | FM510 | LW4 |
| CGVNN 3232P34-A7-36 | 32 | 32 | 170 | 44 | | GVGN34360 | UH1 | SHGV3436 | FM510 | LW4 |

| Spare parts | | | | |
|---|---|----------------------|---|---|
| Clamp & Clamp Screw | Shim | | Shim Screw | Wrench |
|  |  | |  |  |
| UH1 | SHGV3832 SHGV3836 | SHGV3833 SHGV3436 | SHGV3634 | FM510 |
| | | | | LW4 |

CERAMIC

CERMET

PCBN
/
PCD

**TOOL
HOLDER**

MILLING
CUTTER

GVGN

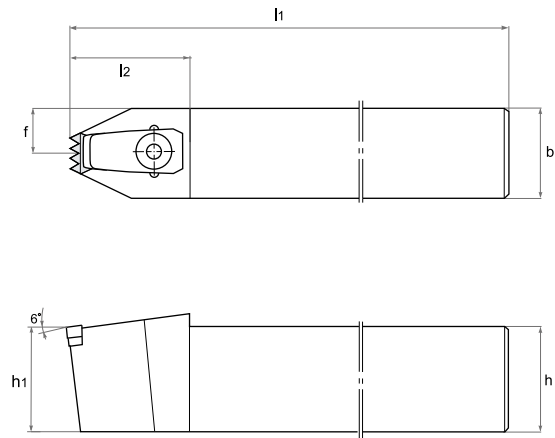


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SPECIAL TOOLHOLDER






PART.
A

CINN



TURNING
&
MILLING

| Type | Dimensions (mm) | | | | | Stock | Insert | Spare Parts | | | |
|---------------------|--------------------|----|----------------|----------------|------|-------|--------------|---------------------|----------|------------|--------|
| | h(h ₁) | b | l ₁ | l ₂ | f | | | Clamp & Clamp Screw | Shim | Shim Screw | Wrench |
| CINNN 2525M09-A4-F3 | 25 | 25 | 150 | 30 | 12.5 | ● | INGN160435F3 | UH1 | SHIN33F3 | TM3008 | LW4 |
| CINNN 2525M12-A4-F4 | 25 | 25 | 150 | 34 | 12.5 | ● | INGN220435F4 | UH1 | SHIN43F4 | TM4010 | LW4 |
| CINNN 3225P09-A4-F3 | 32 | 25 | 170 | 30 | 12.5 | | INGN160435F3 | UH1 | SHIN33F3 | TM3008 | LW4 |
| CINNN 3225P12-A4-F4 | 32 | 25 | 170 | 34 | 12.5 | | INGN220435F4 | UH1 | SHIN43F4 | TM4010 | LW4 |

| Spare parts | | | | |
|---|---|---|---|---|
| Clamp & Clamp Screw | Shim | | Shim Screw | Wrench |
|  |  |  |  |  |
| UH1 | SHIN33F3 | SHIN43F4 | TM3008 | TM4010 |
| | | | | LW4 |

CERAMIC

CERMET

PCBN
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PCD

TOOL
HOLDER

MILLING
CUTTER





MILLING CUTTER

Application Index A 180

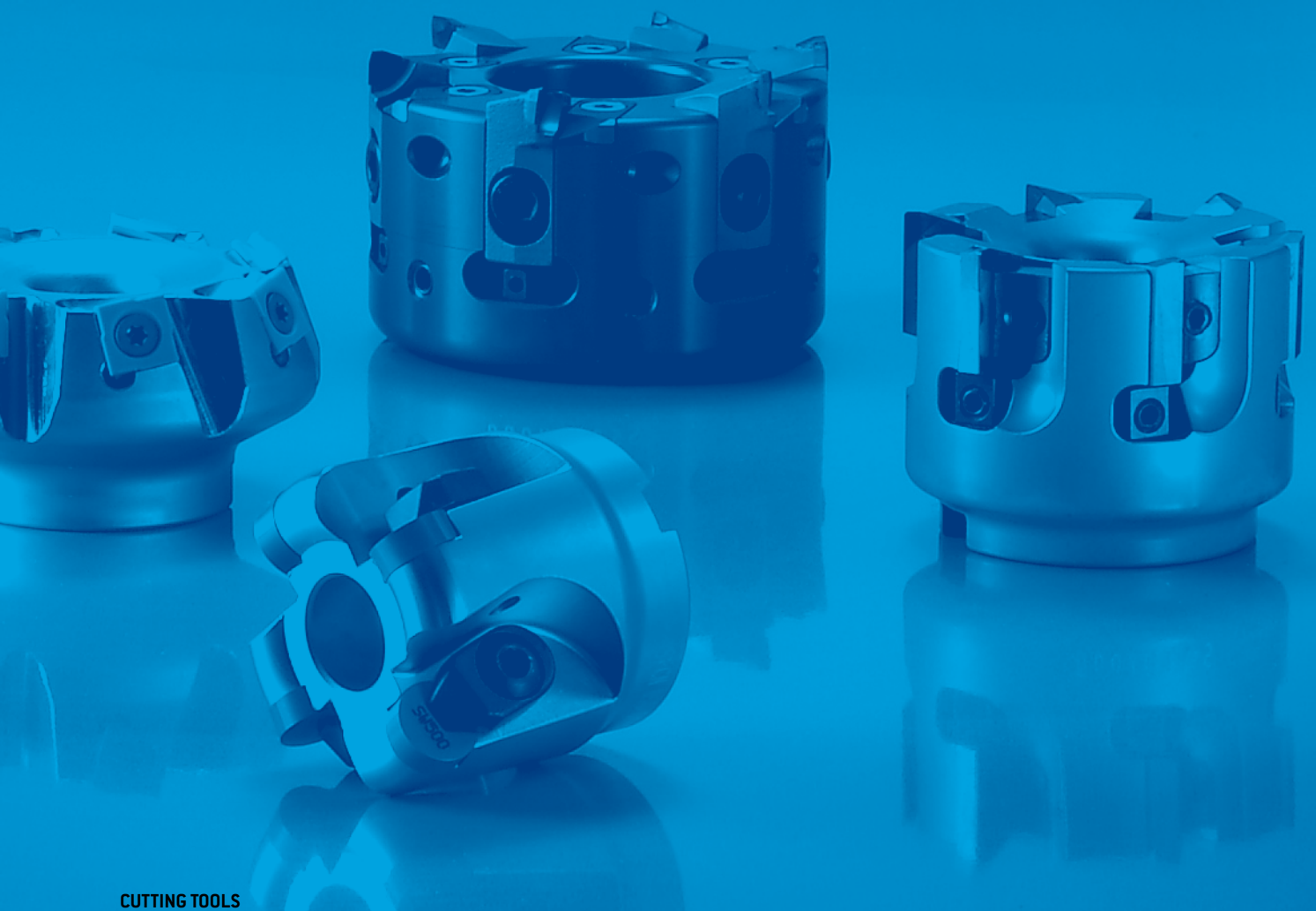
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Chamfer Cutter A 220

Aluminum Cutter A 223

Special Tools A 232



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&
MILLING

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SEXP



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CSC



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HPA-H



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ARBOR



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QCB-I



PAGE 229

QCB-H



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CERAMIC

CERMET

PCBN

EXTERNAL
TOOLHOLDER

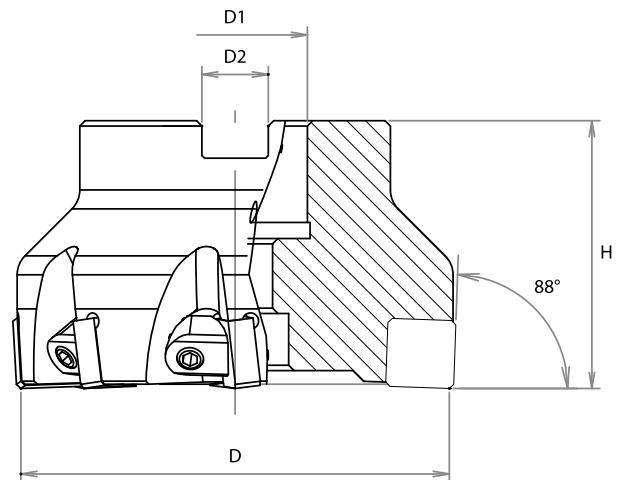
FACE
MILLING
CUTTER

SFKN .. 88



Axial rake angle : -7°

Radial rake angle
D40 : -12°
D50~125 : -10°



| Type | Dimensions [mm] | | | | ⚙️ | Insert |
|--------------------|-----------------|----------------|----------------|----|----|-------------------------------|
| | D | D ₁ | D ₂ | H | | |
| SFKN 040-04-88 N4 | 40 | 16 | 8.4 | 40 | 4 | SNCN 0904 ZYT |
| SFKN 050-05-88 N4 | 50 | 22 | 10.4 | 40 | 5 | |
| SFKN 063-06-88 N4 | 63 | 22 | 10.4 | 40 | 6 | SNCN 1204 ZYT SNCN 1204 ZN |
| SFKN 080-08-88 N4A | 80 | 25.4 | 9.5 | 50 | 8 | |
| SFKN 080-08-88 N4 | 80 | 27 | 12.4 | 50 | 8 | |
| SFKN 100-10-88 N4A | 100 | 31.75 | 12.7 | 50 | 10 | |
| SFKN 100-10-88 N4 | 100 | 32 | 14.4 | 50 | 10 | |
| SFKN 125-12-88 N4A | 125 | 38.1 | 15.9 | 63 | 12 | |
| SFKN 125-12-88 N4 | 125 | 40 | 16.4 | 63 | 12 | |

CERAMIC

CERMET

PCBN
/
PCD

TOOL
HOLDER

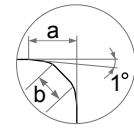
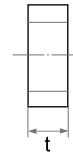
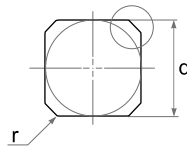
MILLING
CUTTER

| Dimensions [mm] | Spare parts | | |
|-----------------|-------------|-------------|--------|
| | Wedge | Wedge Screw | Wrench |
| D | | | |
| 40 - 50 | SSW9 | WS6 (M6) | LW3 |
| 63 - 125 | SSW10 | WS6 (M6) | LW3 |

Recommended Cutting Condition for Gray Cast Iron

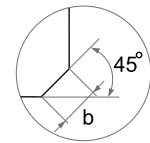
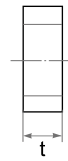
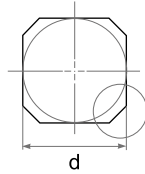
| Process | Hardness [HB] | Cutting Speed Vc[m/min] | Feed fz[mm/z] | Depth ap[mm] | Surface Quality Ra[μm] |
|-----------------|---------------|-------------------------|---------------|--------------|------------------------|
| Roughing | 190~210 | 800~2,000 | 0.08~0.15 | 2.0~5.0 | 6.3~12.5 |
| Roughing | 220~240 | 500~1,500 | 0.08~0.15 | 2.0~5.0 | 6.3~12.5 |
| Roughing | 250~280 | 300~1,200 | 0.08~0.15 | 2.0~5.0 | 6.3~12.5 |

SNCN .. ZZT



| Type | | Dimensions (mm) | | | | | | | | | | | | | | | | | | | | | | | |
|---------------|-------------|-----------------|------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|--|
| ISO | ASA | d | t | a | b | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 | |
| SNCN 0904 ZZT | SNCN 33 ZZT | 9.52 | 4.76 | 1.30 | 1.10 | | | | | | | | | | | | • | • | | • | • | | | | |
| SNCN 1204 ZZT | SNCN 43 ZZT | 12.70 | 4.76 | 3.25 | 1.10 | | | | | | | | | | | | • | • | | • | • | | | | |

SNCN .. ZN



| Type | | Dimensions (mm) | | | | | | | | | | | | | | | | | | | | | | |
|--------------|------------|-----------------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|--|
| ISO | ASA | d | t | b | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 | |
| SNCN 1204 ZN | SNCN 43 ZN | 12.70 | 4.76 | 1.10 | | | | | | | | | | | | • | | | | | | | | |

CERAMIC

CERMET

PCBN
/
PCD

TOOL
HOLDER

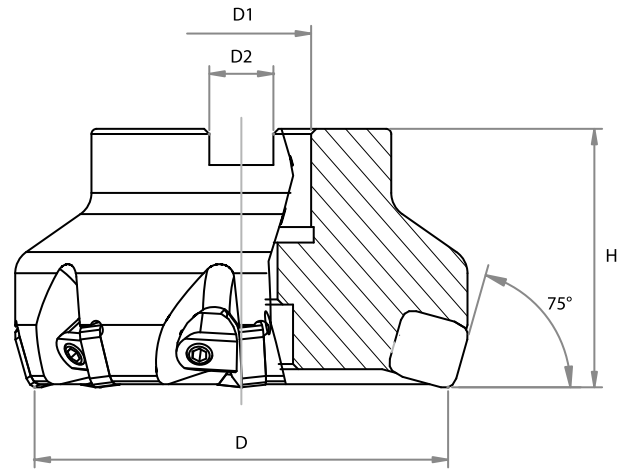
MILLING
CUTTER

SFKN .. 75



Axial rake angle : -6°

Radial rake angle : -10°



| Type | Dimensions [mm] | | | | ⚙️ | Insert |
|--------------------|-----------------|----------------|----------------|----|----|-----------------------------|
| | D | D ₁ | D ₂ | H | | |
| SFKN 050-05-75 N4 | 50 | 22 | 10.4 | 40 | 5 | SNCN 1204 ENTN SNGN 1204 |
| SFKN 063-06-75 N4 | 63 | 22 | 10.4 | 40 | 6 | |
| SFKN 080-08-75 N4A | 80 | 25.4 | 9.5 | 50 | 8 | |
| SFKN 080-08-75 N4 | 80 | 27 | 12.4 | 50 | 8 | |
| SFKN 100-10-75 N4A | 100 | 31.75 | 12.7 | 50 | 10 | |
| SFKN 100-10-75 N4 | 100 | 32 | 14.4 | 50 | 10 | |
| SFKN 125-12-75 N4A | 125 | 38.1 | 15.9 | 63 | 12 | |
| SFKN 125-12-75 N4 | 125 | 40 | 16.4 | 63 | 12 | |

CERAMIC

CERMET

PCBN
/
PCD

TOOL
HOLDER

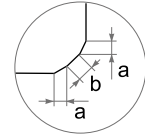
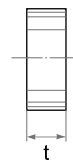
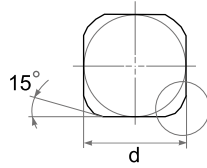
MILLING
CUTTER

| Dimensions [mm] | Spare parts | | |
|-----------------|----------------|----------------------|------------|
| | Wedge | Wedge Screw | Wrench |
| D | | | |
| 50 63 - 125 | SSW10 SSW10 | WS6 [M6] WS6 [M6] | LW3 LW3 |

Recommended Cutting Condition for Gray Cast Iron

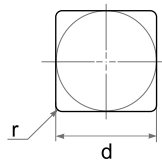
| Process | Hardness [HB] | Cutting Speed Vc[m/min] | Feed fz[mm/z] | Depth ap[mm] | Surface Quality Ra[μm] |
|----------|---------------|-------------------------|---------------|--------------|------------------------|
| Roughing | 190~210 | 800~2,000 | 0.10~0.20 | 2.0~5.0 | 6.3~12.5 |
| Roughing | 220~240 | 500~1,500 | 0.10~0.20 | 2.0~5.0 | 6.3~12.5 |
| Roughing | 250~280 | 300~1,200 | 0.10~0.20 | 2.0~5.0 | 6.3~12.5 |

SNCN .. ENTN



| Type | | Dimensions (mm) | | | | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 |
|----------------|--------------|-----------------|------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|
| ISO | ASA | d | t | a | b | | | | | | | | | | | | | | | | | | | |
| SNCN 1204 ENTN | SNCN 43 ENTN | 12.70 | 4.76 | 1.40 | 1.00 | | | | | | | | | | • | • | • | | | | | | | |

SNGN



| Type | | Dimensions (mm) | | | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 |
|-------------|----------|-----------------|------|-----|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|
| ISO | ASA | d | t | r | | | | | | | | | | | | | | | | | | | |
| SNGN 120412 | SNGN 433 | 12.70 | 4.76 | 1.2 | | | | | | | | | | | | • | | | | | | | |
| SNGN 120416 | SNGN 434 | 12.70 | 4.76 | 1.6 | | | | | | | | | | | | • | | | | | | | |

CERAMIC

CERMET

PCBN
/
PCD

TOOL
HOLDER

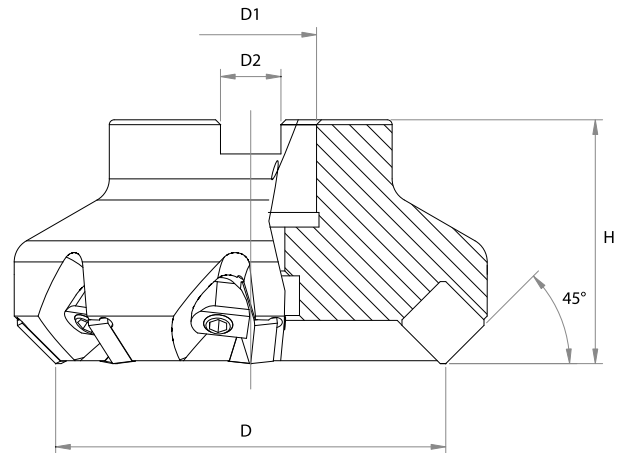
MILLING
CUTTER

SFKN .. 45



Axial rake angle : -6°

Radial rake angle : -12°



| Type | Dimensions [mm] | | | | ⚙️ | Insert |
|--------------------|-----------------|----------------|----------------|----|----|---|
| | D | D ₁ | D ₂ | H | | |
| SFKN 050-05-45 N4 | 50 | 22 | 10.4 | 40 | 5 | SNCN 1204 AN SNCN 1204 ZN SNGN 1204 □ □ |
| SFKN 063-06-45 N4 | 63 | 22 | 10.4 | 40 | 6 | |
| SFKN 080-08-45 N4A | 80 | 25.4 | 9.5 | 50 | 8 | |
| SFKN 080-08-45 N4 | 80 | 27 | 12.4 | 50 | 8 | |
| SFKN 100-10-45 N4A | 100 | 31.75 | 12.7 | 50 | 10 | |
| SFKN 100-10-45 N4 | 100 | 32 | 14.4 | 50 | 10 | |
| SFKN 125-12-45 N4A | 125 | 38.1 | 15.9 | 63 | 12 | |
| SFKN 125-12-45 N4 | 125 | 40 | 16.4 | 63 | 12 | |

CERAMIC

CERMET

PCBN
/
PCD

TOOL
HOLDER

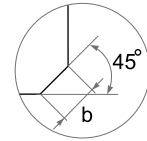
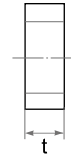
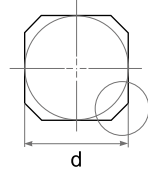
MILLING
CUTTER

| Dimensions [mm] | Spare parts | | |
|-----------------|-------------|-------------|--------|
| | Wedge | Wedge Screw | Wrench |
| D | | | |
| 50 | SSW9 | WS6 [M6] | LW3 |
| 63 - 125 | SSW10 | WS6 [M6] | LW3 |

Recommended Cutting Condition for Gray Cast Iron

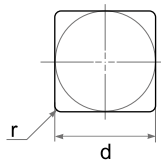
| Process | Hardness [HB] | Cutting Speed Vc[m/min] | Feed fz[mm/z] | Depth ap[mm] | Surface Quality Ra[μm] |
|-----------------|---------------|-------------------------|---------------|--------------|------------------------|
| Roughing | 190~210 | 800~2,000 | 0.15~0.30 | 2.0~5.0 | 3.2~12.5 |
| Roughing | 220~240 | 500~1,500 | 0.15~0.30 | 2.0~5.0 | 3.2~12.5 |
| Roughing | 250~280 | 300~1,200 | 0.15~0.30 | 2.0~5.0 | 3.2~12.5 |

SNCN



| Type | | Dimensions (mm) | | | NEW NEW | | | | | | | | | | | | | | | | | | | |
|--------------|------------|-----------------|------|------|---------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|--|
| ISO | ASA | d | t | b | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 | |
| SNCN 1204 AN | SNCN 43 AN | 12.70 | 4.76 | 2.50 | | | | | | | | | | | | • | | | | | | | | |
| SNCN 1204 ZN | SNCN 43 ZN | 12.70 | 4.76 | 1.10 | | | | | | | | | | | | • | | | | | | | | |

SNGN



| Type | | Dimensions (mm) | | | NEW NEW | | | | | | | | | | | | | | | | | | | |
|-------------|----------|-----------------|------|-----|---------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|--|
| ISO | ASA | d | t | r | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 | |
| SNGN 120412 | SNGN 433 | 12.70 | 4.76 | 1.2 | | | | | | | | | | | | • | | | | | | | | |
| SNGN 120416 | SNGN 434 | 12.70 | 4.76 | 1.6 | | | | | | | | | | | | • | | | | | | | | |

CERAMIC

CERMET

PCBN
/
PCD

TOOL
HOLDER

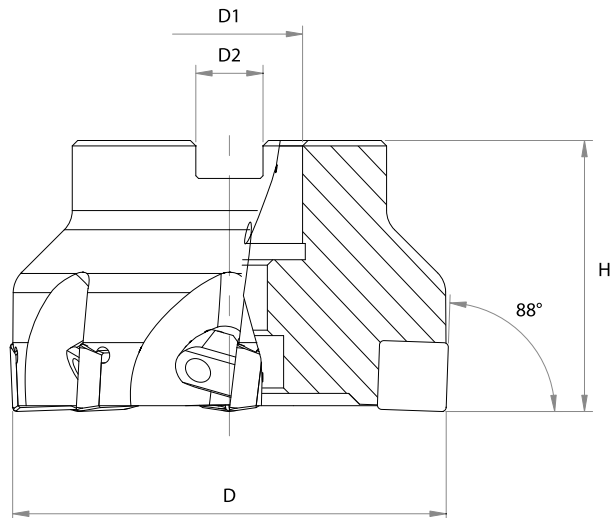
MILLING
CUTTER

SFKP .. 88



Axial rake angle : +7°

Radial rake angle : +3°



| Type | Dimensions [mm] | | | | ⚙️ | Insert |
|--------------------|-----------------|----------------|----------------|----|----|-------------------|
| | D | D ₁ | D ₂ | H | | |
| SFKP 050-05-88 N4 | 50 | 22 | 10.4 | 40 | 5 | SDCN 1204 □ □ T20 |
| SFKP 063-06-88 N4 | 63 | 22 | 10.4 | 40 | 6 | |
| SFKP 080-08-88 N4A | 80 | 25.4 | 9.5 | 50 | 8 | |
| SFKP 080-08-88 N4 | 80 | 27 | 12.4 | 50 | 8 | |
| SFKP 100-10-88 N4A | 100 | 31.75 | 12.7 | 50 | 10 | |
| SFKP 100-10-88 N4 | 100 | 32 | 14.4 | 50 | 10 | |
| SFKP 125-12-88 N4A | 125 | 38.1 | 15.9 | 63 | 12 | |
| SFKP 125-12-88 N4 | 125 | 40 | 16.4 | 63 | 12 | |


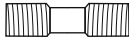

CERAMIC

CERMET

PCBN
/
PCD

TOOL
HOLDER

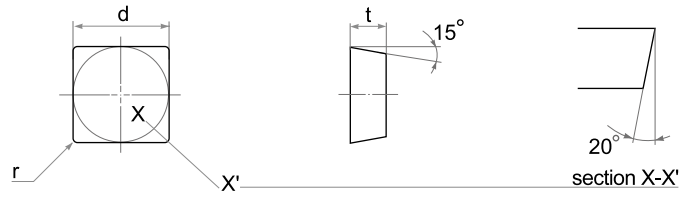
MILLING
CUTTER

| Dimensions [mm] | Spare parts | | |
|-----------------|---|--|---|
| | Wedge | Wedge Screw | Wrench |
| 50 |  |  |  |
| 63 - 125 | SSW9 SSW10 | WS6 [M6] WS6 [M6] | LW3 LW3 |

Recommended Cutting Condition for Gray Cast Iron

| Process | Hardness [HB] | Cutting Speed Vc[m/min] | Feed fz[mm/z] | Depth ap[mm] | Surface Quality Ra[μm] |
|-----------------|---------------|-------------------------|---------------|--------------|------------------------|
| Roughing | 190~210 | 800~2,000 | 0.08~0.15 | 2.0~5.0 | 6.3~12.5 |
| Roughing | 220~240 | 500~1,500 | 0.08~0.15 | 2.0~5.0 | 6.3~12.5 |
| Roughing | 250~280 | 300~1,200 | 0.08~0.15 | 2.0~5.0 | 6.3~12.5 |

SDCN .. T



| Type | | Dimensions (mm) | | | NEW NEW | | | | | | | | | | | | | | | | | | | |
|------------------------|---------------------|-----------------|------|-----|---|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|--|
| ISO | ASA | d | t | r | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 | |
| SDCN 120408 T20 | SDCN 432 T20 | 12.70 | 4.76 | 0.8 | | | | | | | | | | | | • | | | | | | | | |
| SDCN 120412 T20 | SDCN 433 T20 | 12.70 | 4.76 | 1.2 | | | | | | | | | | | | • | | | | | | | | |

CERAMIC

CERMET

PCBN
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PCD

TOOL
HOLDER

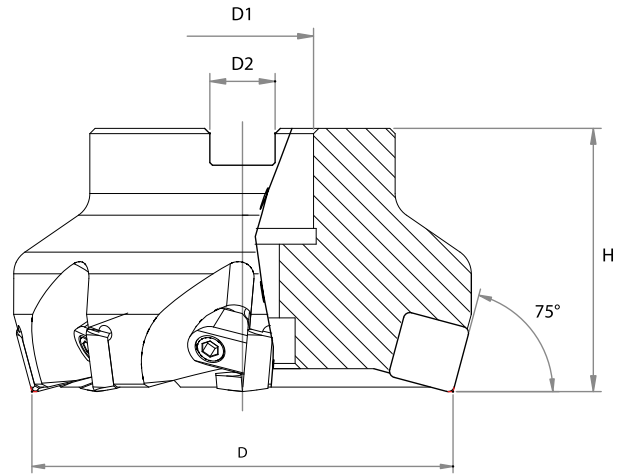
MILLING
CUTTER

SFKP .. 75



Axial rake angle : +5°

Radial rake angle : 0°



| Type | Dimensions [mm] | | | | ⚙️ | Insert |
|--------------------|-----------------|----------------|----------------|----|----|---------------------------------------|
| | D | D ₁ | D ₂ | H | | |
| SFKP 050-05-75 N4 | 50 | 22 | 10.4 | 40 | 5 | SPCN 1204 □ □ T15 SPKN 1204SP EDTR |
| SFKP 063-06-75 N4 | 63 | 22 | 10.4 | 40 | 6 | |
| SFKP 080-08-75 N4A | 80 | 25.4 | 9.5 | 50 | 8 | |
| SFKP 080-08-75 N4 | 80 | 27 | 12.4 | 50 | 8 | |
| SFKP 100-10-75 N4A | 100 | 31.75 | 12.7 | 50 | 10 | |
| SFKP 100-10-75 N4 | 100 | 32 | 14.4 | 50 | 10 | |
| SFKP 125-12-75 N4A | 125 | 38.1 | 15.9 | 63 | 12 | |
| SFKP 125-12-75 N4 | 125 | 40 | 16.4 | 63 | 12 | |

CERAMIC

CERMET

PCBN
/
PCD

TOOL
HOLDER

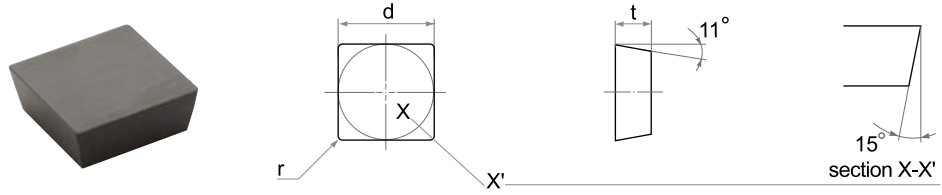
MILLING
CUTTER

| Dimensions [mm] | Spare parts | | |
|-----------------|-------------|-------------|--------|
| | Wedge | Wedge Screw | Wrench |
| D | | | |
| 50 | SSW9 | WS6 (M6) | LW3 |
| 63 - 125 | SSW10 | WS6 (M6) | LW3 |

Recommended Cutting Condition for Gray Cast Iron

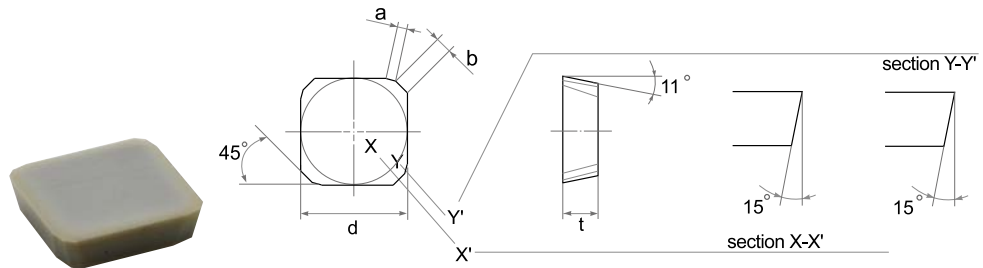
| Process | Hardness [HB] | Cutting Speed Vc[m/min] | Feed fz[mm/z] | Depth ap[mm] | Surface Quality Ra[μm] |
|-----------------|---------------|-------------------------|---------------|--------------|------------------------|
| Roughing | 190~210 | 800~2,000 | 0.10~0.20 | 2.0~5.0 | 3.2~12.5 |
| Roughing | 220~240 | 500~1,500 | 0.10~0.20 | 2.0~5.0 | 3.2~12.5 |
| Roughing | 250~280 | 300~1,200 | 0.10~0.20 | 2.0~5.0 | 3.2~12.5 |

SPCN .. T



| Type | | Dimensions (mm) | | | NEW NEW | | | | | | | | | | | | | | | | | | | |
|-----------------|--------------|-----------------|------|-----|---------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|--|
| ISO | ASA | d | t | r | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 | |
| SPCN 120412 T15 | SPCN 433 T15 | 12.70 | 4.76 | 1.2 | | | | | | | | | | | | • | | | | | | | | |
| SPCN 120416 T15 | SPCN 434 T15 | 12.70 | 4.76 | 1.6 | | | | | | | | | | | | • | | | | | | | | |

SPKN .. SP



| Type | | Dimensions (mm) | | | | NEW NEW | | | | | | | | | | | | | | | | | | |
|------------------|----------------|-----------------|------|------|------|---------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|
| ISO | ASA | d | t | a | b | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 |
| SPKN 1204SP EDTR | SPKN 43SP EDTR | 12.70 | 4.76 | 1.10 | 1.30 | | | | | | | | | | | | • | | | | | | | |

CERAMIC

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TOOL
HOLDER

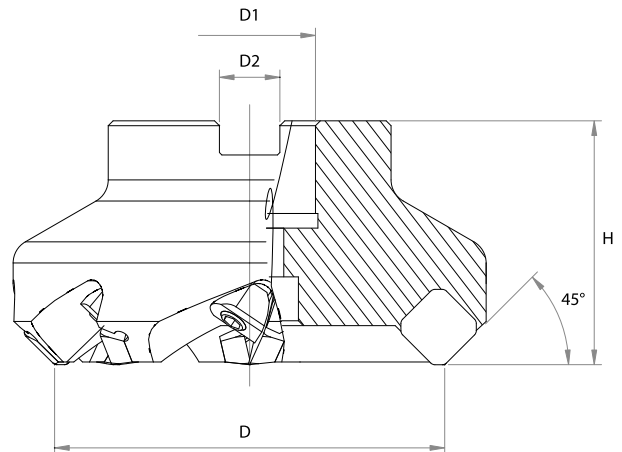
MILLING
CUTTER

SFKP .. 45



Axial rake angle : +19°

Radial rake angle : -6°



| Type | Dimensions (mm) | | | | ⚙️ | Insert |
|--------------------|-----------------|----------------|----------------|----|----|-------------------------------------|
| | D | D ₁ | D ₂ | H | | |
| SFKP 050-05-45 N4 | 50 | 22 | 10.4 | 40 | 5 | SEAN 1204 AFTN W25 SEAN 1204 T25 |
| SFKP 063-06-45 N4 | 63 | 22 | 10.4 | 40 | 6 | |
| SFKP 080-08-45 N4A | 80 | 25.4 | 9.5 | 50 | 8 | |
| SFKP 080-08-45 N4 | 80 | 27 | 12.4 | 50 | 8 | |
| SFKP 100-10-45 N4A | 100 | 31.75 | 12.7 | 50 | 10 | |
| SFKP 100-10-45 N4 | 100 | 32 | 14.4 | 50 | 10 | |
| SFKP 050-05-45 N3 | 50 | 22 | 10.4 | 40 | 5 | SEAN 1203 NWAFTN SEAN 1203 AFTN |
| SFKP 063-06-45 N3 | 63 | 22 | 10.4 | 40 | 6 | |
| SFKP 080-08-45 N3A | 80 | 25.4 | 9.5 | 50 | 8 | |
| SFKP 080-08-45 N3 | 80 | 27 | 12.4 | 50 | 8 | |
| SFKP 100-10-45 N3A | 100 | 31.75 | 12.7 | 50 | 10 | |
| SFKP 100-10-45 N3 | 100 | 32 | 14.4 | 50 | 10 | |

CERAMIC

CERMET

| Dimensions (mm) | Spare parts | | | |
|-----------------|-------------|-------|-------------|--------|
| | D | Wedge | Wedge Screw | Wrench |
| | | | | |
| 50 | | SSW9 | WS6 (M6) | LW3 |
| 63 - 100 | | SSW10 | WS6 (M6) | LW3 |

PCBN
/
PCD

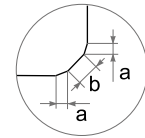
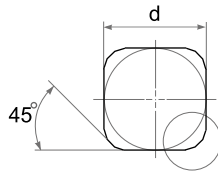
TOOL
HOLDER

Recommended Cutting Condition for Gray Cast Iron

| Process | Hardness (HB) | Cutting Speed Vc(m/min) | Feed fz(mm/z) | Depth ap(mm) | Surface Quality Ra(μm) |
|-----------------|---------------|-------------------------|---------------|--------------|------------------------|
| Roughing | 190~210 | 800~2,000 | 0.15~0.30 | 2.0~5.0 | 6.3~12.5 |
| Roughing | 220~240 | 500~1,500 | 0.15~0.30 | 2.0~5.0 | 6.3~12.5 |
| Roughing | 250~280 | 300~1,200 | 0.15~0.30 | 2.0~5.0 | 6.3~12.5 |

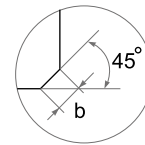
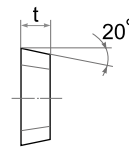
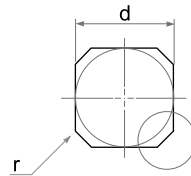
MILLING
CUTTER

SEAN



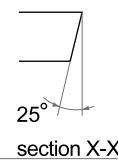
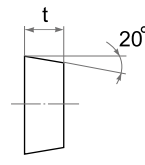
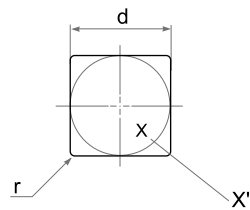
| Type | | Dimensions (mm) | | | | | | | | | | | | | | | | | | | | | | | |
|-------------------|--------------|-----------------|------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|--|
| ISO | ASA | d | t | a | b | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 | |
| SEAN 1203 AFTN | SEAN 42 AFTN | 12.70 | 3.18 | 0.50 | 1.80 | | | | | | | | | | • | • | • | | | | | | | | |

SEAN .. NW



| Type | | Dimensions (mm) | | | | | | | | | | | | | | | | | | | | | | | |
|----------------------|--------------------|-----------------|------|------|-----|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|--|
| ISO | ASA | d | t | b | r | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 | |
| SEAN 1203 NWAFTN | SEAN 42 NWAFTN | 12.70 | 3.18 | 2.40 | 0.4 | | | | | | | | | | • | | | | | | | | | | |
| SEAN 1204 AFTNW25 | SEAN 43 AFTNW25 | 12.70 | 4.76 | 2.50 | 1.2 | | | | | | | | | | | | • | | | | | | | | |

SEAN .. T



| Type | | Dimensions (mm) | | | | | | | | | | | | | | | | | | | | | | |
|--------------------|--------------|-----------------|------|-----|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|--|
| ISO | ASA | d | t | a | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 | |
| SEAN 120412 T25 | SEAN 433 T25 | 12.70 | 4.76 | 1.2 | | | | | | | | | | | | • | | | | | | • | | |
| SEAN 120416 T25 | SEAN 434 T25 | 12.70 | 4.76 | 1.6 | | | | | | | | | | | | • | | | | | | • | | |

CERAMIC

CERMET

PCBN
/
PCD

TOOL
HOLDER

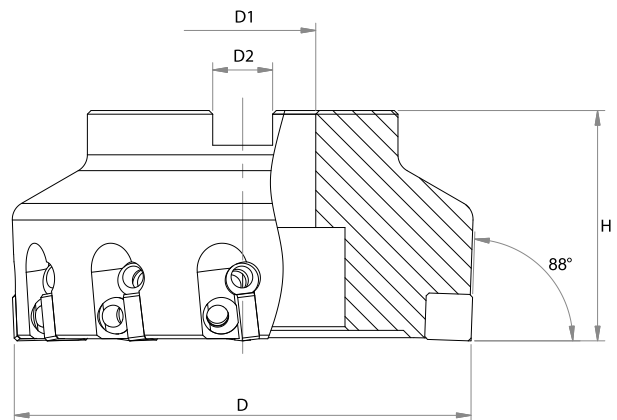
MILLING
CUTTER

SFAN .. 88




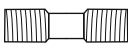

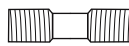
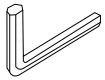
Axial rake angle : -7°

Radial rake angle : -10°



| Type | Dimensions [mm] | | | | ⚙️ | Insert |
|--------------------|-----------------|----------------|----------------|----|----|-------------------------------|
| | D | D ₁ | D ₂ | H | | |
| SFAN 063-06-88 N4 | 63 | 22 | 10.4 | 40 | 6 | SNCN 1204 ZYT SNCN 1204 ZN |
| SFAN 080-08-88 N4A | 80 | 25.4 | 9.5 | 50 | 8 | |
| SFAN 080-08-88 N4 | 80 | 27 | 12.4 | 50 | 8 | |
| SFAN 100-10-88 N4A | 100 | 31.75 | 12.7 | 50 | 10 | |
| SFAN 100-10-88 N4 | 100 | 32 | 14.4 | 50 | 10 | |
| SFAN 125-12-88 N4A | 125 | 38.1 | 15.9 | 63 | 12 | |
| SFAN 125-12-88 N4 | 125 | 40 | 16.4 | 63 | 12 | |

CERAMIC

| Dimensions [mm] | Spare parts | | | | |
|-----------------|---|---|---|---|---|
| | D | Wedge | Wedge Screw | Adjust Wedge | Adjust Wedge Screw |
| 63 - 125 |  |  |  |  |  |
| | SW16 | WS6 (M6) | SAW 20 | WS6 (M6) | LW3 |

CERMET

PCBN
/
PCD

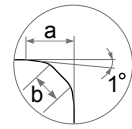
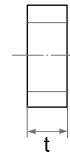
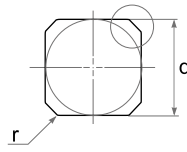
Recommended Cutting Condition for Gray Cast Iron

| Process | Hardness (HB) | Cutting Speed Vc (m/min) | Feed fz (mm/z) | Depth ap (mm) | Surface Quality Ra (μm) |
|------------------|---------------|--------------------------|----------------|---------------|-------------------------|
| Roughing | 190~210 | 800~2,000 | 0.08~0.15 | 2.0~5.0 | 6.3~12.5 |
| Roughing | 220~240 | 500~1,500 | 0.08~0.15 | 2.0~5.0 | 6.3~12.5 |
| Roughing | 250~280 | 300~1,200 | 0.08~0.15 | 2.0~5.0 | 6.3~12.5 |
| Finishing | 190~210 | 200~900 | 0.05~0.10 | 0.1~0.5 | 0.8 |
| Finishing | 220~240 | 200~700 | 0.05~0.10 | 0.1~0.5 | 0.8 |
| Finishing | 250~280 | 200~500 | 0.05~0.10 | 0.1~0.5 | 0.8 |

TOOL
HOLDER

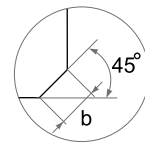
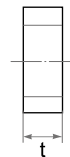
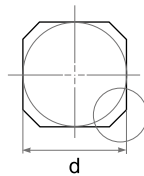
MILLING
CUTTER

SNCN .. ZZT



| Type | | Dimensions (mm) | | | | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 |
|---------------|-------------|-----------------|------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|
| ISO | ASA | d | t | a | b | | | | | | | | | | | | | | | | | | | |
| SNCN 1204 ZZT | SNCN 43 ZZT | 12.70 | 4.76 | 3.25 | 1.10 | | • | | | | | | | | | | • | • | | • | • | | | |

SNCN .. ZN



| Type | | Dimensions (mm) | | | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 |
|--------------|------------|-----------------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|
| ISO | ASA | d | t | b | | | | | | | | | | | | | | | | | | | |
| SNCN 1204 ZN | SNCN 43 ZN | 12.70 | 4.76 | 1.10 | | | | | | | | | | | | • | | | | | | | |

CERAMIC

CERMET

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PCD

TOOL
HOLDER

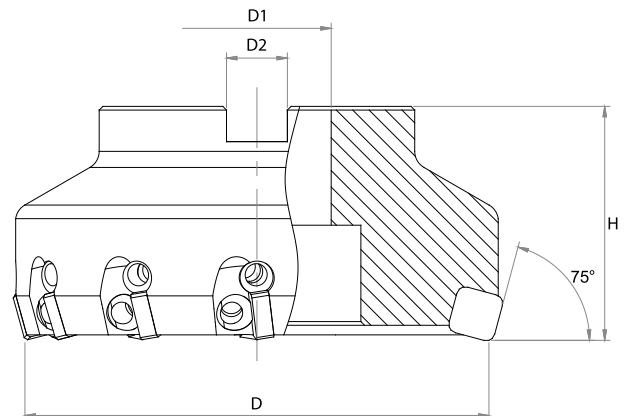
MILLING
CUTTER

SFAN .. 75



Axial rake angle : -6°

Radial rake angle : -10°



| Type | Dimensions (mm) | | | | ⚙ | Insert |
|--------------------|-----------------|----------------|----------------|----|----|-----------------------------|
| | D | D ₁ | D ₂ | H | | |
| SFAN 063-06-75 N4 | 63 | 22 | 10.4 | 40 | 6 | SNCN 1204 ENTN SNGN 1204 |
| SFAN 080-08-75 N4A | 80 | 25.4 | 9.5 | 50 | 8 | |
| SFAN 080-08-75 N4 | 80 | 27 | 12.4 | 50 | 8 | |
| SFAN 100-10-75 N4A | 100 | 31.75 | 12.7 | 50 | 10 | |
| SFAN 100-10-75 N4 | 100 | 32 | 14.4 | 50 | 10 | |
| SFAN 125-12-75 N4A | 125 | 38.1 | 15.9 | 63 | 12 | |
| SFAN 125-12-75 N4 | 125 | 40 | 16.4 | 63 | 12 | |





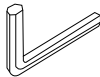
CERAMIC

CERMET

PCBN
/
PCD

TOOL
HOLDER

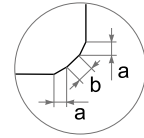
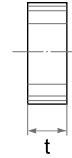
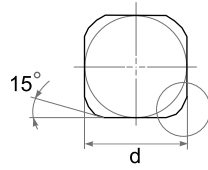
MILLING
CUTTER

| Dimensions (mm) | Spare parts | | | | |
|-----------------|---|---|---|---|--|
| | Wedge | Wedge Screw | Adjust Wedge | Adjust Wedge Screw | Wrench |
| 63 - 125 |  SW16 |  WS6 (M6) |  SAW 20 |  WS6 (M6) |  LW3 |

Recommended Cutting Condition for Gray Cast Iron

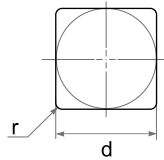
| Process | Hardness (HB) | Cutting Speed Vc(m/min) | Feed fz(mm/z) | Depth ap(mm) | Surface Quality Ra(μm) |
|------------------|---------------|-------------------------|---------------|--------------|------------------------|
| Roughing | 190~210 | 800~2,000 | 0.08~0.15 | 2.0~5.0 | 6.3~12.5 |
| Roughing | 220~240 | 500~1,500 | 0.08~0.15 | 2.0~5.0 | 6.3~12.5 |
| Roughing | 250~280 | 300~1,200 | 0.08~0.15 | 2.0~5.0 | 6.3~12.5 |
| Finishing | 190~210 | 200~900 | 0.08~0.15 | 0.1~0.5 | 0.8 |
| Finishing | 220~240 | 200~700 | 0.08~0.15 | 0.1~0.5 | 0.8 |
| Finishing | 250~280 | 200~500 | 0.08~0.15 | 0.1~0.5 | 0.8 |

SNCN .. ENTN



| Type | | Dimensions (mm) | | | | | | | | | | | | | | | | | | | | | | | |
|----------------|--------------|-----------------|------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|--|
| ISO | ASA | d | t | a | b | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 | |
| SNCN 1204 ENTN | SNCN 43 ENTN | 12.70 | 4.76 | 1.40 | 1.00 | | | | | | | | | | | • | • | • | | | | | | | |

SNGN



| Type | | Dimensions (mm) | | | | | | | | | | | | | | | | | | | | | | |
|-------------|----------|-----------------|------|-----|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|--|
| ISO | ASA | d | t | r | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 | |
| SNGN 120412 | SNGN 433 | 12.70 | 4.76 | 1.2 | | • | | | | | | | | | | • | | | | | | | | |
| SNGN 120416 | SNGN 434 | 12.70 | 4.76 | 1.6 | | • | | | | | | | | | | • | | | | | | | | |

CERAMIC

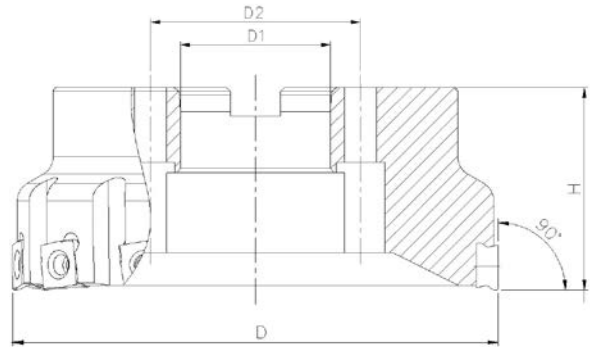
CERMET

PCBN
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PCD

TOOL
HOLDER

MILLING
CUTTER

SFSX .. 00 .. EC



| Type | Dimensions (mm) | | | | Z | Insert |
|-----------------------|-----------------|----------------|----------------|------|----|-------------|
| | D | D ₁ | D ₂ | H | | |
| SFSX 050-05-00-A5EC | 50 | 22 | | 40 | 5 | SPHX1205 NR |
| SFSX 050-05-00-A5ECA | 50.8 | 19.05 | | 44.5 | 5 | |
| SFSX 063-07-00-A5EC | 63 | 22 | - | 40 | 7 | |
| SFSX 063-07-00-A5ECA | 63.5 | 19.05 | | 44.5 | 7 | |
| SFSX 080-08-00-A5EC | 80 | 27 | - | 50 | 8 | |
| SFSX 080-08-00-A5ECA | 76.2 | 25.4 | | 44.5 | 8 | |
| SFSX 100-12-00-A5EC | 100 | 32 | - | 50 | 12 | |
| SFSX 100-12-00-A5ECA | 101.6 | 38.1 | | 44.5 | 12 | |
| SFSX 125-15-00-A5EC | 125 | 40 | - | 63 | 15 | |
| SFSX 125-15-00-A5ECA | 127.0 | 38.1 | | 60.5 | 15 | |
| SFSX 160-18-00-A5EC | 160 | 40 | 66.7 | 63 | 18 | |
| SFSX 160-18-00-A5ECA | 152.4 | 50.8 | | 60.5 | 18 | |
| SFSX 200-24-00-A5EC | 200 | 60 | | 63 | 24 | |
| SFSX 200-24-00-A5ECA | 203.2 | 63.5 | | 60.5 | 24 | |
| SFSX 250-30-00-A5EC | 250 | 60 | | 63 | 30 | |
| SFSX 250-30-00-A5ECA | 254.0 | 63.5 | | 60.5 | 30 | |
| SFSX 080-06-00-AT6EC | 80 | 27 | - | 50 | 6 | SPHX15T6 NR |
| SFSX 080-06-00-AT6ECA | 76.2 | 25.4 | | 44.5 | 6 | |
| SFSX 100-08-00-AT6EC | 100 | 32 | - | 50 | 8 | |
| SFSX 100-08-00-AT6ECA | 101.6 | 31.75 | | 44.5 | 8 | |
| SFSX 125-10-00-AT6EC | 125 | 40 | - | 63 | 10 | |
| SFSX 125-10-00-AT6ECA | 127 | 38.1 | | 60.5 | 10 | |
| SFSX 160-14-00-AT6EC | 160 | 40 | 66.7 | 63 | 14 | |
| SFSX 160-14-00-AT6ECA | 152.4 | 50.8 | | 60.5 | 14 | |

CERAMIC

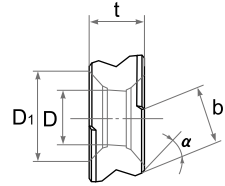
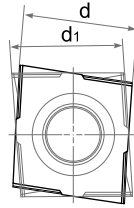
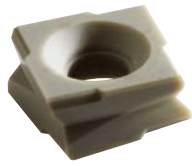
CERMET

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
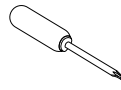
TOOL
HOLDER

MILLING
CUTTER

SPHX



| Type | Dimensions (mm) | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|------------------|-----------------|-------|------|------|-------|----|------|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|--|
| | ISO | d | t | a | b | t | a | b | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 | |
| SPHX 1205NR 480T | 11.67 | 11.33 | 5.50 | 5.10 | 8.41 | 45 | 8.0 | | | | | | | | | | | | | • | | • | | | | | | |
| SPHX 1205NL 480T | 11.67 | 11.33 | 5.50 | 5.10 | 8.41 | 45 | 8.0 | | | | | | | | | | | | | | | | | | | | | |
| SPHX 15T6NR 880T | 14.58 | 14.33 | 6.60 | 6.10 | 10.18 | 45 | 8.80 | | | | | | | | | | | | | • | | • | | | | | | |

| Dimensions (mm) | Spare parts | |
|------------------------|---|---|
| | Screw | Wrench |
| D |  |  |
| 50 - 250 (SPHX1205 NR) | C94010 | T15 |
| 80 - 160 (SPHX15T6 NR) | C95012 | T20 |

Recommended Cutting Conditions

| Process | Cutting Speed Vc[m/min] | Feed fz[mm/z] | Depth ap[mm] max |
|--------------------|-------------------------|---------------|------------------|
| Gray Cast Irons | 500~1,400 | 0.15~0.25 | ~5.0 |
| Ductile Cast Irons | 450~900 | 0.10~0.20 | ~3.0 |

CERAMIC

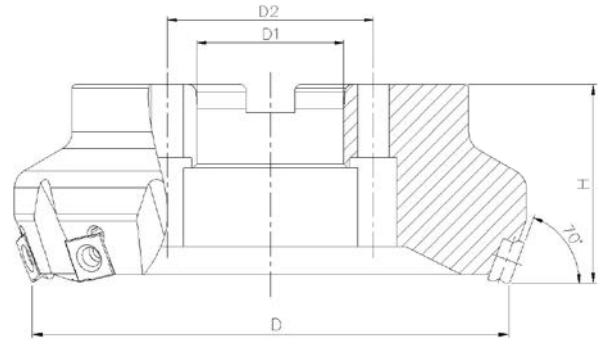
CERMET

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MILLING
CUTTER

SFSX .. 70 .. EC



| Type | Dimensions [mm] | | | | ⚙️ | Insert |
|-----------------------|-----------------|----------------|----------------|------|----|-------------|
| | D | D ₁ | D ₂ | H | | |
| SFSX 050-05-70-A5EC | 50 | 22 | | 40 | 5 | SPHX1205 ER |
| SFSX 050-05-70-A5ECA | 50.8 | 19.05 | | 44.5 | 5 | |
| SFSX 063-07-70-A5EC | 63 | 22 | - | 40 | 7 | |
| SFSX 063-07-70-A5ECA | 63.5 | 19.05 | | 44.5 | 7 | |
| SFSX 080-08-70-A5EC | 80 | 27 | - | 50 | 8 | |
| SFSX 080-08-70-A5ECA | 76.2 | 25.4 | | 44.5 | 8 | |
| SFSX 100-12-70-A5EC | 100 | 32 | - | 50 | 12 | |
| SFSX 100-12-70-A5ECA | 101.6 | 38.1 | | 44.5 | 12 | |
| SFSX 125-15-70-A5EC | 125 | 40 | - | 63 | 15 | |
| SFSX 125-15-70-A5ECA | 127.0 | 38.1 | | 60.5 | 15 | |
| SFSX 160-18-70-A5EC | 160 | 40 | 66.7 | 63 | 18 | |
| SFSX 160-18-70-A5ECA | 152.4 | 50.8 | 101.6 | 60.5 | 18 | |
| SFSX 200-24-70-A5EC | 200 | 60 | 101.6 | 63 | 24 | |
| SFSX 200-24-70-A5ECA | 203.2 | 63.5 | 101.6 | 60.5 | 24 | |
| SFSX 250-30-70-A5EC | 250 | 60 | 101.6 | 63 | 30 | |
| SFSX 250-30-70-A5ECA | 254.0 | 63.5 | 101.6 | 60.5 | 30 | |
| SFSX 080-07-70-AT6EC | 80 | 27 | - | 50 | 7 | SPHX15T6 ER |
| SFSX 080-07-70-AT6ECA | 76.2 | 25.4 | | 44.5 | 7 | |
| SFSX 100-09-70-AT6EC | 100 | 32 | - | 50 | 9 | |
| SFSX 100-09-70-AT6ECA | 101.6 | 31.75 | | 44.5 | 9 | |
| SFSX 125-12-70-AT6EC | 125 | 40 | - | 63 | 12 | |
| SFSX 125-12-70-AT6ECA | 127 | 38.1 | | 60.5 | 12 | |
| SFSX 160-16-70-AT6EC | 160 | 40 | 66.7 | 63 | 16 | |
| SFSX 160-16-70-AT6ECA | 152.4 | 50.8 | - | 60.5 | 16 | |

CERAMIC

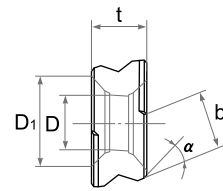
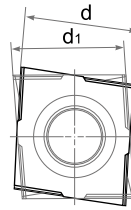
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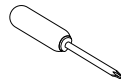
TOOL
HOLDER

MILLING
CUTTER

SPHX



| Type | Dimensions (mm) | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|------------------|-----------------|-------|----------------|------|-------|----------------|------|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|--|
| | ISO | d | d ₁ | t | D | D ₁ | α | b | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 | |
| SPHX 1205ER 855T | 12.09 | 11.33 | 5.50 | 5.10 | 8.41 | 35 | 5.50 | | | | | | | | | | | | | • | | • | | | | | | |
| SPHX 1205EL 855T | 12.09 | 11.33 | 5.50 | 5.10 | 8.41 | 35 | 5.50 | | | | | | | | | | | | | • | | | | | | | | |
| SPHX 15T6ER 865T | 15.50 | 14.33 | 6.60 | 6.10 | 10.18 | 35 | 6.50 | | | | | | | | | | | | | • | | • | | | | | | |

| Dimensions (mm) | Spare parts | |
|------------------------|---|---|
| | Screw | Wrench |
| D | | |
| |  |  |
| 50 - 250 (SPHX1205 ER) | C94010 | T15 |
| 80 - 160 (SPHX15T6 ER) | C95012 | T20 |

Recommended Cutting Conditions

| Process | Cutting Speed Vc[m/min] | Feed fz[mm/z] | Depth ap[mm] max |
|--------------------|-------------------------|---------------|------------------|
| Gray Cast Irons | 500~1,400 | 0.15~0.25 | ~5.0 |
| Ductile Cast Irons | 450~900 | 0.10~0.20 | ~3.0 |

CERAMIC

CERMET

PCBN
/
PCD

TOOL
HOLDER

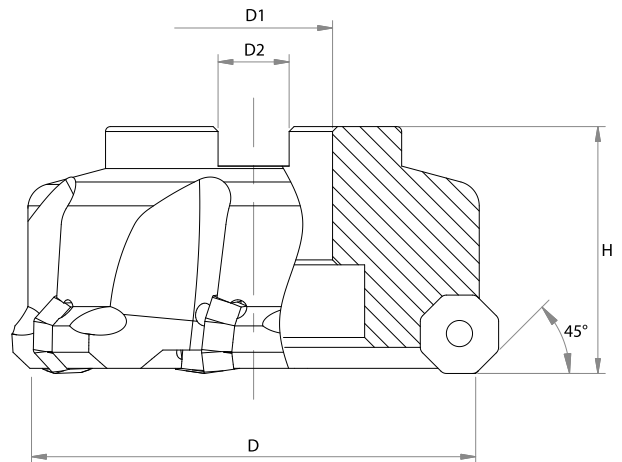
MILLING
CUTTER

SFSP .. OT


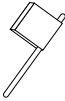


Axial rake angle : +3°

Radial rake angle : +7°



| Type | Dimensions (mm) | | | | ⚙️ | Insert |
|----------------------|-----------------|----------------|----------------|----|----|-----------|
| | D | D ₁ | D ₂ | H | | |
| SFSP 063-05-45-A4 OT | 63 | 22 | 10.40 | 40 | 5 | 0EGB 0704 |
| SFSP 080-06-45-A4 OT | 80 | 27 | 12.40 | 50 | 6 | |
| SFSP 100-07-45-A4 OT | 100 | 32 | 14.40 | 50 | 7 | |

| Dimensions (mm) | Spare parts | |
|-----------------|---|---|
| | Screw | Wrench |
| D |  |  |
| 63 - 100 | SWS 21480072 | T20 |

CERAMIC

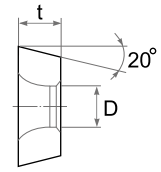
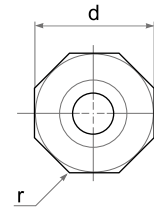
CERMET

PCBN
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PCD

TOOL
HOLDER

MILLING
CUTTER

OEGB



| Type | Dimensions (mm) | | | | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 |
|--------------------|-----------------|------|------|-----|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|
| | d | t | D | r | | | | | | | | | | | | | | | | | | | |
| ISO | | | | | | | | | | | | | | | | | | | | | | | |
| OEGB 070408 | 15.87 | 4.76 | 5.18 | 0.8 | | | | | | | | | | | | • | | | | | | | |
| OEGB 070416 | 15.87 | 4.76 | 5.18 | 1.6 | | | | | | | | | | | • | • | | | | | | | |

NEW **NEW**

CERAMIC

CERMET

PCBN
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PCD

TOOL
HOLDER

**MILLING
CUTTER**

SFKN .. HX



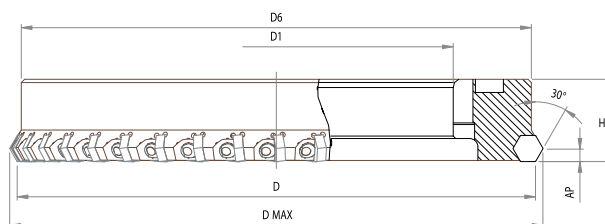
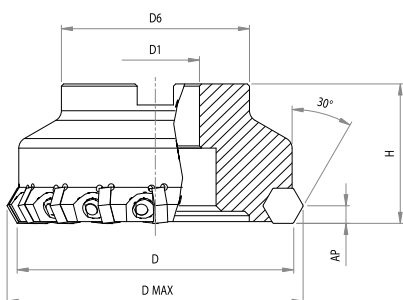
D : 80~200



D : 250~315

Axial rake angle : -6°

Radial rake angle : -7°



| Type | Dimensions (mm) | | | | | ⚙️ | AP max | Insert |
|-----------------------------|-----------------|--------|----------------|----------------|----|----|--------|--|
| | D | D(max) | D ₁ | D ₆ | H | | | |
| SFKN 080-08-30 N5HXA | 80 | 88.7 | 25.4 | 52 | 50 | 8 | 8 | HNEN 090520 HNEN 090530 HNEN 090508 ANSN |
| SFKN 080-08-30 N5HX | 80 | 88.7 | 27 | 58 | 50 | 8 | 8 | |
| SFKN 100-10-30 N5HXA | 100 | 108.7 | 31.75 | 60 | 50 | 10 | 8 | |
| SFKN 100-10-30 N5HX | 100 | 108.7 | 32 | 60 | 50 | 10 | 8 | |
| SFKN 125-16-30 N5HXA | 125 | 133.7 | 38.1 | 80 | 63 | 16 | 8 | |
| SFKN 125-16-30 N5HX | 125 | 133.7 | 40 | 85 | 63 | 16 | 8 | |
| SFKN 160-20-30 N5HXA | 160 | 168.7 | 50.8 | 99 | 63 | 20 | 8 | |
| SFKN 160-20-30 N5HX | 160 | 168.7 | 40 | 85 | 63 | 20 | 8 | |
| SFKN 200-26-30 N5HXA | 200 | 208.7 | 47.625 | 128.57 | 63 | 26 | 8 | |
| SFKN 200-26-30 N5HX | 200 | 208.7 | 60 | 140 | 63 | 26 | 8 | |
| SFKN 250-30-30 N5HXA | 250 | 258.7 | 160.02 | - | 50 | 30 | 8 | |
| SFKN 315-40-30 N5HXA | 315 | 323.7 | 215.02 | - | 50 | 40 | 8 | |




CERAMIC

CERMET

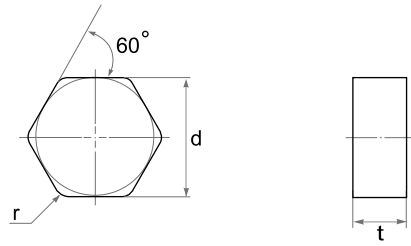
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HOLDER

MILLING
CUTTER

| Dimensions (mm) | Spare parts | | |
|-----------------|--|---|--|
| | Wedge | Wedge Screw | Wrench |
| 80 - 315 |  DT-SW16 |  WS6 |  LW3 |

HNEN



| Type | Dimensions (mm) | | | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 | |
|-------------------------|-----------------|------|-----|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|---|
| | ISO | d | t | | | | | | | | | | | | | | | | | | | | r |
| HNEN 090520 | 16.20 | 5.56 | 2.0 | | | | | | | | | | | • | • | | | | | | | | |
| HNEN 090530 | 16.20 | 5.56 | 3.0 | | | | | | | | | | | • | • | | | | | | | | |
| HNEN 090508 ANSN | 15.87 | 5.64 | 0.8 | | | | | | | | | | | • | • | | | • | • | | | | |

NEW **NEW**

CERAMIC

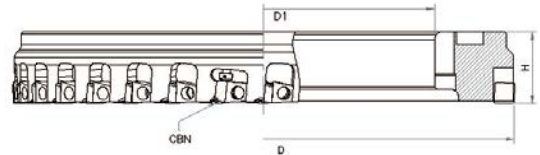
CERMET


PCBN
/
PCD





TOOL
HOLDER

MILLING
CUTTER

SFKP .. MF



| Type | Dimensions (mm) | | |  | | Insert |
|---------------------|-----------------|----------------|----|--|-----|--------------------------------|
| | D | D ₁ | H | Ceramic | CBN | |
| SFKP 250-20-00 N4MF | 250 | 160.02 | 50 | 18 | 2 | SPCN120412(Ceramic)+CBN(Wiper) |
| SFKP 315-32-00 N4MF | 315 | 215.02 | 50 | 28 | 4 | SPCN120412(Ceramic)+CBN(Wiper) |

| Dimensions (mm) | Spare parts | | | |
|-----------------|--|---|--|--|
| | D | Wedge | Adjust Screw | Wedge Screw |
| 250 - 315 |  DT-DW01 |  AJM 5F |  WS8 |  LW4 |

CERAMIC

Recommended Cutting Condition for Gray Cast Iron

| Process | Hardness (HB) | Cutting Speed V _c (m/min) | Feed f _z (mm/z) | Depth a _p (mm) |
|-----------|---------------|--------------------------------------|----------------------------|---------------------------|
| Finishing | 190~210 | 200~800 | 0.08~0.15 | 0.1~0.5 |
| Finishing | 220~240 | 200~600 | 0.08~0.15 | 0.1~0.5 |
| Finishing | 250~280 | 200~400 | 0.08~0.15 | 0.1~0.5 |

PCBN
/
PCD

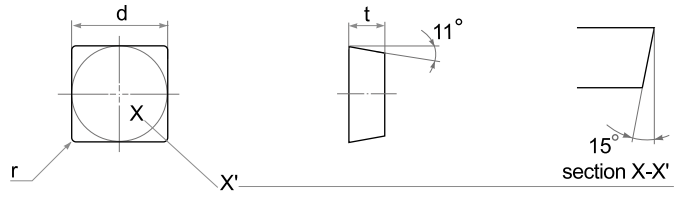
Recommended Cutting Condition for Ductile Cast Iron

| Process | Tensile Strength | Cutting Speed V _c (m/min) | Feed f _z (mm/z) | Depth a _p (mm) |
|-----------|------------------|--------------------------------------|----------------------------|---------------------------|
| Finishing | 400~500 | 300~600 | 0.08~0.15 | 0.1~0.5 |
| Finishing | 500~700 | 200~500 | 0.08~0.15 | 0.1~0.5 |

TOOL
HOLDER

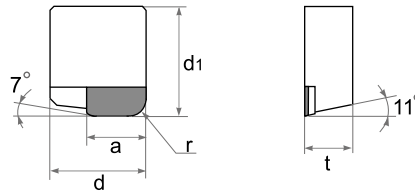
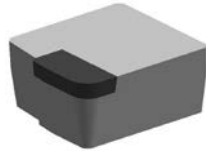
MILLING
CUTTER

SPCN .. T



| Type | | Dimensions (mm) | | | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 | |
|------------------------|---------------------|-----------------|------|-----|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|--|
| ISO | ASA | d | t | r | | | | | | | | | | | | | | | | | | | | |
| SPCN 120412 T15 | SPCN 433 T15 | 12.70 | 4.76 | 1.2 | | | | | | | | | | | | • | | | | | | | | |

SPCN .. T



| Type | | Dimensions (mm) | | | | | PCBN | |
|-----------------------|---------------------|-----------------|----------------|------|------|-----|---------|---------|
| ISO | ASA | d | D ₁ | t | a | r | SBN1000 | SBN2000 |
| SPC 1206 ZZR2X | SPC 44 ZZR2X | 12.70 | 14.50 | 6.35 | 7.80 | 2.0 | • | |

CERAMIC

CERMET

PCBN
/
PCD

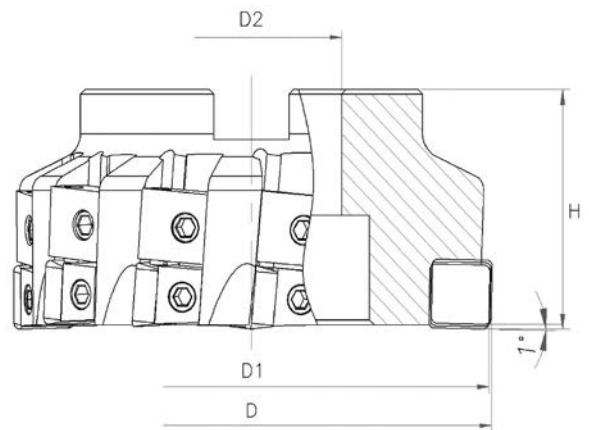
TOOL
HOLDER

MILLING
CUTTER


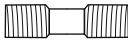

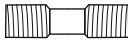

SFMS (MULTI-STEP) .. LRF



Axial rake angle : +5°
Radial rake angle : +6°



| Type | Dimensions (mm) | | | | Insert per set | ⚙️ | Insert |
|---------------------|-----------------|----------------|----------------|-------|----------------|----|---------------|
| | D | D ₁ | D ₂ | H | | | |
| SFMS 80-09-P4N.LRF | 76.20 | 75.20 | 25.40 | 47.60 | 3 | 9 | SPCN 1204 T15 |
| SFMS 100-12-P4N.LRF | 101.60 | 100.60 | 38.10 | 47.60 | 3 | 12 | |
| SFMS 125-15-P4N.LRF | 127.00 | 126.00 | 38.10 | 47.60 | 3 | 15 | |
| SFMS 160-18-P4N.LRF | 152.40 | 151.40 | 50.80 | 47.60 | 3 | 18 | |

| Dimensions (mm) | Spare parts | | | | |
|-----------------|---|---|---|---|---|
| | D | Wedge | Wedge Screw | ADJ Wedge | ADJ Wedge Screw |
| 80 - 160 |  |  |  |  |  |
| | DT-SW14 | WS6 | DT-SW15 | WS6 | LW3 |

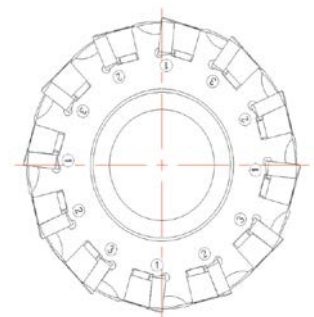
CERAMIC

CERMET

PCBN
/
PCD

TOOL
HOLDER

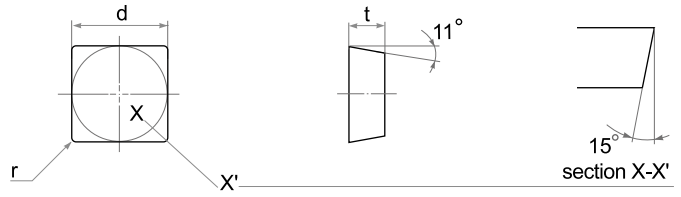
MILLING
CUTTER



Recommended Cutting Condition for Gray Cast Iron

| Process | Hardness (HB) | Cutting Speed V _c (m/min) | Feed f _z (mm/z) | Depth a _p (mm) | Surface Quality Ra(μm) |
|----------------------|---------------|--------------------------------------|----------------------------|---------------------------|------------------------|
| Light Rough & Finish | 190~310 | 240~1,200 | 0.08~0.60 | 2.0~3.80 | 6.3~12.5 |

SPCN .. T



| Type | | Dimensions (mm) | | | NEW NEW | | | | | | | | | | | | | | | | | | | |
|----------------------------|-------------------------|-----------------|------|-----|---|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|--|
| ISO | ASA | d | t | r | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 | |
| SPCN 120412 T15 | SPCN 433 T15 | 12.70 | 4.76 | 1.2 | | | | | | | | | | | | • | | | | | | | | |
| SPCN 120416 T15 | SPCN 434 T15 | 12.70 | 4.76 | 1.6 | | | | | | | | | | | | • | | | | | | | | |

CERAMIC

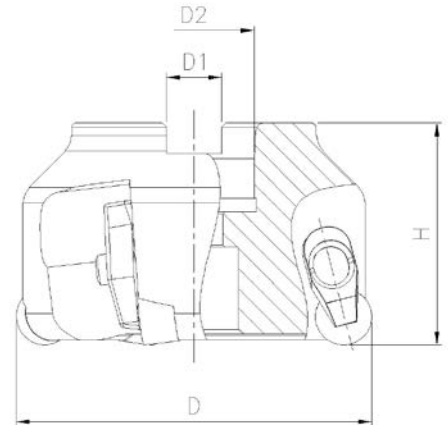
CERMET

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PCD

TOOL
HOLDER

**MILLING
CUTTER**

SFCN .. 00 .. R



| Type | Dimensions (mm) | | | | ⚙️ | Insert |
|--------------------|-----------------|----------------|----------------|----|----|-------------|
| | D | D ₁ | D ₂ | H | | |
| SFCN 050-04-00 R4 | 50 | 10.4 | 22 | 50 | 4 | RNGN 120400 |
| SFCN 050-04-00 R4A | 50.8 | 7.9 | 19.05 | 50 | 4 | |
| SFCN 063-04-00 R4 | 63 | 10.4 | 22 | 50 | 4 | |
| SFCN 063-04-00 R4A | 63.5 | 7.9 | 19.05 | 50 | 4 | |
| SFCN 080-05-00 R4 | 80 | 12.4 | 27 | 50 | 5 | |
| SFCN 080-05-00 R4A | 76.2 | 9.5 | 25.4 | 50 | 5 | |
| SFCN 100-06-00 R4 | 100 | 14.4 | 32 | 50 | 6 | |
| SFCN 100-06-00 R4A | 101.6 | 12.7 | 31.75 | 50 | 6 | |
| SFCN 050-04-00 R7 | 50 | 10.4 | 22 | 50 | 4 | RNGN 120700 |
| SFCN 050-04-00 R7A | 50.8 | 7.9 | 19.05 | 50 | 4 | |
| SFCN 063-04-00 R7 | 63 | 10.4 | 22 | 50 | 4 | |
| SFCN 063-04-00 R7A | 63.5 | 7.9 | 19.05 | 50 | 4 | |
| SFCN 080-05-00 R7 | 80 | 12.4 | 27 | 50 | 5 | |
| SFCN 080-05-00 R7A | 76.2 | 9.5 | 25.4 | 50 | 5 | |
| SFCN 100-06-00 R7 | 100 | 14.4 | 32 | 50 | 6 | |
| SFCN 100-06-00 R7A | 101.6 | 12.7 | 31.75 | 50 | 6 | |

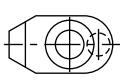


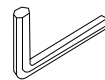
CERAMIC

CERMET

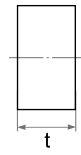
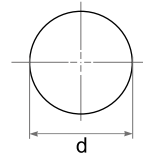
PCBN
/
PCD

TOOL
HOLDER

MILLING
CUTTER

| Dimensions (mm) | Spare parts | | | |
|-----------------|---|---|---|---|
| | Clamp | Clamp Screw | Spring | Wrench |
| D |  |  |  |  |
| 50 - 100 | AMS6T | A0B-6S | SP5 | LW3 |

RNGN



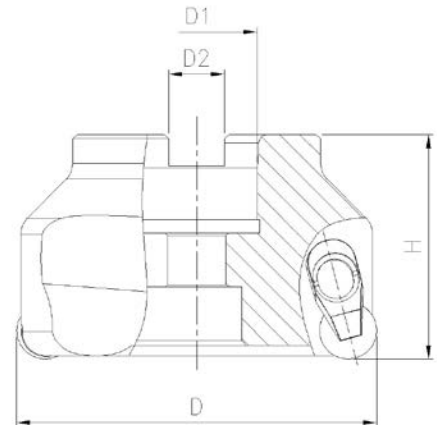
| Type | | Dimensions [mm] | | Grade | | | |
|--------------------|----------------|-----------------|------|-------|-------|-------|--------|
| ISO | ASA | d | t | SW400 | SW800 | SN800 | SN1000 |
| RNGN 120400 | RNGN 43 | 12.7 | 4.76 | • | • | • | • |
| RNGN 120700 | RNGN 45 | 12.7 | 7.94 | • | • | • | • |

CERAMIC

CERMET

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PCDTOOL
HOLDERMILLING
CUTTER

SFCP .. 00 .. R



| Type | Dimensions (mm) | | | | ⚙️ | Insert |
|--------------------|-----------------|----------------|----------------|----|----|-------------|
| | D | D ₁ | D ₂ | H | | |
| SFCP 050-04-00 R4 | 50 | 10.4 | 22 | 50 | 4 | RPGN 120400 |
| SFCP 050-04-00 R4A | 50.8 | 7.9 | 19.05 | 50 | 4 | |
| SFCP 063-04-00 R4 | 63 | 10.4 | 22 | 50 | 4 | |
| SFCP 063-04-00 R4A | 63.5 | 7.9 | 19.05 | 50 | 4 | |
| SFCP 080-05-00 R4 | 80 | 12.4 | 27 | 50 | 5 | |
| SFCP 080-05-00 R4A | 76.2 | 9.5 | 25.4 | 50 | 5 | |
| SFCP 100-06-00 R4 | 100 | 14.4 | 32 | 50 | 6 | |
| SFCP 100-06-00 R4A | 101.6 | 12.7 | 31.75 | 50 | 6 | |

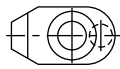


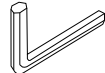
CERAMIC

CERMET

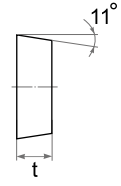
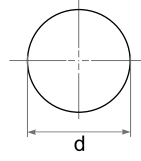
PCBN
/
PCD

TOOL
HOLDER

MILLING
CUTTER

| Dimensions (mm) | Spare parts | | | |
|-----------------|---|---|---|---|
| | Clamp | Clamp Screw | Spring | Wrench |
| D |  |  |  |  |
| 50 - 100 | AMS6T | A0B-6S | SP5 | LW3 |

RPGN



| Type | | Dimensions [mm] | | Grade | | | |
|-------------------|----------------|-----------------|------|-------|-------|-------|--------|
| ISO | ASA | d | t | SW400 | SW800 | SN800 | SN1000 |
| RPGN120400 | RPGN 43 | 12.7 | 4.76 | | • | • | • |

CERAMIC

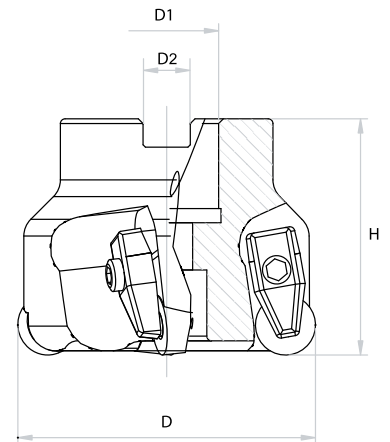
CERMET

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/
PCD

TOOL
HOLDER

**MILLING
CUTTER**

SFXN



| Type | Dimensions (mm) | | | | ⚙️ | Insert |
|---------------------|-----------------|----------------|----------------|----|----|--------------|
| | D | D ₁ | D ₂ | H | | |
| SFXN 050-03-00 RX7A | 50 | 19.05 | 7.9 | 50 | 3 | RNGX 1207 DP |
| SFXN 050-03-00 RX7 | 50 | 22 | 10.4 | 50 | 3 | |
| SFXN 063-04-00 RX7A | 63 | 19.05 | 12.7 | 50 | 4 | |
| SFXN 063-04-00 RX7 | 63 | 22 | 10.4 | 50 | 4 | |
| SFXN 080-05-00 RX7A | 80 | 25.4 | 9.5 | 50 | 5 | |
| SFXN 080-05-00 RX7 | 80 | 27 | 12.4 | 50 | 5 | |
| SFXN 100-06-00 RX7A | 100 | 31.75 | 12.7 | 50 | 6 | |
| SFXN 100-06-00 RX7 | 100 | 32 | 14.4 | 50 | 6 | |




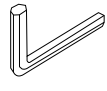
CERAMIC

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PCD

TOOL
HOLDER

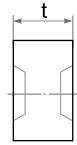
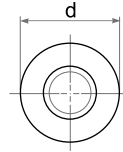
MILLING
CUTTER

| Dimensions (mm) | Spare parts | | | |
|-----------------|---|---|--|--|
| | Clamp | Screw | Spring | Wrench |
| 50 - 100 |  SCL 5M |  SLS4 |  SP4 |  LW3 |

Recommended Cutting Conditions

| Work - Piece | Hardness (HB) | Cutting Speed V _c (m/min) | Feed f _z (mm/z) | Depth a _p (mm) max |
|------------------------------------|---------------|--------------------------------------|----------------------------|-------------------------------|
| Iron-base, Heat-resistant alloys | 135~328 | 300~900 | 0.05~0.13 | 6.35 |
| Cobalt-base, Heat-resistant alloys | 150~425 | 270~1,200 | 0.05~0.13 | 6.35 |
| Nickel base, Heat-resistant alloys | 140~475 | 270~1,200 | 0.05~0.13 | 6.35 |
| PH Stainless steels | 135~450 | 520~700 | 0.08~0.10 | 6.35 |

RNGX .. DP



| Type | | Dimensions (mm) | | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 | |
|--------------|------------|-----------------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|--|
| ISO | ASA | d | t | | | | | | | | | | | | | | | | | | | | |
| RNGX 1207 DP | RNGX 45 DP | 12.70 | 7.94 | | | | | | | | | | | | • | | • | • | • | | | | |

NEW **NEW**

CERAMIC

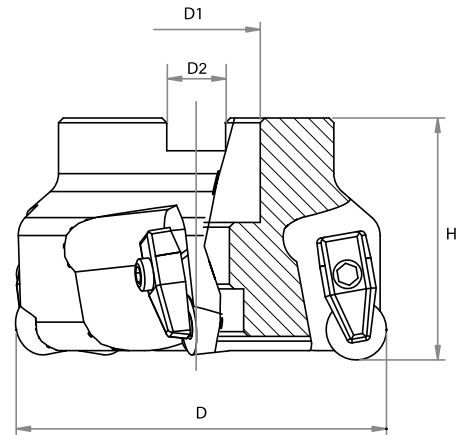
CERMET

PCBN
/
PCD

TOOL
HOLDER

MILLING
CUTTER

SFXP



| Type | Dimensions (mm) | | | | ⚙️ | Insert |
|---------------------|-----------------|----------------|----------------|----|----|--------------|
| | D | D ₁ | D ₂ | H | | |
| SFXP 050-03-00 RP4A | 50 | 19.05 | 7.9 | 50 | 3 | RPGX 1204 DP |
| SFXP 050-03-00 RP4 | 50 | 22 | 10.4 | 50 | 3 | |
| SFXP 050-04-00 RP4A | 50 | 19.05 | 7.9 | 50 | 4 | |
| SFXP 050-04-00 RP4 | 50 | 22 | 10.4 | 50 | 4 | |
| SFXP 063-04-00 RP4A | 63 | 19.05 | 7.9 | 63 | 4 | |
| SFXP 063-04-00 RP4 | 63 | 22 | 10.4 | 63 | 4 | |
| SFXP 080-05-00 RP4A | 80 | 25.4 | 9.5 | 50 | 5 | |
| SFXP 080-05-00 RP4 | 80 | 27 | 12.4 | 50 | 5 | |
| SFXP 100-06-00 RP4A | 100 | 31.75 | 12.7 | 50 | 6 | |
| SFXP 100-06-00 RP4 | 100 | 32 | 14.4 | 50 | 6 | |




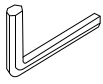
CERAMIC

CERMET

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TOOL
HOLDER

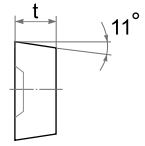
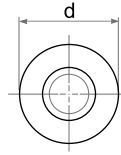
MILLING
CUTTER

| Dimensions (mm) | Spare parts | | | | | | | |
|-----------------|---|--------|---|--------|---|-----|---|-----|
| | D | Clamp | Screw | Spring | Wrench | | | |
| 50 - 100 |  | SCL 5M |  | SLS4 |  | SP4 |  | LW3 |

Recommended Cutting Conditions

| Work - Piece | Hardness (HB) | Cutting Speed Vc(m/min) | Feed fz(mm/z) | Depth ap(mm) max |
|------------------------------------|---------------|-------------------------|---------------|------------------|
| Iron-base, Heat-resistant alloys | 135~328 | 300~900 | 0.05~0.13 | 6.35 |
| Cobalt-base, Heat-resistant alloys | 150~425 | 270~1,200 | 0.05~0.13 | 6.35 |
| Nickel base, Heat-resistant alloys | 140~475 | 270~1,200 | 0.05~0.13 | 6.35 |
| PH Stainless steels | 135~450 | 520~700 | 0.08~0.10 | 6.35 |

RPGX .. DP



| Type | | Dimensions (mm) | | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 | |
|--------------|------------|-----------------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|--|
| ISO | ASA | d | t | | | | | | | | | | | | | | | | | | | | |
| RPGX 1204 DP | RPGX 43 DP | 12.70 | 4.76 | | | | | | | | | | | | • | | | | • | • | | | |

NEW NEW

CERAMIC

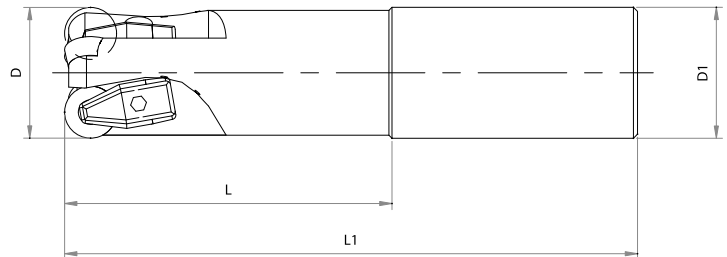
CERMET

PCBN
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PCD

TOOL
HOLDER

MILLING
CUTTER

SEXP



| Type | Dimensions (mm) | | | | ⚙️ | Insert |
|-----------------------|-----------------|----------------|----|----------------|----|--------------|
| | D | D ₁ | L | L ₁ | | |
| SEXP 032-02-80140 X4 | 32 | 32 | 80 | 140 | 2 | RPGX 1204 DP |
| SEXP 032-03-40100 X4A | 32 | 31.75 | 40 | 100 | 3 | |
| SEXP 032-03-40100 X4 | 32 | 32 | 40 | 100 | 3 | |
| SEXP 032-03-80140 X4A | 32 | 31.75 | 80 | 140 | 3 | |
| SEXP 032-03-80140 X4 | 32 | 32 | 80 | 140 | 3 | |
| SEXP 038-03-50100 X4A | 38 | 38.1 | 50 | 100 | 3 | |
| SEXP 038-03-50100 X4 | 38 | 32 | 50 | 100 | 3 | |
| SEXP 038-03-90140 X4A | 38 | 38.1 | 90 | 140 | 3 | |
| SEXP 038-03-90140 X4 | 38 | 32 | 90 | 140 | 3 | |





CERAMIC

CERMET

PCBN
/
PCD

TOOL
HOLDER

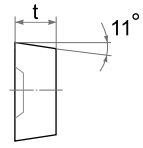
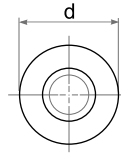
MILLING
CUTTER

| Dimensions (mm) | Spare parts | | | |
|-----------------|---|---|---|---|
| | Clamp | Screw | Spring | Wrench |
| |  |  |  |  |
| 32 - 38 | SCL 5M | SLS4 | SP4 | LW3 |

Recommended Cutting Conditions

| Work - Piece | Hardness (HB) | Cutting Speed Vc(m/min) | Feed fz(mm/z) | Depth ap(mm) max |
|---|---------------|-------------------------|---------------|------------------|
| Iron-base, Heat-resistant alloys | 135~328 | 300~900 | 0.05~0.13 | 6.35 |
| Cobalt-base, Heat-resistant alloys | 150~425 | 270~1,200 | 0.05~0.13 | 6.35 |
| Nickel base, Heat-resistant alloys | 140~475 | 270~1,200 | 0.05~0.13 | 6.35 |
| PH Stainless steels | 135~450 | 520~700 | 0.08~0.10 | 6.35 |

RPGX .. DP



| Type | | Dimensions (mm) | | ST100 | ST300 | ST500 | ST900 | TC300 | TM300 | SD200 | SZ200 | SZ300 | SN26 | SN300 | SN400 | SN500 | SN600 | SN800 | SN1000 | NC400 | SW400 | SW800 | |
|--------------|------------|-----------------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|--|
| ISO | ASA | d | t | | | | | | | | | | | | | | | | | | | | |
| RPGX 1204 DP | RPGX 43 DP | 12.70 | 4.76 | | | | | | | | | | | | • | | | • | • | | | | |

NEW **NEW**

CERAMIC

CERMET

PCBN
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PCD

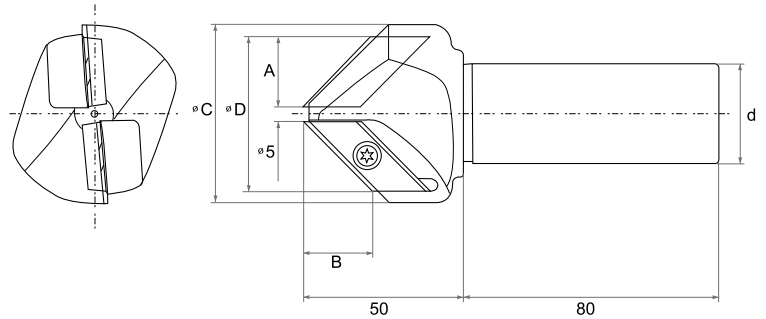
TOOL
HOLDER

MILLING
CUTTER

CHAMFER CUTTER

TURNING
&
MILLING

CSC

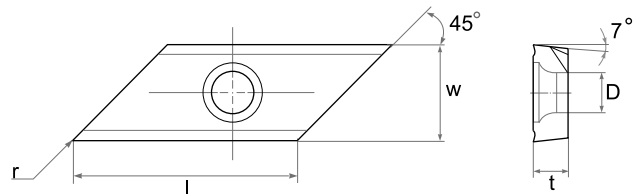


| Type | Dimensions (mm) | | | | | | ⚙️ | Insert | Spare parts | |
|---------------------|-----------------|------|------|-----------------|-----------------|------|----|---------------|-------------|--------|
| | θ | A | B | $\varnothing C$ | $\varnothing D$ | d | | | Screw | Wrench |
| CSC 0503 1R-30 | 30° | 15.5 | 20.5 | 40 | 36.0 | 32.0 | 1 | XCET 310404ER | SDT050 | T-20 |
| CSC 0503 1R-30-A | 30° | 15.5 | 20.5 | 40 | 36.0 | 25.4 | 1 | | | |
| CSC 0503 1R-30-A-2F | 30° | 15.5 | 26.0 | 47 | 43.0 | 25.4 | 2 | | | |
| CSC 0503 1R-41-A | 41° | 20.5 | 20.5 | 56 | 46.0 | 25.4 | 2 | | | |
| CSC 0503 1R-45 | 45° | 22.0 | 20.5 | 56 | 46.0 | 32.0 | 2 | | | |
| CSC 0503 1R-45-A | 45° | 22.0 | 20.5 | 56 | 46.0 | 25.4 | 2 | | | |
| CSC 0503 1R-60 | 60° | 26.5 | 15.0 | 72 | 55.0 | 32.0 | 2 | | | |
| CSC 0503 1R-60-A | 60° | 26.5 | 15.0 | 72 | 55.0 | 25.4 | 2 | | | |

Recommended Cutting Conditions

| Work piece | Carbon Steel (S55C) Stainless Steel 250HB ≥ Cast Iron (FC250) | Alloy Steel (SCM440) 300HB ≥ High Alloy Steel (SKD61) 300HB ≥ |
|-----------------|---|--|
| Feed (mm/tooth) | 0.1~0.25 | 0.1~0.2 |
| rpm | 3000(1000~7000) | |

XCET



| Type | Dimensions (mm) | | | | | Grade | | |
|----------------|-----------------|-------|------|------|-----|-------|-------|--------|
| | l | w | t | D | r | TX515 | TX520 | SCW200 |
| XCET 310404 ER | 22.00 | 12.70 | 4.50 | 5.60 | 0.4 | | • | • |
| XCET 310408 ER | 22.00 | 12.70 | 4.50 | 5.60 | 0.8 | | • | |

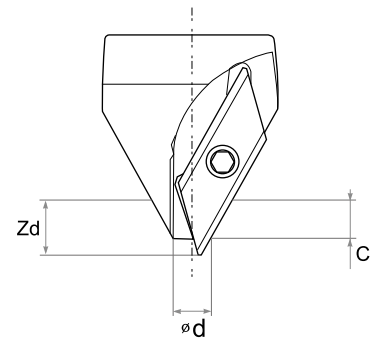
*SCW200 is a coated carbide grade for P20 range machining.

TECHNICAL DATA

30° Chamfer

| Hole Dia $\varnothing d$ | Dimensions (mm) | | | | | | | |
|-----------------------------|-----------------|------|------|------|------|------|------|------|
| | 0.5 | 1 | 1.5 | 2 | 2.5 | 3 | 3.5 | 4 |
| 5 | 0.8 | 1.3 | 1.8 | 2.3 | 2.8 | | | |
| 6 | 1.7 | 2.2 | 2.7 | 3.2 | 3.7 | | | |
| 6.8 | 2.4 | 2.9 | 3.4 | 3.9 | 4.4 | | | |
| 8 | 3.4 | 3.9 | 4.4 | 4.9 | 5.4 | | | |
| 8.5 | 3.8 | 4.3 | 4.8 | 5.3 | 5.8 | | | |
| 10 | 5.1 | 5.6 | 6.1 | 6.6 | 7.1 | 7.6 | 8.1 | 8.6 |
| 10.2 | 5.3 | 5.8 | 6.3 | 6.8 | 7.3 | 7.8 | 8.3 | 8.8 |
| 12 | 6.9 | 7.4 | 7.9 | 8.4 | 8.9 | 9.4 | 9.9 | 10.4 |
| 16 | 10.3 | 10.8 | 11.3 | 11.8 | 12.3 | 12.8 | 13.3 | 13.8 |
| 17.5 | 11.6 | 12.1 | 12.6 | 13.1 | 13.6 | 14.1 | 14.6 | 15.1 |
| 20 | 13.7 | 14.2 | 14.7 | 15.2 | 15.7 | 16.2 | 16.7 | 17.2 |
| 21 | 14.6 | 15.1 | 15.6 | 16.1 | 16.6 | 17.1 | 17.6 | 18.1 |
| 24 | 17.2 | 17.7 | 18.2 | 18.7 | 19.2 | 19.7 | 20.2 | 20.7 |
| 30 | 22.4 | 22.9 | 23.4 | 23.9 | 24.4 | 24.9 | 25.4 | |
| 33 | 24.9 | 25.4 | | | | | | |

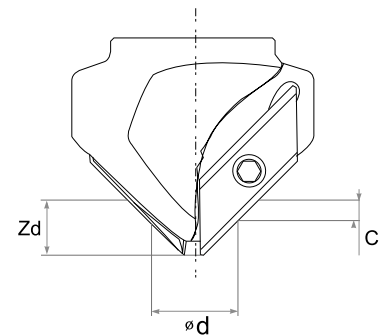
CSC 05031R-30



45° Chamfer

| Hole Dia $\varnothing d$ | Dimensions (mm) | | | | | | |
|-----------------------------|-----------------|------|------|------|------|------|------|
| | 0.5 | 1 | 1.5 | 2 | 3 | 4 | 5 |
| 5 | 0.7 | 1.2 | 1.7 | 2.2 | 3.2 | | |
| 6 | 1.2 | 1.7 | 2.2 | 2.7 | 3.7 | | |
| 6.8 | 1.6 | 2.1 | 2.6 | 3.1 | 4.1 | | |
| 8 | 2.2 | 2.7 | 3.2 | 3.7 | 4.7 | | |
| 8.5 | 2.4 | 2.9 | 3.4 | 3.9 | 4.9 | | |
| 10 | 3.2 | 3.7 | 4.2 | 4.7 | 5.7 | 6.7 | 7.7 |
| 10.2 | 3.3 | 3.8 | 4.3 | 4.8 | 5.8 | 6.8 | 7.8 |
| 12 | 4.2 | 4.7 | 5.2 | 5.7 | 6.7 | 7.7 | 8.7 |
| 14 | 5.2 | 5.7 | 6.2 | 6.7 | 7.7 | 8.7 | 9.7 |
| 16 | 6.2 | 6.7 | 7.2 | 7.7 | 8.7 | 9.7 | 10.7 |
| 17.5 | 6.9 | 7.4 | 7.9 | 8.4 | 9.4 | 10.4 | 11.4 |
| 20 | 8.2 | 8.7 | 9.2 | 9.7 | 10.7 | 11.7 | 12.7 |
| 21 | 8.7 | 9.2 | 9.7 | 10.2 | 11.2 | 12.2 | 13.2 |
| 24 | 10.2 | 10.7 | 11.2 | 11.7 | 12.7 | 13.7 | 14.7 |
| 30 | 13.2 | 13.7 | 14.2 | 14.7 | 15.7 | 16.7 | 17.7 |
| 33 | 14.7 | 15.2 | 15.7 | 16.2 | 17.2 | 18.2 | 19.2 |
| 36 | 16.2 | 16.7 | 17.2 | 17.7 | 18.7 | 19.7 | |
| 42 | 19.2 | 19.7 | 20.2 | | | | |

CSC 05031R-45



CERAMIC

CERMET

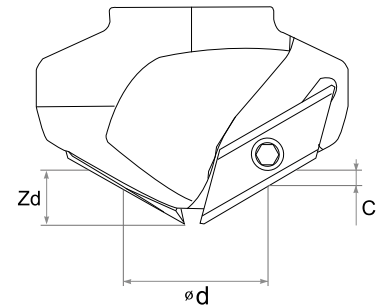
PCBN
/
PCDTOOL
HOLDERMILLING
CUTTER

TECHNICAL DATA

60° Chamfer

| Hole Dia Ød | Dimensions [mm] | | | | | | |
|----------------|-----------------|------|------|------|------|------|------|
| | 0.5 | 1 | 1.5 | 2 | 2.5 | 3 | 3.5 |
| 5 | 0.6 | 1.1 | 1.6 | 2.1 | | | |
| 6 | 0.9 | 1.4 | 1.9 | 2.4 | | | |
| 6.8 | 1.1 | 1.6 | 2.1 | 2.6 | | | |
| 8 | 1.4 | 1.9 | 2.4 | 2.9 | | | |
| 8.5 | 1.6 | 2.1 | 2.6 | 3.1 | | | |
| 10 | 2.0 | 2.5 | 3.0 | 3.5 | 4.0 | 4.5 | 5.0 |
| 10.2 | 2.1 | 2.6 | 3.1 | 3.6 | 4.1 | 4.6 | 5.1 |
| 12 | 2.6 | 3.1 | 3.6 | 4.1 | 4.6 | 5.1 | 5.6 |
| 16 | 3.7 | 4.2 | 4.7 | 5.2 | 5.7 | 6.2 | 6.7 |
| 17.5 | 4.2 | 4.7 | 5.2 | 5.7 | 6.2 | 6.7 | 7.2 |
| 20 | 4.9 | 5.4 | 5.9 | 6.4 | 6.9 | 7.4 | 7.9 |
| 21 | 5.2 | 5.7 | 6.2 | 6.7 | 7.2 | 7.7 | 8.2 |
| 24 | 6.1 | 6.6 | 7.1 | 7.6 | 8.1 | 8.6 | 9.1 |
| 30 | 7.8 | 8.3 | 8.8 | 9.3 | 9.8 | 10.3 | 10.8 |
| 33 | 8.7 | 9.2 | 9.7 | 10.2 | 10.7 | 11.2 | 11.7 |
| 36 | 9.5 | 10.0 | 10.5 | 11.0 | 11.5 | 12.0 | 12.5 |
| 38 | 10.1 | 10.6 | 11.1 | 11.6 | 12.1 | 12.6 | 13.1 |
| 42 | 11.2 | 11.7 | 12.2 | 12.7 | 13.2 | 13.7 | 14.2 |
| 46 | 12.4 | 12.9 | 13.4 | 13.9 | 14.4 | | |
| 48 | 13.0 | 13.5 | 14.0 | 14.5 | | | |
| 52 | 14.1 | | | | | | |

CSC 05031R-60



CERAMIC

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HOLDER

MILLING
CUTTER

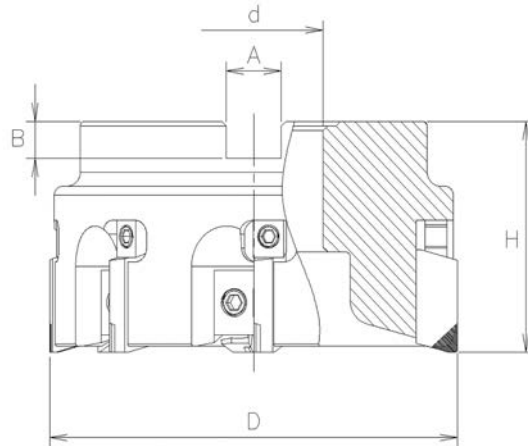
ALUMINUM CUTTER

PART.

A

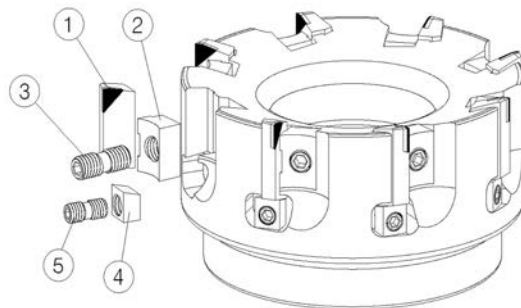
TURNING
&
MILLING

HPA - I



| Type | Dimensions (mm) | | | | | Z | Weight (kg) | Insert | Arbor |
|--------------|-----------------|--------|-------|----|----|----|-------------|---------|------------|
| | ØD | Ød | A | B | H | | | | |
| HPA 025R-I09 | 63 | 22 | 10 | 6 | 50 | 6 | 0.5 | HPA-I09 | FMA 22 |
| HPA 03R-I09 | 80 | 25.4 | 9.5 | 6 | 50 | 8 | 0.7 | | FMA 25.4 |
| HPA 04R-I09 | 100 | 31.75 | 12.7 | 8 | 63 | 10 | 1.4 | | FMA 31.75 |
| HPA 05R-I09 | 125 | 38.1 | 15.9 | 10 | 63 | 12 | 1.8 | | FMA 38.1 |
| HPA 06R-I09 | 160 | 50.8 | 19.05 | 11 | 63 | 14 | 2.4 | | FMA 50.8 |
| HPA 08R-I09 | 200 | 47.625 | 25.4 | 14 | 63 | 16 | 3.5 | | FMA 47.625 |
| HPA 10R-I09 | 250 | 47.625 | 25.4 | 14 | 63 | 18 | 4.8 | | FMA 47.625 |

COMPONENT



| Spare parts | | | | |
|-------------|---------|---------------|----------------|----------------------|
| ① Insert | ② Wedge | ③ Wedge Screw | ④ Adjust Wedge | ⑤ Adjust Wedge Screw |
| | | | | |
| HPA-I09 | DT-ST01 | WS6-16 | DT-ST02 | WS5-11 |

CERAMIC

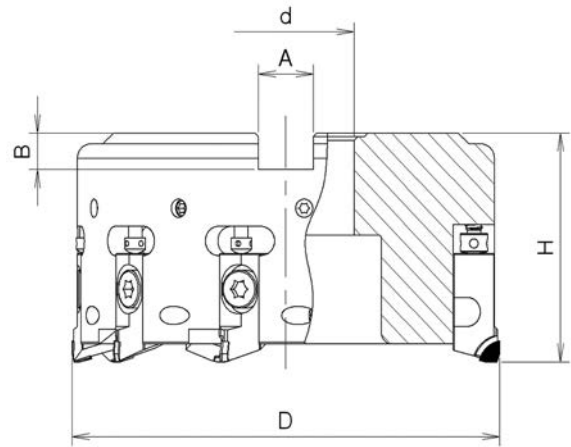
CERMET

PCBN
/
PCD

TOOL
HOLDER

MILLING
CUTTER

HPA - H



| Type | Dimensions (mm) | | | | | ⚙️ | Weight (kg) | Insert | Arbor |
|--------------|-----------------|--------|-------|-----|----|----|-------------|--|------------|
| | ØD | Ød | A | B | H | | | | |
| HPA 02R-H10 | 50 | 16 | 8 | 6.2 | 50 | 4 | 0.4 | ROUGH HPA 10CA-R WIPER HPA 10CA-W | FMA 16 |
| HPA 025R-H10 | 63 | 22 | 10 | 6 | 50 | 4 | 0.5 | | FMA 22 |
| HPA 03R-H10 | 80 | 25.4 | 9.5 | 6 | 50 | 6 | 0.7 | | FMA 25.4 |
| HPA 04R-H10 | 100 | 31.75 | 12.7 | 8 | 50 | 7 | 2.2 | | FMA 31.75 |
| HPA 05R-H10 | 125 | 38.1 | 15.9 | 10 | 63 | 10 | 1.4 | | FMA 38.1 |
| HPA 06R-H10 | 160 | 50.8 | 19.05 | 11 | 63 | 12 | 2.5 | | FMA 50.8 |
| HPA 08R-H10 | 200 | 47.625 | 25.4 | 14 | 63 | 14 | 3.5 | | FMA 47.625 |
| HPA 10R-H10 | 250 | 47.625 | 25.4 | 14 | 63 | 18 | 4.9 | | FMA 47.625 |

COMPONENT

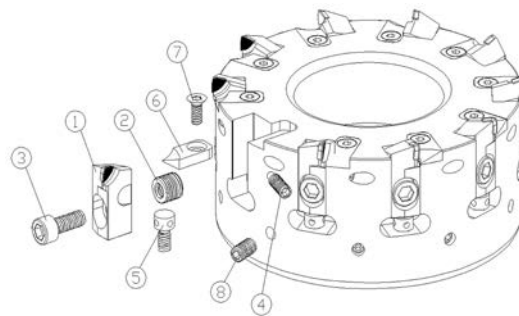
CERAMIC

CERMET

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TOOL
HOLDER

MILLING
CUTTER



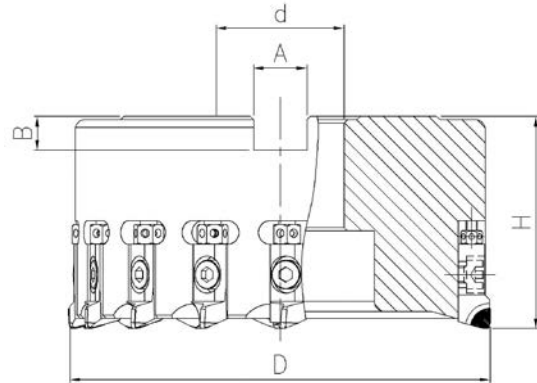
| Spare parts | | | | |
|----------------|--------------|--------------------|-------------------|--------------------|
| ① Cartridge | ① Cartridge | ② Double Screw | ③ Clamp Screw | ④ Side Clamp Screw |
| | | | | |
| HPA 10CA-R | HPA 10CA-W | H108 | M6×15 | M6×16 |
| ⑤ Adjust Screw | ⑥ Chip Cover | ⑦ Chip Cover Screw | ⑧ Balancing Screw | |
| | | | | |
| AJM 5F | HC-R/L | M4×10 | M6×10 | |

ALUMINUM CUTTER

PART.
A

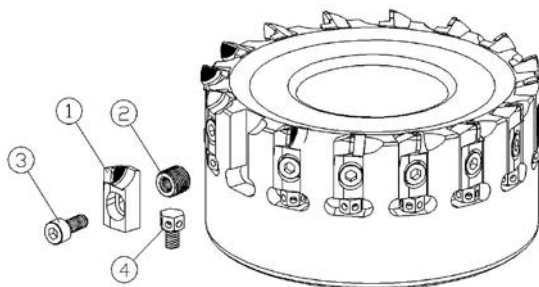
HPA - M

TURNING
&
MILLING



| Type | Dimensions [mm] | | | | | Z | Weight [kg] | Insert | Arbor |
|-------------|-----------------|--------|-------|----|----|----|-------------|--|------------|
| | ØD | Ød | A | B | H | | | | |
| HPA 03R-M10 | 80 | 25.4 | 9.5 | 6 | 50 | 10 | 0.8 | ROUGH HPA 08CA-R WIPER HPA 08CA-W | FMA 25.4 |
| HPA 04R-M10 | 100 | 31.75 | 12.7 | 8 | 50 | 12 | 1.2 | | FMA 31.75 |
| HPA 05R-M10 | 125 | 38.1 | 15.9 | 10 | 63 | 14 | 2.2 | | FMA 38.1 |
| HPA 06R-M10 | 160 | 50.8 | 19.05 | 11 | 63 | 18 | 2.8 | | FMA 50.8 |
| HPA 08R-M10 | 200 | 47.625 | 25.4 | 14 | 63 | 24 | 4.5 | | FMA 47.625 |
| HPA 10R-M10 | 250 | 47.625 | 25.4 | 14 | 63 | 30 | 7 | | FMA 47.625 |

COMPONENT



CERAMIC

CERMET

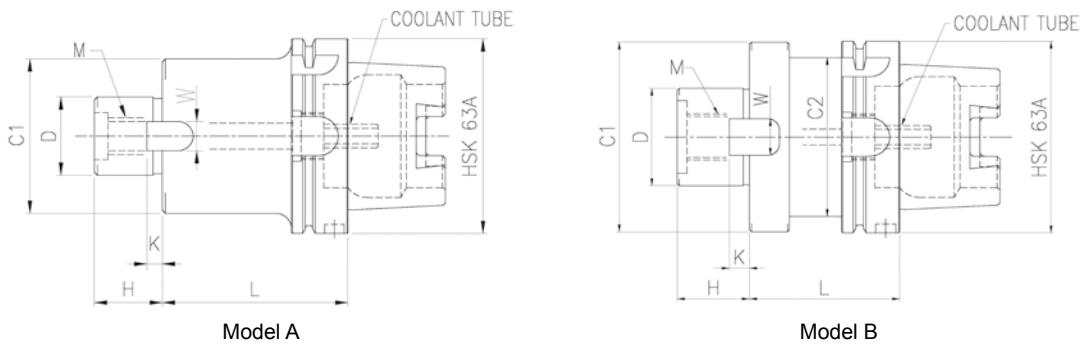
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PCD

TOOL
HOLDER

MILLING
CUTTER

| Spare parts | | | | |
|-------------|-------------|----------------|---------------|----------------|
| ① Cartridge | ① Cartridge | ② Double Screw | ③ Clamp Screw | ④ Adjust Screw |
| | | | | |
| HPA 08CA-R | HPA 08CA-W | H107 | M5x12 | AJM 5F |

ARBOR



| Type | Dimensions (mm) | | | | | | | M | Weight (kg) | Model | Cutter |
|----------------------|-----------------|-----|----|----------------|----------------|------|---|-----|-------------|-------|----------|
| | D | L | H | C ₁ | C ₂ | W | K | | | | |
| HSK 63A-FMA22-50 | 22 | 50 | 19 | 50 | 50 | 9.5 | 5 | M10 | 1.2 | A | HPA 025R |
| HSK 63A-FMA25.4-60 | 25.4 | 60 | 22 | 50 | 50 | 9.5 | 5 | M12 | 1.3 | A | HPA 03R |
| HSK 63A-FMA25.4-90 | 25.4 | 90 | 22 | 50 | 50 | 9.5 | 5 | M12 | 1.9 | A | HPA 03R |
| HSK 63A-FMA25.4-120 | 25.4 | 120 | 22 | 50 | 50 | 9.5 | 5 | M12 | 2.3 | A | HPA 03R |
| HSK 63A-FMA31.75-60 | 31.75 | 60 | 30 | 60 | 53 | 12.7 | 7 | M16 | 1.7 | B | HPA 04R |
| HSK 63A-FMA31.75-90 | 31.75 | 90 | 30 | 60 | 53 | 12.7 | 7 | M16 | 2.5 | B | HPA 04R |
| HSK 63A-FMA31.75-120 | 31.75 | 120 | 30 | 60 | 53 | 12.7 | 7 | M16 | 3.3 | B | HPA 04R |
| HSK 63A-FMA38.1-60 | 38.1 | 60 | 34 | 80 | 53 | 15.9 | 9 | M20 | 2.1 | B | HPA 05R |
| HSK 63A-FMA38.1-90 | 38.1 | 90 | 34 | 80 | 53 | 15.9 | 9 | M20 | 3 | B | HPA 05R |
| HSK 63A-FMA38.1-120 | 38.1 | 120 | 34 | 80 | 53 | 15.9 | 9 | M20 | 4.4 | B | HPA 05R |

CERAMIC

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MILLING
CUTTER

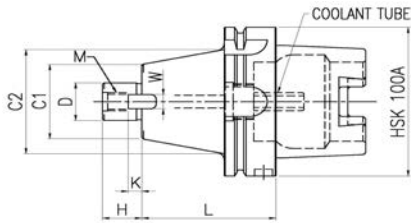


ALUMINUM CUTTER

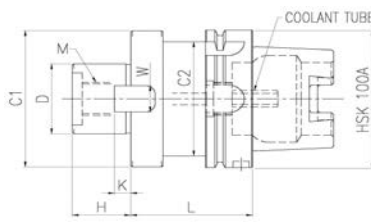
PART.
A

ARBOR

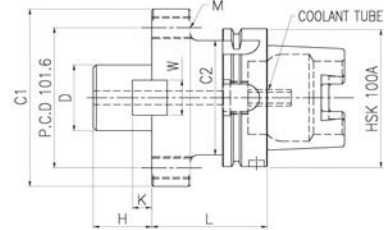
TURNING
&
MILLING



Model A



Model B



Model C

| Type | Dimensions (mm) | | | | | | | M | Weight (kg) | Model | Cutter |
|-----------------------|-----------------|-----|----|----------------|----------------|-------|------|-----|-------------|-------|---------|
| | D | L | H | C ₁ | C ₂ | W | K | | | | |
| HSK 100A-FMA25.4-75 | 25.4 | 75 | 22 | 50 | 70 | 9.5 | 5 | M12 | 3.2 | A | HPA 03R |
| HSK 100A-FMA25.4-105 | 25.4 | 105 | 22 | 50 | 70 | 9.5 | 5 | M12 | 3.9 | A | HPA 03R |
| HSK 100A-FMA25.4-135 | 25.4 | 135 | 22 | 50 | 70 | 9.5 | 5 | M12 | 4.6 | A | HPA 03R |
| HSK 100A-FMA31.75-75 | 31.75 | 75 | 30 | 60 | 70 | 12.7 | 7 | M16 | 3.5 | A | HPA 04R |
| HSK 100A-FMA31.75-105 | 31.75 | 105 | 30 | 60 | 70 | 12.7 | 7 | M16 | 4.3 | A | HPA 04R |
| HSK 100A-FMA31.75-135 | 31.75 | 135 | 30 | 60 | 70 | 12.7 | 7 | M16 | 5.1 | A | HPA 04R |
| HSK 100A-FMA38.1-75 | 38.1 | 75 | 34 | 80 | 80 | 15.9 | 9 | M20 | 4.4 | A | HPA 05R |
| HSK 100A-FMA38.1-105 | 38.1 | 105 | 34 | 80 | 80 | 15.9 | 9 | M20 | 5.7 | A | HPA 05R |
| HSK 100A-FMA38.1-135 | 38.1 | 135 | 34 | 80 | 80 | 15.9 | 9 | M20 | 7.0 | A | HPA 05R |
| HSK 100A-FMA50.8-75 | 50.8 | 75 | 36 | 99 | 83 | 19.05 | 10 | M24 | 5.7 | B | HPA 06R |
| HSK 100A-FMA50.8-105 | 50.8 | 105 | 36 | 99 | 83 | 19.05 | 10 | M24 | 7.7 | B | HPA 06R |
| HSK 100A-FMA50.8-135 | 50.8 | 135 | 36 | 99 | 83 | 19.05 | 10 | M24 | 9.7 | B | HPA 06R |
| HSK 100A-FMA47.625-75 | 47.625 | 75 | 38 | 128.57 | 83 | 25.4 | 12.5 | M16 | | C | HPA 08R |

CERAMIC

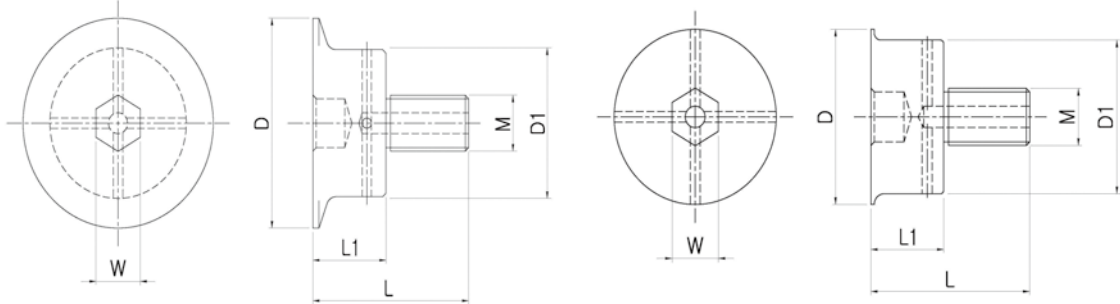
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HOLDER

MILLING
CUTTER

MOUNT'G BOLT



Model A

Model B

| Type | Dimensions (mm) | | | | | M | Model | Cutter | Arbor |
|---------|-----------------|----------------|------|----------------|----|-----|-------|--------------|-----------|
| | D | D ₁ | L | L ₁ | W | | | | |
| ICM-M10 | 28 | 16.5 | 41 | 11 | 8 | M10 | A | HPA 025R-I09 | FMA 22 |
| HCM-M10 | 25 | 18 | 43 | 10 | 8 | M10 | B | HPA 025R-H10 | |
| ICM-M12 | 44 | 26 | 42 | 15.4 | 10 | M12 | A | HPA 03R-I09 | FMA 25.4 |
| HCM-M12 | 40 | 34 | 47.5 | 25.5 | 12 | M12 | B | HPA 03R-H10 | |
| ICM-M16 | 60 | 43 | 49 | 23 | 14 | M16 | A | HPA 04R-I09 | FMA 31.75 |
| HCM-M16 | 49 | 43 | 48 | 22 | 14 | M16 | B | HPA 04R-H10 | |
| ICM-M20 | 79 | 53.6 | 58.8 | 27.8 | 14 | M20 | A | HPA 05R-I09 | FMA 38.1 |
| HCM-M20 | 60 | 54 | 63 | 32 | 14 | M20 | B | HPA 05R-H10 | |
| ICM-M24 | 110 | 65 | 60 | 22 | 17 | M24 | A | HPA 06R-I09 | FMA 50.8 |
| HCM-M24 | 71 | 65 | 60 | 22 | 17 | M24 | B | HPA 06R-H10 | |

CERAMIC

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MILLING
CUTTER

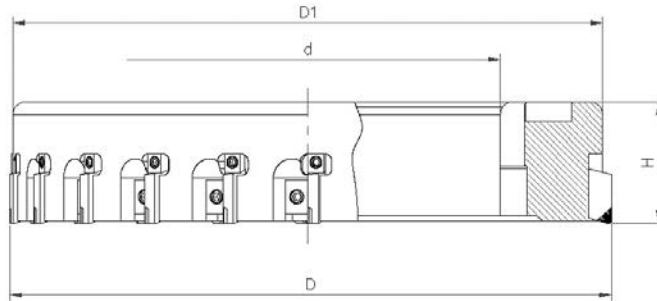
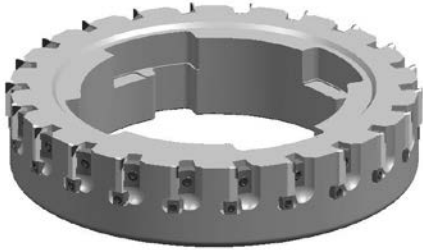
ALUMINUM CUTTER

PART.

A

TURNING
&
MILLING

QCB - I



| Type | Dimensions (mm) | | | | ⚙️ | Insert |
|--------------|-----------------|----------------|--------|----|----|---------|
| | D | D ₁ | d | H | | |
| QCB D200-I09 | 200 | 195 | 120.02 | 50 | 18 | HPA-I09 |
| QCB D250-I09 | 250 | 245 | 160.02 | 50 | 22 | |
| QCB D315-I09 | 315 | 310 | 215.02 | 50 | 28 | |

| Spare parts | | | | |
|-------------|---------|---------------|----------------|----------------------|
| ① Insert | ② Wedge | ③ Wedge Screw | ④ Adjust Wedge | ⑤ Adjust Wedge Screw |
| | | | | |
| HPA-I09 | DT-ST01 | WS6-16 | DT-ST02 | WS5-11 |

CERAMIC

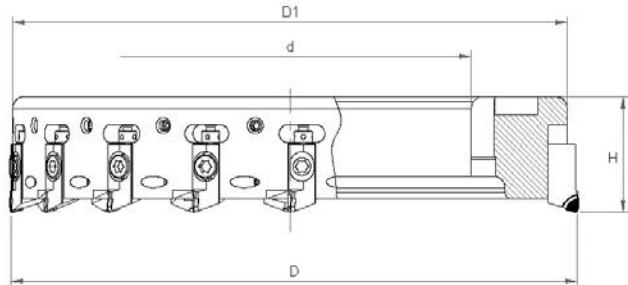
CERMET

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PCD

TOOL
HOLDER

MILLING
CUTTER

QCB - H



| Type | Dimensions (mm) | | | | ⚙️ | Insert |
|---------------------|-----------------|----------------|--------|----|----|--------------------------|
| | D | D ₁ | d | H | | |
| QCB D200-H10 | 200 | 195 | 120.02 | 50 | 14 | HPA 10CA-R HPA 10CA-W |
| QCB D250-H10 | 250 | 245 | 160.02 | 50 | 18 | |
| QCB D315-H10 | 315 | 310 | 215.02 | 50 | 22 | |

| Spare parts | | | | |
|----------------|--------------|--------------------|-------------------|--------------------|
| ① Cartridge | ① Cartridge | ② Double Screw | ③ Clamp Screw | ④ Side Clamp Screw |
| | | | | |
| HPA 10CA-R | HPA 10CA-W | H108 | M6×15 | M6×16 |
| ⑤ Adjust Screw | ⑥ Chip Cover | ⑦ Chip Cover Screw | ⑧ Balancing Screw | |
| | | | | |
| AJM 5F | HC-R/L | M4×10 | M6×10 | |

CERAMIC

CERMET

PCBN
/
PCD

TOOL
HOLDER

MILLING
CUTTER

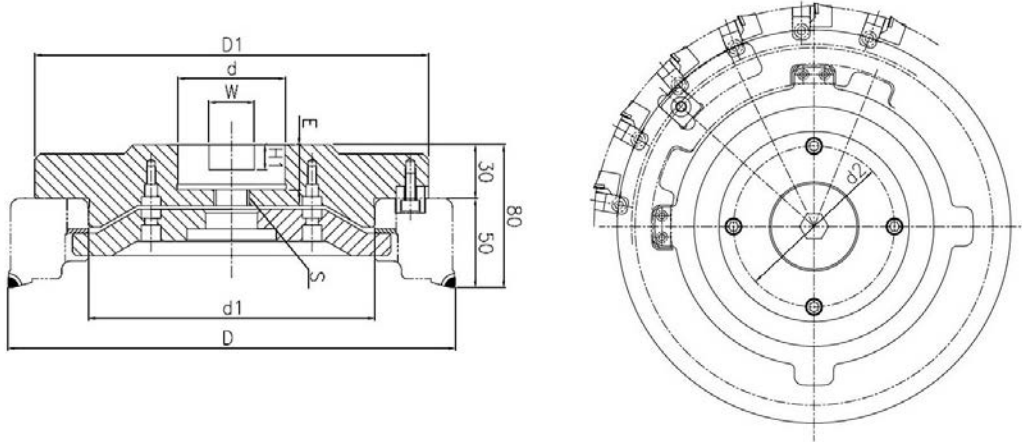
ALUMINUM CUTTER

PART.

A

ARBOR

TURNING
&
MILLING



| Type | Dimensions (mm) | | | | | | | | Center Bolt |
|------------------|-----------------|----------------|--------|----------------|------|----------------|-----|----|-------------|
| | D | D ₁ | d | d ₁ | W | H ₁ | S | E | |
| QCBA-D200 | 200 | 195 | 47.625 | 119.97 | 25.4 | 14 | M20 | 25 | TMBA-M20 |
| QCBA-D250 | 250 | 245 | 60 | 159.97 | 25.4 | 14 | M20 | 25 | |
| QCBA-D315 | 315 | 310 | 60 | 214.97 | 25.4 | 14 | M20 | 25 | |

CERAMIC

CERMET

PCBN
/
PCD

TOOL
HOLDER

**MILLING
CUTTER**

SPECIAL TOOLS

CYLINDER BLOCK



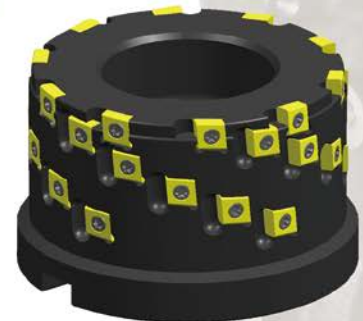
• FACE OIL PAN CUTTER



• BEARING CAP CUTTER



• LOCK NOTCH CUTTER



• FACE NOZZLE PISTON COOLING ENDMILL

CERAMIC

CERMET

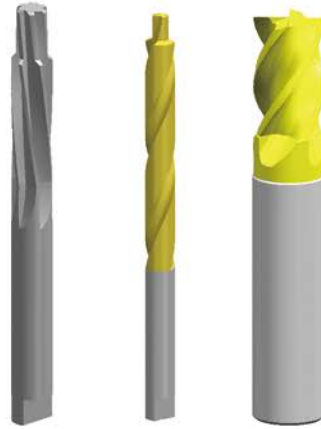
PCBN
/
PCD

TOOL
HOLDER

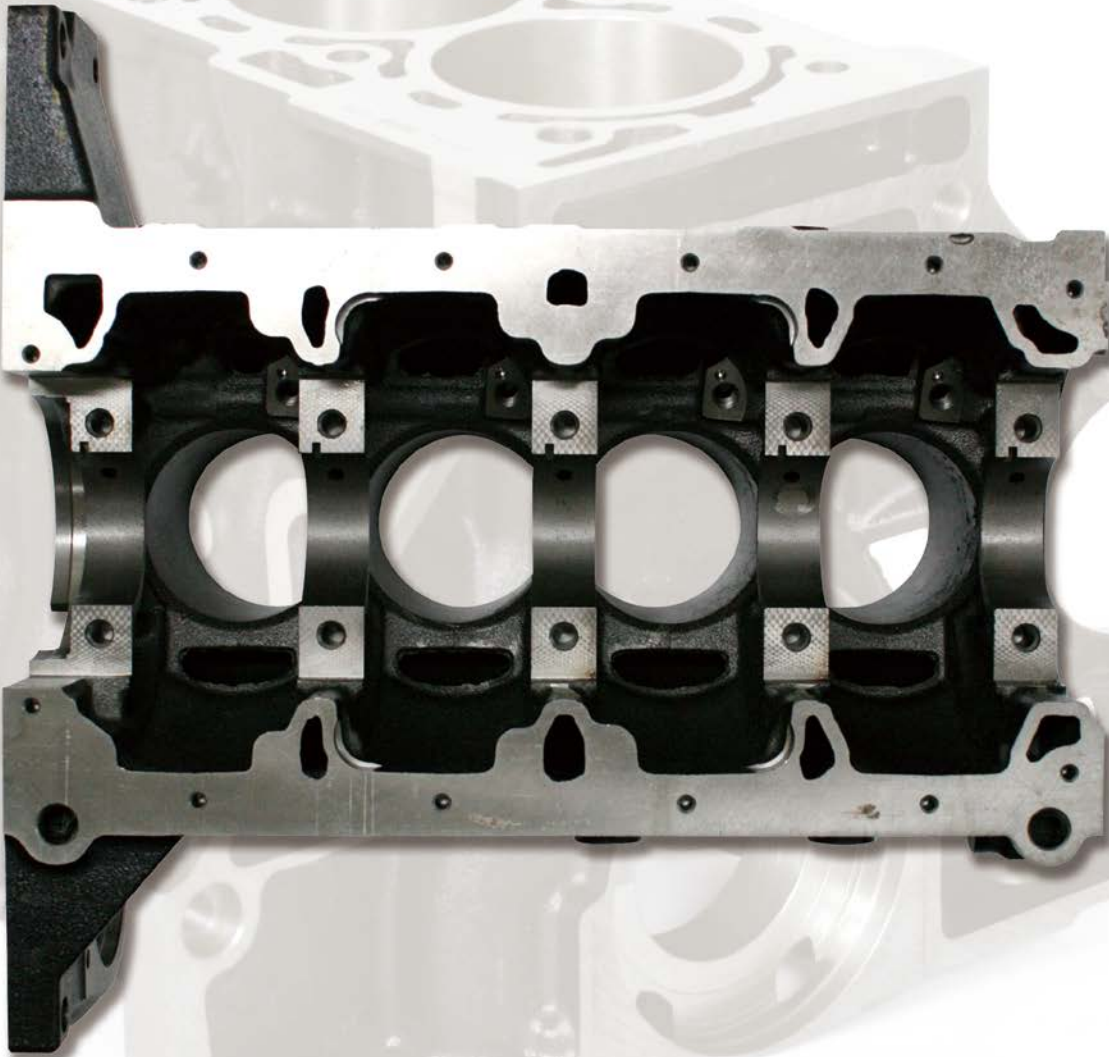
MILLING
CUTTER



• BLOCK HEADS CUTTER



• MANUFACTURING INDEX
HOLE PROCESSING TOOL



CERAMIC

CERMET

PCBN
/
PCD

TOOL
HOLDER

MILLING
CUTTER

CYLINDER BLOCK



• CYLINDER BORE SEMI & FINISH BORING TOOL



• CYLINDER BORE HONING HOLDER



• CYLINDER BORE ROUGH BORING TOOL



• TOP FACE MILLING CUTTER



CERAMIC

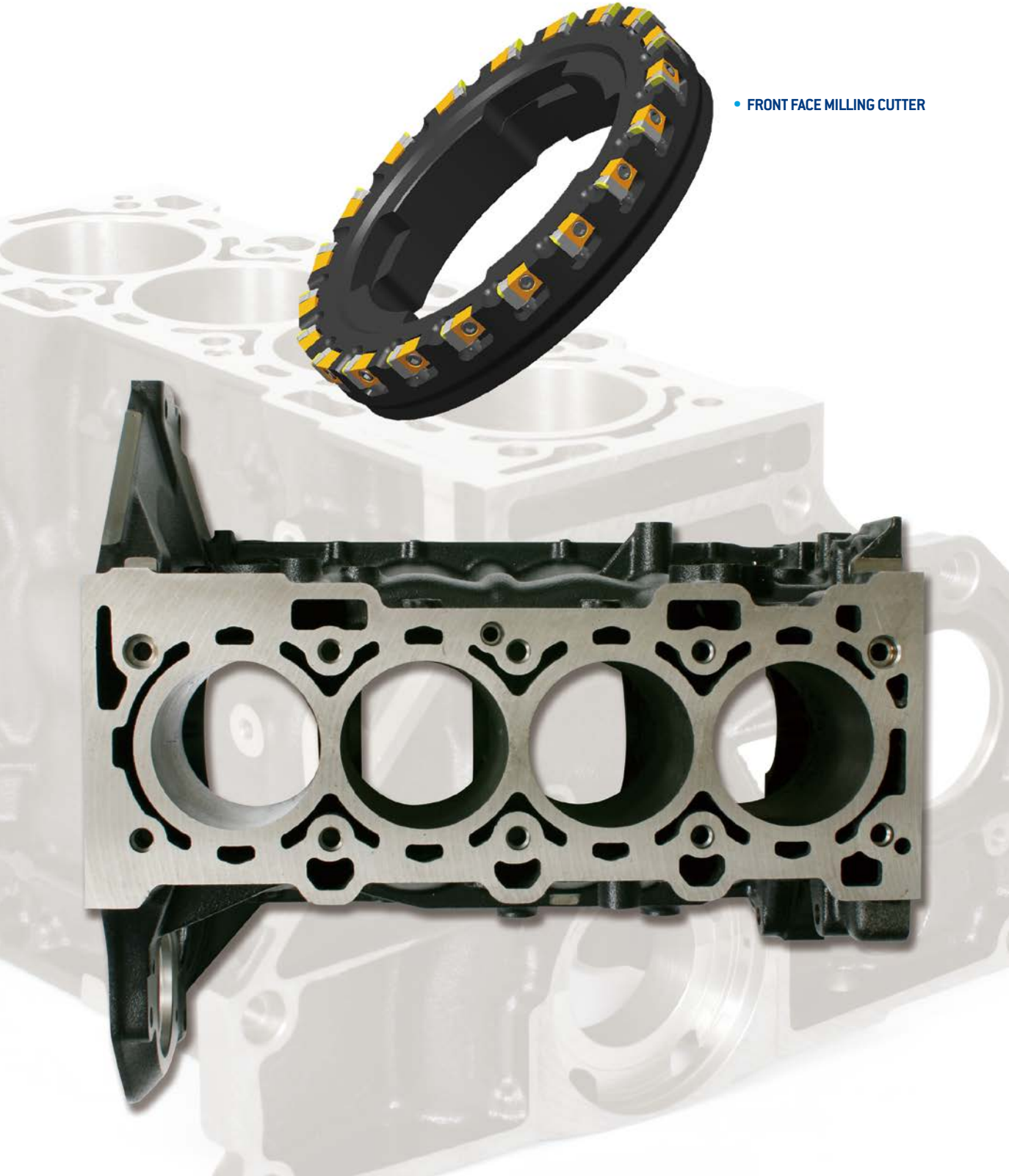
CERMET

PCBN
/
PCD

TOOL
HOLDER

MILLING
CUTTER

• FRONT FACE MILLING CUTTER



CERAMIC

CERMET

PCBN
/
PCD

TOOL
HOLDER

MILLING
CUTTER

SPECIAL TOOLS

CYLINDER BLOCK



• REAR FACE MILLING CUTTER



• OIL MAIN CHANNEL DRILL



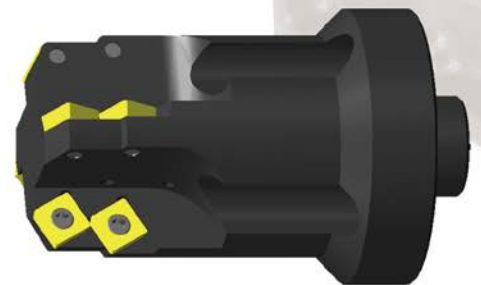
• FACE HOLE TRANSMISSION DRILL



• SLOT SPEED SENSOR ENDMILL



• FACE MOUNTING BOSSES MILLING CUTTER



• CUT OUT STARTER BORING TOOL

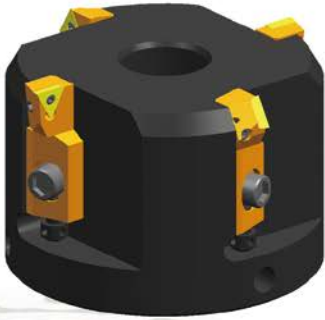
CERAMIC

CERMET

PCBN
/
PCD

TOOL
HOLDER

MILLING
CUTTER



• STOP FACE SEALING CRANK
SHAFT BORING TOOL



• CRANK HONING HOLDER



CERAMIC

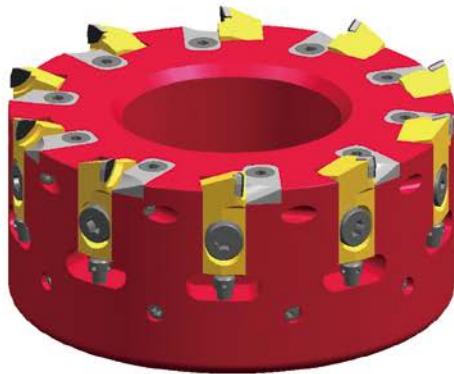
CERMET

PCBN
/
PCD

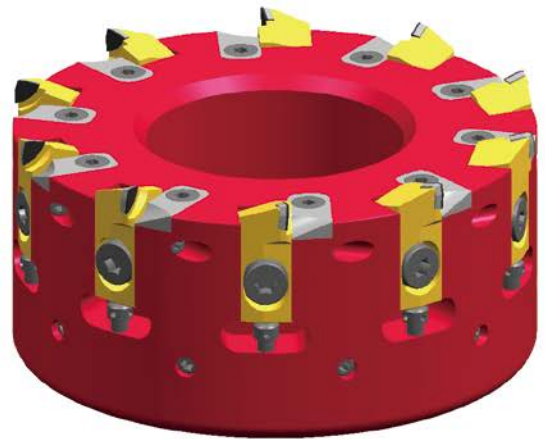
TOOL
HOLDER

MILLING
CUTTER

CYLINDER HEAD



• EXHAUST FACE MILLING CUTTER



• TOP FACE MILLING CUTTER



• SEAT LIFTER-VALVE IN & EX BORING TOOL



• SEAT LIFTER-VALVE IN & EX BORING TOOL

CERAMIC

CERMET

PCBN
/
PCD

TOOL
HOLDER

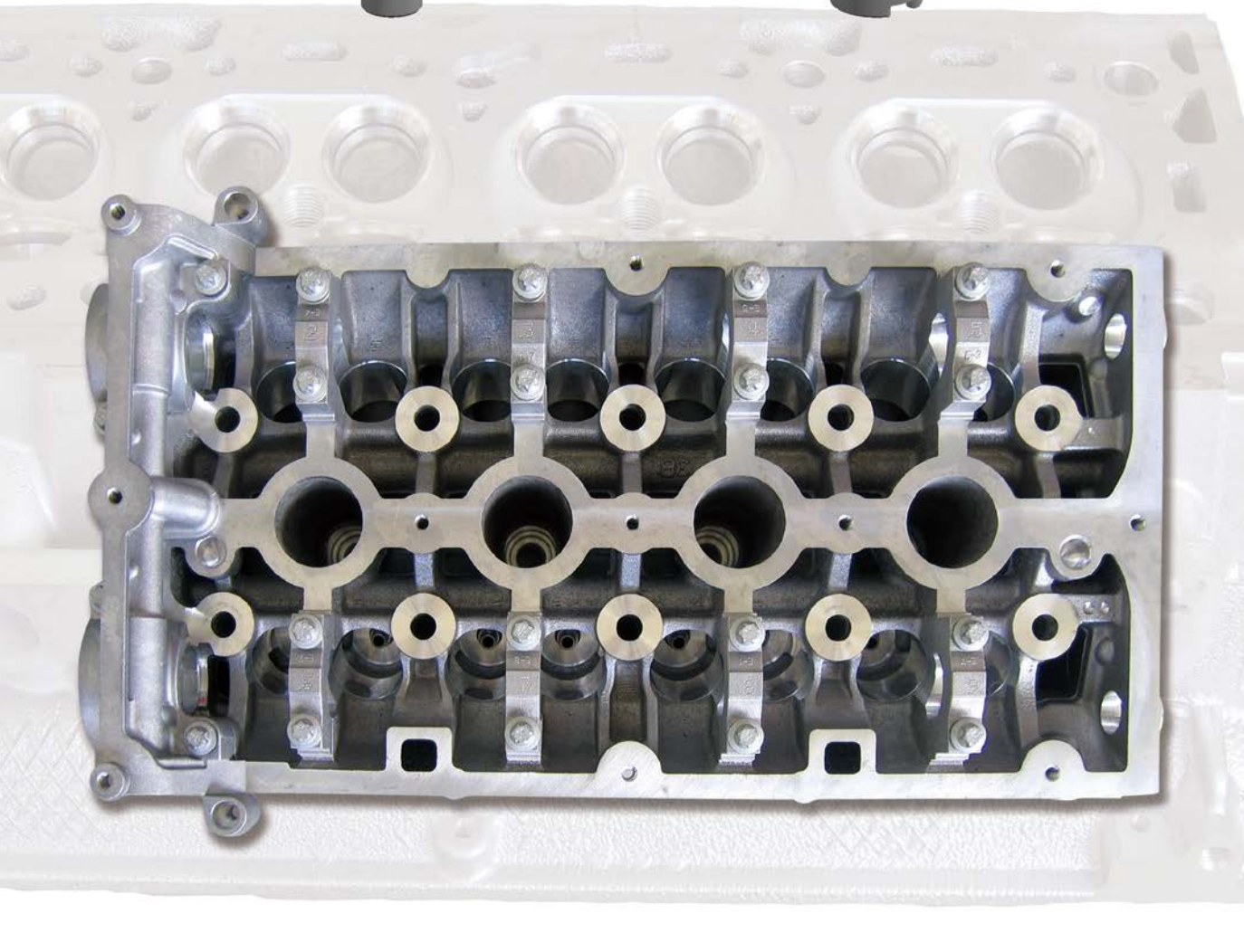
MILLING
CUTTER



• SPARK PLUG HOLE REAMER



• VALVE GUIDE SEAT LIFTER
VALVE BORING TOOL



CERAMIC

CERMET

PCBN
/
PCD

TOOL
HOLDER

MILLING
CUTTER

CYLINDER HEAD



• CAMSHAFT BEARING CHAMFER



• VALVE SEAT GUIDE FINISH BORING TOOL



CERAMIC

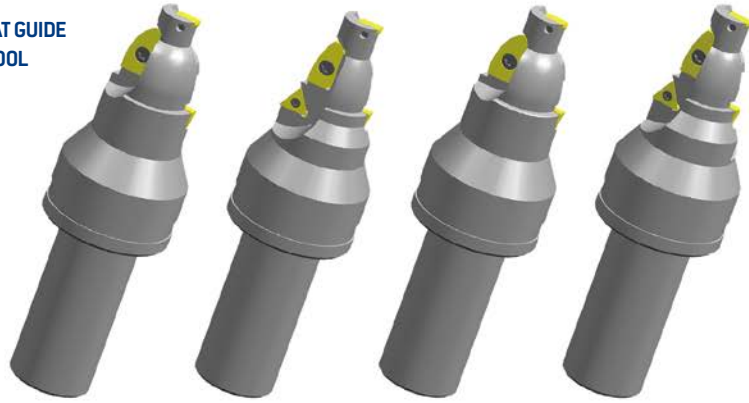
CERMET

PCBN
/
PCD

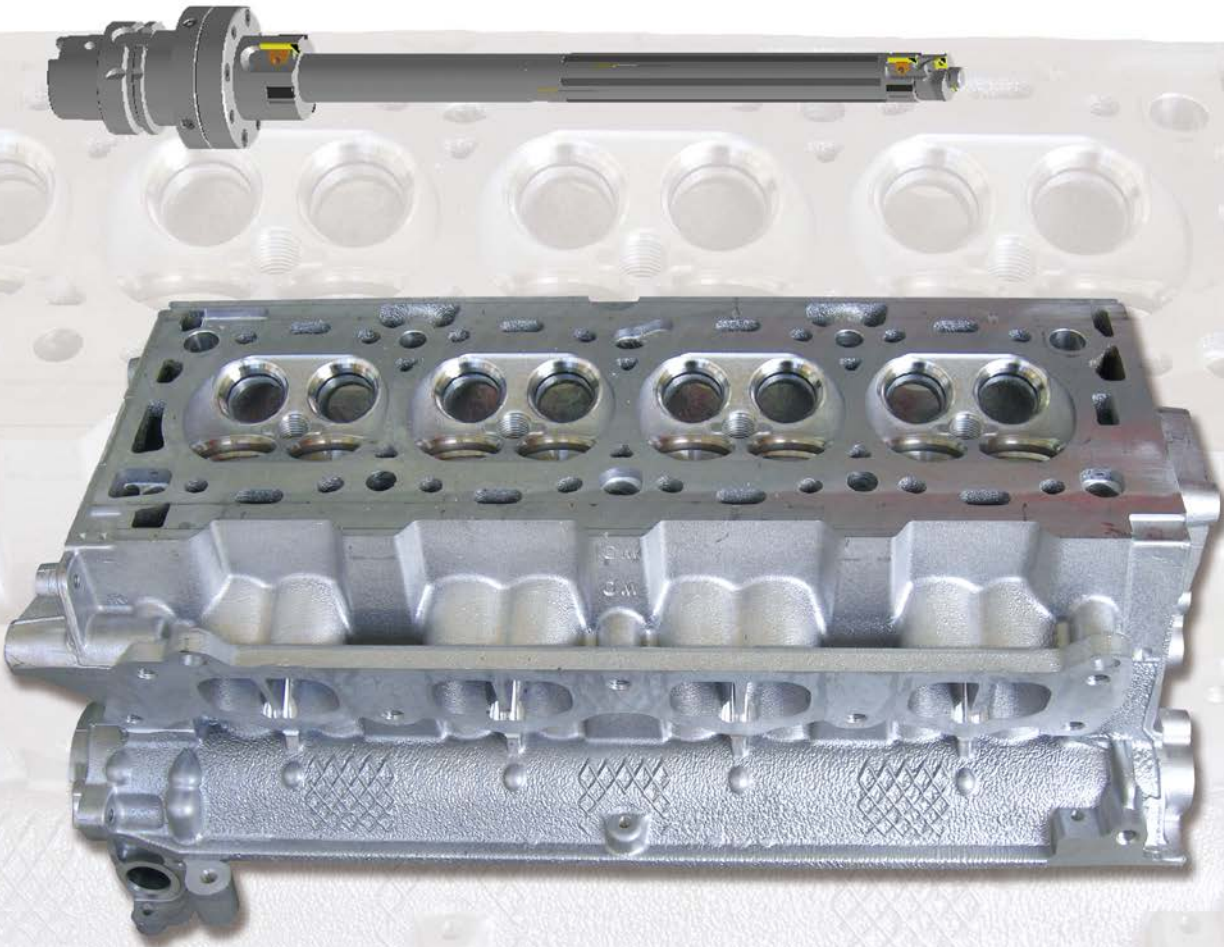
TOOL
HOLDER

MILLING
CUTTER

• VALVE SEAT GUIDE BORING TOOL



• CAMSHAFT BEARING FINISH BORING TOOL



CERAMIC

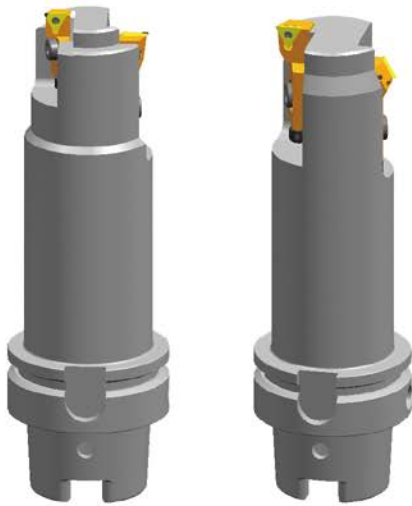
CERMET

PCBN
/
PCD

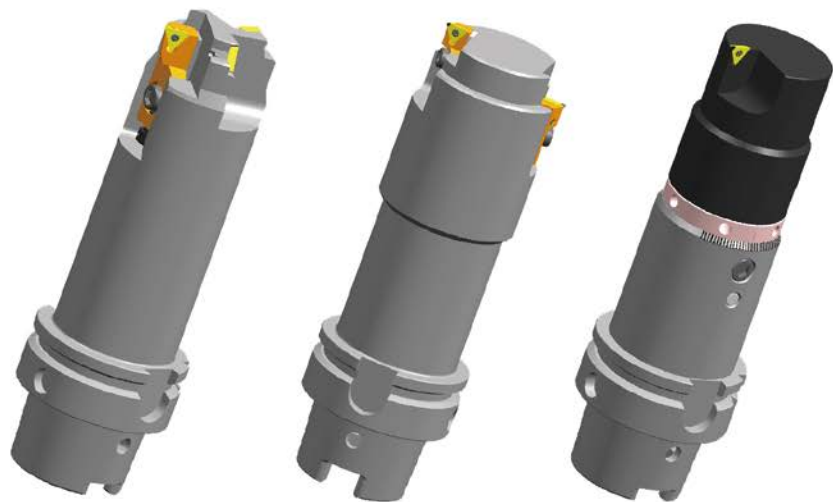
TOOL
HOLDER

MILLING
CUTTER

T / MISSION CASE



• GEAR SHIFT SHAFT LOCK HOLE BORING TOOL



• DIFT HOUSING & OIL SEAL HOLE BORING TOOL

CERAMIC

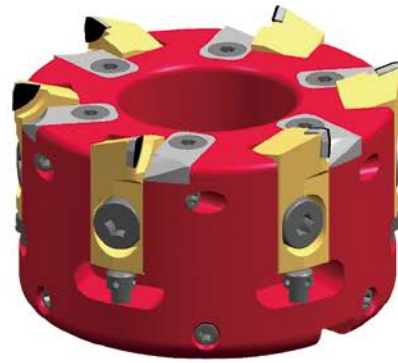
CERMET

PCBN
/
PCD

TOOL
HOLDER

MILLING
CUTTER

• CLUTCH RELEASE LEVER
HOLE REAMER



• CPS COVER ATTACHED FACE
MILLING CUTTER



CERAMIC

CERMET

PCBN
/
PCD

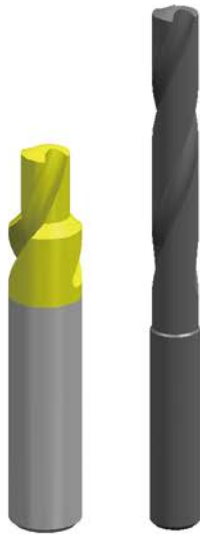
TOOL
HOLDER

MILLING
CUTTER

T / MISSION CASE



• COUNTER SHAFT BRG. HOLE BORING TOOL



CERAMIC

CERMET

PCBN
/
PCD

TOOL
HOLDER

MILLING
CUTTER



• ENGINE MOUNTING HOLE BORING TOOL

PART.

A

TURNING
&
MILLING



CERAMIC

CERMET

PCBN
/
PCD

TOOL
HOLDER

MILLING
CUTTER

B R A K E H O U S I N G



• DISC PATH MILLING CUTTER



• MAIN BORE PROCESSING TOOL



• LUG CUTTER

CERAMIC

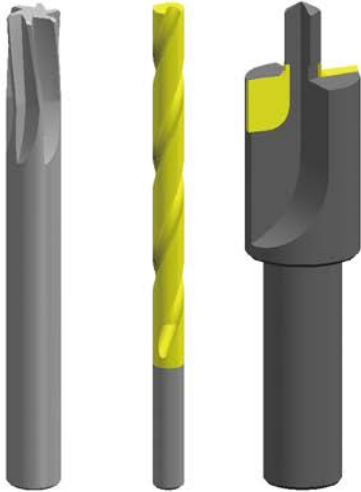
CERMET

PCBN
/
PCD

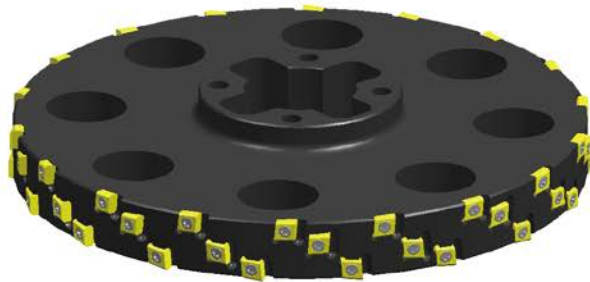
TOOL
HOLDER

MILLING
CUTTER

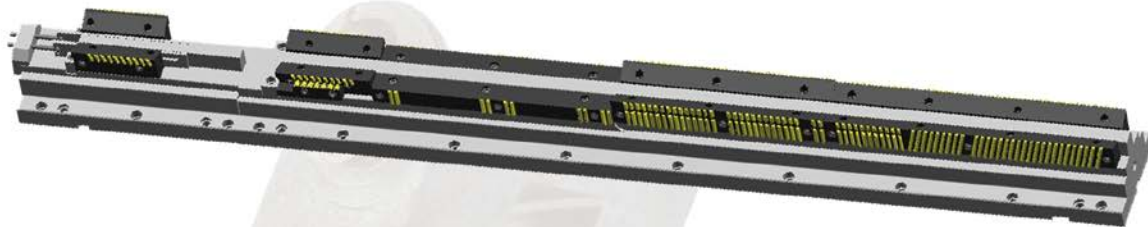
B R A K E C A R R I E R



• HOLE PROCESSING TOOL



• CARRIER CUTTER



• BROACH HOLDER



CERAMIC

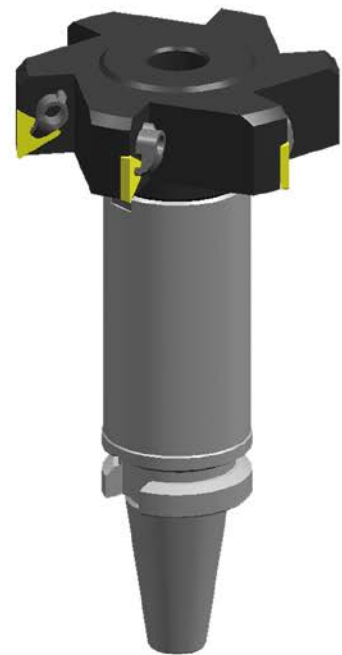
CERMET

PCBN
/
PCD

TOOL
HOLDER

MILLING
CUTTER

K N U C K L E



CERAMIC

CERMET

PCBN
/
PCD

TOOL
HOLDER

MILLING
CUTTER

PART.

A

TURNING
&
MILLING



CERAMIC

CERMET

PCBN
/
PCD

TOOL
HOLDER

MILLING
CUTTER

CONNECTING ROD



CERAMIC

CERMET

PCBN
/
PCD

TOOL
HOLDER

MILLING
CUTTER



CERAMIC

CERMET

PCBN
/
PCD

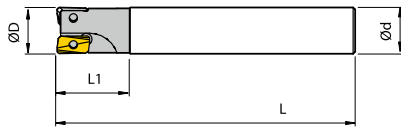
TOOL
HOLDER

MILLING
CUTTER

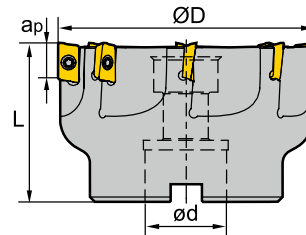
ENDMILL CUTTER

TURNING
&
MILLING

ARE01



ARE02



| Type | | Dimensions (mm) | | | | ⚙️ |
|-------|-----------------------|-----------------|----|----------------|-----|----|
| | | ØD | Ød | L ₁ | L | |
| ARE01 | ARE01-016-120-AP11-2F | 16 | 16 | 25 | 120 | 2 |
| | ARE01-016-180-AP11-2F | 16 | 16 | 30 | 180 | 2 |
| | ARE01-020-120-AP11-2F | 20 | 20 | 30 | 120 | 2 |
| | ARE01-020-180-AP11-2F | 20 | 20 | 30 | 180 | 2 |
| | ARE01-025-150-AP11-3F | 25 | 25 | 35 | 150 | 3 |
| | ARE01-025-200-AP11-3F | 25 | 25 | 35 | 200 | 3 |
| | ARE01-025-150-AP16-2F | 25 | 25 | 35 | 150 | 2 |
| | ARE01-025-200-AP16-2F | 25 | 25 | 35 | 200 | 2 |
| | ARE01-032-160-AP16-3F | 32 | 32 | 40 | 160 | 3 |
| | ARE01-032-200-AP16-3F | 32 | 32 | 40 | 200 | 3 |
| ARE02 | ARE02-050-A22-AP16-5F | 50 | 22 | - | 40 | 5 |
| | ARE02-063-A22-AP16-6F | 63 | 22 | - | 50 | 6 |

CERAMIC

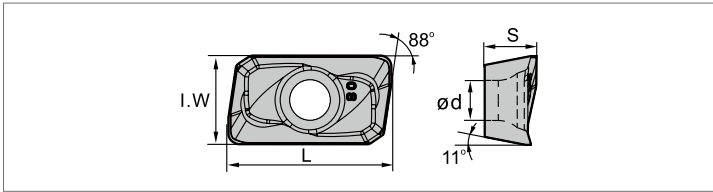
CERMET

PCBN
/
PCD


TOOL
HOLDER

| Diameter ØD | Insert | Screw | Wrench | | |
|----------------|--------|------------|--------|------|--|
| | | | | | |
| Ø16~Ø25 | AP11 | DTKA 02555 | T-7 | - | |
| Ø25~Ø63 | AP16 | DTKA 04100 | - | T-15 | |

MILLING
CUTTER

**SPG200**

- PVD Coating
- P20, M20

| Insert shape | Type | Dimensions [mm] | | | | | Grade |
|---|----------------|-----------------|------|------|-----|-----|--------|
| | | L | I.W | S | d | r | SPG200 |
|  | APMT1135PDR | 11.25 | 6.2 | 3.5 | 2.8 | 0.8 | ● |
| | APMT160408PDER | 17.25 | 9.25 | 4.76 | 4.4 | 0.8 | ● |

● Stock

CERAMIC

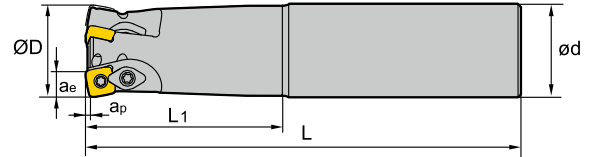
CERMET

PCBN
/
PCDTOOL
HOLDERMILLING
CUTTER

HFC01



S type insert, straight shank



| Type | | Dimensions (mm) | | | | |
|-------|----------------------|-----------------|----|----------------|-----|---|
| | | ØD | ød | L ₁ | L | |
| HFC01 | HFC01-33-200-SD12-2F | 33 | 32 | 50 | 200 | 2 |
| | HFC01-33-250-SD12-2F | 33 | 32 | 50 | 250 | 2 |

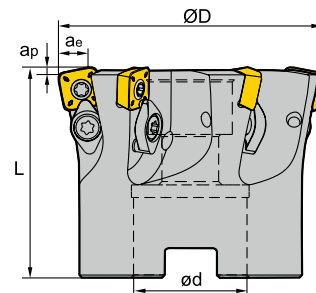
CERAMIC

HFC01

CERMET



S type insert, Arbor mounting

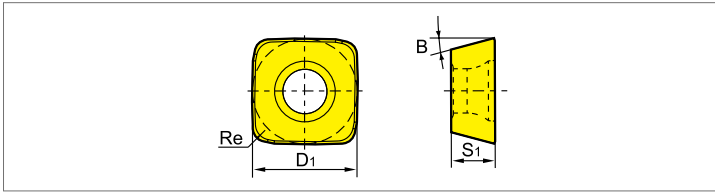


PCBN
/
PCD

TOOL
HOLDER

MILLING
CUTTER

| Type | | Dimensions (mm) | | | | |
|-------|----------------------|-----------------|----|----------------|----|---|
| | | ØD | ød | L ₁ | L | |
| HFC01 | HFC01-50-A22-SD12-3F | 50 | 22 | - | 50 | 3 |
| | HFC01-63-A22-SD12-4F | 63 | 22 | - | 50 | 4 |



SPG210

- PVD Coating
- P20, M20

| Insert shape | Type | Dimensions (mm) | | | | Grade |
|--------------|----------------------|-----------------|-----|------|-------|-------|
| | | B | Re | S1 | D1 | |
| | SDMT09T312-DM | 15° | 1.2 | 3.97 | 9.525 | • |
| | SDMT120412-DM | 15° | 2.0 | 4.76 | 12.7 | • |

- Stock

| Tool Type | Insert Screw | Clamp Screw | Clamp | Wrench | |
|-----------|--------------------|-------------|--------|--------|------|
| | HFC01 □ □-SD12 □ □ | | | | |
| | DTKA 04100 | DS 5003-1 | DYR 08 | T-15 | T-20 |



CERAMIC

CERMET

PCBN
/
PCD

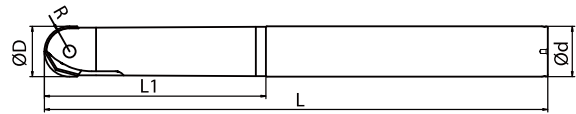
TOOL
HOLDER

MILLING
CUTTER

FINISH BALL CUTTER


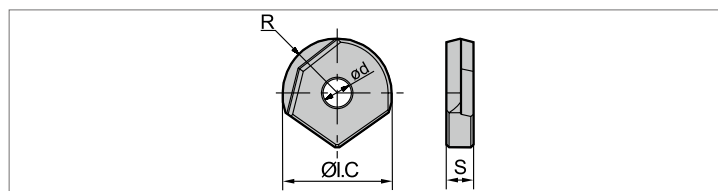
TURNING
&
MILLING

FBC




| Type | | Dimensions (mm) | | | | |
|------|-------------|-----------------|----|----|----------------|-----|
| | | R | ØD | Ød | L ₁ | L |
| FBC | FBC 012-130 | 6 | 12 | 12 | 50 | 130 |
| | FBC 012-150 | 6 | 12 | 12 | 60 | 150 |
| | FBC 016-150 | 8 | 16 | 16 | 60 | 150 |
| | FBC 016-180 | 8 | 16 | 16 | 80 | 180 |
| | FBC 020-180 | 10 | 20 | 20 | 75 | 180 |
| | FBC 020-220 | 10 | 20 | 20 | 90 | 220 |
| | FBC 025-200 | 12.5 | 25 | 25 | 90 | 200 |
| | FBC 025-250 | 12.5 | 25 | 25 | 110 | 250 |
| | FBC 030-200 | 15 | 30 | 30 | 90 | 200 |
| | FBC 030-250 | 15 | 30 | 30 | 110 | 250 |
| | FBC 030-300 | 15 | 30 | 30 | 125 | 300 |

| Diameter | Screw | Wrench |
|----------|-----------|----------|
| | Ø12 | DBF 1210 |
| Ø16 | DBF 1611 | T-15 |
| Ø20 | DBF 20165 | T-20 |
| Ø25 | DBF 2520 | T-25 |
| Ø30 | DBF 3025 | L-5 |

SPG250

- PVD Coating
- P20, M20, K20

| Insert shape | Type | Dimensions (mm) | | | | | Grade |
|---|--------------|-----------------|------|---|------|-----|--------|
| | | R | ØI.C | S | Ød | ØD | SPG250 |
|  | DFBI1203-M/F | 6 | 12 | 3 | 4 | Ø12 | • |
| | DFBI1604-M/F | 8 | 16 | 4 | 5 | Ø16 | • |
| | DFBI2005-M/F | 10 | 20 | 5 | 5 | Ø20 | • |
| | DFBI2506-M/F | 12.5 | 25 | 6 | 6 | Ø25 | • |
| | DFBI3007-M/F | 15 | 30 | 7 | 8.25 | Ø30 | • |

• Stock

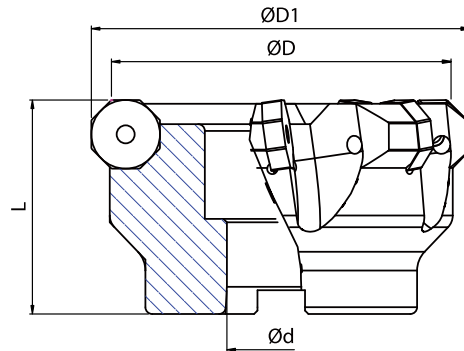
FACE MILL CUTTER

PART.

A

TURNING
&
MILLING

OMR07



| Type | | Dimensions [mm] | | | | |
|-------|-----------------------|-----------------|-----|----------------|----|---|
| | | ØD | Ød | L ₁ | L | |
| OMR07 | OMR07-080-B27-ON08-06 | 80 | 92 | 27 | 50 | 6 |
| | OMR07-100-B32-ON08-07 | 100 | 111 | 32 | 63 | 7 |
| | OMR07-125-B40-ON08-08 | 125 | 138 | 40 | 63 | 8 |

| Diameter ØD | Insert | Screw | Wrench | |
|----------------|--------|----------|----------------|--|
| | | 063~0315 | ONHU 08 -PF/PM | |

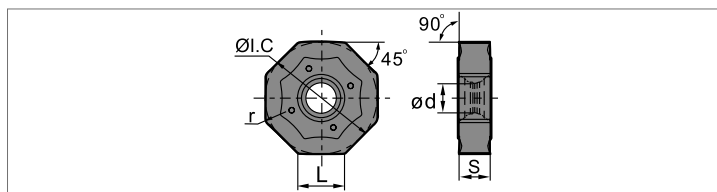
CERAMIC

CERMET

PCBN
/
PCD

TOOL
HOLDER

MILLING
CUTTER



SCK150

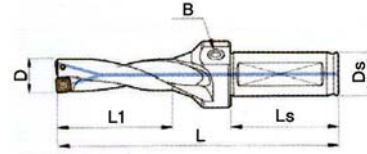
- CVD Coating
- K15

| Insert shape | Type | Dimensions [mm] | | | | | Grade |
|--------------|---------------|-----------------|------|------|-----|------|--------|
| | | L | ØI.C | S | Ød | r | SCK150 |
| | ONHU08T508-PF | 8.37 | 20.2 | 5.77 | 5.3 | 0.83 | |
| | ONHU08T508-PM | 8.37 | 20.2 | 5.79 | 5.3 | 0.83 | • |

• Stock

INDEXIBLE DRILL

JTR 2xD



TURNING
&
MILLING

| Type | D | L1 | L | Ds | Ls | B | Insert | Screw | Wrench |
|------------|------|-----|-----|----|----|--------|---------------|-----------|--------|
| JTR-12520D | 12.5 | 28 | 105 | 20 | 50 | PT-1/8 | SPGT050204-PM | TSB-20045 | TXL-6 |
| JTR-13020D | 13.0 | 29 | 106 | 20 | 50 | PT-1/8 | | | |
| JTR-13520D | 13.5 | 30 | 107 | 20 | 50 | PT-1/8 | | | |
| JTR-14020D | 14.0 | 31 | 108 | 20 | 50 | PT-1/8 | | | |
| JTR-14520D | 14.5 | 32 | 109 | 20 | 50 | PT-1/8 | | | |
| JTR-15020D | 15.0 | 33 | 110 | 20 | 50 | PT-1/8 | | | |
| JTR-15520D | 15.5 | 34 | 120 | 25 | 56 | PT-1/8 | SPGT060204-PM | TSB-22052 | TXL-6 |
| JTR-16020D | 16.0 | 35 | 121 | 25 | 56 | PT-1/8 | | | |
| JTR-16520D | 16.5 | 36 | 122 | 25 | 56 | PT-1/8 | | | |
| JTR-17020D | 17.0 | 37 | 123 | 25 | 56 | PT-1/8 | | | |
| JTR-17520D | 17.5 | 38 | 124 | 25 | 56 | PT-1/8 | | | |
| JTR-18020D | 18.0 | 39 | 125 | 25 | 56 | PT-1/8 | | | |
| JTR-18520D | 18.5 | 40 | 126 | 25 | 56 | PT-1/8 | | | |
| JTR-19020D | 19.0 | 41 | 127 | 25 | 56 | PT-1/8 | | | |
| JTR-19520D | 19.5 | 42 | 128 | 25 | 56 | PT-1/8 | | | |
| JTR-20020D | 20.0 | 43 | 129 | 25 | 56 | PT-1/8 | | | |
| JTR-20520D | 20.5 | 44 | 130 | 25 | 56 | PT-1/8 | | | |
| JTR-21020D | 21.0 | 45 | 131 | 25 | 56 | PT-1/8 | | | |
| JTR-21520D | 21.5 | 46 | 132 | 25 | 56 | PT-1/8 | | | |
| JTR-22020D | 22.0 | 47 | 133 | 32 | 60 | PT-1/4 | SPGT07T308-PM | TSB-25065 | TXL-8 |
| JTR-22520D | 22.5 | 48 | 143 | 32 | 60 | PT-1/4 | | | |
| JTR-23020D | 23.0 | 49 | 144 | 32 | 60 | PT-1/4 | | | |
| JTR-23520D | 23.5 | 50 | 145 | 32 | 60 | PT-1/4 | | | |
| JTR-24020D | 24.0 | 51 | 146 | 32 | 60 | PT-1/4 | | | |
| JTR-24520D | 24.5 | 52 | 147 | 32 | 60 | PT-1/4 | | | |
| JTR-25020D | 25.0 | 53 | 148 | 32 | 60 | PT-1/4 | | | |
| JTR-25520D | 25.5 | 54 | 149 | 32 | 60 | PT-1/4 | | | |
| JTR-26020D | 26.0 | 55 | 150 | 32 | 60 | PT-1/4 | | | |
| JTR-26520D | 26.5 | 56 | 151 | 32 | 60 | PT-1/4 | | | |
| JTR-27020D | 27.0 | 57 | 152 | 32 | 60 | PT-1/4 | | | |
| JTR-27520D | 27.5 | 58 | 153 | 32 | 60 | PT-1/4 | | | |
| JTR-28020D | 28.0 | 59 | 154 | 32 | 60 | PT-1/4 | SPGT090408-PM | TSB-35090 | TXL-15 |
| JTR-28520D | 28.5 | 60 | 155 | 32 | 60 | PT-1/4 | | | |
| JTR-29020D | 29.0 | 61 | 156 | 32 | 60 | PT-1/4 | | | |
| JTR-29520D | 29.5 | 64 | 159 | 32 | 60 | PT-1/4 | | | |
| JTR-30020D | 30.0 | 65 | 160 | 32 | 60 | PT-1/4 | | | |
| JTR-31020D | 31.0 | 67 | 162 | 32 | 60 | PT-1/4 | | | |
| JTR-32020D | 32.0 | 69 | 164 | 32 | 60 | PT-1/4 | SPGT110408-PM | TSB-40100 | TXL-15 |
| JTR-33020D | 33.0 | 71 | 166 | 32 | 60 | PT-1/4 | | | |
| JTR-34020D | 34.0 | 73 | 168 | 32 | 70 | PT-1/4 | | | |
| JTR-35020D | 35.0 | 75 | 170 | 32 | 70 | PT-1/4 | | | |
| JTR-36020D | 36.0 | 77 | 172 | 32 | 70 | PT-1/4 | | | |
| JTR-37020D | 37.0 | 79 | 189 | 40 | 70 | PT-1/4 | | | |
| JTR-38020D | 38.0 | 81 | 191 | 40 | 70 | PT-1/4 | SPGT140512-PM | TSB-50125 | TXL-20 |
| JTR-39020D | 39.0 | 83 | 193 | 40 | 70 | PT-1/4 | | | |
| JTR-40020D | 40.0 | 85 | 195 | 40 | 70 | PT-1/4 | | | |
| JTR-41020D | 41.0 | 87 | 197 | 40 | 70 | PT-1/4 | | | |
| JTR-42020D | 42.0 | 89 | 199 | 40 | 70 | PT-1/4 | | | |
| JTR-43020D | 43.0 | 91 | 201 | 40 | 70 | PT-1/4 | | | |
| JTR-44020D | 44.0 | 93 | 203 | 40 | 70 | PT-1/4 | SPGT140512-PM | TSB-50125 | TXL-20 |
| JTR-45020D | 45.0 | 95 | 205 | 40 | 70 | PT-1/4 | | | |
| JTR-46020D | 46.0 | 97 | 207 | 40 | 70 | PT-1/4 | | | |
| JTR-47020D | 47.0 | 99 | 209 | 40 | 70 | PT-1/4 | | | |
| JTR-48020D | 48.0 | 101 | 211 | 40 | 70 | PT-1/4 | | | |
| JTR-49020D | 49.0 | 103 | 213 | 40 | 70 | PT-1/4 | | | |
| JTR-50020D | 50.0 | 105 | 215 | 40 | 70 | PT-1/4 | | | |

CERAMIC

CERMET

PCBN
/
PCD

TOOL
HOLDER

MILLING
CUTTER

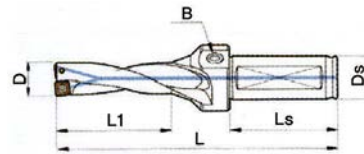
INDEXIBLE DRILL

PART.

A

TURNING
&
MILLING

JTR 3xD



| Type | D | L1 | L | Ds | Ls | B | Insert | Screw | Wrench |
|------------|------|-----|-----|----|----|--------|---------------|-----------|--------|
| JTR-12530D | 12.5 | 41 | 118 | 20 | 50 | PT-1/8 | SPGT050204-PM | TSB-20045 | |
| JTR-13030D | 13.0 | 42 | 119 | 20 | 50 | PT-1/8 | | | |
| JTR-13530D | 13.5 | 44 | 121 | 20 | 50 | PT-1/8 | | | |
| JTR-14030D | 14.0 | 45 | 122 | 20 | 50 | PT-1/8 | | | |
| JTR-14530D | 14.5 | 47 | 124 | 20 | 50 | PT-1/8 | | | |
| JTR-15030D | 15.0 | 48 | 125 | 20 | 50 | PT-1/8 | SPGT060204-PM | TSB-22052 | TXL-6 |
| JTR-15530D | 15.5 | 50 | 136 | 25 | 56 | PT-1/8 | | | |
| JTR-16030D | 16.0 | 51 | 137 | 25 | 56 | PT-1/8 | | | |
| JTR-16530D | 16.5 | 53 | 139 | 25 | 56 | PT-1/8 | | | |
| JTR-17030D | 17.0 | 54 | 140 | 25 | 56 | PT-1/8 | | | |
| JTR-17530D | 17.5 | 56 | 142 | 25 | 56 | PT-1/8 | | | |
| JTR-18030D | 18.0 | 57 | 143 | 25 | 56 | PT-1/8 | | | |
| JTR-18530D | 18.5 | 59 | 145 | 25 | 56 | PT-1/8 | | | |
| JTR-19030D | 19.0 | 60 | 146 | 25 | 56 | PT-1/8 | | | |
| JTR-19530D | 19.5 | 62 | 148 | 25 | 56 | PT-1/8 | | | |
| JTR-20030D | 20.0 | 63 | 149 | 25 | 56 | PT-1/8 | SPGT07T308-PM | TSB-25065 | TXL-8 |
| JTR-20530D | 20.5 | 65 | 151 | 25 | 56 | PT-1/8 | | | |
| JTR-21030D | 21.0 | 66 | 152 | 25 | 56 | PT-1/8 | | | |
| JTR-21530D | 21.5 | 68 | 154 | 25 | 56 | PT-1/8 | | | |
| JTR-22030D | 22.0 | 69 | 155 | 32 | 60 | PT-1/4 | | | |
| JTR-22530D | 22.5 | 71 | 166 | 32 | 60 | PT-1/4 | | | |
| JTR-23030D | 23.0 | 72 | 167 | 32 | 60 | PT-1/4 | | | |
| JTR-23530D | 23.5 | 74 | 169 | 32 | 60 | PT-1/4 | | | |
| JTR-24030D | 24.0 | 75 | 170 | 32 | 60 | PT-1/4 | | | |
| JTR-24530D | 24.5 | 77 | 172 | 32 | 60 | PT-1/4 | | | |
| JTR-25030D | 25.0 | 78 | 173 | 32 | 60 | PT-1/4 | SPGT090408-PM | TSB-35090 | TXL-15 |
| JTR-25530D | 25.5 | 80 | 175 | 32 | 60 | PT-1/4 | | | |
| JTR-26030D | 26.0 | 81 | 176 | 32 | 60 | PT-1/4 | | | |
| JTR-26530D | 26.5 | 83 | 178 | 32 | 60 | PT-1/4 | | | |
| JTR-27030D | 27.0 | 84 | 179 | 32 | 60 | PT-1/4 | | | |
| JTR-27530D | 27.5 | 86 | 181 | 32 | 60 | PT-1/4 | | | |
| JTR-28030D | 28.0 | 87 | 182 | 32 | 60 | PT-1/4 | | | |
| JTR-28530D | 28.5 | 89 | 184 | 32 | 60 | PT-1/4 | | | |
| JTR-29030D | 29.0 | 90 | 185 | 32 | 60 | PT-1/4 | | | |
| JTR-29530D | 29.5 | 94 | 189 | 32 | 60 | PT-1/4 | | | |
| JTR-30030D | 30.0 | 95 | 190 | 32 | 60 | PT-1/4 | SPGT110408-PM | TSB-40100 | |
| JTR-31030D | 31.0 | 98 | 193 | 32 | 60 | PT-1/4 | | | |
| JTR-32030D | 32.0 | 101 | 196 | 32 | 60 | PT-1/4 | | | |
| JTR-33030D | 33.0 | 104 | 199 | 32 | 60 | PT-1/4 | | | |
| JTR-34030D | 34.0 | 107 | 202 | 32 | 70 | PT-1/4 | | | |
| JTR-35030D | 35.0 | 110 | 205 | 32 | 70 | PT-1/4 | | | |
| JTR-36030D | 36.0 | 113 | 208 | 32 | 70 | PT-1/4 | | | |
| JTR-37030D | 37.0 | 116 | 226 | 40 | 70 | PT-1/4 | | | |
| JTR-38030D | 38.0 | 119 | 229 | 40 | 70 | PT-1/4 | | | |
| JTR-39030D | 39.0 | 122 | 232 | 40 | 70 | PT-1/4 | | | |
| JTR-40030D | 40.0 | 125 | 235 | 40 | 70 | PT-1/4 | SPGT140512-PM | TSB-50125 | TXL-20 |
| JTR-41030D | 41.0 | 128 | 238 | 40 | 70 | PT-1/4 | | | |
| JTR-42030D | 42.0 | 131 | 241 | 40 | 70 | PT-1/4 | | | |
| JTR-43030D | 43.0 | 134 | 244 | 40 | 70 | PT-1/4 | | | |
| JTR-44030D | 44.0 | 137 | 247 | 40 | 70 | PT-1/4 | | | |
| JTR-45030D | 45.0 | 140 | 250 | 40 | 70 | PT-1/4 | | | |
| JTR-46030D | 46.0 | 143 | 253 | 40 | 70 | PT-1/4 | | | |
| JTR-47030D | 47.0 | 146 | 256 | 40 | 70 | PT-1/4 | | | |
| JTR-48030D | 48.0 | 149 | 259 | 40 | 70 | PT-1/4 | | | |
| JTR-49030D | 49.0 | 152 | 262 | 40 | 70 | PT-1/4 | | | |
| JTR-50030D | 50.0 | 155 | 265 | 40 | 70 | PT-1/4 | | | |

CERAMIC

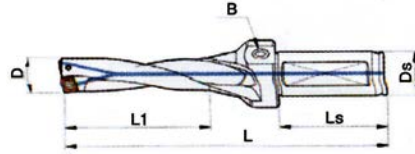
CERMET

PCBN
/
PCD

TOOL
HOLDER

MILLING
CUTTER

JTR 4xD



| Type | D | L1 | L | Ds | Ls | B | Insert | Screw | Wrench | |
|------------|------|-----|-----|----|----|--------|---------------|-----------|--------|--------|
| JTR-12540D | 12.5 | 53 | 130 | 20 | 50 | PT-1/8 | SPGT050204-PM | TSB-20045 | TXL-6 | |
| JTR-13040D | 13.0 | 55 | 132 | 20 | 50 | PT-1/8 | | | | |
| JTR-13540D | 13.5 | 57 | 134 | 20 | 50 | PT-1/8 | | | | |
| JTR-14040D | 14.0 | 59 | 136 | 20 | 50 | PT-1/8 | | | | |
| JTR-14540D | 14.5 | 61 | 138 | 20 | 50 | PT-1/8 | | | | |
| JTR-15040D | 15.0 | 63 | 140 | 20 | 50 | PT-1/8 | | | | |
| JTR-15540D | 15.5 | 65 | 151 | 25 | 56 | PT-1/8 | SPGT060204-PM | TSB-22052 | | |
| JTR-16040D | 16.0 | 67 | 153 | 25 | 56 | PT-1/8 | | | | |
| JTR-16540D | 16.5 | 69 | 155 | 25 | 56 | PT-1/8 | | | | |
| JTR-17040D | 17.0 | 71 | 157 | 25 | 56 | PT-1/8 | | | | |
| JTR-17540D | 17.5 | 73 | 159 | 25 | 56 | PT-1/8 | | | | |
| JTR-18040D | 18.0 | 75 | 161 | 25 | 56 | PT-1/8 | | | | |
| JTR-18540D | 18.5 | 77 | 163 | 25 | 56 | PT-1/8 | | | | |
| JTR-19040D | 19.0 | 79 | 165 | 25 | 56 | PT-1/8 | | | | |
| JTR-19540D | 19.5 | 81 | 167 | 25 | 56 | PT-1/8 | | | | |
| JTR-20040D | 20.0 | 83 | 169 | 25 | 56 | PT-1/8 | | | | |
| JTR-20540D | 20.5 | 85 | 171 | 25 | 56 | PT-1/8 | | | | |
| JTR-21040D | 21.0 | 87 | 173 | 25 | 56 | PT-1/8 | | | | |
| JTR-21540D | 21.5 | 89 | 175 | 25 | 56 | PT-1/8 | | | | |
| JTR-22040D | 22.0 | 91 | 177 | 32 | 60 | PT-1/4 | SPGT07T308-PM | TSB-25065 | TXL-8 | |
| JTR-22540D | 22.5 | 93 | 188 | 32 | 60 | PT-1/4 | | | | |
| JTR-23040D | 23.0 | 95 | 190 | 32 | 60 | PT-1/4 | | | | |
| JTR-23540D | 23.5 | 97 | 192 | 32 | 60 | PT-1/4 | | | | |
| JTR-24040D | 24.0 | 99 | 194 | 32 | 60 | PT-1/4 | | | | |
| JTR-24540D | 24.5 | 101 | 196 | 32 | 60 | PT-1/4 | | | | |
| JTR-25040D | 25.0 | 103 | 198 | 32 | 60 | PT-1/4 | | | | |
| JTR-25540D | 25.5 | 105 | 200 | 32 | 60 | PT-1/4 | | | | |
| JTR-26040D | 26.0 | 107 | 202 | 32 | 60 | PT-1/4 | | | | |
| JTR-26540D | 26.5 | 109 | 204 | 32 | 60 | PT-1/4 | | | | |
| JTR-27040D | 27.0 | 111 | 206 | 32 | 60 | PT-1/4 | | | | |
| JTR-27540D | 27.5 | 113 | 208 | 32 | 60 | PT-1/4 | | | | |
| JTR-28040D | 28.0 | 115 | 210 | 32 | 60 | PT-1/4 | SPGT090408-PM | TSB-35090 | TXL-15 | |
| JTR-28540D | 28.5 | 117 | 212 | 32 | 60 | PT-1/4 | | | | |
| JTR-29040D | 29.0 | 119 | 214 | 32 | 60 | PT-1/4 | | | | |
| JTR-29540D | 29.5 | 123 | 218 | 32 | 60 | PT-1/4 | | | | |
| JTR-30040D | 30.0 | 125 | 220 | 32 | 60 | PT-1/4 | | | | |
| JTR-31040D | 31.0 | 129 | 224 | 32 | 60 | PT-1/4 | | | | |
| JTR-32040D | 32.0 | 133 | 228 | 32 | 60 | PT-1/4 | SPGT110408-PM | TSB-40100 | | |
| JTR-33040D | 33.0 | 137 | 232 | 32 | 60 | PT-1/4 | | | | |
| JTR-34040D | 34.0 | 141 | 236 | 32 | 70 | PT-1/4 | | | | |
| JTR-35040D | 35.0 | 145 | 240 | 32 | 70 | PT-1/4 | | | | |
| JTR-36040D | 36.0 | 149 | 244 | 32 | 70 | PT-1/4 | | | | |
| JTR-37040D | 37.0 | 153 | 263 | 40 | 70 | PT-1/4 | | | | |
| JTR-38040D | 38.0 | 157 | 267 | 40 | 70 | PT-1/4 | SPGT140512-PM | TSB-50125 | | TXL-20 |
| JTR-39040D | 39.0 | 161 | 271 | 40 | 70 | PT-1/4 | | | | |
| JTR-40040D | 40.0 | 165 | 275 | 40 | 70 | PT-1/4 | | | | |
| JTR-41040D | 41.0 | 169 | 279 | 40 | 70 | PT-1/4 | | | | |
| JTR-42040D | 42.0 | 173 | 283 | 40 | 70 | PT-1/4 | | | | |
| JTR-43040D | 43.0 | 177 | 287 | 40 | 70 | PT-1/4 | | | | |
| JTR-44040D | 44.0 | 181 | 291 | 40 | 70 | PT-1/4 | | | | |
| JTR-45040D | 45.0 | 185 | 295 | 40 | 70 | PT-1/4 | | | | |
| JTR-46040D | 46.0 | 189 | 299 | 40 | 70 | PT-1/4 | | | | |
| JTR-47040D | 47.0 | 193 | 303 | 40 | 70 | PT-1/4 | | | | |
| JTR-48040D | 48.0 | 197 | 307 | 40 | 70 | PT-1/4 | | | | |
| JTR-49040D | 49.0 | 201 | 311 | 40 | 70 | PT-1/4 | | | | |
| JTR-50040D | 50.0 | 205 | 315 | 40 | 70 | PT-1/4 | | | | |

CERAMIC

CERMET

PCBN
/
PCD

TOOL
HOLDER

MILLING
CUTTER

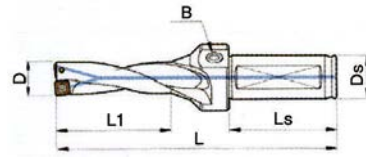
INDEXIBLE DRILL

PART.

A

TURNING
&
MILLING

JSFD 2xD



| Type | D | L ₁ | L | D _s | L _s | B | Insert | Screw | Wrench | | |
|-------------|----|----------------|-----|----------------|----------------|--------|----------------|--------------------------|--------|----------------|--------------------------|
| JSFD-16020D | 16 | 37 | 114 | 20 | 50 | PT-1/8 | WCMX030208R-PG | TSB-22045 (ZSB-22045) | TXL-6 | | |
| JSFD-17020D | 17 | 39 | 116 | 20 | 50 | PT-1/8 | | | | | |
| JSFD-18020D | 18 | 41 | 118 | 20 | 50 | PT-1/8 | | | | | |
| JSFD-19020D | 19 | 43 | 120 | 20 | 50 | PT-1/8 | | | | | |
| JSFD-20020D | 20 | 45 | 122 | 20 | 50 | PT-1/8 | | | | | |
| JSFD-21020D | 21 | 47 | 134 | 25 | 60 | PT-1/8 | WCMX040208R-PG | TSB-25055 (ZSB-25055) | TXL-8 | | |
| JSFD-22020D | 22 | 49 | 136 | 25 | 60 | PT-1/8 | | | | | |
| JSFD-23020D | 23 | 51 | 138 | 25 | 60 | PT-1/8 | | | | | |
| JSFD-24020D | 24 | 53 | 140 | 25 | 60 | PT-1/8 | | | | | |
| JSFD-25020D | 25 | 55 | 142 | 25 | 60 | PT-1/8 | | | | | |
| JSFD-26020D | 26 | 57 | 157 | 32 | 70 | PT-1/4 | WCMX050308R-PG | TSB-30070 (ZSB-30070) | TXL-8 | | |
| JSFD-27020D | 27 | 59 | 159 | 32 | 70 | PT-1/4 | | | | | |
| JSFD-28020D | 28 | 61 | 161 | 32 | 70 | PT-1/4 | | | | | |
| JSFD-29020D | 29 | 63 | 163 | 32 | 70 | PT-1/4 | | | | | |
| JSFD-30020D | 30 | 65 | 165 | 32 | 70 | PT-1/4 | | | | | |
| JSFD-31020D | 31 | 67 | 167 | 32 | 70 | PT-1/4 | WCMX06T308R-PG | TSB-35090 (ZSB-35090) | TXL-15 | | |
| JSFD-32020D | 32 | 69 | 169 | 32 | 70 | PT-1/4 | | | | | |
| JSFD-33020D | 33 | 71 | 171 | 32 | 70 | PT-1/4 | | | | | |
| JSFD-34020D | 34 | 73 | 173 | 32 | 70 | PT-1/4 | | | | | |
| JSFD-35020D | 35 | 75 | 175 | 32 | 70 | PT-1/4 | | | | | |
| JSFD-36020D | 36 | 77 | 177 | 32 | 70 | PT-1/4 | | | | | |
| JSFD-37020D | 37 | 79 | 179 | 32 | 70 | PT-1/4 | | | | | |
| JSFD-38020D | 38 | 81 | 181 | 32 | 70 | PT-1/4 | | | | | |
| JSFD-39020D | 39 | 83 | 183 | 32 | 70 | PT-1/4 | | | | | |
| JSFD-40020D | 40 | 85 | 185 | 32 | 70 | PT-1/4 | | | | | |
| JSFD-41020D | 41 | 87 | 187 | 32 | 70 | PT-1/4 | | | | | |
| JSFD-42020D | 42 | 89 | 199 | 40 | 80 | PT-1/4 | | | | | |
| JSFD-43020D | 43 | 91 | 201 | 40 | 80 | PT-1/4 | | | | WCMX080412R-PG | TSB-40110 (ZSB-40110) |
| JSFD-44020D | 44 | 93 | 203 | 40 | 80 | PT-1/4 | | | | | |
| JSFD-45020D | 45 | 95 | 205 | 40 | 80 | PT-1/4 | | | | | |
| JSFD-46020D | 46 | 97 | 207 | 40 | 80 | PT-1/4 | | | | | |
| JSFD-47020D | 47 | 99 | 209 | 40 | 80 | PT-1/4 | | | | | |
| JSFD-48020D | 48 | 101 | 211 | 40 | 80 | PT-1/4 | | | | | |
| JSFD-49020D | 49 | 103 | 213 | 40 | 80 | PT-1/4 | | | | | |
| JSFD-50020D | 50 | 105 | 215 | 40 | 80 | PT-1/4 | | | | | |
| JSFD-51020D | 51 | 107 | 217 | 40 | 80 | PT-1/4 | | | | | |
| JSFD-52020D | 52 | 109 | 219 | 40 | 80 | PT-1/4 | | | | | |
| JSFD-53020D | 53 | 111 | 221 | 40 | 80 | PT-1/4 | | | | | |
| JSFD-54020D | 54 | 113 | 223 | 40 | 80 | PT-1/4 | | | | | |
| JSFD-55020D | 55 | 115 | 225 | 40 | 80 | PT-1/4 | | | | | |
| JSFD-56020D | 56 | 117 | 227 | 40 | 80 | PT-1/4 | | | | | |
| JSFD-57020D | 57 | 119 | 229 | 40 | 80 | PT-1/4 | | | | | |
| JSFD-58020D | 58 | 121 | 231 | 40 | 80 | PT-1/4 | | | | | |

* TSB : Big screw head / ZSB : Small screw head

CERAMIC

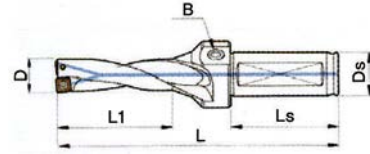
CERMET

PCBN
/
PCD

TOOL
HOLDER

MILLING
CUTTER

JSFD 3×D



| Type | D | L ₁ | L | D _s | L _s | B | Insert | Screw | Wrench |
|-------------|----|----------------|-----|----------------|----------------|--------|----------------|--------------------------|--------|
| JSFD-16030D | 16 | 53 | 130 | 20 | 50 | PT-1/8 | WCMX030208R-PG | TSB-22045 (ZSB-22045) | TXL-6 |
| JSFD-17030D | 17 | 56 | 133 | 20 | 50 | PT-1/8 | | | |
| JSFD-18030D | 18 | 59 | 136 | 20 | 50 | PT-1/8 | | | |
| JSFD-19030D | 19 | 62 | 139 | 20 | 50 | PT-1/8 | | | |
| JSFD-20030D | 20 | 65 | 142 | 20 | 50 | PT-1/8 | | | |
| JSFD-21030D | 21 | 68 | 155 | 25 | 60 | PT-1/8 | WCMX040208R-PG | TSB-25055 (ZSB-25055) | TXL-8 |
| JSFD-22030D | 22 | 71 | 158 | 25 | 60 | PT-1/8 | | | |
| JSFD-23030D | 23 | 74 | 161 | 25 | 60 | PT-1/8 | | | |
| JSFD-24030D | 24 | 77 | 164 | 25 | 60 | PT-1/8 | | | |
| JSFD-25030D | 25 | 80 | 167 | 25 | 60 | PT-1/8 | | | |
| JSFD-26030D | 26 | 83 | 183 | 32 | 70 | PT-1/4 | WCMX050308R-PG | TSB-30070 (ZSB-30070) | TXL-8 |
| JSFD-27030D | 27 | 86 | 186 | 32 | 70 | PT-1/4 | | | |
| JSFD-28030D | 28 | 89 | 189 | 32 | 70 | PT-1/4 | | | |
| JSFD-29030D | 29 | 92 | 192 | 32 | 70 | PT-1/4 | | | |
| JSFD-30030D | 30 | 95 | 195 | 32 | 70 | PT-1/4 | | | |
| JSFD-31030D | 31 | 98 | 198 | 32 | 70 | PT-1/4 | WCMX06T308R-PG | TSB-35090 (ZSB-35090) | TXL-15 |
| JSFD-32030D | 32 | 101 | 201 | 32 | 70 | PT-1/4 | | | |
| JSFD-33030D | 33 | 104 | 204 | 32 | 70 | PT-1/4 | | | |
| JSFD-34030D | 34 | 107 | 207 | 32 | 70 | PT-1/4 | | | |
| JSFD-35030D | 35 | 110 | 210 | 32 | 70 | PT-1/4 | | | |
| JSFD-36030D | 36 | 113 | 213 | 32 | 70 | PT-1/4 | | | |
| JSFD-37030D | 37 | 116 | 216 | 32 | 70 | PT-1/4 | | | |
| JSFD-38030D | 37 | 119 | 219 | 32 | 70 | PT-1/4 | | | |
| JSFD-39030D | 39 | 122 | 222 | 32 | 70 | PT-1/4 | | | |
| JSFD-40030D | 40 | 125 | 225 | 32 | 70 | PT-1/4 | | | |
| JSFD-41030D | 41 | 128 | 228 | 32 | 70 | PT-1/4 | WCMX080412R-PG | TSB-40110 (ZSB-40110) | TXL-15 |
| JSFD-42030D | 42 | 131 | 241 | 40 | 80 | PT-1/4 | | | |
| JSFD-43030D | 43 | 134 | 244 | 40 | 80 | PT-1/4 | | | |
| JSFD-44030D | 44 | 137 | 247 | 40 | 80 | PT-1/4 | | | |
| JSFD-45030D | 45 | 140 | 250 | 40 | 80 | PT-1/4 | | | |
| JSFD-46030D | 46 | 143 | 253 | 40 | 80 | PT-1/4 | | | |
| JSFD-47030D | 47 | 146 | 256 | 40 | 80 | PT-1/4 | | | |
| JSFD-48030D | 48 | 149 | 259 | 40 | 80 | PT-1/4 | | | |
| JSFD-49030D | 49 | 152 | 262 | 40 | 80 | PT-1/4 | | | |
| JSFD-50030D | 50 | 155 | 265 | 40 | 80 | PT-1/4 | | | |
| JSFD-51030D | 51 | 158 | 268 | 40 | 80 | PT-1/4 | TOOL HOLDER | | |
| JSFD-52030D | 52 | 161 | 271 | 40 | 80 | PT-1/4 | | | |
| JSFD-53030D | 53 | 164 | 274 | 40 | 80 | PT-1/4 | | | |
| JSFD-54030D | 54 | 167 | 277 | 40 | 80 | PT-1/4 | | | |
| JSFD-55030D | 55 | 170 | 280 | 40 | 80 | PT-1/4 | | | |
| JSFD-56030D | 56 | 173 | 283 | 40 | 80 | PT-1/4 | | | |
| JSFD-57030D | 57 | 176 | 286 | 40 | 80 | PT-1/4 | | | |
| JSFD-58030D | 58 | 179 | 289 | 40 | 80 | PT-1/4 | | | |

* TSB : Big screw head / ZSB : Small screw head

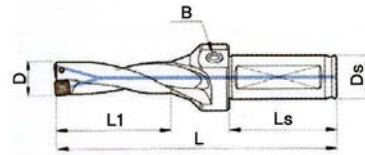
INDEXIBLE DRILL

PART.

A

TURNING
&
MILLING

JSFD 4xD



| Type | D | L ₁ | L | D _s | L _s | B | Insert | Screw | Wrench |
|-------------|----|----------------|-----|----------------|----------------|--------|----------------|--------------------------|--------|
| JSFD-16040D | 16 | 69 | 146 | 20 | 50 | PT-1/8 | WCMX030208R-PG | TSB-22045 (ZSB-22045) | TXL-6 |
| JSFD-17040D | 17 | 73 | 150 | 20 | 50 | PT-1/8 | | | |
| JSFD-18040D | 18 | 77 | 154 | 20 | 50 | PT-1/8 | | | |
| JSFD-19040D | 19 | 81 | 158 | 20 | 50 | PT-1/8 | | | |
| JSFD-20040D | 20 | 85 | 162 | 20 | 50 | PT-1/8 | WCMX040208R-PG | TSB-25055 (ZSB-25055) | TXL-8 |
| JSFD-21040D | 21 | 89 | 176 | 25 | 60 | PT-1/8 | | | |
| JSFD-22040D | 22 | 93 | 180 | 25 | 60 | PT-1/8 | | | |
| JSFD-23040D | 23 | 97 | 184 | 25 | 60 | PT-1/8 | | | |
| JSFD-24040D | 24 | 101 | 188 | 25 | 60 | PT-1/8 | WCMX050308R-PG | TSB-30070 (ZSB-30070) | TXL-8 |
| JSFD-25040D | 25 | 105 | 192 | 25 | 60 | PT-1/8 | | | |
| JSFD-26040D | 26 | 109 | 209 | 32 | 70 | PT-1/4 | | | |
| JSFD-27040D | 27 | 113 | 213 | 32 | 70 | PT-1/4 | | | |
| JSFD-28040D | 28 | 117 | 214 | 32 | 70 | PT-1/4 | WCMX06T308R-PG | TSB-35090 (ZSB-35090) | TXL-15 |
| JSFD-29040D | 29 | 121 | 221 | 32 | 70 | PT-1/4 | | | |
| JSFD-30040D | 30 | 125 | 225 | 32 | 70 | PT-1/4 | | | |
| JSFD-31040D | 31 | 129 | 229 | 32 | 70 | PT-1/4 | | | |
| JSFD-32040D | 32 | 133 | 233 | 32 | 70 | PT-1/4 | WCMX080412R-PG | TSB-40110 (ZSB-40110) | TXL-15 |
| JSFD-33040D | 33 | 137 | 237 | 32 | 70 | PT-1/4 | | | |
| JSFD-34040D | 34 | 141 | 241 | 32 | 70 | PT-1/4 | | | |
| JSFD-35040D | 35 | 145 | 245 | 32 | 70 | PT-1/4 | | | |
| JSFD-36040D | 36 | 149 | 249 | 32 | 70 | PT-1/4 | WCMX080412R-PG | TSB-40110 (ZSB-40110) | TXL-15 |
| JSFD-37040D | 37 | 153 | 253 | 32 | 70 | PT-1/4 | | | |
| JSFD-38040D | 37 | 157 | 257 | 32 | 70 | PT-1/4 | | | |
| JSFD-39040D | 39 | 161 | 261 | 32 | 70 | PT-1/4 | | | |
| JSFD-40040D | 40 | 165 | 265 | 32 | 70 | PT-1/4 | WCMX080412R-PG | TSB-40110 (ZSB-40110) | TXL-15 |
| JSFD-41040D | 41 | 169 | 269 | 32 | 70 | PT-1/4 | | | |
| JSFD-42040D | 42 | 173 | 283 | 40 | 80 | PT-1/4 | | | |
| JSFD-43040D | 43 | 177 | 287 | 40 | 80 | PT-1/4 | | | |
| JSFD-44040D | 44 | 181 | 291 | 40 | 80 | PT-1/4 | WCMX080412R-PG | TSB-40110 (ZSB-40110) | TXL-15 |
| JSFD-45040D | 45 | 185 | 295 | 40 | 80 | PT-1/4 | | | |
| JSFD-46040D | 46 | 189 | 299 | 40 | 80 | PT-1/4 | | | |
| JSFD-47040D | 47 | 193 | 303 | 40 | 80 | PT-1/4 | | | |
| JSFD-48040D | 48 | 197 | 307 | 40 | 80 | PT-1/4 | WCMX080412R-PG | TSB-40110 (ZSB-40110) | TXL-15 |
| JSFD-49040D | 49 | 201 | 311 | 40 | 80 | PT-1/4 | | | |
| JSFD-50040D | 50 | 205 | 315 | 40 | 80 | PT-1/4 | | | |
| JSFD-51040D | 51 | 209 | 319 | 40 | 80 | PT-1/4 | | | |
| JSFD-52040D | 52 | 213 | 323 | 40 | 80 | PT-1/4 | WCMX080412R-PG | TSB-40110 (ZSB-40110) | TXL-15 |
| JSFD-53040D | 53 | 217 | 327 | 40 | 80 | PT-1/4 | | | |
| JSFD-54040D | 54 | 221 | 331 | 40 | 80 | PT-1/4 | | | |
| JSFD-55040D | 55 | 225 | 335 | 40 | 80 | PT-1/4 | | | |
| JSFD-56040D | 56 | 229 | 339 | 40 | 80 | PT-1/4 | WCMX080412R-PG | TSB-40110 (ZSB-40110) | TXL-15 |
| JSFD-57040D | 57 | 233 | 343 | 40 | 80 | PT-1/4 | | | |
| JSFD-58040D | 58 | 237 | 347 | 40 | 80 | PT-1/4 | | | |

* TSB : Big screw head / ZSB : Small screw head

CERAMIC

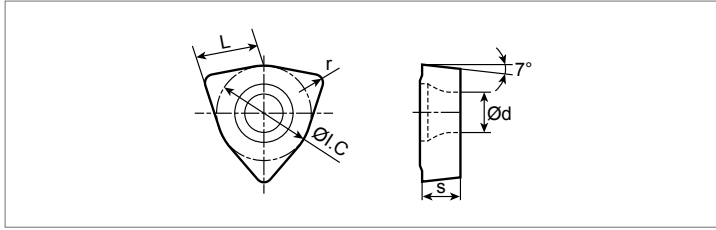
CERMET

PCBN
/
PCD

TOOL
HOLDER


MILLING
CUTTER

MILLING & DRILLING

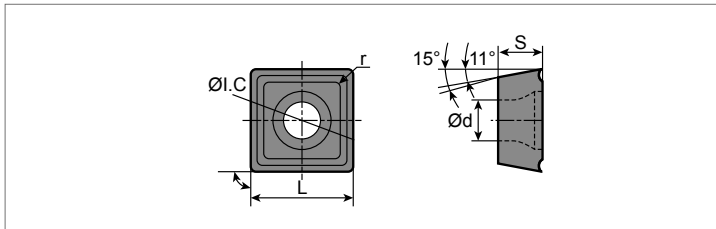


SPG200

- PVD Coating
- P20, M20


| Insert shape | Type | Dimensions (mm) | | | | | Grade |
|---|----------------|-----------------|-------|------|-----|-----|--------|
| | | L | ØI.C | s | d | r | SPG200 |
|  | WCMX030208R-PG | 3.8 | 5.56 | 2.38 | 2.8 | 0.8 | ● |
| | WCMX040208R-PG | 4.3 | 6.35 | 2.38 | 3.1 | 0.8 | ● |
| | WCMX050308R-PG | 5.4 | 7.94 | 3.18 | 3.2 | 0.8 | ● |
| | WCMX06T308R-PG | 6.5 | 9.525 | 3.97 | 3.7 | 0.8 | ● |
| | WCMX080412R-PG | 8.7 | 12.7 | 4.76 | 4.3 | 1.2 | ● |

● Stock



SPG207

- PVD Coating
- P20, M20

| Insert shape | Type | Dimensions (mm) | | | | | Grade |
|---|---------------|-----------------|------|------|------|-----|--------|
| | | L | ØI.C | s | d | r | SPG200 |
|  | SPGT050204-PM | 5.0 | 5.0 | 2.38 | 2.2 | 0.4 | ● |
| | SPGT060204-PM | 6.0 | 6.0 | 2.38 | 2.6 | 0.4 | ● |
| | SPGT07T308-PM | 7.94 | 7.94 | 3.97 | 2.8 | 0.8 | ● |
| | SPGT090408-PM | 9.8 | 9.8 | 4.3 | 4.2 | 0.8 | ● |
| | SPGT110408-PM | 11.5 | 11.5 | 4.76 | 4.4 | 0.8 | ● |
| | SPGT140512-PM | 14.3 | 14.3 | 5.2 | 5.75 | 1.2 | ● |

● Stock

CERAMIC

CERMET

PCBN
/
PCD

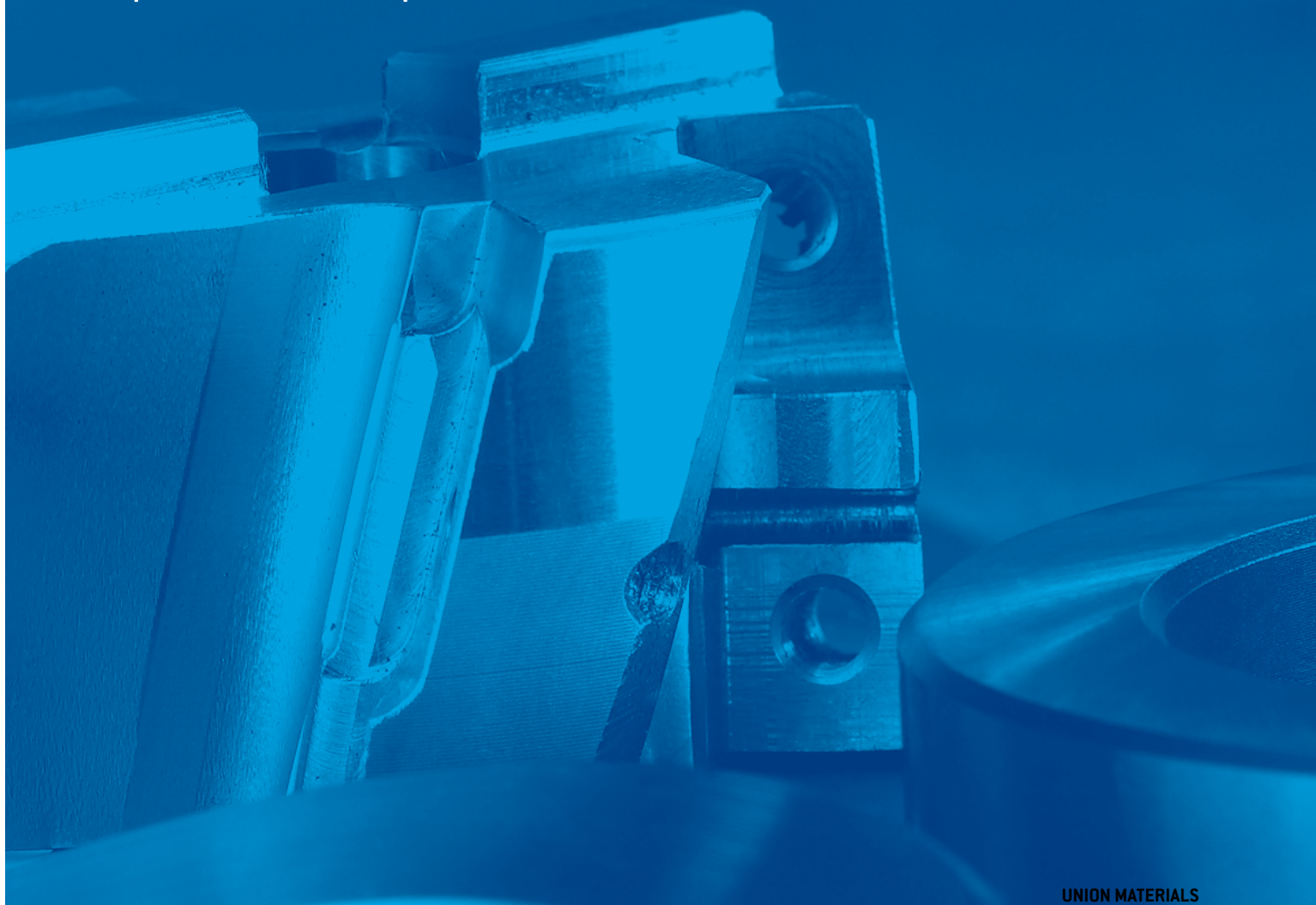
TOOL
HOLDER

MILLING
CUTTER

MEMO

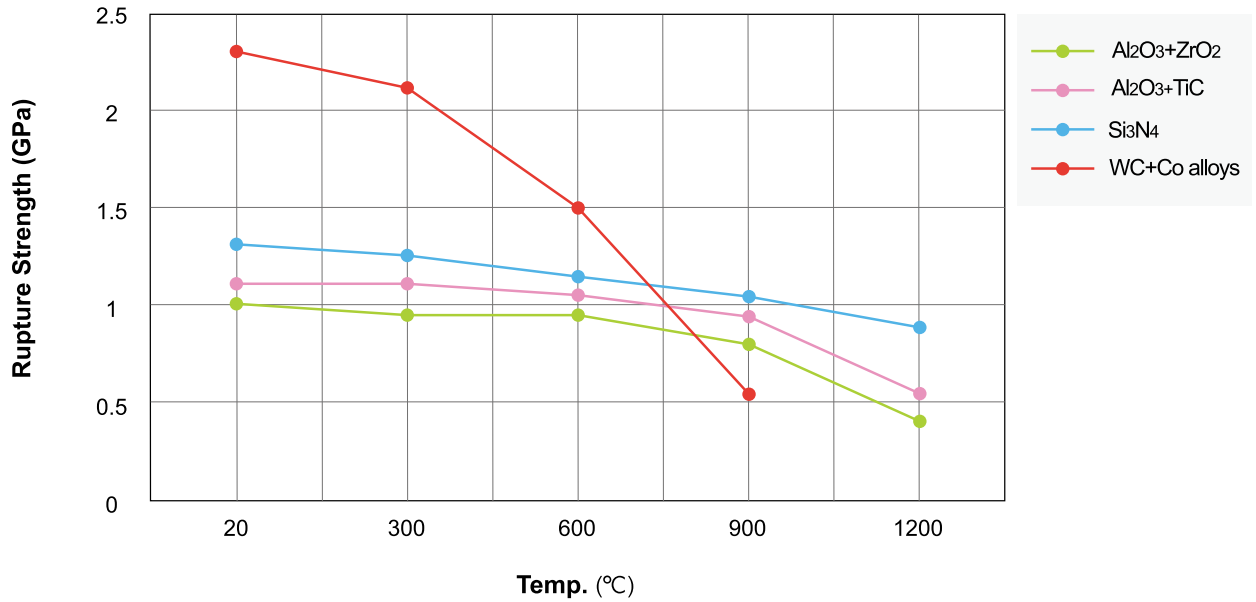
TECHNICAL DATA

| | |
|---------------------------|-------|
| Test Results | A 268 |
| Trouble Shooting | A 271 |
| Hardness Conversion Table | A 272 |
| Grade Comparison | A 274 |
| Comparison of Work-piece | A 275 |

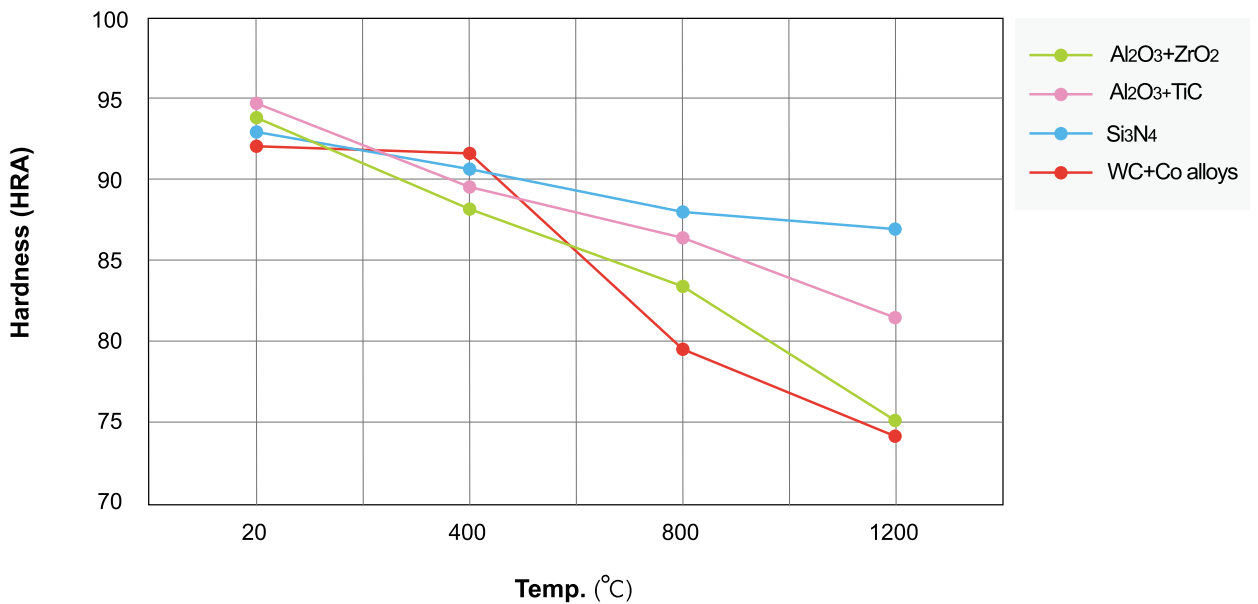




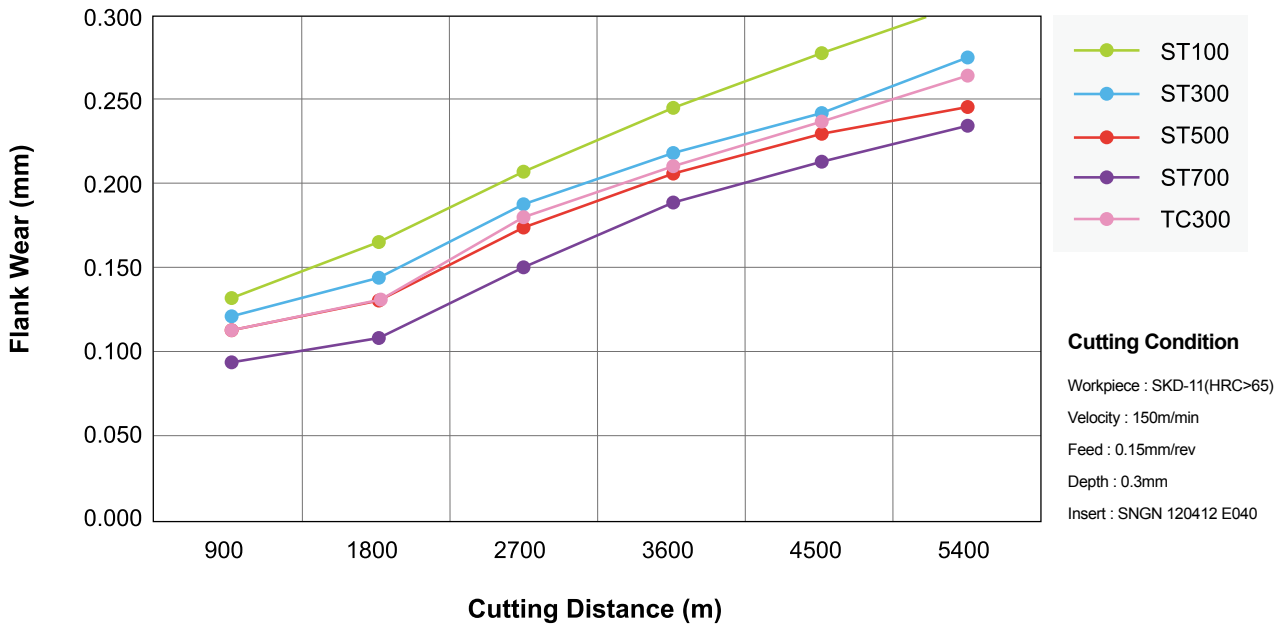
HIGH TEMPERATURE STRENGTH



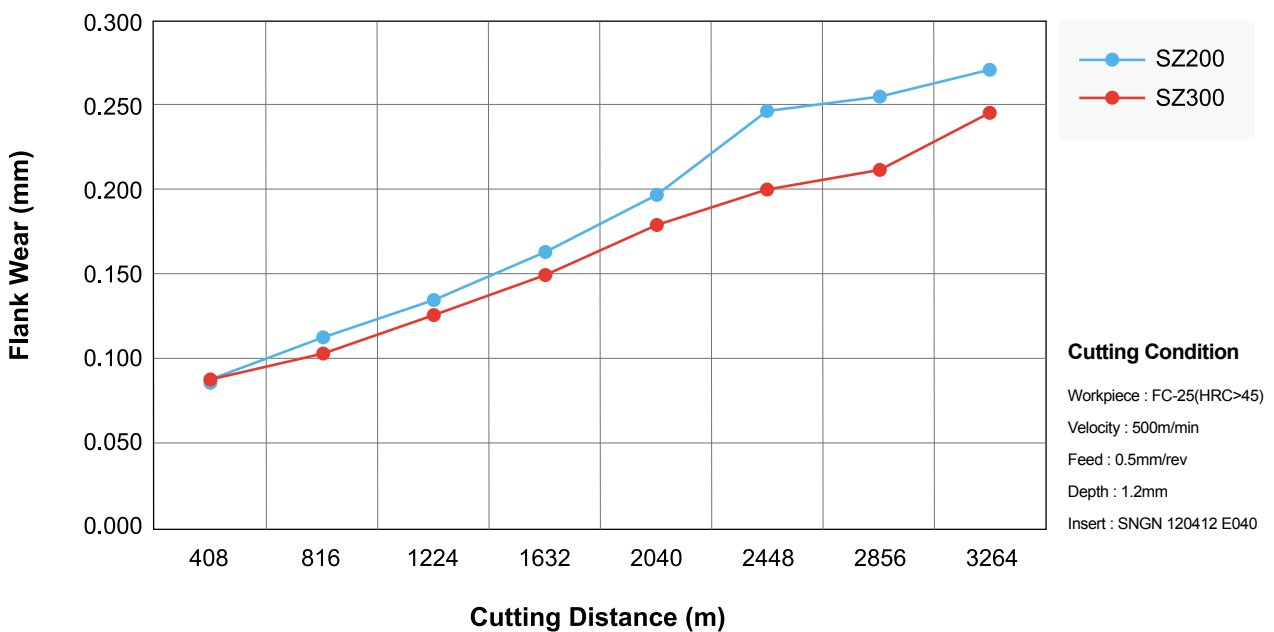
HARDNESS VS TEMPERATURE



FLANK WEAR VS CUTTING DISTANCE

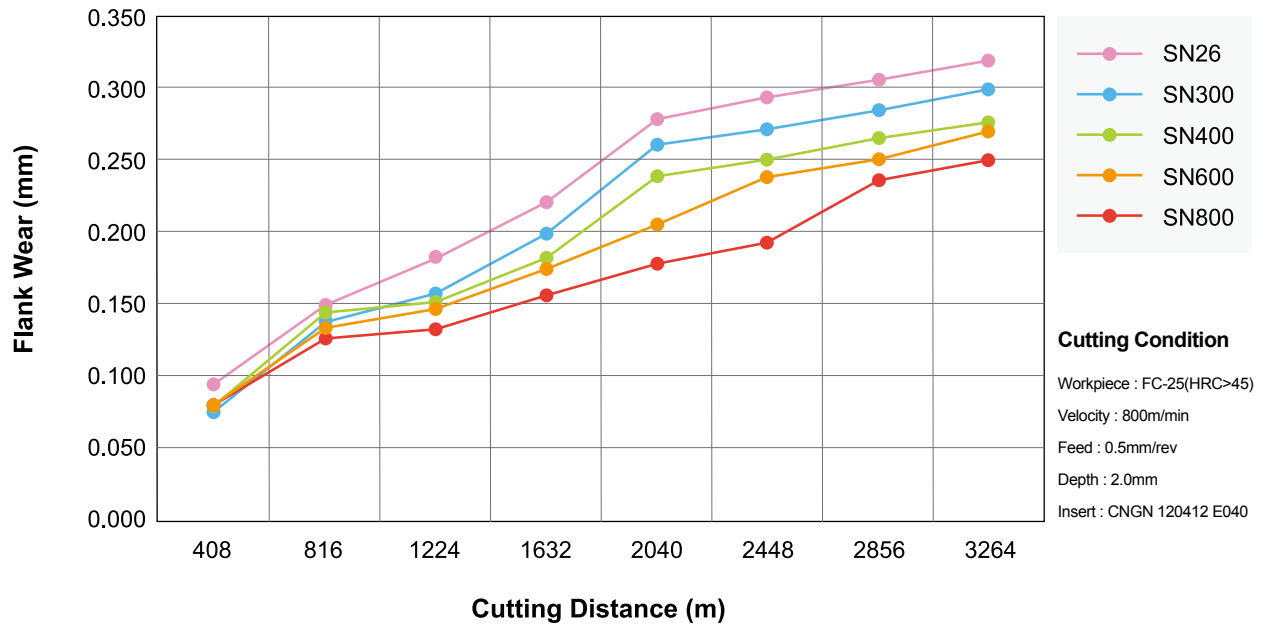


FLANK WEAR VS CUTTING DISTANCE

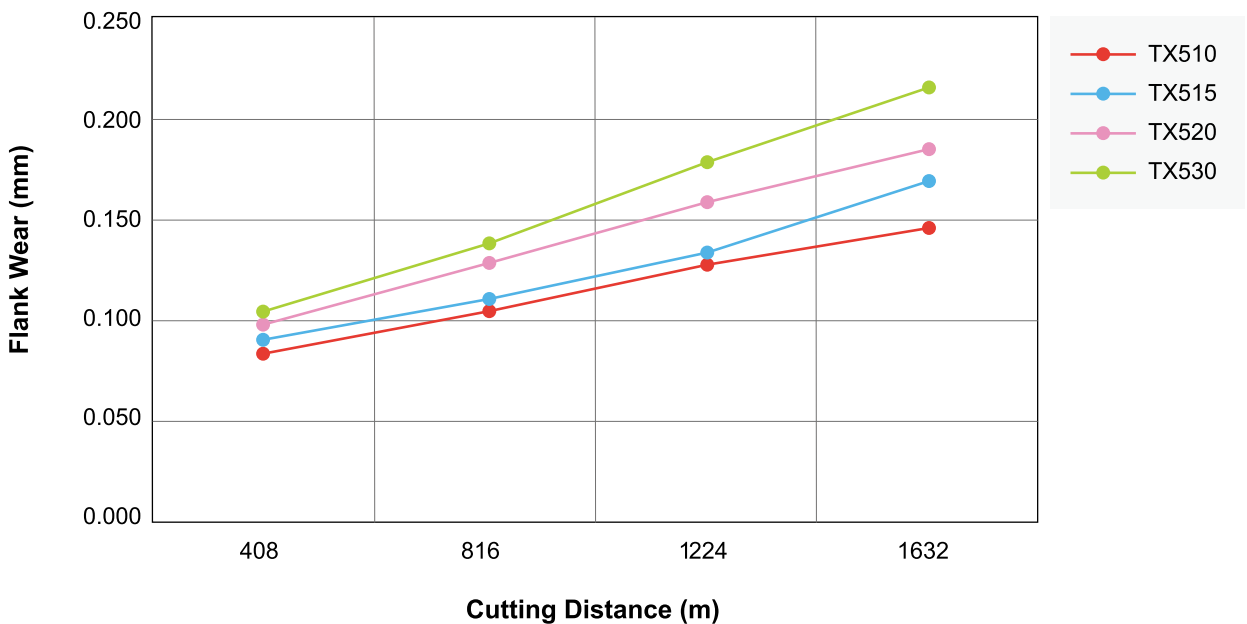


TECHNICAL DATA









FLANK WEAR VS CUTTING DISTANCE



FLANK WEAR VS CUTTING DISTANCE



TROUBLE SHOOTING

| Types | | Status | Cause | Countermeasures |
|---------------------|---|---|---|--|
| Flank Wear |  | <ul style="list-style-type: none"> Variation of dimension Deteriorated finishing surface Increasing machining load | <ul style="list-style-type: none"> Wear by grinded surface Excessive feed rate and cutting speed | <ul style="list-style-type: none"> Reduce cutting Speed Use larger corner radius Use high wear-resistant grade |
| Crater Wear |  | <ul style="list-style-type: none"> Deterioration of chip disposal Deteriorated finishing surface | <ul style="list-style-type: none"> Wear by chips (remarkable with ductile cast iron) Excessive cutting speed | <ul style="list-style-type: none"> Reduce cutting Speed Use smaller lead angle Check edge geometry Use high wear-resistant grade |
| Thermal Cracking |  | <ul style="list-style-type: none"> Deteriorated finishing surface Occurrence of chipping | <ul style="list-style-type: none"> Severe cycle of heating & cooling during cutting Excessive feed rate and cutting speed | <ul style="list-style-type: none"> Reduce cutting speed Reduce feed rate Change to dry machining Use tougher grade |
| Notch Wear |  | <ul style="list-style-type: none"> Deteriorated finishing surface Increasing machining load | <ul style="list-style-type: none"> Excessive feed rate and cutting depth | <ul style="list-style-type: none"> Reduce cutting depth Reduce feed rate Use tougher grade Increase coolant supply |
| Edge Splintering |  | <ul style="list-style-type: none"> Occurrence of fire flower Occurrence of noise Increasing Machining load | <ul style="list-style-type: none"> Excessive feed rate Falling-off of BUE Weak cutting edge | <ul style="list-style-type: none"> Use tougher grade Check edge geometry Increase stability of the system Use larger lead angle |
| Plastic Deformation |  | <ul style="list-style-type: none"> Variation of dimension Chipping of cutting edge | <ul style="list-style-type: none"> High machining load Use of improper grade | <ul style="list-style-type: none"> Reduce cutting speed Reduce feed rate Reduce cutting depth Use harder grade |
| Built-up-Edge |  | <ul style="list-style-type: none"> Deteriorated finishing surface Variation of dimension Occurrence of chipping | <ul style="list-style-type: none"> High affinity with work piece Low cutting speed | <ul style="list-style-type: none"> Increase cutting speed Increase feed rate Use tougher grade Use larger rake angle |
| Breakage |  | <ul style="list-style-type: none"> Occurrence of fire flower Cutting impossible | <ul style="list-style-type: none"> Using low toughness Insert Using improper clamping holder | <ul style="list-style-type: none"> Use tougher grade Reduce feed rate Reduce cutting depth Increase stability of the system |

HARDNESS CONVERSION TABLE

| VICKERS HARDNESS NUMBER (HV) | KNOOP HARDNESS NUMBER (HK) | BRINELL HARDNESS NUMBER (HB) | | ROCKWELL HARDNESS NUMBER (HR) | | | | ROCKWELL SUPERFICIAL HARDNESS NUMBER (HR) | | | SHORE HARDNESS NUMBER (HS) | TENSILE STRENGTH [APPROX.] |
|---------------------------------------|-------------------------------------|---|---|--|--|---|---|--|--|--|-------------------------------------|----------------------------------|
| | | HBS 3000kgf LOAD 10mm STEEL BALL | HBW 3000kgf LOAD 10mm CARBIDE BALL | SCALE A 60kgf LOAD DIAMOND INDENTER | SCALE B 100kgf LOAD 1/16" STEEL BALL | SCALE C 150kgf LOAD DIAMOND INDENTER | SCALE D 100kgf LOAD DIAMOND INDENTER | SCALE 15N 15kgf LOAD DIAMOND INDENTER | SCALE 30N 30kgf LOAD DIAMOND INDENTER | SCALE 45N 45kgf LOAD DIAMOND INDENTER | | |
| 1865 | | | | 92.1 | | 80 | 86.5 | 96.5 | 92.0 | 87.0 | | |
| 1787 | | | | 91.6 | | 79 | 85.7 | 96.3 | 91.5 | 86.2 | | |
| 1710 | | | | 91.1 | | 78 | 84.9 | 96.1 | 90.9 | 85.4 | | |
| 1633 | | | | 90.6 | | 77 | 84.2 | 95.8 | 90.3 | 84.5 | | |
| 1556 | | | | 90.1 | | 76 | 83.4 | 95.5 | 89.7 | 83.6 | | |
| 1478 | | | | 89.6 | | 75 | 82.6 | 95.2 | 89.1 | 82.5 | | |
| 1400 | | | | 89.0 | | 74 | 81.8 | 94.9 | 88.5 | 81.6 | | |
| 1323 | | | | 88.5 | | 73 | 81.0 | 94.6 | 87.9 | 80.7 | | |
| 1245 | | | | 88.0 | | 72 | 80.1 | 94.3 | 87.2 | 79.7 | | |
| 1160 | | | | 87.1 | | 71 | 79.4 | 94.0 | 86.5 | 78.7 | | |
| 1076 | 972 | | | 86.8 | | 70 | 78.6 | 93.7 | 85.8 | 77.6 | | |
| 1004 | 946 | | | 86.2 | | 69 | 77.8 | 93.4 | 85.1 | 76.4 | | |
| 940 | 920 | | | 85.6 | | 68 | 76.9 | 93.2 | 84.3 | 75.4 | | |
| 900 | 895 | | | 85.0 | | 67 | 76.1 | 92.9 | 83.6 | 74.2 | 95.2 | |
| 865 | 870 | | | 84.5 | | 66 | 75.4 | 92.5 | 82.8 | 73.3 | 93.1 | |
| 832 | 846 | | 739 | 83.9 | | 65 | 74.5 | 92.2 | 81.9 | 72.0 | 91.0 | |
| 800 | 822 | | 722 | 83.4 | | 64 | 73.8 | 91.8 | 81.1 | 71.0 | 88.9 | |
| 772 | 799 | | 705 | 82.8 | | 63 | 73.0 | 91.4 | 80.1 | 69.9 | 87.0 | |
| 746 | 776 | | 688 | 82.3 | | 62 | 72.2 | 91.1 | 79.3 | 66.6 | 85.2 | |
| 720 | 754 | | 670 | 81.8 | | 61 | 71.5 | 90.7 | 78.4 | 67.7 | 83.3 | |
| 697 | 732 | | 654 | 81.2 | | 60 | 70.7 | 90.2 | 77.5 | 66.6 | 81.6 | |
| 674 | 710 | | 634 | 80.7 | | 59 | 69.9 | 89.8 | 76.6 | 65.5 | 79.9 | |
| 653 | 690 | | 615 | 80.1 | | 58 | 69.2 | 89.3 | 75.7 | 64.3 | 78.2 | |
| 633 | 670 | | 595 | 79.6 | | 57 | 68.5 | 88.9 | 74.8 | 63.2 | 75.6 | |
| 613 | 650 | | 577 | 79.0 | | 56 | 67.7 | 88.3 | 73.9 | 62.0 | 75.0 | |
| 595 | 630 | | 560 | 78.5 | | 55 | 66.9 | 87.9 | 73.0 | 60.9 | 73.5 | 212 |
| 577 | 612 | | 543 | 78.0 | | 54 | 66.1 | 87.4 | 72.0 | 59.8 | 71.9 | 205 |
| 560 | 594 | | 525 | 77.4 | | 53 | 65.4 | 86.9 | 71.2 | 58.6 | 70.4 | 199 |
| 544 | 576 | 500 | 512 | 76.8 | | 52 | 64.6 | 86.4 | 70.2 | 57.4 | 69.0 | 192 |
| 528 | 558 | 487 | 496 | 76.3 | | 51 | 63.8 | 85.9 | 69.4 | 56.1 | 67.6 | 186 |
| 513 | 542 | 475 | 481 | 75.9 | | 50 | 63.1 | 85.5 | 68.5 | 55.0 | 66.2 | 179 |
| 498 | 526 | 464 | 469 | 75.2 | | 49 | 62.1 | 85.0 | 67.6 | 53.8 | 64.7 | 172 |
| 484 | 510 | 451 | 455 | 74.7 | | 48 | 61.4 | 84.5 | 66.7 | 52.5 | 63.4 | 167 |
| 471 | 495 | 442 | 443 | 74.1 | | 47 | 60.8 | 83.9 | 65.8 | 51.4 | 62.1 | 161 |
| 458 | 480 | 432 | 432 | 73.6 | | 46 | 60.0 | 83.5 | 64.8 | 50.3 | 60.8 | 156 |
| 446 | 466 | 421 | 421 | 73.1 | | 45 | 59.2 | 83.0 | 64.0 | 49.0 | 59.6 | 151 |
| 434 | 452 | 409 | 409 | 72.5 | | 44 | 58.5 | 82.5 | 63.1 | 47.8 | 58.4 | 146 |
| 423 | 438 | 400 | 400 | 70.0 | | 43 | 57.7 | 82.0 | 62.2 | 46.7 | 57.2 | 141 |
| 412 | 426 | 390 | 390 | 71.5 | | 42 | 56.9 | 81.5 | 61.3 | 45.5 | 56.1 | 136 |
| 402 | 414 | 381 | 381 | 70.9 | | 41 | 56.2 | 80.9 | 60.4 | 44.3 | 55.0 | 132 |
| 392 | 402 | 371 | 371 | 70.4 | | 40 | 55.4 | 80.4 | 59.5 | 43.1 | 53.9 | 127 |
| 382 | 391 | 362 | 362 | 69.9 | | 39 | 54.6 | 79.9 | 58.6 | 41.9 | 52.9 | 124 |
| 372 | 380 | 353 | 353 | 69.4 | | 38 | 53.8 | 79.4 | 57.7 | 40.8 | 51.8 | 120 |
| 363 | 370 | 344 | 344 | 68.9 | | 37 | 53.1 | 78.8 | 56.8 | 39.6 | 50.7 | 118 |
| 354 | 360 | 336 | 336 | 68.4 | 109.0 | 36 | 52.3 | 78.3 | 55.9 | 38.4 | 49.7 | 114 |
| 345 | 351 | 327 | 327 | 67.9 | 108.5 | 35 | 51.5 | 77.7 | 55.0 | 37.2 | 48.7 | 110 |

| VICKERS HARDNESS NUMBER (HV) | KNOOP HARDNESS NUMBER (HK) | BRINELL HARDNESS NUMBER (HB) | | ROCKWELL HARDNESS NUMBER (HR) | | | | ROCKWELL SUPERFICIAL HARDNESS NUMBER (HRS) | | | SHORE HARDNESS NUMBER (HS) | TENSILE STRENGTH (APPROX.) |
|---------------------------------------|-------------------------------------|---|---|--|--|---|---|--|--|--|-------------------------------------|----------------------------------|
| | | HBS 3000kgf LOAD 10mm STEEL BALL | HBW 3000kgf LOAD 10mm CARBIDE BALL | SCALE A 60kgf LOAD DIAMOND INDENTER | SCALE B 100kgf LOAD 1/16" STEEL BALL | SCALE C 150kgf LOAD DIAMOND INDENTER | SCALE D 100kgf LOAD DIAMOND INDENTER | SCALE 15N 15kgf LOAD DIAMOND INDENTER | SCALE 30N 30kgf LOAD DIAMOND INDENTER | SCALE 45N 45kgf LOAD DIAMOND INDENTER | | |
| 336 | 342 | 319 | 319 | 67.4 | 108.0 | 34 | 50.8 | 77.2 | 54.2 | 36.1 | 47.7 | 108 |
| 327 | 334 | 311 | 311 | 66.8 | 107.5 | 33 | 50.0 | 76.6 | 53.3 | 34.9 | 46.6 | 105 |
| 318 | 326 | 301 | 301 | 66.3 | 107.0 | 32 | 49.2 | 76.1 | 52.1 | 33.7 | 45.6 | 102 |
| 310 | 318 | 294 | 294 | 65.8 | 106.0 | 31 | 48.4 | 75.6 | 51.3 | 32.5 | 44.6 | 100 |
| 302 | 311 | 286 | 286 | 65.3 | 105.5 | 30 | 47.7 | 75.0 | 50.4 | 31.3 | 43.6 | 97 |
| 294 | 304 | 279 | 279 | 64.7 | 104.5 | 29 | 47.0 | 74.5 | 49.5 | 30.1 | 42.7 | 95 |
| 286 | 297 | 271 | 271 | 64.3 | 104.0 | 28 | 46.1 | 73.9 | 48.6 | 28.9 | 41.7 | 93 |
| 279 | 290 | 264 | 264 | 63.8 | 103.0 | 27 | 45.2 | 73.3 | 47.7 | 27.8 | 40.8 | 90 |
| 272 | 284 | 258 | 258 | 63.3 | 102.5 | 26 | 44.6 | 72.8 | 46.8 | 26.7 | 39.9 | 88 |
| 266 | 278 | 253 | 253 | 62.8 | 101.5 | 25 | 43.8 | 72.2 | 45.9 | 25.5 | 39.2 | 86 |
| 260 | 272 | 247 | 247 | 62.4 | 101.0 | 24 | 43.1 | 71.6 | 45.0 | 24.3 | 38.4 | 84 |
| 254 | 266 | 243 | 243 | 62.0 | 100.0 | 23 | 42.1 | 71.0 | 44.0 | 23.1 | 37.7 | 82 |
| 248 | 261 | 237 | 237 | 61.5 | 99.0 | 22 | 41.6 | 70.5 | 43.2 | 22.0 | 36.9 | 80 |
| 243 | 256 | 231 | 231 | 61.0 | 98.5 | 21 | 40.9 | 69.9 | 42.3 | 20.7 | 36.3 | 79 |
| 238 | 251 | 226 | 226 | 60.5 | 97.8 | 20 | 40.1 | 69.4 | 41.5 | 19.6 | 35.6 | 77 |
| 230 | 243 | 219 | 219 | | 96.7 | 18 | | | | | 34.6 | 75 |
| 222 | 236 | 212 | 212 | | 95.5 | 16 | | | | | 33.5 | 72 |
| 213 | 229 | 203 | 203 | | 93.9 | 14 | | | | | 32.3 | 69 |
| 204 | 220 | 194 | 194 | | 92.3 | 12 | | | | | 31.1 | 66 |
| 196 | 212 | 187 | 187 | | 90.7 | 10 | | | | | 30.0 | 63 |
| 188 | 204 | 179 | 179 | | 89.5 | 8 | | | | | | 61 |
| 180 | 196 | 171 | 171 | | 87.1 | 6 | | | | | | 59 |
| 173 | 189 | 165 | 165 | | 85.5 | 4 | | | | | | 56 |
| 166 | 181 | 158 | 158 | | 83.5 | 2 | | | | | | 54 |

PROPERTIES OF ELEMENTS

| Element | Density (g/cm ³) | Hardness (kg/mm ²) | Young's Modulus (X10 ³ kg/mm ²) | Thermal Expansion Coefficient (10 ⁻⁶ /°C) | Melting Point (°C) |
|--------------------------------|---------------------------------|-----------------------------------|---|--|-----------------------|
| WC | 15.60 | 2,150 | 70 | 5.1 | 2,900 |
| TiC | 4.94 | 3,200 | 46 | 7.6 | 3,200 |
| TaC | 14.50 | 1,800 | 29 | 6.6 | 3,800 |
| NbC | 8.20 | 2,050 | 35 | 6.8 | 3,500 |
| TiN | 5.43 | 2,000 | 26 | 9.2 | 2,950 |
| Al ₂ O ₃ | 3.98 | 3,000 | 42 | 8.5 | 2,050 |
| CBN | 3.48 | 4,500 | 71 | 4.7 | |
| Diamond | 3.52 > | 9,000 | 99 | 3.1 | |
| Co | 8.90 | | 10~18 | 12.3 | 1,495 |
| Ni | 8.90 | | 20 | 13.3 | 1,455 |

GRADE COMPARISON

| Maker Grade | | Union | NTK | Ceram Tec | Kennametal | Sandvik | Tungaloy | Greenleaf | Kyocera | Mitsubishi | Sumitomo | Taegu Tec | |
|------------------------|-----------------|------------|------------------|-------------------------|-------------------------|-----------------|-------------------------|------------------|----------------|----------------------------------|---|-----------|------|
| CERAMIC | Black Ceramic | ST100 | HC2 | SH1 | K090 | | LX21 | | A65 | XD202 | NB90M | | |
| | | ST300 | HC4 | SH2/SH3 | KY1615 | CC650 | | GEM6 | | XD805 | NB90S | AB20 | |
| | | ST500 | HC5 | | MC2 | | | | | | | AB20 | |
| | | ST900 | HC7 | | | | | | | | | | |
| | SD200 | HC6 | | | | | | | | | | | |
| | Coated Ceramic | TC100 | ZC4 | | KY4400 | | | | | | | | |
| | | TC300 | ZC7 | SH2C | HTM85D | CC6050 | LX11 | | A66N PT600M | | NB100C | | |
| | | TM300 | | | | | | | | | | | |
| | White Ceramic | SZ200 | HC1 | SN60 | AC5 | CC620 | LXA | GEM9 | AZ5000 | | W80 | AW120 | |
| | | | SN80 | K060 | | | | | SN60 | | | | |
| | Pink | SZ300 | HW2 | | | | | | | | | AW120 | |
| | | | EC1 | SL100 | KY2000 | | | | KS5000 | | NS130 | AS10 | |
| | Silicon Nitride | SN300 | SX8 | SL200 | KY3000 | CC690 | | | KS5000 | | | | |
| | | | SX2 SX6 | SL500/SL506 SL608 | KY1320/KY3500 | CC6090 | FX90 FX105 | GSN | KS6000 | XD515 XD520 | NS260 | AS10 | |
| | | SN500 | SX1 | SL508 | | | | | | KS7000 | | NS30 | AS10 |
| | | | SX5 | | | CC680 | | | | | | | |
| SN800 SN1000 | | SX9 SX7 | SL800/SL806 | KY1540/KY1310 KY2100 | CC6080 CC6060/CC6065 | | | | KS6040 | | | AS500 | |
| | | | | | | | | | | | | | |
| Coated Silicon Nitride | NC400 | SP2 | SL550C | KY3400 | GC1690 | CXC73 TF110 | HSN200 | KX207 | | NS260C | | | |
| | | | | | | | | | | | | | |
| Whisker | SW400 SW800 | WA5 WA1 | | KY1525 KY4300 MC3 | CC670 | | WG300 WG600 WG700 | | | WX120 WX2000 | TC430 | | |
| | | | | | | | | | | | | | |
| CERMET | Non Coated | TX510 | T3N/CTX XT3 | SC35 | KT125/HTX | | NS520 | | TN30 TN6010 | | T110A | | |
| | | TX515 | T15/C30 | SC15 | KT315/KT175/HT2 | CT5015 CT525 | | | TN40 | | T12A | | |
| | | TX520 | C7X/N20/ C50 | SC40 | TT125/PS5 | CT530 | NS420 NS730 | | TN60 TN6020 | | T130A | | |
| | | TX530 | N40/C45 | SC60 | KZ20S | | NS540 NS740 | | TN90 | | | | |
| | Coated | TX910 | | | | | GT520 GT720 | | PV30 PV7010 | | | | |
| | | TX915 | Q151Z15 | | | | AT530 GT730 | | PV7020 | AP25N | | | |
| | | TX920 | Q50/ C7Z/Z50 | | KT513S | GC1525 | GT530 | | | UP35N | T1200A T130Z | | |
| | | TX930 | | | | | | | | UP45N | | | |
| PCBN | SBN1000 | B22 | WBN735 WBN750 | KB1345 KD120 | | BX950 | | KBN65B | MB710 MB730 | BN100 BN500 BN600 BN700 | | | |
| | | B20 | WBN570 | KB1610 KD050/KD081 | CB7015 | BX310 | | KBN10B | MB810 | BN250 BNX10 | | | |
| | SBN3000 | B24 | WBN560 | KB1625 | CB7020 | BX330 | | | MB825 | BN250 | | | |
| | SBN4000 | B36 | WBN555 | KB1630 | CB7050 | | BX360 BX380 BX450 | | KBN25B | MB8025 MB850 MB835 | BN350 BN300 BNX20 BNS25 BN250 BN80 | | |
| | | B16 | WBN100 WBN101 | KD230 | CB50 | BX90S | | | KBN900 | MBS140 | BNS800 | | |
| PCD | SPD1000 | | | | | DX120 | | KPD001 KPD002 | MD230 | DA200 | | | |
| | | PA1 | | KD100 KD1415 | CD10 | DX140 | | KPD010 | MD220 | DA150 | | | |
| | SPD3000 | PD1 | | KD100 | | DX160 | | KPD025 | MD205 | DA90 DA1000 | | | |
| | | | | | | DX180 | | | | | | | |

COMPARISON OF WORK-PIECE

| ISO | Korea KS | United Kingdom BS | America AIS/SAE | German DIN | Spain UNF | Italy UNI | Sweden SS | France AFNOR | Japan JIS |
|------------|-------------------|----------------------|---------------------|---------------|----------------|---------------|---------------|-----------------|--------------|
| P Steel | Carbon steels | | | | | | | | |
| | SM15C | 080M15 | 1015 | Ck15 | C15K | C16 | 1370 | XC12 | S15C |
| | SM25C | - | 1025 | Ck25 | - | - | - | - | S25C |
| | SM35C | 060A35 | 1035{1037} | Ck35 | - | C36 | 1572 | XC38TS | S35C |
| | SM45C | 080M46 | 1045{1046} | Ck45 | C45K | C45 | 1672 | XC42 | S45C |
| | SM50C | 060A52 | 1049 | Ck50 | - | C53 | 1674 | XC48TS | S50C |
| | SM55C | 070M55 | 1055 | Ck55 | C55K | C5 | - | XC55 | S55C |
| | SM58C | 080A62 | 1060 | Ck58 | - | C60 | 1678 | XC60 | S58C |
| | - | 212M36 | 1140 | 35S20 | F210G | - | 1957 | 35MF4 | - |
| | SCMn1 | 150M28 | 1330 | 28Mn6 | - | - | - | 20M5 | SCMn1 |
| | - | 230M07 | 1215 | 9SMn36 | 12SMn35 | CF9SMn36 | - | S300 | - |
| | SMn438(H) | - | 1355 | 36Mn5 | 36Mn5 | - | 2120 | 40M5 | SMn738(H) |
| | sum22 | 230M07 | 1213 | 9SMn28 | 11SMn28 | CF9SMn28 | 1912 | S250 | sum22 |
| | Low alloy steels | | | | | | | | |
| | SNC815 | 655M13 | 3310:3415 | 14NiCr14 | - | - | - | 12NC15 | SNC815(H) |
| | SNC415 | - | 3415 | 14NiCr10 | 15NiCr11 | 16NiCr11 | - | 14NC11 | SNC415(H) |
| | SNC236 | 640A35 | 3435 | 36NiCr6 | - | - | - | 35NC6 | SNC236 |
| | SCM420,SCM430 | 1717DS110 | 41300 | 25CrMo4 | 55Cr3 | 25CrMo{KB} | 2225 | 25CD4 | SM420;SCM430 |
| | SCM432,SCCRM3 | 708A37 | 4137:4135 | 34CrMo4 | 34CrMo4 | 35CrMo4 | 2234 | 35CD4 | SM432;SCCRM3 |
| | SCM415 | - | - | 15CrMo5 | 12CrMo4 | - | 2216 | 12CD4 | SCM415(H) |
| | SCM440 | 708M40 | 4140 | 42CrMo4 | 42CrMo4 | 42CrMo4 | 2244 | 42CD4 | SCM440(H) |
| | SCM440 | 708M40 | 4140:4142 | 41CrMo4 | 42CrMo4 | 41CrMo4 | 2244 | 42CD4TS | SCM440 |
| | - | 820A16 | - | 17CrNiMo6 | 14NiCrMo13 | - | - | 18NCD6 | - |
| | - | 1503-245-420 | 4520 | 16Mo5 | 16Mo5 | 16Mo5 | - | - | - |
| | SCMnH1 | Z120M12 | - | G-X120Mn12 | X120Mn12 | XG120Mn12 | - | Z120M12 | SCMnH/1 |
| | SCr415 | 523M15 | 5015 | 15Cr3 | - | - | - | 12C3 | SCr415(H) |
| | - | {527M20} | 5115 | 16MnCr5 | 16MnCr5 | 16MnCr5 | 2511 | 16MC5 | - |
| | SCr430 | 530A32 | 5130 | 34Cr4 | 35Cr4 | 34Cr4{KB} | - | 32C4 | SCr430(H) |
| | SCr440 | 530M40 | 5140 | 42Cr4 | 42Cr4 | 41Cr4 | - | 42C4 | SCr440(H) |
| | SPS | 735A50 | 6050 | 50CrV4 | 51CrV4 | 50CrV4 | 2230 | 50CA4 | SUP10 |
| | SPS9 | 527M60 | 5155 | 55Cr3 | - | - | - | 55Cr3 | SUP9(A) |
| | - | 905M39 | - | 41CrAlMo7 | 41CrAlMo7 | 41CrAlMo7 | 2940 | 40CAD6,12 | - |
| | SNCM220 | 805M20 | 8620 | 21NiCrMo22 | 20NiCrMo2 | 20NiCrMo2 | 2506 | 30NCD2 | SNCM22(H) |
| | SNCM240 | 311-Type7 | 8637,8640 | 40NiCrMo22 | 40NiCrMo2 | 40NiCrMo2{KB} | - | - | SNCM240 |
| | - | 250A53 | 9255 | 55Si7 | 56Si7 | 55Si8 | 2085 | 55S7 | - |
| | - | 816M40 | 9840 | 36CrNiMo4 | 35NiCrMo4 | 38NiCrMo4{KB} | - | 40NCD3 | - |
| | SU2 | 534A99 | 52100 | 100Cr6 | F.131 | 100Cr6 | 2258 | 100C6 | SU2 |
| | SUM22L | - | 12L13 | 9SMnPb28 | 11SMnPb28 | CF9SMnPb28 | 1914 | S250Pb | SUM22L |
| | - | - | 12L14 | -SMnPb36 | 12SMnPb25 | CF9SMnPb36 | 1926 | S300Pb | - |
| | - | 150-620Gr27 | ASTM A182 | 13CrMo44 | 14CrMo45 | 14CrMo45 | - | 15CD3.5 | - |
| | - | 1501-622 | ASTM A182 | 10CrMo910 | TU.H | 12CrMo9,10 | 2218 | 12CD9,10 | - |
| | - | - | ASTM A350LF5 | 14Ni6 | 15Ni6 | 14Ni6 | - | 16N6 | - |
| | - | 1501-240 | ASTM A204Gr.A | 15Mo3 | 16Mo3 | 16Mo3KW | 2912 | 15D3 | - |
| | - | 722M24 | -32CrMo12 | 32CrMo12 | F124.A | 32CrMo12 | 2240 | 30CD12 | - |
| | High alloy steels | | | | | | | | |
| STD1 | BD3 | D3 | X210Cr12 | X210Cr12 | X210CrMoV13KU | - | Z200C12 | SKD1 | |
| STS12 | - | A2 | Z100CrMoV51Z100CDV5 | BA2 | 2260 | Z100CrMoV51 | Z100CrMoV51KU | SKD12 | |
| - | - | - | X210CrW12 | X210CrE12 | X215CRW121KU | 2312 | - | SKD2 | |
| STD61 | BH21 | H21 | X30WCrV9 | X30WCrV9 | X28W09KU | - | Z30WCV9 | SKD5 | |
| - | BH13 | H13 | X40CrMoV51 | X40CrMoV5 | X35CrMoVKU | 2242 | Z40CDV5 | SKS31 | |
| STS31 | - | - | 105WCr6 | 05WCr5 | 3KU | 2140 | 105WC13 | SKS43 | |
| STS43 | BW2 | W210 | 100Vi | - | - | - | Y105V | SKT4 | |
| STF4 | - | L6 | 55NiCrMoV6 | F520.S | - | - | 55NCDV7 | SUH1 | |
| - | 401S45 | HW3 | X45GrSi93 | F322 | 10WCr6 | - | Z45CS9 | SKH55 | |
| - | - | - | - | - | - | - | - | - | |
| SKH55 | - | - | S6-5-2-5 | HS6-5-2-5 | - | 2723 | Z85WDCV2723 | SKH3 | |
| SKH3 | BT4 | T4 | S18-1-2-5 | HS18-1-1-5 | X78WCo1805KU | - | Z80WKCV | SKH9 | |
| SKH51 | BM2 | M2 | S6-5-2 | HS6-5-2 | X82WMo0650KU | -2722 | Z85WDCV | - | |
| - | - | - | M7 | HS2-9-2 | Z100WCWHS2-9-2 | 2782 | S2-9-2 | - | |
| SKH2 | BT1 | T1 | S18-0-1 | HS18-0-1 | X75W18KU | - | Z08WCV | SKH2 | |
| - | BS1 | S1 | 45WCrV7 | 45WCrSi8 | 45WCrV8KU | 2710 | - | - | |

COMPARISON OF WORK-PIECE

| ISO | Korea KS | United Kingdom BS | America AIS/SAE | German DIN | Spain UNF | Italy UNI | Sweden SS | France AFNOR | Japan JIS |
|-------------------------|-------------------|----------------------|--------------------|------------------------|--------------|-------------------|-----------------|------------------------|--------------|
| M Stainless Steel | Carbon steels | | | | | | | | |
| | STS301 | - | 301 | X12CrNi177 | - | 2331 | F.3517 | Z12CN17.07X12CrNi17.07 | SUS301 |
| | STS303 | - | 303 | X12CrNiS188Z10CNF18.09 | - | 2346 | F.3517 | X10CrNiS18.09 | SUS303 |
| | - | - | 304 | X5CrNi189 | 304S31 | X5CrNi18 | 2332/2333F.3551 | Z6CN18.09 | SUS304 |
| | STS304 | 304S15 | 304 | X5CrNi189 | F.3551 | X5CrNi1810 | 2332 | Z6CN18.09 | SUS304 |
| | STS304L | - | 304L | X2CrNi1911 | 304C12 | 2333 | - | - | SUS304L |
| | SSC16 | - | 304LX2CrNi1819 | Z2CrNi1810 | 304S12 | 2352 | F.3503 | X2CrNi1011 | SCS16 |
| | STS304L | 304S62 | 304LN | Z2CrNiN,1810 | - | - | 2371 | Z2CN1810 | NSUS304LN |
| | STR31 | - | HW3X45CrSi93 | Z45CrSi93 | 401S45 | - | SF322 | X45CrSi8 | SUH1 |
| | STR309 | - | 309 | X15CrNiSi201 | - | - | - | Z15CNS2012 | SUH309 |
| | STR310 | 310S24 | 310S | X12CrNi2521 | F.332 | X60CrNi2520 | 2361 | Z12CN2520 | SUH310 |
| | STS316 | - | 316 | X5CrNiMo1810 | 346S16 | X5CrNiMo17122347 | F.3543 | Z6CND1711 | SUS316 |
| | STS316LN | - | 316LN | X2CrNiMoN | - | - | 2375 | X2CND1713 | SUS316LN |
| | STS316L | - | 316L | X2CrNiMo1812 | - | - | - | - | SUS316L |
| | SSC16 | - | 316LXCrNiMo | Z2cndCND1712 | 316S13 | 2353 | - | X2CrNiMo1712 | SCS16 |
| | - | 320S17 | 316Ti | Z2CND1915 | F.3535 | X6CrNiMoTi1712 | 2350 | Z6VDT17.12 | - |
| | STS317L | - | 317L | X24CrNiMo1816 | 317S12 | 2367 | - | X2CrNiMo1816 | 317L |
| | - | - | X10CrNi | Z6CNDNb | - | - | - | X6CrNiMoMoNb | 318 |
| | - | - | S32304 | "X2CrNiN,234" | - | - | 2327 | Z2CN23-04AZ | - |
| | - | - | S32900 | X8CrNiMo.275 | - | - | 2324 | - | - |
| | - | - | S31803 | X2CrNiMoN | - | - | 2377 | Z2CND22-0503 | - |
| | STS321 | 351S12 | 321 | X10CrNiTi | F.3553 | X6CrNiTi1811 | 2337 | Z6CNT18.10 | SUS321 |
| | STS347 | - | 347 | X6CrNiNb189 | 347S17 | X6CrNiNb18.112338 | F.3552 | Z6CNSb18.10 | SUS347 |
| | STS12 | BA2 | A2 | Z100CrMoV51 | Z100CrMoV51 | Z100CrMoV51KU | 2260 | Z100CDV5 | SKD12 |
| | High alloy steels | | | | | | | | |
| | STS403 | 403S17 | 403 | X7Cr13 | F.3110 | X6Cr13 | 2301 | Z6C13 | SUS403 |
| | STS405 | 403S17 | 405 | X10CrAl13 | F.311 | X10CrAl13 | - | Z10C13 | SUS405 |
| | STS410 | 410S21 | 410 | X10Cr13 | F.3401 | L13 | 2302 | Z10C14 | SUS410 |
| | STS420J2 | 420S45 | - | X46Cr13 | F.3405 | X40Cr145 | 2304 | Z4CM | SUS420J2 |
| | STS430 | 430S15 | 430 | X8Cr17 | F.3113 | X8Cr17 | 2320 | ZBC17 | SUS430 |
| | STS430F | - | 430F | X12CrMoS17 | F.3117 | X10CrS17 | 2383 | Z10CF17 | SUS430F |
| | STS431 | 431S29 | 431 | X22CrNi6 | F.33427 | X16CrNi16 | 2321 | Z15CNi6.02 | SUS431 |
| | STS434 | 434S17 | 434 | X6CrMo17 | - | ZX8CrMo17 | 2325 | ZBCD17.01 | SUS434 |
| | STR446 | - | 446 | X10CrA124 | - | X16Cr26 | 2322 | Z10CAC24 | SUH446 |
| | SSC5 | 425C11 | - | X5CrNi134 | - | - | - | Z4CND13.4M | SCS5 |
| | STR35,STR36 | 348S54 | EV8 | X53CrMnNiN219 | - | X53CrMnNiN | - | Z52CMN21.09 | SUH35,SUH36 |
| | STR4 | 443S65 | HNW6 | X80CrNiSi20 | F.320B | X80CrSiNi20 | - | Z80CSN20.02 | SUH4 |
| | High alloy steels | | | | | | | | |
| | HRHC15 | 330C11 | - | GX40NiCrSi | - | XG50NiCr | - | - | SCH15 |
| | STR330 | - | X12NiCrSi | - | - | - | - | Z12NCS35.16 | SUH330330 |
| | - | 3072-76 | 4676 | NiCu30Al | - | - | - | - | - |
| | - | - | 5390A | - | - | - | - | NC22FeD | - |
| | - | 3146-3 | 5391 | S-NiCr13A16MoNb | - | - | - | NC12D | - |
| | - | HR8 | 5383 | NiCr19Fe19NbMo | - | - | - | NC19rNB | - |
| | - | - | 5537C | CoCr20W15Ni | - | - | - | KC20WN | - |
| - | - | 5660 | NiFe35Cr14MoTi | - | - | - | ZSNCDT42 | - | |
| - | - | 5666 | NiCr22Mo9Nb | - | - | - | NC22FeDNB | - | |
| - | - | AMS5397 | NiCr15Cr10MoATi | - | - | - | - | - | |
| - | - | AMS5399 | NiCr19Co11MoTi | - | - | - | NC19KDT | - | |
| - | - | AMS5544 | NiCr19Fe19NbMo | - | - | - | NC20K14 | - | |
| - | - | AMS5772 | CoCr22W14Ni | - | - | - | KC22WN | - | |
| - | TA10-13/TA28 | AMSR56400 | TiAl6V4 | - | - | - | T-A6V | - | |
| - | TA14/17 | AMSR54520 | TiAl5Sn2.5 | - | - | - | T-A5E | - | |

COMPARISON OF WORK-PIECE

| ISO | Korea KS | United Kingdom BS | America AIS/SAE | German DIN | Spain UNF | Italy UNI | Sweden SS | France AFNOR | Japan JIS |
|-----------|-------------------|----------------------|--------------------|---------------|--------------|--------------|--------------|-----------------|--------------|
| K | Gray cast iron | | | | | | | | |
| | GC100 | - | No20B | GG10 | - | G10 | 110 | Ft100 | FC100 |
| | GC150 | Grade150 | No25B | GG15 | - | G14 | 115 | Ft150 | FC150 |
| | GC200 | Grade220 | No30B | GG20 | - | G20 | 120 | Ft200 | FC200 |
| | GC250 | Grade260 | No35B | GG25 | - | G25 | 125 | Ft250 | FC250 |
| | GC300 | Grade300 | GNo45B | GG30 | - | G30 | 130 | Ft300 | FC300 |
| | GC350 | Grade350 | No50B | GG35 | - | G35 | 135 | Ft350 | FC350 |
| | GCD400 | SNG420/2 | 60-40-18 | GGG40 | - | GS400-12 | 0717-02 | FCS400-12 | FCD400 |
| | GCD500 | SNG500/7 | 65-45-12 | GGG50 | - | GS500/7 | 0727-02 | HGS500-7 | FCD500 |
| | GCD600 | SNG600/3 | 80-55-06 | GGG60 | - | GS600/3 | 0732-03 | FGS600-3 | FCD600 |
| GCD700 | SNG700/2 | 100-70-03 | GGG70 | - | GS700/2 | 0737-01 | FGS700-2 | FCD700 | |
| Cast iron | Ductile cast iron | | | | | | | | |
| | - | B340/12 | 32510 | GTS-35 | - | - | 0815 | MN35-10 | - |
| | - | P440/7 | 40010 | GTS-45 | - | - | 0852 | - | - |
| | - | P510/4 | 50005 | GTS-55 | - | - | 0854 | MP50-5 | - |
| Aluminium | Aluminium alloy | | | | | | | | |
| | HRHC15 | 330C11 | - | GX40NiCrSi | - | XG50NiCr | - | - | SCH15 |
| | STR330 | - | X12NiCrSi | - | - | - | - | Z12NCS35.16 | SUH330330 |
| | - | 3072-76 | 4676 | NiCu30Al | - | - | - | - | - |
| | - | - | 5390A | - | - | - | - | NC22FeD | - |
| - | 3146-3 | 5391 | S-NiCr13A16MoNb | - | - | - | NC12D | - | |

COMPARISON OF WORK-PIECE (NI-BASED HEAT RESISTANT ALLOYS)

| Material Condition | Commercial designation | Hardness Brinell HB | | Nominal composition Approximate content in % | | | | | | | | | | |
|------------------------------|------------------------|---------------------|------|---|------|------|------|------|------|------|------|------|------|--------|
| | | Ann. | Aged | Ni | Cr | Co | Fe | Mo | C | Mn | Si | Al | Ti | Others |
| Ni-based Alloys | Haynes 80A | - | - | 70.9 | 20.0 | 2.0 | 3.0 | - | 0.1 | - | - | 1.5 | 2.5 | - |
| | Haynes 75 | - | - | 73.7 | 20.0 | - | 5.0 | - | 0.12 | - | - | 0.25 | 0.4 | 0.5 |
| | Haynes 263 | - | - | 51.4 | 20.0 | 20.0 | - | 6.0 | 0.06 | - | - | 1.0 | 1.5 | - |
| | Haynes 600 | - | - | 75.9 | 16.0 | - | 8.0 | - | 0.08 | - | - | - | - | - |
| | Haynes 625 | - | - | 61.4 | 21.0 | - | 5.0 | 9.0 | 0.1 | - | - | - | - | 3.5 |
| | Haynes X-750 | - | - | 74.9 | 16.0 | - | 7.0 | - | 0.08 | - | - | 0.8 | 0.25 | 1.0 |
| | Haynes 718 | - | - | 53.5 | 18.0 | - | 19.0 | 3.0 | 0.08 | - | - | 0.5 | 0.9 | 5.0 |
| | Inconel 781 | - | - | 70.0 | 16.0 | - | 8.0 | - | 0.07 | 2.25 | 0.15 | 0.1 | 3.0 | 0.2 |
| | Nimocast PE10 | - | - | 56.4 | 20.0 | - | - | 6.0 | - | - | - | - | - | 9.0 |
| | Nimocast PD16 | - | - | 43.8 | 16.5 | - | 34.0 | 3.3 | 0.06 | - | - | 1.2 | 1.2 | - |
| | Nimocast PK24 | - | - | 61.1 | 9.5 | 15.0 | - | 3.0 | 0.17 | - | - | 5.5 | 4.7 | 1.0 |
| | Nimocast 842 | - | - | 57.7 | 22.0 | 10.0 | - | 10.0 | 0.3 | - | - | - | - | - |
| | Nimocast 713 | - | - | 72.6 | 13.4 | - | - | 4.5 | 0.12 | - | - | 6.2 | 1.0 | 2.3 |
| | Nimonic 95 | - | - | 49.9 | 19.5 | - | 5.0 | - | 0.11 | - | 1.0 | 2.0 | 3.5 | - |
| | Nimonic 242 | - | - | 58.0 | 21.5 | 10.0 | - | 10.5 | - | - | - | - | - | - |
| | Nimonic PE13 | - | - | 49.0 | 21.8 | 1.5 | 18.5 | 9.0 | 0.1 | 0.5 | 0.5 | - | - | 0.6 |
| | Nimonic PK25 | - | - | 49.9 | 19.0 | 19.5 | - | 4.0 | 0.08 | 0.8 | 0.8 | 2.9 | 2.9 | - |
| | Nimonic PK31 | - | - | 53.8 | 20.0 | 14.0 | - | 4.5 | - | - | - | 0.4 | 2.3 | 5.0 |
| | Refractaloy 26 | - | - | 38.0 | 19.0 | 20.0 | 16.0 | 3.2 | 0.03 | 0.8 | 1.0 | 0.2 | 2.75 | - |
| | Rene 63 | - | - | 54.4 | 14.0 | 15.0 | 0.5 | 6.0 | 0.05 | 0.1 | 0.2 | 3.8 | 2.5 | 3.5 |
| | Rene 77 | - | - | 57.6 | 15.0 | 15.0 | 0.4 | 4.2 | 0.17 | 0.1 | 0.1 | 4.3 | 3.3 | - |
| | Rene 80 | - | - | 61.0 | 14.0 | 9.5 | - | 4.0 | 0.15 | - | - | - | .0 | 8.0 |
| | Rene 95 | - | - | 64.5 | 14.0 | 8.0 | - | 3.5 | 0.15 | - | - | - | 2.5 | 3.5 |
| | Rene 100 | - | - | 60.6 | 10.0 | 15.0 | - | 3.0 | 0.18 | - | - | 5.5 | 4.7 | - |
| | Rene 125 | - | - | 60.0 | 8.9 | 10.0 | - | 2.0 | 0.1 | - | - | 4.7 | 2.5 | 7.0 |
| | TRW 1800 | - | - | 70.0 | 13.0 | - | - | - | 0.1 | - | - | 6.0 | 0.06 | 10.5 |
| TRW V1 A | - | - | 70.5 | 6.0 | 7.5 | - | 2.0 | 0.13 | - | - | 5.4 | 1.0 | 6.3 | |
| Udimet 630 | - | - | 41.0 | 17.0 | - | 17.5 | 3.0 | 0.04 | - | - | 0.6 | 1.1 | 4.1 | |
| Udimet 700 | - | - | 54.6 | 15.0 | 17.5 | - | - | 0.1 | - | - | 4.4 | 3.4 | - | |
| Udimet 710 | - | - | 55.0 | 18.0 | 15.0 | 0.5 | 1.5 | 0.07 | - | - | 2.5 | 5.0 | 1.5 | |
| Annealed or Solution Treated | Hastalloy B | 140 | - | 64.3 | 0.6 | 1.25 | 5.5 | 28.0 | 0.1 | 0.8 | 0.7 | - | - | - |
| | Hastalloy C | 200 | - | 54.1 | 16.0 | 1.25 | 5.75 | 17.0 | 0.07 | 0.8 | 0.7 | - | - | 4.0 |
| | Hastalloy N | - | - | 72.2 | 7.0 | 0.25 | 3.0 | 16.5 | 0.06 | 0.4 | 0.25 | 0.5 | - | 0.21 |
| | Hastalloy W | - | - | 62.7 | 5.0 | 1.25 | 5.5 | 24.5 | 0.06 | 0.5 | 0.5 | - | - | - |
| | Hastalloy X | 160 | - | 47.1 | 22.0 | 1.5 | 18.5 | 9.0 | 0.1 | 0.6 | 0.6 | - | - | 0.6 |
| | Incoloy 804 | - | - | 41.0 | 29.5 | - | 26.0 | - | 0.1 | 1.0 | 0.75 | 0.25 | 0.6 | 0.5 |
| | Incoloy 825 | 180 | - | 42.0 | 21.0 | - | 30.0 | 3.0 | 0.04 | - | - | - | 1.0 | 2.0 |
| | Inconel 600 | 170 | - | 75.0 | 15.5 | - | 8.0 | - | 0.05 | - | - | - | - | - |
| | Inconel 601 | 150 | - | 60.0 | 23.0 | - | 14.0 | - | 0.05 | - | - | 1.4 | - | - |
| | Inconel 604 | 180 | - | 74.4 | 15.8 | - | 7.2 | - | 0.04 | 0.2 | 0.2 | - | - | 0.1 |
| | Inconel 625 | 180 | - | 61.0 | 21.5 | - | 2.5 | 9.0 | 0.04 | 0.5 | 0.5 | 0.4 | 0.4 | 3.6 |
| | Monel 400 | 110 | - | 64.0 | - | - | 1.5 | - | 0.12 | 1.0 | - | - | - | 32.0 |
| | Monel R-405 | 110 | - | 66.0 | - | - | 1.2 | - | 0.15 | 1.0 | - | - | - | 31.06 |
| Nimonic 75 | 170 | - | 75.0 | 19.5 | - | 4.0 | - | 0.12 | - | - | - | 0.4 | - | |

| USA | | UK | France | Germany | | Others |
|-------|-------|-----------|-----------|------------|------------------|--------|
| SAE | AMS | BS | AFNOR | Werkst.-Nr | DIN1706 | |
| - | - | - | - | - | - | - |
| - | - | - | - | - | - | - |
| - | - | - | - | - | - | - |
| - | - | - | - | - | - | - |
| - | - | - | - | - | - | - |
| - | 5542 | - | NC15TNbA | - | - | - |
| - | - | - | - | - | - | - |
| - | - | - | - | - | - | - |
| - | - | - | - | - | NiFe33Cr17Mo | - |
| - | 5397 | - | NK15CAT | LW2.4674 | - | - |
| - | - | - | - | - | - | - |
| 5391A | - | HC204 | NC13AD | 2.4670 | S-NiCr13Al6MoNb | - |
| - | - | 3146 | - | - | - | - |
| - | - | HC6,204 | - | - | - | - |
| - | - | - | - | - | - | - |
| 5536E | 5754E | - | NC22FeD | 2.4665 | NiCr22Fe18Mo | - |
| 5751A | 5753 | - | NKOD20ATU | 2.4666 | NiCr18CoMo | - |
| - | - | - | - | - | - | - |
| - | - | - | Z6NKCDT38 | - | - | - |
| - | - | - | - | - | - | - |
| - | - | - | - | - | - | - |
| - | - | - | - | - | - | - |
| - | - | - | NC14K8 | - | - | - |
| - | - | - | - | - | NiCo15Cr10MoAlTi | - |
| - | - | - | - | - | - | - |
| - | - | - | - | - | - | - |
| - | - | - | - | - | NiTa9Co8W6CrAl | - |
| - | - | - | - | 2.4668 | NiCr19NbMo | - |
| - | - | - | NCKD20AT | 2.4636 | NiCo15CrMoAlTi | - |
| - | - | - | NC18TDA | - | - | - |
| 5396A | 5596 | - | ND37FeV | 2.4800 | S-NiMo30 | N10001 |
| 5388C | 5388 | - | - | 2.4602 | NiCr17Mo17FeW | N10002 |
| 5771 | 5607 | - | - | - | - | N10003 |
| - | 5786 | - | - | - | - | N10004 |
| 5390A | 5390 | 3072-76 | NC22FeD | 2.4603 | - | N06002 |
| - | - | 3072-76 | - | - | - | - |
| - | - | - | NC21FeDU | 2.4858 | NiCr21Mo | N08825 |
| 5540 | 5580 | - | NC15Fe | 2.4816 | NiCr15Fe | N06600 |
| - | 5715 | - | - | 2.4851 | NiCr23Fe | N06601 |
| - | - | 3072-76 | - | - | - | - |
| - | 5666 | - | NC22FeDNB | 2.4856 | NiCr22Mo9Nb | N06625 |
| 4544 | 4574 | HR5,203-4 | NU30 | 2.4360 | NiCu30Fe | N04400 |
| 4674 | 7234 | - | - | - | - | N04405 |
| - | - | - | NC20T | 2.4630 | NiCr20Ti | - |

COMPARISON OF WORK-PIECE (NI-BASED HEAT RESISTANT ALLOYS)

| Material Condition | Commercial designation | Hardness Brinell HB | | Nominal composition Approximate content in % | | | | | | | | | | |
|-----------------------------------|------------------------|---------------------|------|---|------|------|------|------|------|--------|------|------|------|--------|
| | | Ann. | Aged | Ni | Cr | Co | Fe | Mo | C | Mn | Si | Al | Ti | Others |
| Aged or Solution Treated and Aged | Astrolloy | - | - | 56.9 | 15.0 | 15.0 | - | 5.25 | 0.06 | - | - | 4.0 | 3.5 | 0.05 |
| | Hastelloy R235 | - | - | 61.0 | 15.0 | 2.5 | 10.0 | 5.5 | 0.15 | 0.25 | 0.6 | 3.0 | 2.0 | - |
| | Incoloy 901 | 180 | 300 | 44.3 | 12.5 | - | 34.0 | 6.0 | 0.05 | 0.24 | 0.12 | 0.15 | 2.7 | 0.15 |
| | Incoloy 903 | - | 380 | 39.0 | - | 15.0 | 41.0 | - | 0.02 | - | - | 0.7 | 1.4 | 3.0 |
| | Inconel 700 | - | 350 | 46.0 | 15.0 | 23.5 | 0.7 | 3.75 | 0.12 | 0.10.0 | 0.3 | 3.0 | 2.2 | - |
| | Inconel 702 | - | - | 79.6 | 15.6 | - | 0.35 | - | 0.04 | 0.05 | 0.2 | 3.0 | 0.7 | - |
| | Inconel 706 | - | - | 42.0 | 16.0 | - | 40.0 | - | 0.03 | 0.2 | 0.3 | 0.4 | 1.75 | - |
| | Inconel 713 | - | - | 75.0 | 12.5 | - | - | 4.2 | 0.12 | - | - | 6.1 | 0.8 | - |
| | Inconel 718 | 180 | 380 | 52.5 | 19.0 | - | 19.0 | 3.0 | 0.04 | 0.35 | 0.35 | 0.9 | 0.9 | 0.1 |
| | Inconel 722 | - | 380 | 74.8 | 15.0 | - | 6.5 | - | 0.04 | 0.55 | 0.2 | 0.6 | 2.4 | - |
| | Inconel X-750 | - | 390 | 73.0 | 15.5 | - | 7.0 | - | 0.04 | 0.35 | 0.35 | 0.7 | 2.5 | - |
| | Inconel 751 | - | - | 70.0 | 15.5 | - | 7.0 | - | 0.1 | 1.0 | 0.5 | 1.5 | 2.6 | 0.5 |
| | Jethete M-252 | - | 320 | 55.3 | 20.0 | 10.0 | - | 10.0 | 0.15 | 0.5 | 0.5 | 1.0 | 2.6 | - |
| | MAR-M 246 | - | 270 | 59.5 | 9.0 | 10.0 | 0.2 | 2.5 | 0.15 | - | - | 5.5 | 1.5 | 11.5 |
| | MAR-M 421 | - | - | 62.3 | 15.5 | 10.0 | - | 1.7 | 0.15 | - | - | 4.3 | 1.75 | 5.3 |
| | MAR-M 432 | - | - | 52.3 | 15.5 | 20.0 | - | - | 0.15 | - | - | 2.8 | 4.3 | 5.0 |
| | Monel K-500 | 120 | 290 | 64.0 | - | - | 1.0 | - | 0.13 | 0.8 | - | 2.8 | 0.6 | 30.0 |
| | Nimocast 80 | - | - | 69.9 | 20.0 | 2.0 | 5.0 | - | 0.1 | - | - | 1.0 | 2.0 | - |
| | Nimocast 90 | - | - | 52.9 | 20.0 | 18.0 | 5.0 | - | 0.1 | - | - | 1.5 | 2.5 | - |
| | Nimonic 80A | - | 350 | 75.0 | 19.5 | - | - | - | 0.08 | - | - | 1.4 | 2.4 | - |
| | Nimonic 90 | - | 346 | 59.0 | 19.5 | 16.5 | - | - | 0.08 | - | - | 1.5 | 2.5 | - |
| | Nimonic 105 | - | 320 | 53.0 | 15.0 | 20.0 | - | 5.0 | 0.12 | - | - | 4.7 | 1.2 | - |
| | Nimonic 115 | - | 350 | 59.0 | 14.2 | 13.2 | - | 4.0 | 0.16 | - | - | 5.0 | 4.0 | - |
| | Nimonic 901 | - | 350 | 44.0 | 12.5 | - | 35.0 | 5.7 | 0.04 | - | - | 0.3 | 2.9 | - |
| | Nimonic 263/C263 | - | 275 | 51.5 | 20.2 | 20.0 | - | 6.0 | 0.06 | - | - | 0.5 | 2.0 | - |
| | Nimonic PE16 | - | 250 | 43.5 | 16.5 | - | 34.0 | 3.3 | 0.06 | - | - | 1.2 | 1.2 | - |
| | Nimonic PK33 | - | 350 | 55.9 | 18.0 | 14.0 | 0.5 | 7.0 | 0.05 | 0.25 | 0.25 | 2.1 | 2.2 | - |
| | R-235 | - | - | 63.3 | 15.0 | 1.2 | 10.0 | 5.5 | 0.12 | 0.1 | 0.3 | 2.0 | 2.5 | - |
| Rene 41 | - | - | 53.1 | 19.0 | 11.0 | 1.8 | 10.5 | 0.09 | 0.3 | 0.3 | 1.5 | 3.1 | - | |
| Udimet 500 | - | - | 51.7 | 19.0 | 19.0 | - | 4.0 | 0.4 | 0.1 | 0.1 | 3.0 | 3.0 | - | |
| Udimet 718 | 180 | 380 | 52.5 | 18.0 | - | 18.0 | 3.0 | 0.05 | - | - | 0.6 | 0.1 | 5.2 | |
| Waspaloy | - | - | 56.9 | 19.8 | 13.5 | 0.8 | 4.45 | 0.07 | 0.1 | 0.1 | 1.4 | 3.0 | - | |
| Cast or Cast and Aged | GMR 235 | - | - | 63.3 | 15.5 | - | 10.0 | 5.2 | 0.15 | 0.25 | 0.6 | 3.0 | 2.0 | 0.06 |
| | GMR 235D | - | - | 63.0 | 15.5 | - | 4.5 | 5.0 | 0.15 | 0.1 | 0.3 | 3.5 | 2.5 | 0.05 |
| | IN-100 | - | - | 61.6 | 10.0 | 15.0 | - | 3.0 | 0.18 | 1.2 | 0.5 | 5.5 | 4.75 | - |
| | Jessop G39 | 130 | - | 67.5 | 19.5 | - | 5.0 | 3.0 | 0.5 | - | - | - | - | 4.5 |
| | Jessop G64 | 220 | - | 60.7 | 11.0 | - | 2.0 | 3.0 | 0.15 | - | - | 6.0 | - | 4.0 |
| | Jessop G81 | - | 300 | 79.3 | 20.0 | 13.0 | - | - | 0.05 | - | - | 1.3 | 2.3 | - |
| | MAR-M 200 | - | - | 69.4 | 9.0 | 10.0 | - | - | 0.15 | - | - | 5.0 | 2.0 | 13.5 |

| USA | | UK | France | Germany | | Others |
|-------|-------|-----------|-----------|------------|------------------|----------|
| SAE | AMS | BS | AFNOR | Werkst.-Nr | DIN1706 | |
| - | - | - | - | - | - | - |
| - | - | - | - | - | - | - |
| - | 5660 | - | ZSNCDT42 | LW2.4662 | NiFe35Cr14MoTi | N09901 |
| - | - | - | - | - | - | - |
| - | - | - | NK27CADT | - | NiCo29Cr15MoAlTi | - |
| - | 5550 | - | - | - | - | N07702 |
| - | 5702 | - | - | - | - | N09707 |
| - | 5391 | 3146-3 | NC12AD | LW2.4670 | S-NiCr13Al6MoNb | - |
| 5383 | 5589 | HR8 | NC19FeNB | LW24668 | NiCr19Fe19NbMo | N07713 |
| - | 5541 | - | NC16FeTi | - | NiCr16FeTi | N07722 |
| 5542G | 5582 | - | NC16FeNb | 2.4669 | NiCr16FeTi | N07750 |
| - | - | - | - | - | - | N07751 |
| - | 5551 | - | - | 2.4916 | S-NiCr19Co | N07252 |
| - | - | - | - | 2.4675 | NiCo10W10Cr9AlTi | - |
| - | - | - | - | - | NiCr16Co10WAlTi | - |
| - | - | - | - | - | NiCo20Cr16WAlTi | - |
| 4676 | - | 3072-76 | - | 2.4375 | NiCu30Al | N05500 |
| - | - | 3146 | - | - | - | - |
| - | - | - | - | - | - | - |
| - | - | Hr401,601 | NC20TA | 2.4631 | NiCr20TiAk | N07080 |
| - | - | Hr2,202 | NC20ATV | 2.4632 | NiCr20Co18Ti | N07090 |
| - | - | HR3 | NCKD20ATV | 2.4634 | NiCo20C15MoAlTi | - |
| - | - | HR4 | NCK15ATD | 2.4636 | NiCo15C15MoAlTi | - |
| 5660C | 5661A | - | ZSNCDT42 | 2.4662 | NiCr15MoTi | - |
| - | - | HR10 | NCK20D | 2.4650 | NiCr15Co19MoTi | - |
| - | - | HR207 | NW11AC | - | NiFe33Cr17Mo | - |
| - | - | - | NC19KDUV | - | NiCr20Co16MoTi | - |
| - | - | - | - | - | - | - |
| - | 5399 | - | NC19KDT | 2.4973 | NiCr19Co11MoTi | N07041 |
| - | 5751 | - | NCK19DAT | 2.4983 | NiCr18Co18MoTi | N07500 |
| 5383 | 5589 | HR8 | NC19FeN | LW2.4668 | NiCr19Co19NbMo | N07718 |
| - | 5544 | - | NC20K14 | LW2.4668 | NiCr19Co19NbMo | N07001 |
| - | - | - | - | - | - | AlSi:686 |
| - | - | - | - | - | NiCr16MoAl | - |
| - | 5397 | - | - | LW2.4674 | NiCo15Cr10MoAlTi | N13100 |
| - | - | - | - | - | NiCr20MoW | - |
| - | - | - | - | - | NiCr11AlWNb | - |
| - | - | - | - | - | NiCr20Co18Ti | - |
| - | - | - | - | - | NiW13Co10Cr9AlTi | - |

COMPARISON OF WORK-PIECE (NI-BASED HEAT RESISTANT ALLOYS)

| Material Condition | Commercial designation | Hardness Brinell HB | | Nominal composition Approximate content in % | | | | | | | | | | |
|-----------------------------|------------------------|---------------------|------|---|------|------|------|------|------|------|------|-----|------|--------|
| | | Ann. | Aged | Ni | Cr | Co | Fe | Mo | C | Mn | Si | Al | Ti | Others |
| Co-based Alloys | Air Resist 13 | - | - | 1.0 | - | 79.6 | 2.5 | - | 11.0 | - | - | 3.5 | - | 4.12 |
| | Air Resist 213 | - | - | - | 19.0 | 65.8 | - | - | 4.7 | - | - | 3.5 | - | 6.68 |
| | Altemp S 816 | - | - | 20.0 | 20.0 | 47.6 | - | 4.0 | 4.0 | - | - | - | - | 0.4 |
| | FSX 414 | - | - | 10.0 | 29.0 | 52.8 | 1.0 | - | 7.0 | - | - | - | - | 0.25 |
| | Haynes 36 | - | - | 10.0 | 18.5 | 52.8 | 2.0 | - | 14.5 | 1.2 | 0.6 | - | - | 0.4 |
| | Haynes 151 | - | - | - | 20.0 | 65.6 | - | - | 12.8 | 0.5 | 0.5 | - | 0.15 | 0.47 |
| | HS 25 | - | - | 10.0 | 20.0 | 48.4 | 3.0 | - | 15.0 | 1.5 | 2.0 | - | - | 0.1 |
| | HS 30 | - | - | 16.0 | 24.0 | 51.4 | 1.0 | 6.0 | - | 0.6 | 0.6 | - | - | 0.4 |
| | HS 31 | - | - | 10.0 | 25.0 | 53.8 | 1.5 | - | 8.0 | 0.6 | 0.8 | - | - | 0.4 |
| | HS 36 | - | - | 10.0 | 18.0 | 53.1 | 2.0 | - | 15.0 | 1.5 | - | - | - | 0.4 |
| | Jessop 832 | - | - | 12.0 | 19.0 | 44.0 | 17.0 | 2.0 | - | 0.8 | 0.3 | - | - | 3.5 |
| | Jessop 834 | - | - | 12.0 | 19.0 | 42.0 | 20.0 | 2.0 | - | - | - | - | - | 6.5 |
| | Jessop 865 | - | - | 10.5 | 25.5 | 53.0 | 2.0 | - | 7.5 | 0.6 | 0.6 | - | - | 0.45 |
| | Jessop 875 | - | - | - | 21.0 | 66.0 | - | - | 11.0 | - | - | - | - | 2.45 |
| | Jessop 887 | - | - | 10.0 | 20.0 | 50.0 | 3.0 | - | 15.0 | 0.5 | 1.5 | - | - | 0.1 |
| | Jetalloy 209 | - | - | 10.0 | 20.0 | 52.0 | 1.0 | - | 15.0 | - | - | - | 2.0 | 0.02 |
| | L-251 | - | - | 10.0 | 19.0 | 56.0 | 1.0 | - | 14.0 | - | - | - | - | 0.4 |
| | L-605 | - | - | 10.0 | 20.0 | 51.0 | 1.6 | - | 15.0 | 1.5 | 0.6 | - | - | 0.1 |
| | M 203 | - | - | 25.0 | 20.0 | 38.0 | 1.6 | - | 12.0 | 0.8 | 1.0 | 0.7 | 2.0 | 1.67 |
| | M 204 | - | - | 25.0 | 18.0 | 42.0 | 1.6 | - | 12.0 | - | - | - | - | 1.27 |
| | M 205 | - | - | 25.0 | 18.0 | 40.0 | 1.6 | - | 12.0 | - | - | 2.7 | - | 1.67 |
| | MAR-M 302 | - | - | - | 21.5 | 57.0 | 0.75 | - | 10.0 | 0.1 | 0.2 | - | - | 10.0 |
| | MAR-M 322 | - | - | - | 21.5 | 60.0 | 0.75 | - | 9.0 | 0.1 | 0.1 | - | 0.75 | 7.7 |
| | MAR-M 509 | - | - | 10.0 | 23.0 | 55.0 | - | - | 7.0 | 0.05 | 0.05 | - | 0.2 | 4.6 |
| | MAR-M 905 | - | - | 20.0 | 20.0 | 55.0 | - | - | - | - | - | - | 0.5 | 7.65 |
| | MAR-M 918 | - | - | 20.0 | 20.0 | 52.0 | 0.4 | - | - | 0.1 | 0.1 | - | 0.5 | 7.65 |
| | Refractaloy 70 | - | - | 20.0 | 21.0 | 46.0 | 0.5 | 8.0 | 4.0 | - | - | - | - | 0.08 |
| | V-36 | - | - | 20.0 | 25.0 | 43.2 | 2.4 | 4.0 | 2.0 | 0.6 | 0.5 | - | - | 2.29 |
| WI-52 | - | - | 0.5 | 21.0 | 62.6 | 2.0 | - | 11.0 | 0.25 | 0.25 | - | - | 2.45 | |
| Jessop X-40 | - | - | 10.5 | 25.5 | 53.0 | 1.5 | - | 7.5 | 0.75 | 0.75 | - | - | 0.5 | |
| Jessop X-45 | - | - | 10.5 | 25.5 | 54.7 | 2.0 | - | 7.0 | - | - | - | - | 0.25 | |
| Jessop X-50 | - | - | 20.5 | 25.5 | 40.3 | 4.0 | - | 12.0 | - | - | - | - | 0.75 | |
| Jessop X-63 | - | - | 10.0 | 25.0 | 57.6 | 1.0 | 6.0 | - | - | - | - | - | 0.45 | |
| Annealed or SolutionTreated | J 1650 | - | - | 27.0 | 19.0 | 38.0 | - | - | 12.0 | - | - | - | 0.2 | |
| In Aged Condition | Haynes 25 | - | - | 10.0 | 20.0 | 49.0 | 3.0 | - | 15.0 | 0.5 | 0.5 | - | 0.1 | |
| | Haynes 188 | - | - | 22.0 | 22.0 | 38.0 | 2.5 | - | 14.0 | 0.4 | 0.4 | - | 0.1 | |
| | HS 6 | - | - | 2.5 | 28.0 | 60.5 | 3.0 | - | 5.0 | - | - | - | 1.0 | |
| | HS 21 | - | - | 3.0 | 27.0 | 62.6 | 2.0 | 5.0 | - | 0.6 | 0.6 | - | 0.25 | |
| | J1570 | - | - | 28.0 | 19.0 | 39.0 | 2.0 | - | 7.0 | - | - | - | - | |

| USA | | UK | France | Germany | | Others |
|-------|--------|--------|--------|------------|-------------------|--------|
| SAE | AMS | BS | AFNOR | Werkst.-Nr | DIN1706 | |
| - | - | - | - | - | - | - |
| - | - | - | - | - | - | - |
| - | (5534) | - | - | LW2.4989 | CoCr20Ni20W | - |
| - | - | - | - | - | - | - |
| - | - | - | - | - | CoCr19W14NiB | - |
| - | - | - | - | - | CoCr20W13 | - |
| - | 5759 | - | KC20WN | LW2.4964 | CoCr20W15Ni | - |
| 5380 | - | - | - | - | CoCr25NiW | R30030 |
| 5382 | - | 3146 | - | LW2.4670 | CoCr25NiW | R30031 |
| - | - | - | - | - | CoCr19W14NiB | - |
| - | - | - | - | - | CoCr19Fe16NiMoVNB | - |
| - | - | - | - | - | CoCr19Fe20NiMoVNB | - |
| - | - | - | - | - | CoCr25NiW | - |
| - | - | - | - | - | CoCr21W11Nb | - |
| - | - | - | - | - | CoCr20W15Ni | - |
| - | - | - | - | - | - | - |
| - | - | - | - | - | - | - |
| - | 5759 | - | - | 2.4964 | CoCr20W15Ni | R30605 |
| - | - | - | - | - | - | - |
| - | - | - | - | - | - | - |
| - | - | - | - | - | - | - |
| - | - | - | - | - | CoCrW10TaZrB | - |
| - | - | - | - | - | CoCr22W9TaZrNb | - |
| - | - | 3146-3 | - | - | CoCr24Ni10W1TaZrB | - |
| - | - | - | - | - | - | - |
| - | - | - | - | - | CoCr20Ni20Ta | - |
| - | - | - | - | - | - | - |
| - | - | - | - | - | CoCr25NiMoWNB | - |
| - | - | - | - | - | CoCr12MoW | - |
| - | 5382 | 3156-2 | - | LW2.4670 | CoCr25NiW | - |
| - | - | - | - | - | - | - |
| - | - | - | - | - | - | - |
| - | - | - | - | - | - | - |
| - | - | - | - | - | - | - |
| - | - | - | - | - | - | - |
| 5537C | 5759 | - | KC20WN | LW2.4964 | CoCr20W15Ni | - |
| - | 5772 | - | KC22WN | - | CoCr22W14Ni | - |
| - | 5373 | - | - | - | - | R30006 |
| - | 5385 | 3531 | - | - | CoCr29Mo | R30021 |
| - | - | - | - | - | - | - |

UNION MATERIALS

CUTTING TOOLS

B

ENDMILL &

ENDMILL

| | |
|--------------------------|------|
| ZAMUS STAR SERIES | B 6 |
| ZAMUS PLUS SERIES | B 18 |
| ZAMUS CLASSIC SERIES | B 21 |
| ZAMUS THUNDER SERIES | B 49 |
| ZAMUS SUS-MATE SERIES | B 55 |
| ZAMUS COPPER-MATE SERIES | B 57 |
| ZAMUS GRA-MATE SERIES | B 58 |
| ALU-WAVE SERIES | B 60 |
| STANDARD ENDMILL SERIES | B 64 |
| TECHNICAL DATA | B 70 |


















DRILL

| | |
|---------------------------|-------|
| POWER MAX DRILL SERIES | B 114 |
| POWER DRILL SERIES | B 128 |
| SOLID SPIRAL DRILL SERIES | B 136 |
| TECHNICAL DATA | B 139 |

DRILL

APPLICATION INDEX

Zamus Star

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| | ZE714  Page 13 | ZE716  Page 13 | ZSLNB  Page 14 | ZSLNS  Page 16 | | |

Zamus Plus

| | | | | |
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Zamus Classic

| | | | | | | |
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| | ZR502A  Page 29 | ZR522A  Page 30 | ZR532A  Page 30 | ZR504A  Page 31 | ZR524A  Page 31 | ZR534A  Page 32 |
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Metric Size

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Zamus Thunder

Inch Size

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Metric Size

| | | | | | |
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Zamus Sus-Mate

Metric Size



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APPLICATION INDEX

Zamus Copper-Mate

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Zamus Gra-Mate

| | | |
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Alu-Wave Series

| | | | | | | |
|-------------|---|---|---|--|---|---|
| Metric Size | AE302 | AE30(2)3 | AB302 | AR502 | AR503 | AF303 |
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Standard Endmill

| | | | | | | |
|-------------|---|---|---|--|---|---|
| Metric Size | E302 | E304 | B302 | B304 | E322 | E324 |
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Power Max Drill

| PF503 | PF505 | SF503 | SF505 | P503A(F) | PI503A(F) | PI505A(F) |
|---|---|---|---|--|---|---|
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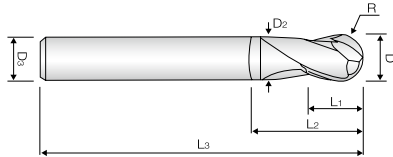
Power Drill

| PDS | PDM | PDSI | PDMI |
|---|---|---|---|
|  |  |  |  |
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Solid Spiral Drill

| SSD | SSDL |
|---|---|
|  |  |
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DA702

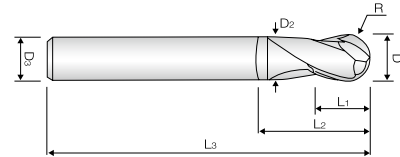


**2 FLUTE, STUB CUT LENGTH,
BALL NOSE with EXTENDED NECK**

- Designed to machine high hardened materials up to HRC 70.
- Suitable for dry cutting & high speed cutting due to newly developed raw-material and new coating.
- Excellent workpiece finishes.

| EDP. No. | D | R | L ₁ | L ₂ | L ₃ | D ₂ | D ₃ | STOCK |
|----------|------|-------|----------------|----------------|----------------|----------------|----------------|-------|
| DA702001 | 1/32 | R1/64 | 1/32 | 1/16 | 2 | .029 | 1/4 | ● |
| DA702002 | 1/16 | R1/32 | 1/16 | 1/8 | 2 | .059 | 1/4 | ● |
| DA702003 | 3/32 | R3/64 | 3/32 | 3/16 | 2 | .090 | 1/4 | ● |
| DA702004 | 1/8 | R1/16 | 1/8 | 1/4 | 2-1/2 | .121 | 1/4 | ● |
| DA702006 | 3/16 | R3/32 | 3/16 | 3/8 | 3 | .184 | 1/4 | ● |
| DA702008 | 1/4 | R1/8 | 1/4 | 1/2 | 3-1/2 | .246 | 1/4 | ● |
| DA702010 | 5/16 | R5/32 | 5/16 | 5/8 | 4 | .309 | 5/16 | ● |
| DA702012 | 3/8 | R3/16 | 3/8 | 3/4 | 4 | .371 | 3/8 | ● |
| DA702016 | 1/2 | R1/4 | 1/2 | 1 | 4-1/2 | .496 | 1/2 | ● |

DB702



**2 FLUTE, STUB CUT LENGTH,
BALL NOSE with EXTENDED NECK**

- Designed to machine high hardened materials up to HRC 70.
- Suitable for dry cutting & high speed cutting due to newly developed raw-material and new coating.
- Excellent workpiece finishes.

| EDP. No. | D | R | L ₁ | L ₂ | L ₃ | D ₂ | D ₃ | STOCK |
|-----------|-----|------|----------------|----------------|----------------|----------------|----------------|-------|
| DB702005 | 0.5 | 0.25 | 0.7 | - | 40 | - | 4 | ● |
| DB702006 | 0.6 | 0.3 | 0.9 | - | 40 | - | 4 | ● |
| DB702007 | 0.7 | 0.35 | 1.1 | - | 40 | - | 4 | ● |
| DB702008 | 0.8 | 0.4 | 1.2 | - | 40 | - | 4 | ● |
| DB702009 | 0.9 | 0.45 | 1.4 | - | 40 | - | 4 | ● |
| DB702010 | 1 | 0.5 | 1.5 | 3 | 50 | 0.95 | 6 | ● |
| DB702015 | 1.5 | 0.75 | 2 | 4 | 50 | 1.45 | 6 | ● |
| DB702020 | 2 | 1 | 2.5 | 5 | 50 | 1.9 | 6 | ● |
| DB702025 | 2.5 | 1.25 | 3 | 7 | 50 | 2.45 | 6 | ● |
| DB702030S | 3 | 1.5 | 4 | 10 | 50 | 2.9 | 6 | ● |
| DB702030 | 3 | 1.5 | 4 | 10 | 60 | 2.9 | 6 | ● |
| DB702031 | 3 | 1.5 | 4 | 10 | 70 | 2.9 | 6 | ● |
| DB702040S | 4 | 2 | 5 | 10 | 50 | 3.7 | 6 | ● |
| DB702040 | 4 | 2 | 5 | 10 | 60 | 3.7 | 6 | ● |
| DB702041 | 4 | 2 | 5 | 10 | 70 | 3.7 | 6 | ● |
| DB702050 | 5 | 2.5 | 6 | 12 | 60 | 4.7 | 6 | ● |
| DB702060 | 6 | 3 | 7 | 12 | 60 | 5.6 | 6 | ● |
| DB702061 | 6 | 3 | 7 | 12 | 90 | 5.9 | 6 | ● |
| DB702080 | 8 | 4 | 9 | 15 | 70 | 7.4 | 8 | ● |
| DB702081 | 8 | 4 | 9 | 15 | 100 | 7.9 | 8 | ● |
| DB702100 | 10 | 5 | 11 | 25 | 75 | 9.4 | 10 | ● |
| DB702101 | 10 | 5 | 11 | 25 | 100 | 9.9 | 10 | ● |
| DB702120 | 12 | 6 | 12 | 25 | 80 | 11.4 | 12 | ● |
| DB702121 | 12 | 6 | 12 | 25 | 110 | 11.9 | 12 | ● |

| Diameter | Tolerance of Radius(Inch) | Tolerance of Shank Dia. |
|-----------|---------------------------|-------------------------|
| up to 1/4 | ±0.002 | h6 |
| over 1/4 | ±0.004 | |

* For the items produced from 1st. 2010, apply to these tolerance.

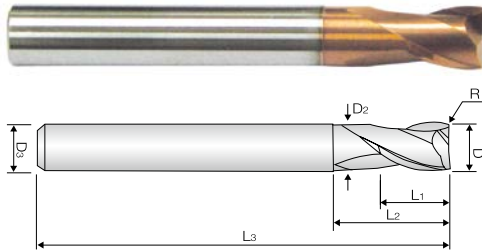
| Diameter | Tolerance of Radius(Inch) | Tolerance of Shank Dia. |
|----------|---------------------------|-------------------------|
| up to 6 | ±0.005 | h6 |
| over 6 | ±0.01 | |

* For the items produced from 1st. 2010, apply to these tolerance.

ENDMILL

DRILL

ZE702



2 FLUTE, STUB CUT LENGTH with EXTENDED NECK

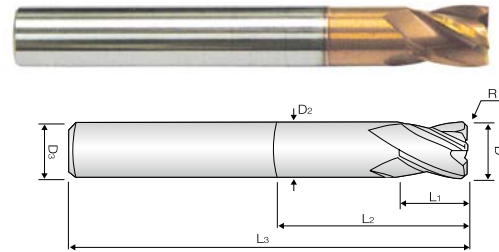
- Designed to machine high hardened materials up to HRC 70.
- Suitable for dry cutting & high speed cutting due to newly developed raw-material and new coating.
- Corner radius against chipping in high speed machining.

| EDP. No. | D | R | L ₁ | L ₂ | L ₃ | D ₂ | D ₃ | STOCK |
|------------|-----|------|----------------|----------------|----------------|----------------|----------------|-------|
| ZE702003 | 0.3 | - | 0.5 | - | 40 | - | 4 | ● |
| ZE702004 | 0.4 | - | 0.7 | - | 40 | - | 4 | ● |
| ZE702005 | 0.5 | 0.05 | 1 | - | 40 | - | 4 | ● |
| ZE702006 | 0.6 | 0.05 | 1.2 | - | 40 | - | 4 | ● |
| ZE702007 | 0.7 | 0.05 | 1.4 | - | 40 | - | 4 | ● |
| ZE702008 | 0.8 | 0.05 | 1.6 | - | 40 | - | 4 | ● |
| ZE702009 | 0.9 | 0.05 | 2 | - | 40 | - | 4 | ● |
| ZE702010S4 | 1 | 0.1 | 1.5 | - | 40 | - | 4 | ● |
| ZE702010 | 1 | 0.1 | 1.5 | - | 40 | - | 6 | ● |
| ZE7020 15 | 1.5 | 0.1 | 2.2 | - | 40 | - | 6 | ● |
| ZE702020S4 | 2 | 0.1 | 3 | 6 | 40 | 1.9 | 4 | ● |
| ZE702020 | 2 | 0.1 | 3 | 6 | 40 | 1.9 | 6 | ● |
| ZE702025 | 2.5 | 0.1 | 4 | 6 | 40 | 2.4 | 6 | ● |
| ZE702030 | 3 | 0.1 | 4 | 7 | 45 | 2.9 | 6 | ● |
| ZE702035 | 3.5 | 0.1 | 6 | 9 | 45 | 3.3 | 6 | ● |
| ZE702040 | 4 | 0.1 | 6 | 9 | 45 | 3.8 | 6 | ● |
| ZE702045 | 4.5 | 0.1 | 6 | 10 | 45 | 4.3 | 6 | ● |
| ZE702050 | 5 | 0.2 | 6 | 11 | 50 | 4.8 | 6 | ● |
| ZE702060 | 6 | 0.2 | 7 | 14 | 50 | 5.8 | 6 | ● |
| ZE702080 | 8 | 0.2 | 9 | 18 | 60 | 7.8 | 8 | ● |
| ZE702100 | 10 | 0.2 | 12 | 25 | 75 | 9.7 | 10 | ● |
| ZE702120 | 12 | 0.3 | 15 | 30 | 75 | 11.7 | 12 | ● |
| ZE702160 | 16 | 0.3 | 18 | 38 | 90 | 15.7 | 16 | ● |
| ZE702200 | 20 | 0.3 | 24 | 45 | 100 | 19.7 | 20 | ● |

| Tolerance of Mill Dia. [mm] | | Tolerance of Shank Dia. |
|-----------------------------|------------|-------------------------|
| Diameter | Tolerance | |
| up to 6 | 0 ~ -0.012 | h6 |
| over 6 | 0 ~ -0.015 | |

* For the items produced from 1st. 2010, apply to these tolerance.

ZE704



4 FLUTE, STUB CUT LENGTH with EXTENDED NECK

- Designed to machine high hardened materials up to HRC 70.
- Suitable for dry cutting & high speed cutting due to newly developed raw-material and new coating.
- Corner radius against chipping in high speed machining.

| EDP. No. | D | R | L ₁ | L ₂ | L ₃ | D ₂ | D ₃ | STOCK |
|------------|-----|-----|----------------|----------------|----------------|----------------|----------------|-------|
| ZE704010S4 | 1 | 0.1 | 1.5 | - | 40 | - | 4 | ● |
| ZE704010 | 1 | 0.1 | 1.5 | - | 40 | - | 6 | ● |
| ZE704015 | 1.5 | 0.1 | 2.2 | - | 40 | - | 6 | ● |
| ZE704020S4 | 2 | 0.1 | 3 | 6 | 40 | 1.9 | 4 | ● |
| ZE704020 | 2 | 0.1 | 3 | 6 | 40 | 1.9 | 6 | ● |
| ZE704025 | 2.5 | 0.1 | 4 | 6 | 40 | 2.4 | 6 | ● |
| ZE704030 | 3 | 0.1 | 4 | 7 | 45 | 2.9 | 6 | ● |
| ZE704035 | 3.5 | 0.1 | 5 | 9 | 45 | 3.3 | 6 | ● |
| ZE704040 | 4 | 0.1 | 5 | 9 | 45 | 3.8 | 6 | ● |
| ZE704045 | 4.5 | 0.1 | 6 | 10 | 45 | 4.3 | 6 | ● |
| ZE704050 | 5 | 0.2 | 6 | 11 | 50 | 4.8 | 6 | ● |
| ZE704060 | 6 | 0.2 | 7 | 14 | 50 | 5.8 | 6 | ● |
| ZE704080 | 8 | 0.2 | 9 | 18 | 60 | 7.8 | 8 | ● |
| ZE704100 | 10 | 0.2 | 12 | 25 | 75 | 9.7 | 10 | ● |
| ZE704120 | 12 | 0.3 | 15 | 30 | 75 | 11.7 | 12 | ● |
| ZE704160 | 16 | 0.3 | 18 | 38 | 90 | 15.7 | 16 | ● |
| ZE704200 | 20 | 0.3 | 24 | 45 | 100 | 19.7 | 20 | ● |

| Tolerance of Mill Dia. [mm] | | Tolerance of Shank Dia. |
|-----------------------------|------------|-------------------------|
| Diameter | Tolerance | |
| up to 6 | 0 ~ -0.012 | h6 |
| over 6 | 0 ~ -0.015 | |

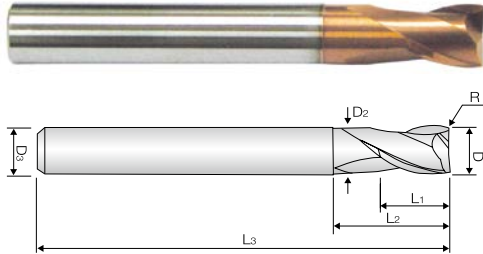
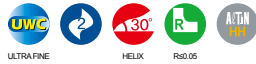
* For the items produced from 1st. 2010, apply to these tolerance.

ENDMILL
&
DRILL

ENDMILL

DRILL

ZE752

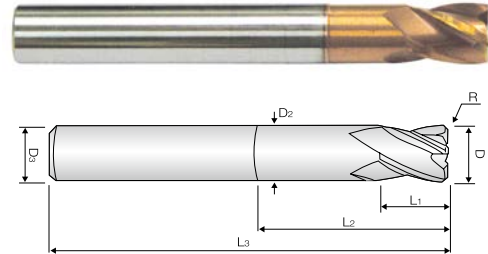
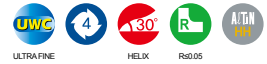


2 FLUTE, STUB CUT LENGTH with EXTENDED NECK

- Designed to machine high hardened materials up to HRC 70.
- Suitable for dry cutting & high speed cutting due to newly developed raw-material and new coating.
- Corner radius(**below 0.05**) against chipping in high speed machining.

| EDP. No. | D | R | L ₁ | L ₂ | L ₃ | D ₂ | D ₃ | STOCK |
|-------------------|-----|------|----------------|----------------|----------------|----------------|----------------|-------|
| ZE752010S4 | 1 | 0.05 | 1.5 | - | 40 | - | 4 | ● |
| ZE752010 | 1 | 0.05 | 1.5 | - | 40 | - | 6 | ● |
| ZE7520 15 | 1.5 | 0.05 | 2.2 | - | 40 | - | 6 | ● |
| ZE752020S4 | 2 | 0.05 | 3 | 6 | 40 | 1.9 | 4 | ● |
| ZE752020 | 2 | 0.05 | 3 | 6 | 40 | 1.9 | 6 | ● |
| ZE752025 | 2.5 | 0.05 | 4 | 6 | 40 | 2.4 | 6 | ● |
| ZE752030 | 3 | 0.05 | 4 | 7 | 45 | 2.9 | 6 | ● |
| ZE752035 | 3.5 | 0.05 | 6 | 9 | 45 | 3.3 | 6 | ● |
| ZE752040 | 4 | 0.05 | 6 | 9 | 45 | 3.8 | 6 | ● |
| ZE752045 | 4.5 | 0.05 | 6 | 10 | 45 | 4.3 | 6 | ● |
| ZE752050 | 5 | 0.05 | 6 | 11 | 50 | 4.8 | 6 | ● |
| ZE752060 | 6 | 0.05 | 7 | 14 | 50 | 5.8 | 6 | ● |
| ZE752080 | 8 | 0.05 | 9 | 18 | 60 | 7.8 | 8 | ● |
| ZE752100 | 10 | 0.05 | 12 | 25 | 75 | 9.7 | 10 | ● |
| ZE752120 | 12 | 0.05 | 15 | 30 | 75 | 11.7 | 12 | ● |

ZE754



4 FLUTE, STUB CUT LENGTH with EXTENDED NECK

- Designed to machine high hardened materials up to HRC 70.
- Suitable for dry cutting & high speed cutting due to newly developed raw-material and new coating.
- Corner radius(**below 0.05**) against chipping in high speed machining.

| EDP. No. | D | R | L ₁ | L ₂ | L ₃ | D ₂ | D ₃ | STOCK |
|-------------------|-----|------|----------------|----------------|----------------|----------------|----------------|-------|
| ZE754020S4 | 2 | 0.05 | 3 | 6 | 40 | 1.9 | 4 | ● |
| ZE754020 | 2 | 0.05 | 3 | 6 | 40 | 1.9 | 6 | ● |
| ZE754025 | 2.5 | 0.05 | 4 | 6 | 40 | 2.4 | 6 | ● |
| ZE754030 | 3 | 0.05 | 4 | 7 | 45 | 2.9 | 6 | ● |
| ZE754035 | 3.5 | 0.05 | 5 | 9 | 45 | 3.3 | 6 | ● |
| ZE754040 | 4 | 0.05 | 5 | 9 | 45 | 3.8 | 6 | ● |
| ZE754045 | 4.5 | 0.05 | 6 | 10 | 45 | 4.3 | 6 | ● |
| ZE754050 | 5 | 0.05 | 6 | 11 | 50 | 4.8 | 6 | ● |
| ZE754060 | 6 | 0.05 | 7 | 14 | 50 | 5.8 | 6 | ● |
| ZE754080 | 8 | 0.05 | 9 | 18 | 60 | 7.8 | 8 | ● |
| ZE754100 | 10 | 0.05 | 12 | 25 | 75 | 9.7 | 10 | ● |
| ZE754120 | 12 | 0.05 | 15 | 30 | 75 | 11.7 | 12 | ● |

ENDMILL

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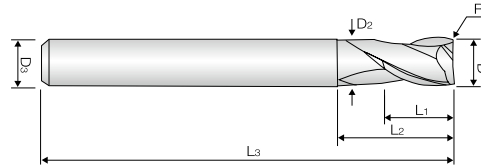
| Tolerance of Mill Dia. (mm) | | Tolerance of Shank Dia. |
|-----------------------------|------------|-------------------------|
| Diameter | Tolerance | |
| up to 6 | 0 ~ -0.012 | h6 |
| over 6 | 0 ~ -0.015 | |

* For the items produced from 1st. 2010, apply to these tolerance.

| Tolerance of Mill Dia. (mm) | | Tolerance of Shank Dia. |
|-----------------------------|------------|-------------------------|
| Diameter | Tolerance | |
| up to 6 | 0 ~ -0.012 | h6 |
| over 6 | 0 ~ -0.015 | |

* For the items produced from 1st. 2010, apply to these tolerance.

ZR702



2 FLUTE, STUB CUT LENGTH, CORNER RADIUS with EXTENDED NECK

- Applied various corner "R" and effected length.
- Suitable for dry cutting & high speed cutting due to newly developed raw-material and new coating.

| EDP. No. | D | R | L ₁ | L ₂ | L ₃ | D ₂ | D ₃ | STOCK | |
|--------------|-----|-----|----------------|----------------|----------------|----------------|----------------|-------|---|
| ZR7020100104 | 1 | 0.1 | 1.5 | 4 | 50 | 0.95 | 6 | • | |
| ZR7020100106 | | | | 6 | | | | • | |
| ZR7020100204 | | 0.2 | | 4 | | | | • | |
| ZR7020100206 | | | | 6 | | | | • | |
| ZR7020100210 | | | | 10 | | | | • | |
| ZR7020100212 | | | | 12 | | | | • | |
| ZR7020120208 | 1.2 | 0.2 | 2 | 8 | 50 | 1.15 | 6 | • | |
| ZR7020120212 | | | | 12 | | | | • | |
| ZR7020150204 | 1.5 | 0.2 | 2.5 | 4 | 50 | 1.45 | 6 | • | |
| ZR7020150206 | | | | 6 | | | | • | |
| ZR7020150208 | | | | 8 | | | | • | |
| ZR7020150210 | | | | 10 | | | | • | |
| ZR7020150215 | | | | 15 | | | | • | |
| ZR7020200108 | | | | 2 | | | | 0.1 | 3 |
| ZR7020200112 | 12 | • | | | | | | | |
| ZR7020200206 | 0.2 | 6 | • | | | | | | |
| ZR7020200209 | | 9 | • | | | | | | |
| ZR7020200216 | | 16 | • | | | | | | |
| ZR7020200306 | | 0.3 | 6 | | • | | | | |
| ZR7020200506 | | | 6 | | • | | | | |
| ZR7020200509 | | | 9 | | • | | | | |
| ZR7020200512 | 0.5 | 12 | • | | | | | | |
| ZR7020200516 | | 16 | • | | | | | | |
| ZR7020300108 | | 0.1 | 8 | | • | | | | |
| ZR7020300112 | 12 | | • | | | | | | |
| ZR7020300209 | 0.2 | | 9 | • | | | | | |
| ZR7020300309 | | | 9 | • | | | | | |
| ZR7020300312 | 0.3 | | 12 | 55 | 2.9 | 6 | • | | |
| ZR7020300314 | | | 14 | • | | | | | |
| ZR7020300509 | | 0.5 | 9 | • | | | | | |
| ZR7020300516 | 16 | | • | | | | | | |
| ZR7020300520 | 20 | | • | | | | | | |

| EDP. No. | D | R | L ₁ | L ₂ | L ₃ | D ₂ | D ₃ | STOCK |
|--------------|-----|-----|----------------|----------------|----------------|----------------|----------------|-------|
| ZR7020400212 | 4 | 0.2 | 5 | 12 | 55 | 3.8 | 6 | • |
| ZR7020400216 | | | | 16 | | | | • |
| ZR7020400220 | | | | 20 | | | | • |
| ZR7020400312 | | 0.3 | | 12 | | | | • |
| ZR7020400316 | | | | 16 | | | | • |
| ZR7020400512 | | | | 12 | | | | • |
| ZR7020400516 | 0.5 | 16 | • | | | | | |
| ZR7020400520 | | 20 | • | | | | | |
| ZR7020500318 | 5 | 0.3 | 6 | 18 | 60 | 4.8 | 6 | • |
| ZR7020600320 | 6 | 0.3 | 7 | 20 | 60 | 5.8 | 6 | • |
| ZR7020600520 | | 0.5 | | 20 | | | | • |
| ZR7020601020 | | 1 | | 20 | | | | • |
| ZR7020800325 | 8 | 0.3 | 9 | 25 | 60 | 7.8 | 8 | • |
| ZR7020800525 | | 0.5 | | 25 | | | | • |
| ZR7020801025 | | 1 | | 25 | | | | • |
| ZR7021000332 | 10 | 0.3 | 11 | 32 | 70 | 9.7 | 10 | • |
| ZR7021000532 | | 0.5 | | 32 | | | | • |
| ZR7021001032 | | 1 | | 32 | | | | • |
| ZR7021200538 | 12 | 0.5 | 12 | 38 | 80 | 11.7 | 12 | • |
| ZR7021201038 | | 1 | | 38 | | | | • |

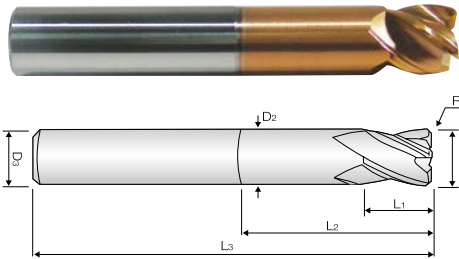
| Diameter | Tolerance of Radius [Inch] | Tolerance of Shank Dia. |
|----------|----------------------------|-------------------------|
| up to 6 | 0 ~ -0.012 | h6 |
| over 6 | 0 ~ -0.015 | |

* For the items produced from 1st. 2010, apply to these tolerance.

ENDMILL

DRILL

ZS1(2)04

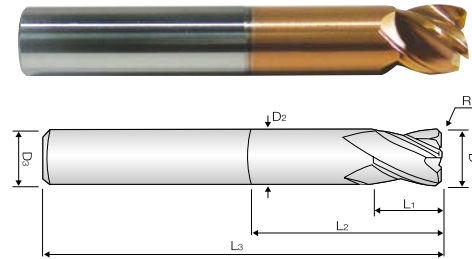
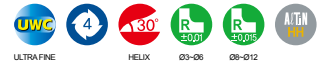


4 FLUTE, CORNER RADIUS BROKEN INDEX

- The impacting debut of new type endmill for high hardened steels up to HRC70 and high speed machining up to 200m/min.
- High precision and excellent surface due to each 4F unequal index geometry.
- Longer tool life over 50% as reducing chatter and resonance.

| EDP. No. | D | R | L ₁ | L ₂ | L ₃ | D ₂ | D ₃ | STOCK |
|----------|----|-----|----------------|----------------|----------------|----------------|----------------|-------|
| ZS104030 | 3 | - | 4 | 7 | 45 | 2.9 | 6 | ● |
| ZS204030 | 3 | 0.1 | 4 | 7 | 45 | 2.9 | 6 | ● |
| ZS104040 | 4 | - | 5 | 9 | 45 | 3.8 | 6 | ● |
| ZS204040 | 4 | 0.1 | 5 | 9 | 45 | 3.8 | 6 | ● |
| ZS104060 | 6 | - | 7 | 14 | 50 | 5.8 | 6 | ● |
| ZS204060 | 6 | 0.2 | 7 | 14 | 50 | 5.8 | 6 | ● |
| ZS104080 | 8 | - | 9 | 18 | 60 | 7.8 | 8 | ● |
| ZS204080 | 8 | 0.2 | 9 | 18 | 60 | 7.8 | 8 | ● |
| ZS104100 | 10 | - | 12 | 25 | 75 | 9.7 | 10 | ● |
| ZS204100 | 10 | 0.2 | 12 | 25 | 75 | 9.7 | 10 | ● |
| ZS104120 | 12 | - | 15 | 30 | 75 | 11.7 | 12 | ● |
| ZS204120 | 12 | 0.3 | 15 | 30 | 75 | 11.7 | 12 | ● |

ZS204



4 FLUTE, CORNER RADIUS BROKEN INDEX

- The impacting debut of new type endmill for high hardened steels up to HRC70 and high speed machining up to 200m/min.
- High precision and excellent surface due to each 4F unequal index geometry.
- Longer tool life over 50% as reducing chatter and resonance.

| EDP. No. | D | R | L ₁ | L ₂ | L ₃ | D ₂ | D ₃ | STOCK |
|--------------|----|-----|----------------|----------------|----------------|----------------|----------------|-------|
| ZS2040300309 | | 0.3 | | 9 | | | | ● |
| ZS2040300312 | 3 | 0.3 | 4 | 12 | 55 | 2.9 | 6 | ● |
| ZS2040300316 | | 0.3 | | 16 | | | | ● |
| ZS2040400312 | | 0.3 | | 12 | | | | ● |
| ZS2040400316 | | 0.3 | | 16 | | | | ● |
| ZS2040400320 | | 0.3 | | 20 | | | | ● |
| ZS2040400512 | 4 | 0.5 | 5 | 12 | 55 | 3.8 | 6 | ● |
| ZS2040400516 | | 0.5 | | 16 | | | | ● |
| ZS2040400520 | | 0.5 | | 20 | | | | ● |
| ZS2040401012 | | 1.0 | | 12 | | | | ● |
| ZS2040600520 | | 0.5 | | | | | | ● |
| ZS2040601020 | 6 | 1.0 | 7 | 20 | 60 | 5.8 | 6 | ● |
| ZS2040601520 | | 1.5 | | | | | | ● |
| ZS2040800525 | | 0.5 | | | | | | ● |
| ZS2040801025 | 8 | 1.0 | 9 | 25 | 60 | 7.8 | 8 | ● |
| ZS2040801525 | | 1.5 | | | | | | ● |
| ZS2040802025 | | 2.0 | | | | | | ● |
| ZS2041000532 | | 0.5 | | | | | | ● |
| ZS2041001032 | 10 | 1.0 | 11 | 32 | 75 | 9.7 | 10 | ● |
| ZS2041001532 | | 1.5 | | | | | | ● |
| ZS2041002032 | | 2.0 | | | | | | ● |
| ZS2041200538 | | 0.5 | | | | | | ● |
| ZS2041201038 | 12 | 1.0 | 12 | 38 | 75 | 11.7 | 12 | ● |
| ZS2041201538 | | 1.5 | | | | | | ● |
| ZS2041202038 | | 2.0 | | | | | | ● |

ENDMILL

DRILL

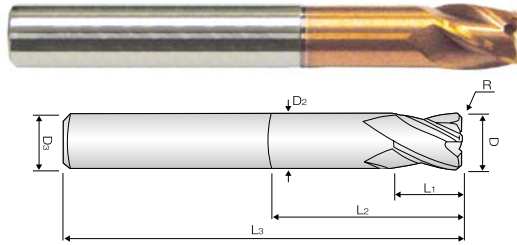
| Tolerance of Mill Dia. (mm) | Tolerance of Shank Dia. |
|-----------------------------|-------------------------|
| 0 ~ -0.02 | h6 |

* For the items produced from 1st. 2010, apply to these tolerance.

| Tolerance of Mill Dia. (mm) | Tolerance of Shank Dia. |
|-----------------------------|-------------------------|
| 0 ~ -0.02 | h6 |

* For the items produced from 1st. 2010, apply to these tolerance.

ZR704



4 FLUTE, STUB CUT LENGTH, CORNER RADIUS with EXTENDED NECK

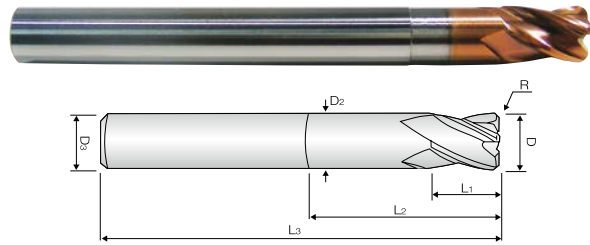
- Applied various corner "R" and effected length.
- Suitable for dry cutting & high speed cutting due to newly developed raw-material and new coating.

| EDP. No. | D | R | L ₁ | L ₂ | L ₃ | D ₂ | D ₃ | STOCK |
|--------------|----|-----|----------------|----------------|----------------|----------------|----------------|-------|
| ZR7040200208 | 2 | 0.2 | 3 | 8 | 50 | 1.9 | 6 | ● |
| ZR7040300309 | 3 | 0.3 | 4 | 9 | 55 | 2.9 | 6 | ● |
| ZR7040300312 | | 0.3 | | 12 | | | | ● |
| ZR7040300316 | | 0.3 | | 16 | | | | ● |
| ZR7040300509 | 3 | 0.5 | 4 | 9 | 55 | 2.9 | 6 | ● |
| ZR7040300516 | | 0.5 | | 16 | | | | ● |
| ZR7040300520 | | 0.5 | | 20 | | | | ● |
| ZR7040400212 | 4 | 0.2 | 5 | 12 | 55 | 3.8 | 6 | ● |
| ZR7040400312 | | 0.3 | | 12 | | | | ● |
| ZR7040400512 | | 0.5 | | 12 | | | | 55 |
| ZR7040400516 | 4 | 0.5 | 5 | 16 | 55 | 3.8 | 6 | ● |
| ZR7040400520 | | 0.5 | | 20 | | | | ● |
| ZR7040600520 | | 0.5 | | 7 | | | | 20 |
| ZR7040601020 | 6 | 1.0 | 7 | 20 | 60 | 5.8 | 6 | ● |
| ZR7040800525 | 8 | 0.5 | 9 | 25 | 60 | 7.8 | 8 | ● |
| ZR7040801025 | | 1.0 | | 25 | | | | 60 |
| ZR7041000532 | 10 | 0.5 | 11 | 32 | 70 | 9.7 | 10 | ● |
| ZR7041001032 | | 1.0 | | 32 | | | | 70 |
| ZR7041200538 | 12 | 0.5 | 12 | 38 | 80 | 11.7 | 12 | ● |
| ZR7041201038 | | 1.0 | | 38 | | | | 80 |

| Tolerance of Mill Dia. [mm] | | Tolerance of Shank Dia. |
|-----------------------------|------------|-------------------------|
| Diameter | Tolerance | |
| up to 6 | 0 ~ -0.012 | h6 |
| over 6 | 0 ~ -0.015 | |

* For the items produced from 1st. 2010, apply to these tolerance.

ZR724



4 FLUTE, STUB CUT LENGTH, CORNER RADIUS with LONG SHANK

- Applied various corner "R" and effected length.
- Suitable for dry cutting & high speed cutting due to newly developed raw-material and new coating.

| EDP. No. | D | R | L ₁ | L ₂ | L ₃ | D ₂ | D ₃ | STOCK | | | | | |
|--------------|----|-----|----------------|----------------|----------------|----------------|----------------|-------|----|-----|------|----|---|
| ZR7240600520 | 6 | 0.5 | 9 | 20 | 90 | 5.8 | 6 | ● | | | | | |
| ZR7240601020 | | 1.0 | | | | | | ● | | | | | |
| ZR7240800525 | 8 | 0.5 | 12 | 25 | 100 | 7.7 | 8 | ● | | | | | |
| ZR7240801025 | | 1.0 | | | | | | ● | | | | | |
| ZR7241000532 | 10 | 0.5 | 15 | 32 | 100 | 9.7 | 10 | ● | | | | | |
| ZR7241001032 | | 1.0 | | | | | | 15 | 32 | 100 | 9.7 | 10 | ● |
| ZR7241002032 | | 2.0 | | | | | | ● | | | | | |
| ZR7241200538 | 12 | 0.5 | 18 | 38 | 110 | 11.7 | 12 | ● | | | | | |
| ZR7241201038 | | 1.0 | | | | | | 18 | 38 | 110 | 11.7 | 12 | ● |
| ZR7241202038 | | 2.0 | | | | | | ● | | | | | |

| Tolerance of Mill Dia. [mm] | | Tolerance of Shank Dia. |
|-----------------------------|------------|-------------------------|
| Diameter | Tolerance | |
| up to 6 | 0 ~ -0.012 | h6 |
| over 6 | 0 ~ -0.015 | |

* For the items produced from 1st. 2010, apply to these tolerance.

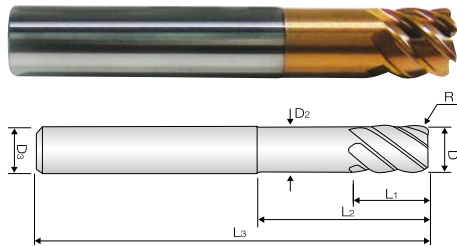
ENDMILL

DRILL

ZAMUS STAR SERIES

METRIC

ZR706



6 FLUTE, 45° HELIX STUB CUT LENGTH, CORNER RADIUS with EXTENDED NECK

- Applied various corner "R" and effected length.
- Suitable for dry cutting & high speed cutting due to newly developed raw-material and new coating.

| EDP. No. | D | R | L ₁ | L ₂ | L ₃ | D ₂ | D ₃ | STOCK |
|--------------|----|-----|----------------|----------------|----------------|----------------|----------------|-------|
| ZR7060600314 | 6 | 0.3 | 6 | 14 | 50 | 5.8 | 6 | ● |
| ZR7060600514 | 6 | 0.5 | 6 | 14 | 50 | 5.8 | 6 | ● |
| ZR7060800524 | 8 | 0.5 | 8 | 24 | 60 | 7.8 | 8 | ● |
| ZR7060801024 | 8 | 1 | 8 | 24 | 60 | 7.8 | 8 | ● |
| ZR7061000530 | 10 | 0.5 | 10 | 30 | 70 | 9.8 | 10 | ● |
| ZR7061001030 | 10 | 1 | 10 | 30 | 70 | 9.8 | 10 | ● |
| ZR7061200530 | 12 | 0.5 | 12 | 30 | 75 | 11.8 | 12 | ● |
| ZR7061201030 | 12 | 1 | 12 | 30 | 75 | 11.8 | 12 | ● |

ZE712



2 FLUTE, 35° HELIX REGULAR LENGTH

- Designed to machine high hardened materials up to HRc 70.
- Suitable for dry cutting & high speed cutting due to newly developed raw-material and new coating.

| EDP. No. | Dia. | C.L | OAL | SH.Dia. | STOCK |
|----------|------|-----|-----|---------|-------|
| ZE712010 | 1 | 3 | 40 | 6 | ● |
| ZE712015 | 1.5 | 4 | 40 | 6 | ● |
| ZE712020 | 2 | 5 | 40 | 6 | ● |
| ZE712025 | 2.5 | 6 | 40 | 6 | ● |
| ZE712030 | 3 | 8 | 45 | 6 | ● |
| ZE712035 | 3.5 | 10 | 45 | 6 | ● |
| ZE712040 | 4 | 10 | 45 | 6 | ● |
| ZE712045 | 4.5 | 11 | 45 | 6 | ● |
| ZE712050 | 5 | 13 | 50 | 6 | ● |
| ZE712055 | 5.5 | 13 | 50 | 6 | ● |
| ZE712060 | 6 | 13 | 50 | 6 | ● |
| ZE712065 | 6.5 | 16 | 60 | 8 | ● |
| ZE712070 | 7 | 18 | 60 | 8 | ● |
| ZE712080 | 8 | 19 | 60 | 8 | ● |
| ZE712100 | 10 | 22 | 70 | 10 | ● |
| ZE712120 | 12 | 26 | 75 | 12 | ● |

ENDMILL

DRILL

| Tolerance of Mill Dia. [mm] | Tolerance of Shank Dia. |
|-----------------------------|-------------------------|
| 0 ~ -0.02 | h6 |

* For the items produced from 1st. 2010, apply to these tolerance.

| Tolerance of Mill Dia. [mm] | Tolerance of Shank Dia. |
|-----------------------------|-------------------------|
| 0 ~ -0.02 | h6 |

* For the items produced from 1st. 2010, apply to these tolerance.

ZE714



4 FLUTE, 45° HELIX REGULAR LENGTH

- Designed to machine high hardened materials up to HRC 70.
- Suitable for dry cutting & high speed cutting due to newly developed raw-material and new coating.

| EDP. No. | Dia. | C.L | OAL | SH.Dia. | STOCK |
|----------|------|-----|-----|---------|-------|
| ZE714020 | 2 | 5 | 40 | 6 | ● |
| ZE714025 | 2.5 | 6 | 40 | 6 | ● |
| ZE714030 | 3 | 8 | 45 | 6 | ● |
| ZE714040 | 4 | 10 | 45 | 6 | ● |
| ZE714050 | 5 | 13 | 50 | 6 | ● |
| ZE714060 | 6 | 13 | 50 | 6 | ● |
| ZE714080 | 8 | 19 | 60 | 8 | ● |
| ZE714100 | 10 | 22 | 70 | 10 | ● |
| ZE714120 | 12 | 26 | 75 | 12 | ● |

ZE716



6 FLUTE, 50° HELIX REGULAR LENGTH

- Designed to machine high hardened materials up to HRC 70.
- Suitable for dry cutting & high speed cutting due to newly developed raw-material and new coating.

| EDP. No. | Dia. | C.L | OAL | SH.Dia. | STOCK |
|----------|------|-----|-----|---------|-------|
| ZE716060 | 6 | 13 | 50 | 6 | ● |
| ZE716080 | 8 | 18 | 60 | 8 | ● |
| ZE716100 | 10 | 22 | 70 | 10 | ● |
| ZE716120 | 12 | 26 | 75 | 12 | ● |
| ZE716160 | 16 | 35 | 90 | 16 | ● |
| ZE716200 | 20 | 44 | 100 | 20 | ● |

ENDMILL

DRILL

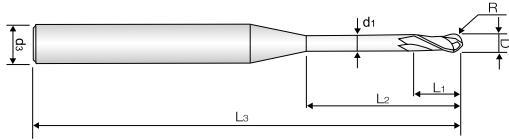
| Tolerance of Mill Dia. (mm) | Tolerance of Shank Dia. |
|-----------------------------|-------------------------|
| 0 ~ -0.02 | h6 |

* For the items produced from 1st. 2010, apply to these tolerance.

| Tolerance of Mill Dia. (mm) | Tolerance of Shank Dia. |
|-----------------------------|-------------------------|
| 0 ~ -0.02 | h6 |

* For the items produced from 1st. 2010, apply to these tolerance.

ZSLNB



For RIB PROCESSING

- Designed to machine high hardened materials up to HRc 70.
- Suitable for dry cutting & high speed cutting due to newly developed raw-material and new coating.
- Long neck design for deep machining near walls.

| EDP. No. | Dimension (mm) | | | | | | | STOCK |
|---------------|----------------|-----|----------------|----------------|----------------|----------------|----------------|-------|
| | R | D | L ₁ | L ₂ | L ₃ | D ₂ | D ₃ | |
| ZSLNB2001-0.2 | | | 0.2 | | | | | ● |
| ZSLNB2001-0.3 | 0.05 | 0.1 | 0.3 | 0.08 | 0.08 | 45 | 4 | ● |
| ZSLNB2001-0.5 | | | 0.5 | | | | | ● |
| ZSLNB2002-0.5 | | | 0.5 | | | | | ● |
| ZSLNB2002-1 | | | 1 | | | | | ● |
| ZSLNB2002-1.5 | | | 1.5 | | | | | ● |
| ZSLNB2002-2 | 0.1 | 0.2 | 2. | 0.15 | 0.17 | 50 | 4 | ● |
| ZSLNB2002-2.5 | | | 2.5 | | | | | ● |
| ZSLNB2002-3.0 | | | 3 | | | | | ● |
| ZSLNB2003-1 | | | 1 | | | | | ● |
| ZSLNB2003-1.5 | | | 1.5 | | | | | ● |
| ZSLNB2003-2 | 0.15 | 0.3 | 2 | 0.25 | 0.27 | 50 | 4 | ● |
| ZSLNB2003-2.5 | | | 2.5 | | | | | ● |
| ZSLNB2003-3 | | | 3 | | | | | ● |
| ZSLNB2004-1 | | | 1 | | | | | ● |
| ZSLNB2004-1.5 | | | 1.5 | | | | | ● |
| ZSLNB2004-2 | | | 2 | | | | | ● |
| ZSLNB2004-2.5 | | | 2.5 | | | | | ● |
| ZSLNB2004-3 | 0.2 | 0.4 | 3 | 0.3 | 0.37 | 50 | 4 | ● |
| ZSLNB2004-3.5 | | | 3.5 | | | | | ● |
| ZSLNB2004-4 | | | 4 | | | | | ● |
| ZSLNB2004-4.5 | | | 4.5 | | | | | ● |
| ZSLNB2005-1 | | | 1 | | | | | ● |
| ZSLNB2005-2 | | | 2 | | | | | ● |
| ZSLNB2005-3 | | | 3 | | | | | ● |
| ZSLNB2005-4 | 0.25 | 0.5 | 4 | 0.35 | 0.47 | 50 | 4 | ● |
| ZSLNB2005-5 | | | 5 | | | | | ● |
| ZSLNB2005-6 | | | 6 | | | | | ● |
| ZSLNB2005-7 | | | 8 | | | | | ● |
| ZSLNB2006-1 | | | 1 | | | | | ● |
| ZSLNB2006-2 | | | 2 | | | | | ● |
| ZSLNB2006-3 | | | 3 | | | | | ● |
| ZSLNB2006-4 | | | 4 | | | | | ● |
| ZSLNB2006-5 | | | 5 | | | | | ● |
| ZSLNB2006-6 | 0.3 | 0.6 | 6 | 0.4 | 0.57 | 50 | 4 | ● |
| ZSLNB2006-7 | | | 7 | | | | | ● |
| ZSLNB2006-8 | | | 8 | | | | | ● |
| ZSLNB2006-9 | | | 9 | | | | | ● |
| ZSLNB2006-10 | | | 10 | | | | | ● |
| ZSLNB2006-12 | | | 12 | | | | | ● |
| ZSLNB2008-2 | | | 2 | | | | | ● |
| ZSLNB2008-4 | | | 4 | | | | | ● |
| ZSLNB2008-5 | 0.4 | 0.8 | 5 | 0.5 | 0.77 | 50 | 4 | ● |
| ZSLNB2008-6 | | | 6 | | | | | ● |
| ZSLNB2008-8 | | | 8 | | | | | ● |
| ZSLNB2008-10 | | | 10 | | | | | ● |

ENDMILL

DRILL

| EDP. No. | Dimension(mm) | | | | | | | STOCK |
|--------------|---------------|-----|----------------|----------------|----------------|----------------|----------------|-------|
| | R | D | L ₁ | L ₂ | L ₃ | D ₂ | D ₃ | |
| ZSLNB2010-2 | | | 2 | | | | | ● |
| ZSLNB2010-3 | | | 3 | | | | | ● |
| ZSLNB2010-4 | | | 4 | | | | | ● |
| ZSLNB2010-5 | | | 5 | | | | | ● |
| ZSLNB2010-6 | | | 6 | | | 50 | | ● |
| ZSLNB2010-7 | | | 7 | | | | | ● |
| ZSLNB2010-8 | 0.5 | 1 | 8 | 0.8 | 0.96 | | 4 | ● |
| ZSLNB2010-9 | | | 9 | | | | | ● |
| ZSLNB2010-10 | | | 10 | | | | | ● |
| ZSLNB2010-12 | | | 12 | | | 55 | | ● |
| ZSLNB2010-14 | | | 14 | | | | | ● |
| ZSLNB2010-16 | | | 16 | | | | | ● |
| ZSLNB2010-18 | | | 18 | | | 60 | | ● |
| ZSLNB2010-20 | | | 20 | | | | | ● |
| ZSLNB2012-8 | 0.6 | 1.2 | 8 | 1.1 | 1.15 | 50 | 4 | ● |
| ZSLNB2012-12 | | | 12 | | | 55 | | ● |
| ZSLNB2014-8 | | | 8 | | | 50 | | ● |
| ZSLNB2014-12 | 0.7 | 1.4 | 12 | 1.3 | 1.34 | 55 | 4 | ● |
| ZSLNB2014-16 | | | 16 | | | | | ● |
| ZSLNB2015-4 | | | 4 | | | | | ● |
| ZSLNB2015-6 | | | 6 | | | 50 | | ● |
| ZSLNB2015-8 | | | 8 | | | | | ● |
| ZSLNB2015-10 | 0.75 | 1.5 | 10 | 1.35 | 1.44 | | 4 | ● |
| ZSLNB2015-12 | | | 12 | | | 55 | | ● |
| ZSLNB2015-16 | | | 16 | | | | | ● |
| ZSLNB2015-20 | | | 20 | | | 60 | | ● |
| ZSLNB2016-8 | | | 8 | | | 50 | | ● |
| ZSLNB2016-12 | 0.8 | 1.6 | 12 | 1.4 | 1.54 | 55 | 4 | ● |
| ZSLNB2016-16 | | | 16 | | | | | ● |
| ZSLNB2016-20 | | | 20 | | | 60 | | ● |
| ZSLNB2018-8 | | | 8 | | | 50 | | ● |
| ZSLNB2018-12 | 0.9 | 1.8 | 12 | 1.6 | 1.73 | 55 | 4 | ● |
| ZSLNB2018-16 | | | 16 | | | | | ● |
| ZSLNB2018-20 | | | 20 | | | 60 | | ● |

| EDP. No. | Dimension(mm) | | | | | | | STOCK |
|--------------|---------------|---|----------------|----------------|----------------|----------------|----------------|-------|
| | R | D | L ₁ | L ₂ | L ₃ | D ₂ | D ₃ | |
| ZSLNB2020-3 | | | 3 | | | | | ● |
| ZSLNB2020-4 | | | 4 | | | | | ● |
| ZSLNB2020-6 | | | 6 | | | 50 | | ● |
| ZSLNB2020-8 | | | 8 | | | | | ● |
| ZSLNB2020-10 | | | 10 | | | | | ● |
| ZSLNB2020-12 | | | 12 | | | | | ● |
| ZSLNB2020-14 | | | 14 | | | 55 | | ● |
| ZSLNB2020-16 | 1 | 2 | 16 | 1.7 | 1.92 | | 4 | ● |
| ZSLNB2020-18 | | | 18 | | | 60 | | ● |
| ZSLNB2020-20 | | | 20 | | | | | ● |
| ZSLNB2020-22 | | | 22 | | | 60 | | ● |
| ZSLNB2020-25 | | | 25 | | | 65 | | ● |
| ZSLNB2020-30 | | | 30 | | | 70 | | ● |
| ZSLNB2020-35 | | | 35 | | | 75 | | ● |
| ZSLNB2020-40 | | | 40 | | | 80 | | ● |
| ZSLNB2030-8 | | | 8 | | | 55 | | ● |
| ZSLNB2030-10 | | | 10 | | | | | ● |
| ZSLNB2030-13 | | | 13 | | | 60 | | ● |
| ZSLNB2030-16 | 1.5 | 3 | 16 | 2.5 | 2.88 | | 6 | ● |
| ZSLNB2030-20 | | | 20 | | | 65 | | ● |
| ZSLNB2030-25 | | | 25 | | | 70 | | ● |
| ZSLNB2030-30 | | | 30 | | | 75 | | ● |
| ZSLNB2030-35 | | | 35 | | | 80 | | ● |
| ZSLNB2040-10 | | | 10 | | | 55 | | ● |
| ZSLNB2040-13 | | | 13 | | | 60 | | ● |
| ZSLNB2040-16 | | | 16 | | | | | ● |
| ZSLNB2040-20 | | | 20 | | | 65 | | ● |
| ZSLNB2040-25 | 2 | 4 | 25 | 3 | 3.9 | 70 | 6 | ● |
| ZSLNB2040-30 | | | 30 | | | 75 | | ● |
| ZSLNB2040-35 | | | 35 | | | | | ● |
| ZSLNB2040-40 | | | 40 | | | 80 | | ● |
| ZSLNB2040-45 | | | 45 | | | 90 | | ● |
| ZSLNB2040-50 | | | 50 | | | 100 | | ● |
| ZSLNB2050-20 | | | 20 | | | 65 | | ● |
| ZSLNB2050-25 | 2.5 | 5 | 25 | 3.5 | 4.9 | 70 | 6 | ● |
| ZSLNB2050-30 | | | 30 | | | 75 | | ● |
| ZSLNB2050-35 | | | 35 | | | 80 | | ● |

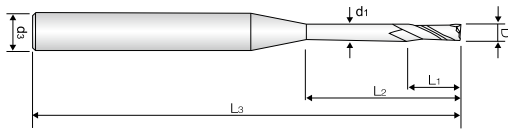
ENDMILL

DRILL

| Tolerance of Mill Dia. (mm) | Tolerance of Shank Dia. |
|-----------------------------|-------------------------|
| ±0.005 | h5 |

* For the items produced from 1st. 2010, apply to these tolerance.

ZSLNS



For RIB PROCESSING

- Designed to machine high hardened materials up to HRC 70.
- Suitable for dry cutting & high speed cutting due to newly developed raw-material and new coating.
- Long neck design for deep machining near walls.

| EDP. No. | Dimension (mm) | | | | | | STOCK |
|---------------|----------------|----------------|----------------|----------------|----------------|----------------|-------|
| | D | L ₂ | L ₁ | d ₁ | L ₃ | d ₃ | |
| ZSLNS2001-1.5 | | 0.3 | | | | | • |
| ZSLNS2001-0.5 | 0.1 | 0.5 | 0.15 | 0.08 | 45 | 4 | • |
| ZSLNS2001-1 | | 1 | | | | | • |
| ZSLNS2002-0.5 | | 0.5 | | | | | • |
| ZSLNS2002-1 | 0.2 | 1 | 0.3 | 0.17 | 50 | 4 | • |
| ZSLNS2002-1.5 | | 1.5 | | | | | • |
| ZSLNS2003-1 | | 1 | | | | | • |
| ZSLNS2003-1.5 | | 1.5 | | | | | • |
| ZSLNS2003-2 | 0.3 | 2 | 0.45 | 0.27 | 50 | 4 | • |
| ZSLNS2003-2.5 | | 2.5 | | | | | • |
| ZSLNS2003-3 | | 3 | | | | | • |
| ZSLNS2004-1 | | 1 | | | | | • |
| ZSLNS2004-1.5 | | 1.5 | | | | | • |
| ZSLNS2004-2 | | 2 | | | | | • |
| ZSLNS2004-2.5 | | 2.5 | | | | | • |
| ZSLNS2004-3 | 0.4 | 3 | 0.6 | 0.37 | 50 | 4 | • |
| ZSLNS2004-3.5 | | 3.5 | | | | | • |
| ZSLNS2004-4 | | 4 | | | | | • |
| ZSLNS2004-5 | | 5 | | | | | • |
| ZSLNS2004-6 | | 6 | | | | | • |
| ZSLNS2005-1 | | 1 | | | | | • |
| ZSLNS2005-1.5 | | 1.5 | | | | | • |
| ZSLNS2005-2 | | 2 | | | | | • |
| ZSLNS2005-2.5 | | 2.5 | | | | | • |
| ZSLNS2005-3 | 0.5 | 3 | 0.75 | 0.47 | 50 | 4 | • |
| ZSLNS2005-4 | | 4 | | | | | • |
| ZSLNS2005-5 | | 5 | | | | | • |
| ZSLNS2005-6 | | 6 | | | | | • |
| ZSLNS2005-8 | | 8 | | | | | • |
| ZSLNS2006-2 | | 2 | | | | | • |
| ZSLNS2006-4 | | 4 | | | | | • |
| ZSLNS2006-6 | 0.6 | 6 | 0.9 | 0.57 | 50 | 4 | • |
| ZSLNS2006-8 | | 8 | | | | | • |
| ZSLNS2006-10 | | 10 | | | | | • |
| ZSLNS2007-2 | | 2 | | | | | • |
| ZSLNS2007-4 | | 4 | | | | | • |
| ZSLNS2007-6 | 0.7 | 6 | 1.05 | 0.67 | 50 | 4 | • |
| ZSLNS2007-8 | | 8 | | | | | • |
| ZSLNS2007-10 | | 10 | | | | | • |
| ZSLNS2008-4 | | 4 | | | | | • |
| ZSLNS2008-6 | | 6 | | | 50 | | • |
| ZSLNS2008-8 | 0.8 | 8 | 1.2 | 0.77 | | 4 | • |
| ZSLNS2008-10 | | 10 | | | | | • |
| ZSLNS2008-12 | | 12 | | | 55 | | • |

ENDMILL

DRILL

| EDP. No. | Dimension(mm) | | | | | | STOCK |
|--------------|---------------|----------------|----------------|----------------|----------------|----------------|-------|
| | D | L ₂ | L ₁ | d ₁ | L ₃ | d ₃ | |
| ZSLNS2009-6 | 0.9 | 6 | 1.35 | 0.86 | 50 | 4 | ● |
| ZSLNS2009-8 | | 8 | | | | | ● |
| ZSLNS2009-10 | | 10 | | | | | ● |
| ZSLNS2009-12 | | 12 | | | | | ● |
| ZSLNS2010-2 | 1 | 2 | 1.5 | 0.96 | 50 | 4 | ● |
| ZSLNS2010-4 | | 4 | | | | | ● |
| ZSLNS2010-6 | | 6 | | | | | ● |
| ZSLNS2010-8 | | 8 | | | | | ● |
| ZSLNS2010-10 | | 10 | | | | | ● |
| ZSLNS2010-12 | | 12 | | | | | ● |
| ZSLNS2010-14 | | 14 | | | | | ● |
| ZSLNS2010-16 | | 16 | | | | | ● |
| ZSLNS2012-6 | 1.2 | 6 | 1.8 | 1.15 | 50 | 4 | ● |
| ZSLNS2012-8 | | 8 | | | | | ● |
| ZSLNS2012-10 | | 10 | | | | | ● |
| ZSLNS2012-12 | | 12 | | | | | ● |
| ZSLNS2012-16 | | 16 | | | | | ● |
| ZSLNS2014-6 | 1.4 | 6 | 2.1 | 1.34 | 50 | 4 | ● |
| ZSLNS2014-8 | | 8 | | | | | ● |
| ZSLNS2014-10 | | 10 | | | | | ● |
| ZSLNS2014-12 | | 12 | | | | | ● |
| ZSLNS2014-14 | | 14 | | | | | ● |
| ZSLNS2014-16 | | 16 | | | | | ● |
| ZSLNS2015-4 | 1.5 | 4 | 2.25 | 1.44 | 50 | 4 | ● |
| ZSLNS2015-6 | | 6 | | | | | ● |
| ZSLNS2015-8 | | 8 | | | | | ● |
| ZSLNS2015-10 | | 10 | | | | | ● |
| ZSLNS2015-12 | | 12 | | | | | ● |
| ZSLNS2015-14 | | 14 | | | ● | | |
| ZSLNS2015-16 | | 16 | | | ● | | |
| ZSLNS2015-18 | | 18 | | | ● | | |
| ZSLNS2015-20 | | 20 | | | ● | | |
| ZSLNS2015-25 | | 25 | | | ● | | |
| ZSLNS2016-6 | | 1.6 | | | 6 | | 2.4 |
| ZSLNS2016-8 | 8 | | ● | | | | |
| ZSLNS2016-10 | 10 | | ● | | | | |
| ZSLNS2016-12 | 12 | | ● | | | | |
| ZSLNS2016-14 | 14 | | ● | | | | |
| ZSLNS2016-16 | 16 | | ● | | | | |
| ZSLNS2016-18 | 18 | | ● | | | | |
| ZSLNS2016-20 | 20 | | ● | | | | |

| EDP. No. | Dimension(mm) | | | | | | STOCK |
|--------------|---------------|----------------|----------------|----------------|----------------|----------------|-------|
| | D | L ₂ | L ₁ | d ₁ | L ₃ | d ₃ | |
| ZSLNS2018-6 | 1.8 | 6 | 2.7 | 1.73 | 50 | 4 | ● |
| ZSLNS2018-8 | | 8 | | | | | ● |
| ZSLNS2018-10 | | 10 | | | | | ● |
| ZSLNS2018-12 | | 12 | | | | | ● |
| ZSLNS2018-14 | | 14 | | | ● | | |
| ZSLNS2018-16 | | 16 | | | ● | | |
| ZSLNS2018-18 | | 18 | | | ● | | |
| ZSLNS2018-20 | | 20 | | | ● | | |
| ZSLNS2020-4 | 2 | 4 | 3 | 1.92 | 50 | 4 | ● |
| ZSLNS2020-6 | | 6 | | | | | ● |
| ZSLNS2020-8 | | 8 | | | | | ● |
| ZSLNS2020-10 | | 10 | | | | | ● |
| ZSLNS2020-12 | | 12 | | | | | ● |
| ZSLNS2020-14 | | 14 | | | ● | | |
| ZSLNS2020-16 | | 16 | | | ● | | |
| ZSLNS2020-18 | | 18 | | | ● | | |
| ZSLNS2020-20 | | 20 | | | ● | | |
| ZSLNS2020-25 | | 25 | | | ● | | |
| ZSLNS2020-30 | 30 | ● | | | | | |
| ZSLNS2025-8 | 2.5 | 8 | 3.75 | 2.4 | 50 | 4 | ● |
| ZSLNS2025-12 | | 12 | | | | | ● |
| ZSLNS2025-16 | | 16 | | | | | ● |
| ZSLNS2025-20 | | 20 | | | | | ● |
| ZSLNS2030-8 | 3 | 8 | 4.5 | 2.88 | 55 | 6 | ● |
| ZSLNS2030-12 | | 12 | | | | | ● |
| ZSLNS2030-16 | | 16 | | | | | ● |
| ZSLNS2030-20 | | 20 | | | ● | | |
| ZSLNS2030-25 | | 25 | | | ● | | |
| ZSLNS2030-30 | | 30 | | | ● | | |
| ZSLNS2030-40 | | 40 | | | ● | | |
| ZSLNS2040-12 | 4 | 12 | 6 | 3.85 | 60 | 6 | ● |
| ZSLNS2040-16 | | 16 | | | | | ● |
| ZSLNS2040-20 | | 20 | | | | | ● |
| ZSLNS2040-25 | | 25 | | | | | ● |
| ZSLNS2040-30 | | 30 | | | ● | | |
| ZSLNS2040-35 | | 35 | | | ● | | |
| ZSLNS2040-40 | | 40 | | | ● | | |

Data → P100

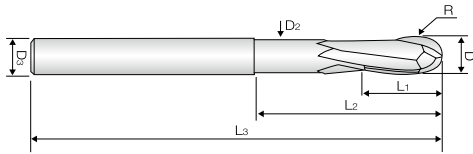
| Tolerance of Mill Dia. (mm) | Tolerance of Shank Dia. |
|-----------------------------|-------------------------|
| 0 ~ -0.012 | h5 |
| 0 ~ -0.015 | h5 |

* For the items produced from 1st. 2010, apply to these tolerance.

ENDMILL

DRILL

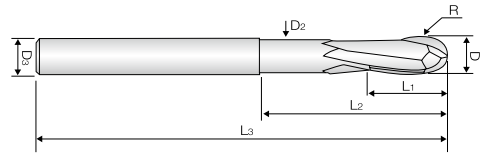
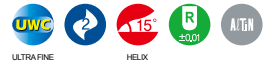
DA412



**2 FLUTE, 15° HELIX STUB CUT LENGTH,
BALL NOSE with EXTENDED NECK**

- Designed for high hardened materials up to HRc 62.
- Suitable for high speed machining.

DB412



**2 FLUTE, 15° HELIX STUB CUT LENGTH,
BALL NOSE with EXTENDED NECK**

- Designed for high hardened materials up to HRc 62.
- Suitable for high speed machining.

| EDP. No. | D | R | L ₁ | L ₂ | L ₃ | D ₂ | D ₃ | STOCK |
|----------|------|--------|----------------|----------------|----------------|----------------|----------------|-------|
| DA412001 | 1/32 | R 1/64 | 1/32 | 1/16 | 2 | .029 | 1/4 | ● |
| DA412002 | 1/16 | R 1/32 | 1/16 | 1/8 | 2 | .059 | 1/4 | ● |
| DA412003 | 3/32 | R 3/64 | 3/32 | 3/16 | 2 | .090 | 1/4 | ● |
| DA412004 | 1/8 | R 1/16 | 1/8 | 1/4 | 2-1/2 | .121 | 1/4 | ● |
| DA412006 | 3/16 | R 3/32 | 3/16 | 3/8 | 3 | .184 | 1/4 | ● |
| DA412008 | 1/4 | R 1/8 | 1/4 | 1/2 | 3-1/2 | .246 | 1/4 | ● |
| DA412010 | 5/16 | R 5/32 | 5/16 | 5/8 | 4 | .309 | 5/16 | ● |
| DA412012 | 3/8 | R 3/16 | 3/8 | 3/4 | 4 | .371 | 3/8 | ● |
| DA412016 | 1/2 | R 1/4 | 1/2 | 1 | 4-1/2 | .496 | 1/2 | ● |

| EDP. No. | D | R | L ₁ | L ₂ | L ₃ | D ₂ | D ₃ | STOCK |
|-----------|-----|------|----------------|----------------|----------------|----------------|----------------|-------|
| DB412010 | 1 | 0.5 | 1 | 3 | 50 | 4 | 0.95 | ● |
| DB412015 | 1.5 | 0.75 | 2 | 5 | 50 | 4 | 1.4 | ● |
| DB412020 | 2 | 1 | 3 | 6 | 50 | 6 | 1.9 | ● |
| DB412030S | 3 | 1.5 | 4 | 8 | 50 | 4 | 2.9 | ● |
| DB412030 | 3 | 1.5 | 4 | 8 | 50 | 6 | 2.9 | ● |
| DB412030L | 3 | 1.5 | 4 | 8 | 75 | 6 | 2.9 | ● |
| DB412040S | 4 | 2 | 5 | 10 | 50 | 4 | 3.9 | ● |
| DB412040 | 4 | 2 | 5 | 10 | 50 | 6 | 3.9 | ● |
| DB412040L | 4 | 2 | 5 | 10 | 75 | 6 | 3.9 | ● |
| DB412050 | 5 | 2.5 | 5 | 10 | 50 | 6 | 4.9 | ● |
| DB412060S | 6 | 3 | 6 | 12 | 50 | 6 | 5.9 | ● |
| DB412060 | 6 | 3 | 6 | 12 | 75 | 6 | 5.9 | ● |
| DB412060L | 6 | 3 | 6 | 16 | 100 | 6 | 5.9 | ● |
| DB412080 | 8 | 4 | 8 | 16 | 60 | 8 | 7.9 | ● |
| DB412080L | 8 | 4 | 8 | 25 | 100 | 8 | 7.9 | ● |
| DB412100 | 10 | 5 | 10 | 20 | 70 | 10 | 9.9 | ● |
| DB412100L | 10 | 5 | 10 | 30 | 100 | 10 | 9.9 | ● |

ENDMILL

DRILL

| Tolerance of Mill Dia. [mm] | Tolerance of Shank Dia. |
|-----------------------------|-------------------------|
| 0 ~ -0.0012 | h6 |

* For the items produced from 1st. 2010, apply to these tolerance.

| Tolerance of Mill Dia. [mm] | Tolerance of Shank Dia. |
|-----------------------------|-------------------------|
| 0 ~ -0.03 | h6 |

* For the items produced from 1st. 2010, apply to these tolerance.

ZE512



2 FLUTE, 35° HELIX REGULAR LENGTH

- Designed for high hardened materials up to HRc 62.
- Suitable for high speed machining.

| EDP. No. | Dia. | C.L | OAL | SH.Dia. | STOCK |
|----------|------|-----|-----|---------|-------|
| ZE512010 | 1 | 3 | 40 | 6 | ● |
| ZE512015 | 1.5 | 4 | 40 | 6 | ● |
| ZE512020 | 2 | 5 | 40 | 6 | ● |
| ZE512025 | 2.5 | 6 | 40 | 6 | ● |
| ZE512030 | 3 | 8 | 45 | 6 | ● |
| ZE512035 | 3.5 | 10 | 45 | 6 | ● |
| ZE512040 | 4 | 10 | 45 | 6 | ● |
| ZE512045 | 4.5 | 11 | 45 | 6 | ● |
| ZE512050 | 5 | 13 | 50 | 6 | ● |
| ZE512055 | 5.5 | 13 | 50 | 6 | ● |
| ZE512060 | 6 | 13 | 50 | 6 | ● |
| ZE512065 | 6.5 | 16 | 60 | 8 | ● |
| ZE512070 | 7 | 18 | 60 | 8 | ● |
| ZE512080 | 8 | 19 | 60 | 8 | ● |
| ZE512100 | 10 | 22 | 70 | 10 | ● |
| ZE512120 | 12 | 26 | 75 | 12 | ● |

| Tolerance of Mill Dia. (mm) | Tolerance of Shank Dia. |
|-----------------------------|-------------------------|
| 0 ~ -0.02 | h6 |

* For the items produced from 1st. 2010, apply to these tolerance.

ZE514



4 FLUTE, 45° HELIX REGULAR LENGTH

- Designed for high hardened materials up to HRc 62.
- Suitable for high speed machining.

| EDP. No. | Dia. | C.L | OAL | SH.Dia. | STOCK |
|----------|------|-----|-----|---------|-------|
| ZE514020 | 2 | 5 | 40 | 6 | ● |
| ZE514025 | 2.5 | 6 | 40 | 6 | ● |
| ZE514030 | 3 | 8 | 45 | 6 | ● |
| ZE514040 | 4 | 10 | 45 | 6 | ● |
| ZE514050 | 5 | 13 | 50 | 6 | ● |
| ZE514060 | 6 | 13 | 50 | 6 | ● |
| ZE514080 | 8 | 19 | 60 | 8 | ● |
| ZE514100 | 10 | 22 | 70 | 10 | ● |
| ZE514120 | 12 | 26 | 75 | 12 | ● |

| Tolerance of Mill Dia. (mm) | Tolerance of Shank Dia. |
|-----------------------------|-------------------------|
| 0 ~ -0.02 | h6 |

* For the items produced from 1st. 2010, apply to these tolerance.

ENDMILL

DRILL

ZE516**6 FLUTE, 50° HELIX REGULAR LENGTH**

- Designed for high hardened materials up to HRc 62.
- Suitable for high speed machining.

| EDP. No. | Dia. | C.L | OAL | SH.Dia. | STOCK |
|-----------------|------|-----|-----|---------|-------|
| ZE516060 | 6 | 13 | 50 | 6 | ● |
| ZE516080 | 8 | 18 | 60 | 8 | ● |
| ZE516100 | 10 | 22 | 70 | 10 | ● |

| EDP. No. | Dia. | C.L | OAL | SH.Dia. | STOCK |
|-----------------|------|-----|-----|---------|-------|
| ZE516120 | 12 | 26 | 75 | 12 | ● |
| ZE516160 | 16 | 35 | 90 | 16 | ● |
| ZE516200 | 20 | 44 | 100 | 20 | ● |

ENDMILL

DRILL

Tolerance of Mill Dia. (mm)

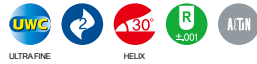
0 ~ -0.02

Tolerance of Shank Dia.

h6

* For the items produced from 1st. 2010, apply to these tolerance.

DA512



2 FLUTE, LONG LENGTH, BALL NOSE

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- For copy-milling machines.

| EDP. No. | Dia. | R | C.L | OAL | SH.Dia. | STOCK |
|----------|------|-------|-------|-------|---------|-------|
| DA512001 | 1/32 | R1/64 | 1/32 | 2-1/2 | 1/4 | ● |
| DA512002 | 1/16 | R1/32 | 1/16 | 2-1/2 | 1/4 | ● |
| DA512003 | 3/32 | R3/64 | 3/32 | 2-1/2 | 1/4 | ● |
| DA512004 | 1/8 | R1/16 | 5/16 | 2-3/8 | 1/8 | ● |
| DA512006 | 3/16 | R3/32 | 3/8 | 3-1/8 | 3/16 | ● |
| DA512008 | 1/4 | R1/8 | 1/2 | 3-1/2 | 1/4 | ● |
| DA512010 | 5/16 | R5/32 | 9/16 | 4 | 5/16 | ● |
| DA512012 | 3/8 | R3/16 | 3/4 | 4 | 3/8 | ● |
| DA512016 | 1/2 | R1/4 | 7/8 | 4-1/4 | 1/2 | ● |
| DA512020 | 5/8 | R5/16 | 1-1/4 | 5-1/2 | 5/8 | ● |
| DA512024 | 3/4 | R3/8 | 1-1/2 | 6-1/4 | 3/4 | ● |
| DA512032 | 1 | R1/2 | 2 | 7-1/8 | 1 | ● |

| Tolerance of Mill Dia. [mm] | Tolerance of Shank Dia. |
|-----------------------------|-------------------------|
| 0 ~ -.0012 | h6 |

* For the items produced from 1st. 2010, apply to these tolerance.

DA514



4 FLUTE, LONG LENGTH, BALL NOSE

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- For copy-milling machines.

| EDP. No. | Dia. | R | C.L | OAL | SH.Dia. | STOCK |
|----------|------|-------|-------|-------|---------|-------|
| DA514004 | 1/8 | R1/16 | 5/16 | 2-3/8 | 1/8 | ● |
| DA514006 | 3/16 | R3/32 | 3/8 | 3-1/8 | 3/16 | ● |
| DA514008 | 1/4 | R1/8 | 1/2 | 3-1/2 | 1/4 | ● |
| DA514010 | 5/16 | R5/32 | 9/16 | 4 | 5/16 | ● |
| DA514012 | 3/8 | R3/16 | 3/4 | 4 | 3/8 | ● |
| DA514016 | 1/2 | R1/4 | 7/8 | 4-1/4 | 1/2 | ● |
| DA514020 | 5/8 | R5/16 | 1-1/4 | 5-1/2 | 5/8 | ● |
| DA514024 | 3/4 | R 3/8 | 1-1/2 | 6-1/4 | 3/4 | ● |
| DA514032 | 1 | R 1/2 | 2 | 7-1/8 | 1 | ● |

| Tolerance of Mill Dia. [mm] | Tolerance of Shank Dia. |
|-----------------------------|-------------------------|
| 0 ~ -.0012 | h6 |

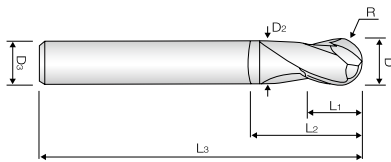
* For the items produced from 1st. 2010, apply to these tolerance.

ENDMILL
&
DRILL

ENDMILL

DRILL

DA522



2 FLUTE, LONG LENGTH, BALL NOSE with EXTENDED NECK

- Deep slotting milling is possible by reduced neck.
- High efficiency milling is possible in deep slotting with projection of the end mill being long.

| EDP. No. | D | R | L ₁ | L ₂ | L ₃ | D ₂ | D ₃ | STOCK |
|----------|------|-------|----------------|----------------|----------------|----------------|----------------|-------|
| DA522004 | 1/8 | R1/16 | 5/16 | - | 2-3/4 | - | 1/4 | ● |
| DA522006 | 3/16 | R3/32 | 1/2 | - | 3-1/8 | - | 1/4 | ● |
| DA522008 | 1/4 | R1/8 | 1/2 | 7/8 | 3-1/8 | .242 | 1/4 | ● |
| DA522010 | 5/16 | R5/32 | 9/16 | 1-1/16 | 3-1/2 | .305 | 5/16 | ● |
| DA522012 | 3/8 | R3/16 | 3/4 | 1-1/4 | 4 | .367 | 3/8 | ● |
| DA522016 | 1/2 | R1/4 | 7/8 | 1-3/8 | 4-1/4 | .492 | 1/2 | ● |
| DA522020 | 5/8 | R5/16 | 1-1/4 | 2 | 5-1/2 | .617 | 5/8 | ● |
| DA522024 | 3/4 | R3/8 | 1-1/2 | 2-1/4 | 6-1/4 | .742 | 3/4 | ● |
| DA522032 | 1 | R1/2 | 2-1/8 | 3 | 7 | .992 | 1 | ● |

MD502



2 FLUTE, MINIATURE, BALL NOSE

- High precision milling in medical, optical, electronics and aerospace industrials.
- Excellent performance at dry cutting conditon.
- Excellent performance on high hardened steel.

| EDP. No. | Dia. | R | C.L | OAL | SH.Dia. | STOCK |
|----------|------|--------|------|-------|---------|-------|
| MD502024 | .024 | R.012 | .043 | 1-1/2 | 1/8 | ● |
| MD502028 | .028 | R.014 | .060 | 1-1/2 | 1/8 | ● |
| MD502031 | .031 | R.0155 | .080 | 1-1/2 | 1/8 | ● |
| MD502035 | .035 | R.0175 | .087 | 1-1/2 | 1/8 | ● |
| MD502040 | .040 | R.020 | .100 | 1-1/2 | 1/8 | ● |
| MD502043 | .043 | R.0215 | .118 | 1-1/2 | 1/8 | ● |
| MD502047 | .047 | R.0235 | .118 | 1-1/2 | 1/8 | ● |
| MD502052 | .052 | R.026 | .138 | 1-1/2 | 1/8 | ● |
| MD502055 | .055 | R.0275 | .138 | 1-1/2 | 1/8 | ● |
| MD502062 | .062 | R.031 | .157 | 1-1/2 | 1/8 | ● |

ENDMILL

DRILL

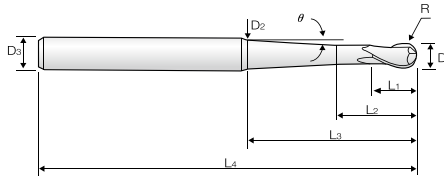
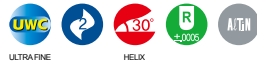
| Tolerance of Mill Dia. (mm) | Tolerance of Shank Dia. |
|-----------------------------|-------------------------|
| 0 ~ -.0012 | h6 |

* For the items produced from 1st. 2010, apply to these tolerance.

| Tolerance of Mill Dia. (mm) | Tolerance of Shank Dia. |
|-----------------------------|-------------------------|
| 0 ~ -.001 | h6 |

* For the items produced from 1st. 2010, apply to these tolerance.

DA542

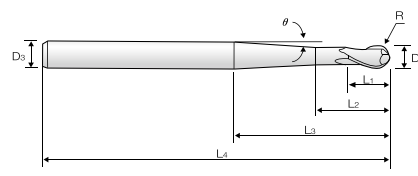


2 FLUTE, BALL NOSE with TAPER NECK

- High efficiency milling is possible in deep slotting with projection of the end mill being long.

| EDP. No. | D | R | L ₁ | L ₂ | L ₃ | D ₂ | D ₃ | L ₄ | θ | STOCK |
|----------|------|-------|----------------|----------------|----------------|----------------|----------------|----------------|-------|-------|
| DA542001 | 1/16 | R1/32 | 5/32 | 15/64 | 7/8 | .096 | 1/4 | 2-3/8 | 1°30' | ● |
| DA542002 | 1/16 | R1/32 | 5/32 | 15/64 | 1-5/8 | .208 | 1/4 | 3-1/8 | 3° | ● |
| DA542004 | 1/8 | R1/16 | 1/4 | 21/64 | 2-1/16 | .216 | 1/4 | 3-5/8 | 1°30' | ● |
| DA542006 | 3/16 | R3/32 | 3/8 | 29/64 | 2-3/8 | .288 | 3/8 | 4-3/8 | 1°30' | ● |
| DA542008 | 1/4 | R1/8 | 1/2 | 5/8 | 2-1/16 | .325 | 3/8 | 4-3/8 | 1°30' | ● |
| DA542010 | 5/16 | R5/32 | 9/16 | 11/16 | 2-1/16 | .385 | 1/2 | 4-3/4 | 1°30' | ● |
| DA542012 | 3/8 | R3/16 | 11/16 | 13/16 | 2-3/8 | .458 | 1/2 | 5-1/16 | 1°30' | ● |
| DA542016 | 1/2 | R1/4 | 7/8 | 1 | 3-1/4 | .618 | 3/4 | 6-3/8 | 1°30' | ● |

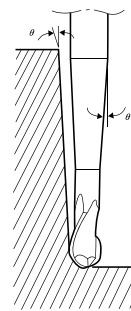
DA552



2 FLUTE, BALL NOSE with PENCIL NECK

- High efficiency milling is possible in deep slotting with projection of the end mill being long.

| EDP. No. | D | R | L ₁ | L ₂ | L ₃ | D ₃ | L ₄ | θ | STOCK |
|----------|------|-------|----------------|----------------|----------------|----------------|----------------|-------|-------|
| DA552006 | 3/16 | R3/32 | 9/16 | .659 | 3-11/32 | 3/8 | 7-3/4 | 2° | ● |
| DA552007 | 3/16 | R3/32 | 9/16 | .666 | 2-13/16 | 3/8 | 6 | 2°30' | ● |
| DA552008 | 1/4 | R1/8 | 3/4 | .859 | 4-7/16 | 1/2 | 7-3/4 | 2° | ● |
| DA552009 | 1/4 | R1/8 | 3/4 | .856 | 3-23/32 | 1/2 | 6 | 2°30' | ● |
| DA552010 | 5/16 | R5/32 | 3/4 | .868 | 4-29/32 | 1/2 | 7-3/4 | 1°20' | ● |
| DA552011 | 5/16 | R5/32 | 3/4 | .870 | 3-15/16 | 1/2 | 6 | 1°45' | ● |
| DA552012 | 3/8 | R3/16 | 1-3/16 | 1.326 | 4-29/32 | 5/8 | 7-3/4 | 2° | ● |
| DA552013 | 3/8 | R3/16 | 1-3/16 | 1.325 | 4-3/16 | 5/8 | 6 | 2°30' | ● |
| DA552016 | 1/2 | R1/4 | 1-3/16 | 1.309 | 4 | 5/8 | 7-3/4 | 1°20' | ● |
| DA552017 | 1/2 | R1/4 | 1-3/16 | 1.329 | 3-3/8 | 5/8 | 6 | 1°45' | ● |



MILLING ON TAPERED WALL

| | |
|-----------------------------|-------------------------|
| Tolerance of Mill Dia. (mm) | Tolerance of Shank Dia. |
| 0 ~ -.0012 | h6 |

* For the items produced from 1st. 2010, apply to these tolerance.

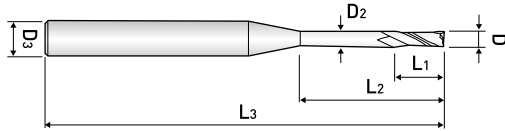
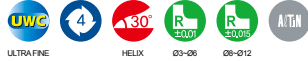
| | |
|-----------------------------|-------------------------|
| Tolerance of Mill Dia. (mm) | Tolerance of Shank Dia. |
| 0 ~ -.0012 | h6 |

* For the items produced from 1st. 2010, apply to these tolerance.

ENDMILL

DRILL

WB712



2 FLUTE, For RIB PROCESSING

- High efficiency milling is possible in deep slotting with projection of the end mill being long.
- Excellent performance on tool steel, mold steel, alloy steel.

| EDP. No. | R | L ₁ | L ₂ | L ₃ | D ₂ | D ₃ | STOCK |
|-----------|------|----------------|----------------|----------------|----------------|----------------|-------|
| WB7120502 | | | 2 | | | | ● |
| WB7120503 | | | 3 | | | | ● |
| WB7120504 | | | 4 | | | | ● |
| WB7120505 | 0.25 | 0.5 | 5 | 45 | 0.45 | 4 | ● |
| WB7120506 | | | 6 | | | | ● |
| WB7120508 | | | 8 | | | | ● |
| WB7120510 | | | 10 | | | | ● |
| WB7120602 | | | 2 | | | | ● |
| WB7120603 | | | 3 | | | | ● |
| WB7120604 | | | 4 | | | | ● |
| WB7120605 | 0.3 | 0.6 | 5 | 45 | 0.55 | 4 | ● |
| WB7120606 | | | 6 | | | | ● |
| WB7120608 | | | 8 | | | | ● |
| WB7120610 | | | 10 | | | | ● |
| WB7120612 | | | 12 | | | | ● |
| WB7120702 | | | 2 | | | | ● |
| WB7120704 | 0.35 | 0.7 | 4 | 45 | 0.65 | 4 | ● |
| WB7120708 | | | 8 | | | | ● |
| WB7120802 | | | 2 | | | | ● |
| WB7120804 | | | 4 | | | | ● |
| WB7120805 | | | 5 | | | | ● |
| WB7120806 | | | 6 | 45 | | | ● |
| WB7120807 | 0.4 | 0.8 | 7 | | 0.75 | 4 | ● |
| WB7120808 | | | 8 | | | | ● |
| WB7120810 | | | 10 | | | | ● |
| WB7120812 | | | 12 | | | | ● |
| WB7120816 | | | 16 | 50 | | | ● |

| EDP. No. | R | L ₁ | L ₂ | L ₃ | D ₂ | D ₃ | STOCK |
|-----------|------|----------------|----------------|----------------|----------------|----------------|-------|
| WB7121003 | | | 3 | | | | ● |
| WB7121004 | | | 4 | | | | ● |
| WB7121005 | | | 5 | | | | ● |
| WB7121006 | | | 6 | | | | ● |
| WB7121007 | | | 7 | 45 | | | ● |
| WB7121008 | | | 8 | | | | ● |
| WB7121009 | | | 9 | | | | ● |
| WB7121010 | 0.5 | 0.5 | 10 | | 0.95 | 4 | ● |
| WB7121012 | | | 12 | | | | ● |
| WB7121014 | | | 14 | | | | ● |
| WB7121016 | | | 16 | 50 | | | ● |
| WB7121018 | | | 18 | | | | ● |
| WB7121020 | | | 20 | 55 | | | ● |
| WB7121022 | | | 22 | | | | ● |
| WB7121025 | | | 25 | 60 | | | ● |
| WB7121204 | | | 4 | | | | ● |
| WB7121206 | | | 6 | | | | ● |
| WB7121208 | | | 8 | 45 | | | ● |
| WB7121210 | 0.6 | 1.2 | 10 | | 1.15 | 4 | ● |
| WB7121212 | | | 12 | | | | ● |
| WB7121216 | | | 16 | 50 | | | ● |
| WB7121220 | | | 20 | 55 | | | ● |
| WB7121224 | | | 24 | 60 | | | ● |
| WB7121406 | | | 6 | | | | ● |
| WB7121408 | 0.7 | 1.4 | 8 | 45 | 1.35 | 4 | ● |
| WB7121412 | | | 12 | | | | ● |
| WB7121416 | | | 16 | 50 | | | ● |
| WB7121503 | | | 3 | | | | ● |
| WB7121504 | | | 4 | | | | ● |
| WB7121506 | | | 6 | 45 | | | ● |
| WB7121508 | | | 8 | | | | ● |
| WB7121510 | | | 10 | | | | ● |
| WB7121512 | | | 12 | | | | ● |
| WB7121514 | 0.75 | 1.5 | 14 | | 1.45 | 4 | ● |
| WB7121516 | | | 16 | 50 | | | ● |
| WB7121518 | | | 18 | | | | ● |
| WB7121520 | | | 20 | 55 | | | ● |
| WB7121522 | | | 22 | | 60 | | ● |
| WB7121525 | | | 25 | | | | ● |
| WB7121530 | | | 30 | | | | ● |
| WB7121535 | | | 35 | 70 | | | ● |
| WB7121606 | | | 6 | | | | ● |
| WB7121608 | | | 8 | | | | ● |
| WB7121610 | 0.8 | 1.6 | 10 | 45 | 1.55 | 4 | ● |
| WB7121612 | | | 12 | | | | ● |
| WB7121616 | | | 16 | 50 | | | ● |
| WB7121620 | | | 20 | 55 | | | ● |

ENDMILL

DRILL

| EDP. No. | R | L ₁ | L ₂ | L ₃ | D ₂ | D ₃ | STOCK |
|-----------|------|----------------|----------------|----------------|----------------|----------------|-------|
| WB7122004 | | | 6 | | | | ● |
| WB7122006 | | | 8 | 45 | | | ● |
| WB7122008 | 0.9 | 1.8 | 12 | | 1.75 | 4 | ● |
| WB7122010 | | | 16 | 50 | | | ● |
| WB7122012 | | | 20 | 55 | | | ● |
| WB7122014 | | | 4 | | | | ● |
| WB7122016 | | | 6 | | | | ● |
| WB7122018 | | | 8 | 45 | | | ● |
| WB7122020 | | | 10 | | | | ● |
| WB7122022 | | | 12 | | | | ● |
| WB7122025 | | | 14 | | | | ● |
| WB7122030 | | | 16 | 50 | | | ● |
| WB7122035 | 1 | 2 | 18 | | 1.95 | 4 | ● |
| WB7122040 | | | 20 | 55 | | | ● |
| WB7122045 | | | 22 | 60 | | | ● |
| WB7122508 | | | 25 | 65 | | | ● |
| WB7122510 | | | 30 | 70 | | | ● |
| WB7122516 | | | 35 | | | | ● |
| WB7122520 | | | 40 | 80 | | | ● |
| WB7122525 | | | 45 | | | | ● |
| WB7122530 | | | 8 | | | | ● |
| WB7122535 | | | 10 | 50 | | | ● |
| WB7123006 | | | 16 | | | | ● |
| WB7123008 | 1.25 | 2.5 | 20 | | 2.4 | 4 | ● |
| WB7123010 | | | 25 | 60 | | | ● |
| WB7123012 | | | 30 | | | | ● |
| WB7123014 | | | 35 | 70 | | | ● |
| WB7123016 | | | 6 | | | | ● |
| WB7123018 | | | 8 | 50 | | | ● |
| DB6123010 | | | 10 | | | | ● |
| DB6123012 | 1.5 | 3 | 12 | | 2.85 | 6 | ● |
| DB6123014 | | | 14 | 55 | | | ● |
| DB6123016 | | | 16 | | | | ● |
| DB6123018 | | | 18 | 60 | | | ● |

ZA502 - REGULAR LENGTH ZA522 - LONG LENGTH



2 FLUTE, REGULAR & LONG LENGTH

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- Superior workpiece finishes.

| EDP. No. | Dia. | C.L | OAL | SH.Dia. | STOCK |
|----------|------|-------|-------|---------|-------|
| ZA502004 | 1/16 | 3/16 | 1-1/2 | 1/8 | ● |
| ZA502008 | 1/8 | 1/2 | 1-1/2 | 1/8 | ● |
| ZA502012 | 3/16 | 5/8 | 2 | 3/16 | ● |
| ZA502016 | 1/4 | 3/4 | 2-1/2 | 1/4 | ● |
| ZA502020 | 5/16 | 13/16 | 2-1/2 | 5/16 | ● |
| ZA502024 | 3/8 | 1 | 2-1/2 | 3/8 | ● |
| ZA502032 | 1/2 | 1 | 3 | 1/2 | ● |
| ZA502040 | 5/8 | 1-1/4 | 3-1/2 | 5/8 | ● |
| ZA502048 | 3/4 | 1-1/2 | 4 | 3/4 | ● |
| ZA502064 | 1 | 1-1/2 | 4 | 1 | ● |

| EDP. No. | Dia. | C.L | OAL | SH.Dia. | STOCK |
|----------|------|-------|-------|---------|-------|
| ZA522008 | 1/8 | 3/4 | 2-1/4 | 1/8 | ● |
| ZA522012 | 3/16 | 3/4 | 2-1/2 | 3/16 | ● |
| ZA522016 | 1/4 | 1-1/8 | 3 | 1/4 | ● |
| ZA522020 | 5/16 | 1-1/8 | 3 | 5/16 | ● |
| ZA522024 | 3/8 | 1-1/8 | 3 | 3/8 | ● |
| ZA522032 | 1/2 | 2 | 4 | 1/2 | ● |
| ZA522040 | 5/8 | 2-1/4 | 5 | 5/8 | ● |
| ZA522048 | 3/4 | 2-1/4 | 5 | 3/4 | ● |
| ZA522064 | 1 | 2-1/4 | 5 | 1 | ● |

| Tolerance of Mill Dia. (mm) | Tolerance of Shank Dia. |
|-----------------------------|-------------------------|
| 0 ~ -.0012 | h6 |

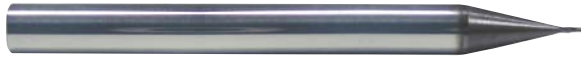
* For the items produced from 1st. 2010, apply to these tolerance.

ENDMILL
&
DRILL

ENDMILL

DRILL

MZ502



2 FLUTE, MINIATURE

- High precision milling in medical, optical, electronics and aero space industries.
- Excellent performance on high hardened steel.

| EDP. No. | Dia. | C.L | OAL | SH.Dia. | STOCK |
|----------|------|------|-------|---------|-------|
| MZ502016 | .016 | .031 | 1-1/2 | 1/8 | ● |
| MZ502020 | .020 | .040 | 1-1/2 | 1/8 | ● |
| MZ502024 | .024 | .047 | 1-1/2 | 1/8 | ● |
| MZ502028 | .028 | .055 | 1-1/2 | 1/8 | ● |
| MZ502031 | .031 | .063 | 1-1/2 | 1/8 | ● |
| MZ502035 | .035 | .080 | 1-1/2 | 1/8 | ● |
| MZ502040 | .040 | .100 | 1-1/2 | 1/8 | ● |
| MZ502043 | .043 | .100 | 1-1/2 | 1/8 | ● |
| MZ502047 | .047 | .157 | 1-1/2 | 1/8 | ● |
| MZ502052 | .052 | .157 | 1-1/2 | 1/8 | ● |
| MZ502055 | .055 | .157 | 1-1/2 | 1/8 | ● |
| MZ502062 | .062 | .157 | 1-1/2 | 1/8 | ● |

ZA504 - REGULAR LENGTH
ZA524 - LONG LENGTH



4 FLUTE, REGULAR & LONG LENGTH

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- Superior workpiece finishes.

| EDP. No. | Dia. | C.L | OAL | SH.Dia. | STOCK |
|----------|------|-------|-------|---------|-------|
| ZA504004 | 1/16 | 3/16 | 1-1/2 | 1/8 | ● |
| ZA504008 | 1/8 | 1/2 | 1-1/2 | 1/8 | ● |
| ZA504012 | 3/16 | 5/8 | 2 | 3/16 | ● |
| ZA504016 | 1/4 | 3/4 | 2-1/2 | 1/4 | ● |
| ZA504020 | 5/16 | 13/16 | 2-1/2 | 5/16 | ● |
| ZA504024 | 3/8 | 1 | 2-1/2 | 3/8 | ● |
| ZA504028 | 7/16 | 1 | 2-3/4 | 7/16 | ● |
| ZA504032 | 1/2 | 1 | 3 | 1/2 | ● |
| ZA504040 | 5/8 | 1-1/4 | 3-1/2 | 5/8 | ● |
| ZA504048 | 3/4 | 1-1/2 | 4 | 3/4 | ● |
| ZA504064 | 1 | 1-1/2 | 4 | 1 | ● |

| EDP. No. | Dia. | C.L | OAL | SH.Dia. | STOCK |
|----------|------|-------|-------|---------|-------|
| ZA524008 | 1/8 | 3/4 | 2-1/4 | 1/8 | ● |
| ZA524012 | 3/16 | 3/4 | 2-1/2 | 3/16 | ● |
| ZA524016 | 1/4 | 1-1/8 | 3 | 1/4 | ● |
| ZA524020 | 5/16 | 1-1/8 | 3 | 5/16 | ● |
| ZA524024 | 3/8 | 1-1/8 | 3 | 3/8 | ● |
| ZA524032 | 1/2 | 2 | 4 | 1/2 | ● |
| ZA524040 | 5/8 | 2-1/4 | 5 | 5/8 | ● |
| ZA524048 | 3/4 | 2-1/4 | 5 | 3/4 | ● |
| ZA524064 | 1 | 2-1/4 | 5 | 1 | ● |
| ZA504048 | 3/4 | 1-1/2 | 4 | 3/4 | ● |
| ZA504064 | 1 | 1-1/2 | 4 | 1 | ● |

| | |
|-----------------------------|-------------------------|
| Tolerance of Mill Dia. (mm) | Tolerance of Shank Dia. |
| 0 ~ -.001 | h6 |

* For the items produced from 1st. 2010, apply to these tolerance.

| | |
|-----------------------------|-------------------------|
| Tolerance of Mill Dia. (mm) | Tolerance of Shank Dia. |
| 0 ~ -.0012 | h6 |

* For the items produced from 1st. 2010, apply to these tolerance.

ENDMILL

DRILL

ZA506(8) - LONG LENGTH

ZA526(8) - EXTRA LONG LENGTH



6&8 FLUTE, 45 HELIX LONG EXTRA LONG LENGTH

- Designed to machine tool steel, hardened materials.
- High speed cutting and finish milling with high feed rate.
- Superior workpiece finishes.
- Superior wear resistant.

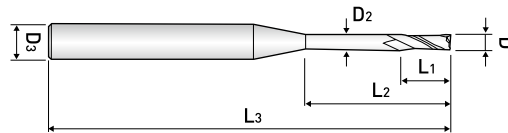
| EDP. No. | Dia. | C.L | OAL | SH.Dia. | NO. OF FLUTE | STOCK |
|----------|------|-------|-------|---------|--------------|-------|
| ZA506016 | 1/4 | 1/2 | 2-1/4 | 1/4 | 6 | ● |
| ZA506020 | 5/16 | 3/4 | 2-1/2 | 5/16 | 6 | ● |
| ZA506024 | 3/8 | 7/8 | 2-7/8 | 3/8 | 6 | ● |
| ZA506032 | 1/2 | 1 | 3-1/4 | 1/2 | 6 | ● |
| ZA506040 | 5/8 | 1-1/4 | 3-5/8 | 5/8 | 6 | ● |
| ZA508048 | 3/4 | 1-1/2 | 4-1/8 | 3/4 | 8 | ● |
| ZA508064 | 1 | 1-3/4 | 4-1/4 | 1 | 8 | ● |

| EDP. No. | Dia. | C.L | OAL | SH.Dia. | NO. OF FLUTE | STOCK |
|----------|------|-------|-------|---------|--------------|-------|
| ZA506016 | 1/4 | 1/2 | 2-1/4 | 1/4 | 6 | ● |
| ZA506020 | 5/16 | 3/4 | 2-1/2 | 5/16 | 6 | ● |
| ZA506024 | 3/8 | 7/8 | 2-7/8 | 3/8 | 6 | ● |
| ZA506020 | 5/16 | 3/4 | 2-1/2 | 5/16 | 6 | ● |
| ZA506020 | 5/16 | 3/4 | 2-1/2 | 5/16 | 6 | ● |
| ZA506024 | 3/8 | 7/8 | 2-7/8 | 3/8 | 6 | ● |
| ZA506032 | 1/2 | 1 | 3-1/4 | 1/2 | 6 | ● |
| ZA506040 | 5/8 | 1-1/4 | 3-5/8 | 5/8 | 6 | ● |
| ZA508048 | 3/4 | 1-1/2 | 4-1/8 | 3/4 | 8 | ● |
| ZA508064 | 1 | 1-3/4 | 4-1/4 | 1 | 8 | ● |

| Tolerance of Mill Dia. [mm] | Tolerance of Shank Dia. |
|-----------------------------|-------------------------|
| 0 ~ -.0012 | h6 |

* For the items produced from 1st. 2010, apply to these tolerance.

WE712



2 FLUTE, For RIB PROCESSING

- High efficiency milling is possible in deep slotting with projection of the end mill being long.
- Excellent performance on tool steel, mold steel, alloy steel.

| EDP. No. | D | L ₁ | L ₂ | L ₃ | D ₂ | D ₃ | STOCK |
|-----------|-----|----------------|----------------|----------------|----------------|----------------|-------|
| WE7120402 | 0.4 | 0.6 | 2 | 45 | 0.37 | 4 | ● |
| WE7120403 | | | 3 | | | | ● |
| WE7120404 | | | 4 | | | | ● |
| WE7120405 | | | 5 | | | | ● |
| WE7120406 | | | 6 | | | | ● |
| WE7120408 | | | 8 | | | | ● |
| WE7120502 | 0.5 | 0.7 | 2 | 45 | 0.45 | 4 | ● |
| WE7120503 | | | 3 | | | | ● |
| WE7120504 | | | 4 | | | | ● |
| WE7120505 | | | 5 | | | | ● |
| WE7120506 | | | 6 | | | | ● |
| WE7120508 | | | 8 | | | | ● |
| WE7120510 | 10 | ● | | | | | |
| WE7120602 | 0.6 | 0.9 | 2 | 45 | 0.55 | 4 | ● |
| WE7120603 | | | 3 | | | | ● |
| WE7120604 | | | 4 | | | | ● |
| WE7120605 | | | 5 | | | | ● |
| WE7120606 | | | 6 | | | | ● |
| WE7120608 | | | 8 | | | | ● |
| WE7120610 | 10 | ● | | | | | |
| WE7120612 | 12 | ● | | | | | |
| WE7120702 | 0.7 | 1 | 2 | 45 | 0.65 | 4 | ● |
| WE7120704 | | | 4 | | | | ● |
| WE7120706 | | | 6 | | | | ● |
| WE7120708 | | | 8 | | | | ● |
| WE7120710 | 10 | ● | | | | | |
| WE7120802 | 0.8 | 1.2 | 2 | 45 | 0.75 | 4 | ● |
| WE7120804 | | | 4 | | | | ● |
| WE7120806 | | | 6 | | | | ● |
| WE7120808 | | | 8 | | | | ● |
| WE7120810 | | | 10 | | | | ● |
| WE7120812 | | | 12 | | | | ● |

ENDMILL

DRILL

ZAMUS CLASSIC SERIES

INCH

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DRILL

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DRILL

| EDP. No. | D | L ₁ | L ₂ | L ₃ | D ₂ | D ₃ | STOCK |
|-----------|-----|----------------|----------------|----------------|----------------|----------------|-------|
| WE7120906 | | | 6 | | | | ● |
| WE7120908 | 0.9 | 1.4 | 8 | 45 | 0.85 | 4 | ● |
| WE7120910 | | | 10 | | | | ● |
| WE7121003 | | | 3 | | | | ● |
| WE7121004 | | | 4 | | | | ● |
| WE7121005 | | | 5 | | | | ● |
| WE7121006 | | | 6 | | | | ● |
| WE7121008 | | | 8 | 45 | | | ● |
| WE7121010 | 1 | 1.5 | 10 | | 0.95 | 4 | ● |
| WE7121012 | | | 12 | | | | ● |
| WE7121014 | | | 14 | | | | ● |
| WE7121016 | | | 16 | | | | ● |
| WE7121018 | | | 18 | 50 | | | ● |
| WE7121020 | | | 20 | | | | ● |
| WE7121025 | | | 25 | 60 | | | ● |
| WE7121206 | | | 6 | | | | ● |
| WE7121208 | | | 8 | | | | ● |
| WE7121210 | | | 10 | 45 | | | ● |
| WE7121212 | 1.2 | 1.8 | 12 | | 1.15 | 4 | ● |
| WE7121216 | | | 16 | | | | ● |
| WE7121220 | | | 20 | 50 | | | ● |
| WE7121225 | | | 25 | 60 | | | ● |
| WE7121406 | | | 6 | | | | ● |
| WE7121408 | | | 8 | | | | ● |
| WE7121410 | | | 10 | 45 | | | ● |
| WE7121412 | 1.4 | 2.1 | 12 | | 1.35 | 4 | ● |
| WE7121414 | | | 14 | | | | ● |
| WE7121416 | | | 16 | 50 | | | ● |
| WE7121420 | | | 20 | | | | ● |
| WE7121506 | | | 6 | | | | ● |
| WE7121508 | | | 8 | | | | ● |
| WE7121510 | | | 10 | 45 | | | ● |
| WE7121512 | | | 12 | | | | ● |
| WE7121514 | 1.5 | 2.3 | 14 | | 1.45 | 4 | ● |
| WE7121516 | | | 16 | 50 | | | ● |
| WE7121518 | | | 18 | 55 | | | ● |
| WE7121520 | | | 20 | | | | ● |
| WE7121525 | | | 25 | 60 | | | ● |
| WE7121606 | | | 6 | | | | ● |
| WE7121608 | | | 8 | | | | ● |
| WE7121610 | | | 10 | 45 | | | ● |
| WE7121612 | 1.6 | 2.5 | 12 | | 1.55 | 4 | ● |
| WE7121614 | | | 14 | | | | ● |
| WE7121616 | | | 16 | 50 | | | ● |
| WE7121618 | | | 18 | | | | ● |
| WE7121620 | | | 20 | 55 | | | ● |

| EDP. No. | D | L ₁ | L ₂ | L ₃ | D ₂ | D ₃ | STOCK |
|-----------|-----|----------------|----------------|----------------|----------------|----------------|-------|
| WE7121806 | | | 6 | | | | ● |
| WE7121808 | | | 8 | | | | ● |
| WE7121810 | | | 10 | 45 | | | ● |
| WE7121812 | 1.8 | 2.8 | 12 | | 1.75 | 4 | ● |
| WE7121814 | | | 14 | | | | ● |
| WE7121816 | | | 16 | 50 | | | ● |
| WE7121818 | | | 18 | | | | ● |
| WE7121820 | | | 20 | 55 | | | ● |
| WE7122006 | | | 6 | | | | ● |
| WE7122008 | | | 8 | | | | ● |
| WE7122010 | | | 10 | 45 | | | ● |
| WE7122012 | | | 12 | | | | ● |
| WE7122014 | | | 14 | | | | ● |
| WE7122016 | | | 16 | 50 | | | ● |
| WE7122018 | 2 | 3 | 18 | | 1.95 | 4 | ● |
| WE7122020 | | | 20 | 55 | | | ● |
| WE7122022 | | | 22 | | | | ● |
| WE7122025 | | | 25 | 60 | | | ● |
| WE7122030 | | | 30 | | | | ● |
| WE7122035 | | | 35 | 70 | | | ● |
| WE7122040 | | | 40 | 80 | | | ● |
| WE7122508 | | | 8 | | | | ● |
| WE7122510 | | | 10 | 45 | | | ● |
| WE7122512 | | | 12 | | | | ● |
| WE7122514 | | | 14 | 50 | | | ● |
| WE7122516 | | | 16 | | | | ● |
| WE7122518 | 2.5 | 3.7 | 18 | | 2.45 | 4 | ● |
| WE7122520 | | | 20 | 55 | | | ● |
| WE7122525 | | | 25 | 60 | | | ● |
| WE7122530 | | | 30 | | | | ● |
| WE7122535 | | | 35 | 70 | | | ● |
| WE7122540 | | | 40 | 80 | | | ● |
| WE7123008 | | | 8 | | | | ● |
| WE7123010 | | | 10 | 45 | | | ● |
| WE7123012 | | | 12 | | | | ● |
| WE7123014 | | | 14 | 50 | | | ● |
| WE7123016 | | | 16 | | | | ● |
| WE7123018 | | | 18 | | | | ● |
| WE7123020 | 3 | 4.5 | 20 | 55 | 2.85 | 6 | ● |
| WE7123025 | | | 25 | 60 | | | ● |
| WE7123030 | | | 30 | 70 | | | ● |
| WE7123035 | | | 35 | 80 | | | ● |
| WE7123040 | | | 40 | | | | ● |
| WE7123045 | | | 45 | 90 | | | ● |
| WE7123050 | | | 50 | 100 | | | ● |

ZAMUS CLASSIC SERIES

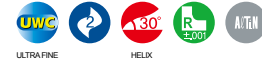
INCH

PART.
B

ENDMILL
&
DRILL

| EDP. No. | D | L ₁ | L ₂ | L ₃ | D ₂ | D ₃ | STOCK |
|-----------|---|----------------|----------------|----------------|----------------|----------------|-------|
| WE7124010 | 4 | 6 | 10 | 50 | 3.85 | 6 | ● |
| WE7124012 | | | 12 | | | | ● |
| WE7124016 | | | 16 | 60 | | | ● |
| WE7124020 | | | 20 | | | | ● |
| WE7124025 | | | 25 | 70 | | | ● |
| WE7124030 | | | 30 | | | | ● |
| WE7124035 | | | 35 | 80 | | | ● |
| WE7124040 | | | 40 | | | | ● |
| WE7124045 | | | 45 | 90 | | | ● |
| WE7124050 | | | 50 | | | | 100 |
| WE7125016 | 5 | 7.5 | 16 | 60 | 4.85 | 6 | ● |
| WE7125020 | | | 20 | | | | ● |
| WE7125025 | | | 25 | 70 | | | ● |
| WE7125030 | | | 30 | | | | ● |
| WE7125035 | | | 35 | 80 | | | ● |
| WE7125040 | | | 40 | | | | ● |
| WE7125050 | | | 45 | 90 | | | ● |
| | | | | | | | 100 |

ZR502A



2 FLUTE, STUB LENGTH, CORNER RADIUS

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- Superior workpiece finishes.

| EDP. No. | Dia. | R | C.L | OAL | SH.Dia. | STOCK |
|-------------|------|-------|-----|-------|---------|-------|
| ZR502A00408 | 1/16 | R.008 | 1/8 | 2-1/4 | 1/4 | ● |
| ZR502A00810 | 1/8 | R.010 | 1/4 | 2-1/4 | 1/4 | ● |
| ZR502A00820 | | R.020 | | | | ● |
| ZR502A00830 | | R.030 | | | | ● |
| ZR502A01210 | 3/16 | R.010 | 3/8 | 2-1/2 | 1/4 | ● |
| ZR502A01220 | | R.020 | | | | ● |
| ZR502A01230 | | R.030 | | | | ● |
| ZR502A01610 | 1/4 | R.010 | 1/2 | 3 | 1/4 | ● |
| ZR502A01620 | | R.020 | | | | ● |
| ZR502A01630 | | R.030 | | | | ● |
| ZR502A02020 | 5/16 | R.020 | 1/2 | 3 | 5/16 | ● |
| ZR502A02030 | | R.030 | | | | ● |
| ZR502A02060 | | R.060 | | | | ● |
| ZR502A02090 | | R.090 | | | | ● |
| ZR502A02420 | 3/8 | R.020 | 5/8 | 3 | 3/8 | ● |
| ZR502A02430 | | R.030 | | | | ● |
| ZR502A02460 | | R.060 | | | | ● |
| ZR502A02490 | | R.090 | | | | ● |
| ZR502A03220 | 1/2 | R.020 | 5/8 | 4 | 1/2 | ● |
| ZR502A03230 | | R.030 | | | | ● |
| ZR502A03260 | | R.060 | | | | ● |
| ZR502A03290 | | R.090 | | | | ● |

ENDMILL

DRILL

| Tolerance of Mill Dia. (mm) | Tolerance of Shank Dia. |
|-----------------------------|-------------------------|
| 0 ~ -0.02 | h6 |

* For the items produced from 1st. 2010, apply to these tolerance.

| Tolerance of Mill Dia. (mm) | Tolerance of Shank Dia. |
|-----------------------------|-------------------------|
| 0 ~ -.0012 | h6 |

* For the items produced from 1st. 2010, apply to these tolerance.

ZR522A



2 FLUTE, REGULAR LENGTH, CORNER RADIUS

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- Superior workpiece finishes.

| EDP. No. | Dia. | R | C.L | OAL | SH.Dia. | STOCK |
|-------------|------|-------|-------|-------|---------|-------|
| ZR522A00408 | 1/16 | R.008 | 3/16 | 2-1/4 | 1/4 | ● |
| ZR522A00810 | | R.010 | | | | ● |
| ZR522A00820 | 1/8 | R.020 | 1/2 | 2-1/4 | 1/4 | ● |
| ZR522A00830 | | R.030 | | | | ● |
| ZR522A01210 | | R.010 | | | | ● |
| ZR522A01220 | 3/16 | R.020 | 5/8 | 2-1/2 | 1/4 | ● |
| ZR522A01230 | | R.030 | | | | ● |
| ZR522A01610 | | R.010 | | | | ● |
| ZR522A01620 | 1/4 | R.020 | 3/4 | 3 | 1/4 | ● |
| ZR522A01630 | | R.030 | | | | ● |
| ZR522A02020 | | R.020 | | | | ● |
| ZR522A02030 | 5/16 | R.030 | 13/16 | 3 | 5/16 | ● |
| ZR522A02060 | | R.060 | | | | ● |
| ZR522A02090 | | R.090 | | | | ● |
| ZR522A02420 | | R.020 | | | | ● |
| ZR522A02430 | 3/8 | R.030 | 1 | 3 | 3/8 | ● |
| ZR522A02460 | | R.060 | | | | ● |
| ZR522A02490 | | R.090 | | | | ● |
| ZR522A02820 | | R.020 | | | | ● |
| ZR522A02830 | 7/16 | R.030 | 1 | 4 | 7/16 | ● |
| ZR522A02860 | | R.060 | | | | ● |
| ZR522A02890 | | R.090 | | | | ● |
| ZR522A03220 | | R.020 | | | | ● |
| ZR522A03230 | 1/2 | R.030 | 1 | 4 | 1/2 | ● |
| ZR522A03260 | | R.060 | | | | ● |
| ZR522A03290 | | R.090 | | | | ● |

Tolerance of Mill Dia. [mm]

0 ~ -.0012

Tolerance of Shank Dia.

h6

* For the items produced from 1st. 2010, apply to these tolerance.

ZR532A



2 FLUTE, LONG LENGTH, CORNER RADIUS

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- Superior workpiece finishes.

| EDP. No. | Dia. | R | C.L | OAL | SH.Dia. | STOCK |
|-------------|------|-------|-------|-----|---------|-------|
| ZR532A01620 | | R.020 | | | | ● |
| ZR532A01630 | 1/4 | R.030 | 1-1/8 | 3 | 1/4 | ● |
| ZR532A02020 | | R.020 | | | | ● |
| ZR532A02030 | 5/16 | R.030 | 1-1/8 | 3 | 5/16 | ● |
| ZR532A02060 | | R.060 | | | | ● |
| ZR532A02090 | | R.090 | | | | ● |
| ZR532A02420 | | R.020 | | | | ● |
| ZR532A02430 | 3/8 | R.030 | 1-1/8 | 3 | 3/8 | ● |
| ZR532A02460 | | R.060 | | | | ● |
| ZR532A02490 | | R.090 | | | | ● |
| ZR532A03220 | | R.020 | | | | ● |
| ZR532A03230 | 1/2 | R.030 | 2 | 4 | 1/2 | ● |
| ZR532A03260 | | R.060 | | | | ● |
| ZR532A03290 | | R.090 | | | | ● |

Tolerance of Mill Dia. [mm]

0 ~ -.0012

Tolerance of Shank Dia.

h6

* For the items produced from 1st. 2010, apply to these tolerance.

ENDMILL

DRILL

ZR504A



4 FLUTE, STUB LENGTH, CORNER RADIUS

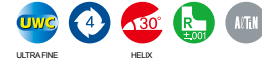
- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- Superior workpiece finishes.

| EDP. No. | Dia. | R | C.L | OAL | SH.Dia. | STOCK |
|-------------|------|-------|-----|-------|---------|-------|
| ZR504A00408 | 1/16 | R.008 | 1/8 | 2-1/4 | 1/4 | ● |
| ZR504A00810 | | R.010 | | | | ● |
| ZR504A00820 | 1/8 | R.020 | 1/4 | 2-1/4 | 1/4 | ● |
| ZR504A00830 | | R.030 | | | | ● |
| ZR504A01210 | | R.010 | | | | ● |
| ZR504A01220 | 3/16 | R.020 | 3/8 | 2-1/2 | 1/4 | ● |
| ZR504A01230 | | R.030 | | | | ● |
| ZR504A01610 | | R.010 | | | | ● |
| ZR504A01620 | 1/4 | R.020 | 1/2 | 3 | 1/4 | ● |
| ZR504A01630 | | R.030 | | | | ● |
| ZR504A02020 | | R.020 | | | | ● |
| ZR504A02030 | 5/16 | R.030 | 1/2 | 3 | 5/16 | ● |
| ZR504A02060 | | R.060 | | | | ● |
| ZR504A02090 | | R.090 | | | | ● |
| ZR504A02420 | | R.020 | | | | ● |
| ZR504A02430 | 3/8 | R.030 | 5/8 | 3 | 3/8 | ● |
| ZR504A02460 | | R.060 | | | | ● |
| ZR504A02490 | | R.090 | | | | ● |
| ZR504A03220 | | R.020 | | | | ● |
| ZR504A03230 | 7/16 | R.030 | 5/8 | 4 | 1/2 | ● |
| ZR504A03260 | | R.060 | | | | ● |
| ZR504A03290 | | R.090 | | | | ● |

| | |
|-----------------------------|-------------------------|
| Tolerance of Mill Dia. [mm] | Tolerance of Shank Dia. |
| 0 ~ -.0012 | h6 |

* For the items produced from 1st. 2010, apply to these tolerance.

ZR524A



4 FLUTE, REGULAR LENGTH, CORNER RADIUS

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- Superior workpiece finishes.

| EDP. No. | Dia. | R | C.L | OAL | SH.Dia. | STOCK |
|-------------|------|-------|-------|-------|---------|-------|
| ZR524A00408 | 1/16 | R.008 | 3/16 | 2-1/4 | 1/4 | ● |
| ZR524A00810 | | R.010 | | | | ● |
| ZR524A00820 | 1/8 | R.020 | 1/2 | 2-1/4 | 1/4 | ● |
| ZR524A00830 | | R.030 | | | | ● |
| ZR524A01210 | | R.010 | | | | ● |
| ZR524A01220 | 3/16 | R.020 | 5/8 | 2-1/2 | 1/4 | ● |
| ZR524A01230 | | R.030 | | | | ● |
| ZR524A01610 | | R.010 | | | | ● |
| ZR524A01620 | 1/4 | R.020 | 3/4 | 3 | 1/4 | ● |
| ZR524A01630 | | R.030 | | | | ● |
| ZR524A02020 | | R.020 | | | | ● |
| ZR524A02030 | 5/16 | R.030 | 13/16 | 3 | 5/16 | ● |
| ZR524A02060 | | R.060 | | | | ● |
| ZR524A02090 | | R.090 | | | | ● |
| ZR524A02420 | | R.020 | | | | ● |
| ZR524A02430 | 3/8 | R.030 | 1 | 3 | 3/8 | ● |
| ZR524A02460 | | R.060 | | | | ● |
| ZR524A02490 | | R.090 | | | | ● |
| ZR524A02820 | | R.020 | | | | ● |
| ZR524A02830 | 7/16 | R.030 | 1 | 4 | 7/16 | ● |
| ZR524A02860 | | R.060 | | | | ● |
| ZR524A02890 | | R.090 | | | | ● |
| ZR524A03220 | | R.020 | | | | ● |
| ZR524A03230 | 1/2 | R.030 | 1 | 4 | 1/2 | ● |
| ZR524A03260 | | R.060 | | | | ● |
| ZR524A03290 | | R.090 | | | | ● |

| | |
|-----------------------------|-------------------------|
| Tolerance of Mill Dia. [mm] | Tolerance of Shank Dia. |
| 0 ~ -.0012 | h6 |

* For the items produced from 1st. 2010, apply to these tolerance.

ENDMILL
&
DRILL

ENDMILL

DRILL

ZAMUS CLASSIC SERIES

INCH

ZR534A



4 FLUTE, LONG LENGTH, CORNER RADIUS

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- Superior workpiece finishes.

| EDP. No. | Dia. | R | C.L | OAL | SH.Dia. | STOCK |
|-------------|------|-------|-------|-----|---------|-------|
| ZR534A01620 | 1/4 | R.020 | 1-1/8 | 3 | 1/4 | ● |
| ZR534A01630 | | R.030 | | | | ● |
| ZR534A02020 | 5/16 | R.020 | 1-1/8 | 3 | 5/16 | ● |
| ZR534A02030 | | R.030 | | | | ● |
| ZR534A02060 | | R.060 | | | | ● |
| ZR534A02090 | | R.090 | | | | ● |
| ZR534A02420 | 3/8 | R.020 | 1-1/8 | 3 | 3/8 | ● |
| ZR534A02430 | | R.030 | | | | ● |
| ZR534A02460 | | R.060 | | | | ● |
| ZR534A02490 | | R.090 | | | | ● |
| ZR534A03220 | 1/2 | R.020 | 2 | 4 | 1/2 | ● |
| ZR534A03230 | | R.030 | | | | ● |
| ZR534A03260 | | R.060 | | | | ● |
| ZR534A03290 | | R.090 | | | | ● |

ZR506(8)A



6&8 FLUTE, 45° HELIX, LONG LENGTH, CORNER RADIUS

- Designed to machine tool steel, hardened materials.
- High speed cutting and finish milling with high feed rates.
- Superior workpiece finishes.

| EDP. No. | Dia. | R | C.L | OAL | SH.Dia. | NO. OF FLUTE | STOCK |
|-------------|------|-------|-------|-------|---------|--------------|-------|
| ZR506A01620 | 1/4 | R.020 | 1/2 | 2-1/4 | 1/4 | 6 | ● |
| ZR506A02020 | 5/16 | R.020 | 3/4 | 2-1/2 | 5/16 | 6 | ● |
| ZR506A02420 | 3/8 | R.020 | 7/8 | 2-7/8 | 3/8 | 6 | ● |
| ZR506A02430 | 3/8 | R.030 | 7/8 | 2-7/8 | 3/8 | 6 | ● |
| ZR506A03220 | 1/2 | R.020 | 1 | 3-1/4 | 1/2 | 6 | ● |
| ZR506A03230 | 1/2 | R.030 | 1 | 3-1/4 | 1/2 | 6 | ● |
| ZR506A04030 | 5/8 | R.030 | 1-1/4 | 3-5/8 | 5/8 | 6 | ● |
| ZR506A04060 | 5/8 | R.060 | 1-1/4 | 3-5/8 | 5/8 | 6 | ● |
| ZR508A04830 | 3/4 | R.030 | 1-1/2 | 4-1/8 | 3/4 | 8 | ● |
| ZR508A04860 | 3/4 | R.060 | 1-1/2 | 4-1/8 | 3/4 | 8 | ● |
| ZR508A04890 | 3/4 | R.090 | 1-1/2 | 4-1/8 | 3/4 | 8 | ● |

ENDMILL

DRILL

Tolerance of Mill Dia. [mm]

0 ~ -.0012

Tolerance of Shank Dia.

h6

* For the items produced from 1st. 2010, apply to these tolerance.

Tolerance of Mill Dia. [mm]

0 ~ -.0012

Tolerance of Shank Dia.

h6

* For the items produced from 1st. 2010, apply to these tolerance.

DB512



2 FLUTE, LONG LENGTH, BALL NOSE

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- Suitable for copy milling.

| EDP. No. | Dia. | R | C.L | OAL | SH.Dia. | STOCK |
|----------|------|------|-----|-----|---------|-------|
| DB512010 | 1.0 | 0.5 | 3 | 50 | 6 | ● |
| DB512015 | 1.5 | 0.75 | 4 | 50 | 6 | ● |
| DB512020 | 2.0 | 1 | 5 | 60 | 6 | ● |
| DB512025 | 2.5 | 1.25 | 6 | 60 | 6 | ● |
| DB512030 | 3.0 | 1.5 | 8 | 70 | 6 | ● |
| DB512035 | 3.5 | 1.75 | 8 | 70 | 6 | ● |
| DB512040 | 4.0 | 2 | 8 | 70 | 6 | ● |
| DB512045 | 4.5 | 2.25 | 10 | 70 | 6 | ● |
| DB512050 | 5.0 | 2.5 | 12 | 80 | 6 | ● |
| DB512055 | 5.5 | 2.75 | 12 | 80 | 6 | ● |
| DB512060 | 6.0 | 3 | 12 | 90 | 6 | ● |
| DB512065 | 6.5 | 3.25 | 12 | 90 | 8 | ● |
| DB512070 | 7.0 | 3.5 | 15 | 90 | 8 | ● |
| DB512080 | 8.0 | 4 | 15 | 100 | 8 | ● |
| DB512090 | 9.0 | 4.5 | 20 | 100 | 10 | ● |
| DB512100 | 10 | 5 | 20 | 100 | 10 | ● |
| DB512101 | | | 25 | 150 | | ● |
| DB512110 | 11 | 5.5 | 25 | 110 | 12 | ● |
| DB512120 | | | 25 | 110 | | ● |
| DB512121 | 12 | 6 | 30 | 150 | 12 | ● |
| DB512122 | | | 35 | 200 | | ● |
| DB512130 | 13 | 6.5 | 30 | 120 | 14 | ● |
| DB512140 | 14 | 7 | 30 | 120 | 14 | ● |
| DB512150 | 15 | 7.5 | 35 | 140 | 16 | ● |
| DB512160 | 16 | 8 | 35 | 140 | 16 | ● |
| DB512161 | | | 40 | 200 | | ● |
| DB512162 | | | 45 | 250 | | ● |
| DB512180 | 18 | 9 | 40 | 150 | 18 | ● |
| DB512200 | 20 | 10 | 40 | 160 | 20 | ● |
| DB512201 | | | 45 | 200 | | ● |
| DB512202 | | | 50 | 250 | | ● |
| DB512250 | 25 | 12.5 | 50 | 180 | 25 | ● |

| | |
|-----------------------------|-------------------------|
| Tolerance of Mill Dia. (mm) | Tolerance of Shank Dia. |
| 0 ~ -0.02 | h6 |

* For the items produced from 1st. 2010, apply to these tolerance.

DB514



4 FLUTE, LONG LENGTH, BALL NOSE

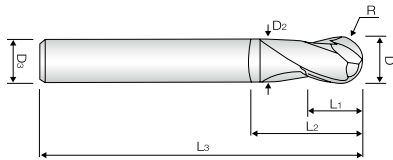
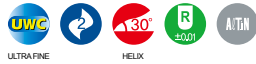
- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- Suitable for copy milling.

| EDP. No. | Dia. | R | C.L | OAL | SH.Dia. | STOCK |
|----------|------|------|-----|-----|---------|-------|
| DB514030 | 3 | 1.5 | 8 | 70 | 6 | ● |
| DB514040 | 4 | 2 | 8 | 70 | 6 | ● |
| DB514050 | 5 | 2.5 | 10 | 80 | 6 | ● |
| DB514060 | 6 | 3 | 12 | 90 | 6 | ● |
| DB514070 | 7 | 3.5 | 15 | 90 | 8 | ● |
| DB514080 | 8 | 4 | 15 | 100 | 8 | ● |
| DB514090 | 9 | 4.5 | 20 | 100 | 10 | ● |
| DB514100 | 10 | 5 | 20 | 100 | 10 | ● |
| DB514110 | 11 | 5.5 | 25 | 110 | 12 | ● |
| DB514120 | 12 | 6 | 25 | 110 | 12 | ● |
| DB514130 | 13 | 6.5 | 30 | 120 | 14 | ● |
| DB514140 | 14 | 7 | 30 | 120 | 14 | ● |
| DB514150 | 15 | 7.5 | 35 | 140 | 16 | ● |
| DB514160 | 16 | 8 | 35 | 140 | 16 | ● |
| DB514180 | 18 | 9 | 40 | 150 | 18 | ● |
| DB514200 | 20 | 10 | 40 | 160 | 20 | ● |
| DB514250 | 25 | 12.5 | 50 | 180 | 25 | ● |

| | |
|-----------------------------|-------------------------|
| Tolerance of Mill Dia. (mm) | Tolerance of Shank Dia. |
| 0 ~ -0.02 | h6 |

* For the items produced from 1st. 2010, apply to these tolerance.

DB502

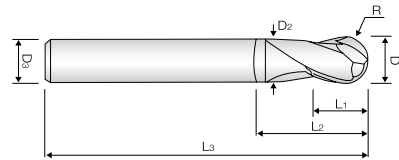
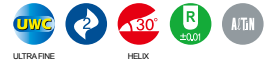


**2 FLUTE, STUB CUT LENGTH,
BALL NOSE with EXTENDED NECK**

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- Suitable for copy milling.
- Designed to high strength.

| EDP. No. | D | R | L ₁ | L ₂ | L ₃ | D ₂ | D ₃ | STOCK |
|----------|------|------|----------------|----------------|----------------|----------------|----------------|-------|
| DB502010 | 1.0 | 0.5 | 1 | 3 | 50 | 0.95 | 6 | ● |
| DB502015 | 1.5 | 0.75 | 1.5 | 4 | 50 | 1.45 | 6 | ● |
| DB502020 | 2.0 | 1 | 2 | 6 | 60 | 1.9 | 6 | ● |
| DB502030 | 3.0 | 1.5 | 4 | 9 | 70 | 2.85 | 6 | ● |
| DB502040 | 4.0 | 2 | 5 | 12 | 70 | 3.85 | 6 | ● |
| DB502050 | 5.0 | 2.5 | 6 | 15 | 80 | 4.7 | 6 | ● |
| DB502060 | 6.0 | 3 | 7 | 18 | 90 | 5.7 | 6 | ● |
| DB502080 | 8.0 | 4 | 10 | 24 | 90 | 7.7 | 8 | ● |
| DB502100 | 10.0 | 5 | 12 | 30 | 100 | 9.5 | 10 | ● |
| DB502120 | 12.0 | 6 | 14 | 36 | 110 | 11.5 | 12 | ● |

DB522



2 FLUTE, EXTENDED NECK-LONG SHANK

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- Suitable for copy milling.
- Suitable for deep copy milling with long neck type.

| EDP. No. | D | R | L ₁ | L ₂ | L ₃ | D ₂ | D ₃ | STOCK |
|----------|----|-----|----------------|----------------|----------------|----------------|----------------|-------|
| DB522030 | 3 | 1.5 | 4 | 35 | 100 | 2.9 | 6 | ● |
| DB522040 | 4 | 2 | 6 | 35 | 100 | 3.9 | 6 | ● |
| DB522050 | 5 | 2.5 | 7 | 40 | 115 | 4.9 | 6 | ● |
| DB522060 | 6 | 3 | 8 | 45 | 115 | 5.9 | 6 | ● |
| DB522061 | 6 | 3 | 8 | 45 | 115 | 5.9 | 8 | ● |
| DB522070 | 7 | 3.5 | 10 | 45 | 125 | 6.9 | 8 | ● |
| DB522080 | 8 | 4 | 12 | 55 | 125 | 7.9 | 8 | ● |
| DB522081 | 8 | 4 | 12 | 55 | 125 | 7.9 | 10 | ● |
| DB522090 | 9 | 4.5 | 15 | 65 | 140 | 8.9 | 10 | ● |
| DB522100 | 10 | 5 | 15 | 65 | 140 | 9.9 | 10 | ● |
| DB522120 | 12 | 6 | 18 | 75 | 150 | 11.9 | 12 | ● |
| DB522140 | 14 | 7 | 23 | 75 | 155 | 13.9 | 14 | ● |
| DB522160 | 16 | 8 | 30 | 75 | 155 | 15.9 | 16 | ● |

ENDMILL

DRILL

Tolerance of Mill Dia. [mm]

0 ~ -0.02

Tolerance of Shank Dia.

h6

* For the items produced from 1st. 2010, apply to these tolerance.

Tolerance of Mill Dia. [mm]

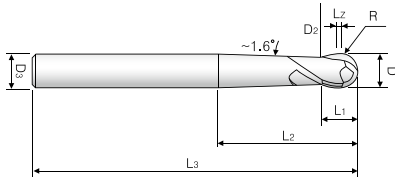
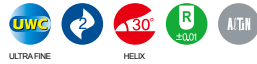
0 ~ -0.02

Tolerance of Shank Dia.

h6

* For the items produced from 1st. 2010, apply to these tolerance.

DB532

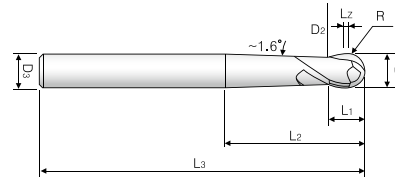


2 FLUTE, MMC-SPHERE TYPE

- For copy milling & steep sloped machining in Mold & Die.
- ALTiN coated for high wear resistance.

| EDP. No. | D | R | L ₁ | L ₂ | L ₃ | D ₃ | L ₄ | Lz | STOCK |
|----------|----|-----|----------------|----------------|----------------|----------------|----------------|-----|-------|
| DB532030 | 3 | 1.5 | 4 | 30 | 80 | 2.5 | 6 | 1.5 | ● |
| DB532031 | 3 | 1.5 | 2.3 | 30 | 80 | 2.5 | 6 | - | ● |
| DB532040 | 4 | 2 | 5 | 30 | 80 | 3.3 | 6 | 1.5 | ● |
| DB532041 | 4 | 2 | 3.1 | 30 | 80 | 3.3 | 6 | - | ● |
| DB532050 | 5 | 2.5 | 6 | 43 | 80 | 4.1 | 6 | 2 | ● |
| DB532051 | 5 | 2.5 | 3.9 | 38 | 80 | 4.1 | 6 | - | ● |
| DB532060 | 6 | 3 | 7 | 30 | 100 | 4.7 | 6 | 2 | ● |
| DB532061 | 6 | 3 | 4.9 | 28 | 100 | 4.7 | 6 | - | ● |
| DB532080 | 8 | 4 | 9 | 36 | 100 | 6.5 | 8 | 3 | ● |
| DB532081 | 8 | 4 | 6.3 | 33 | 100 | 6.5 | 8 | - | ● |
| DB532100 | 10 | 5 | 11 | 43 | 100 | 8.2 | 10 | 3 | ● |
| DB532101 | 10 | 5 | 7.9 | 40 | 100 | 8.2 | 10 | - | ● |
| DB532120 | 12 | 6 | 13 | 52 | 100 | 9.8 | 12 | 3 | ● |
| DB532121 | 12 | 6 | 9.5 | 49 | 100 | 9.8 | 12 | - | ● |
| DB532160 | 16 | 8 | 15 | 61 | 150 | 13.4 | 16 | 3 | ● |
| DB532161 | 16 | 8 | 12.4 | 59 | 150 | 13.4 | 16 | - | ● |

DB534



4 FLUTE, MMC-SPHERE TYPE

- For copy milling & steep sloped machining in Mold & Die.
- ALTiN coated for high wear resistance.

| EDP. No. | D | R | L ₁ | L ₂ | L ₃ | D ₃ | L ₄ | Lz | STOCK |
|----------|----|-----|----------------|----------------|----------------|----------------|----------------|----|-------|
| DB534050 | 5 | 2.5 | 6 | 43 | 80 | 4.1 | 6 | 2 | ● |
| DB534051 | 5 | 2.5 | 3.9 | 38 | 80 | 4.1 | 6 | - | ● |
| DB534060 | 6 | 3 | 7 | 30 | 100 | 4.7 | 6 | 2 | ● |
| DB534061 | 6 | 3 | 4.9 | 28 | 100 | 4.7 | 6 | - | ● |
| DB534080 | 8 | 4 | 9 | 36 | 100 | 6.5 | 8 | 3 | ● |
| DB534081 | 8 | 4 | 6.3 | 33 | 100 | 6.5 | 8 | - | ● |
| DB534100 | 10 | 5 | 11 | 43 | 100 | 8.2 | 10 | 3 | ● |
| DB534101 | 10 | 5 | 7.9 | 40 | 100 | 8.2 | 10 | - | ● |
| DB534120 | 12 | 6 | 13 | 52 | 100 | 9.8 | 12 | 3 | ● |
| DB534121 | 12 | 6 | 9.5 | 49 | 100 | 9.8 | 12 | - | ● |
| DB534160 | 16 | 8 | 15 | 61 | 150 | 13.4 | 16 | 3 | ● |
| DB534161 | 16 | 8 | 12.4 | 59 | 150 | 13.4 | 16 | - | ● |

ENDMILL

DRILL

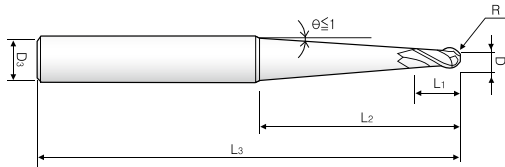
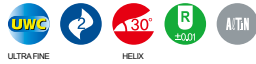
| | |
|-----------------------------|-------------------------|
| Tolerance of Mill Dia. (mm) | Tolerance of Shank Dia. |
| 0 ~ -0.02 | h6 |

* For the items produced from 1st. 2010, apply to these tolerance.

| | |
|-----------------------------|-------------------------|
| Tolerance of Mill Dia. (mm) | Tolerance of Shank Dia. |
| 0 ~ -0.02 | h6 |

* For the items produced from 1st. 2010, apply to these tolerance.

DB54(5)2



2 FLUTE, BALL NOSE with TAPER NECK

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- Suitable for copy milling.
- Suitable for deep copy milling with taper long neck type.

| EDP. No. | D | R | L ₁ | L ₂ | L ₃ | D ₃ | STOCK |
|----------|----|-----|----------------|----------------|----------------|----------------|-------|
| DB542020 | 2 | 1.0 | 3 | 63 | 110 | 6 | ● |
| DB552020 | 2 | 1.0 | 5 | 85 | 155 | 6 | ● |
| DB542030 | 3 | 1.5 | 5 | 65 | 110 | 6 | ● |
| DB552030 | 3 | 1.5 | 7 | 87 | 155 | 6 | ● |
| DB542040 | 4 | 2.0 | 7 | 67 | 110 | 6 | ● |
| DB552040 | 4 | 2.0 | 10 | 90 | 155 | 8 | ● |
| DB542050 | 5 | 2.5 | 10 | 70 | 110 | 6 | ● |
| DB552050 | 5 | 2.5 | 15 | 95 | 155 | 8 | ● |
| DB542060 | 6 | 3.0 | 18 | 78 | 155 | 10 | ● |
| DB552060 | 6 | 3.0 | 20 | 110 | 200 | 10 | ● |
| DB542080 | 8 | 4.0 | 30 | 100 | 155 | 12 | ● |
| DB552080 | 8 | 4.0 | 30 | 120 | 200 | 12 | ● |
| DB542100 | 10 | 5.0 | 40 | 100 | 155 | 12 | ● |
| DB552100 | 10 | 5.0 | 40 | 120 | 200 | 12 | ● |
| DB542120 | 12 | 6.0 | 50 | 110 | 155 | 16 | ● |
| DB552120 | 12 | 6.0 | 50 | 130 | 200 | 16 | ● |

ZE502



2 FLUTE, REGULAR LENGTH

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- Superior workpiece finishes.

| EDP. No. | Dia. | C.L | OAL | SH.Dia. | STOCK |
|-------------|------|-----|-----|---------|-------|
| ZE502010 | 1 | 3 | 42 | 6 | ● |
| ZE502015 | 1.5 | 4 | 42 | 6 | ● |
| ZE502020 | 2 | 6 | 42 | 6 | ● |
| ZE502025 | 2.5 | 8 | 42 | 6 | ● |
| ZE502030 | 3 | 10 | 50 | 6 | ● |
| ZE502035 | 3.5 | 10 | 50 | 6 | ● |
| ZE502040 | 4 | 12 | 50 | 6 | ● |
| ZE502045 | 4.5 | 14 | 50 | 6 | ● |
| ZE502050 | 5 | 15 | 50 | 6 | ● |
| ZE502055 | 5.5 | 15 | 50 | 6 | ● |
| ZE502060 | 6 | 15 | 50 | 6 | ● |
| ZE502065 | 6.5 | 18 | 60 | 8 | ● |
| ZE502070 | 7 | 20 | 60 | 8 | ● |
| ZE502075 | 7.5 | 20 | 60 | 8 | ● |
| ZE502080 | 8 | 20 | 60 | 8 | ● |
| ZE502085 | 8.5 | 23 | 70 | 10 | ● |
| ZE502090 | 9 | 25 | 70 | 10 | ● |
| ZE502095 | 9.5 | 25 | 70 | 10 | ● |
| ZE502100 | 10 | 25 | 70 | 10 | ● |
| ZE502105 | 10.5 | 28 | 75 | 12 | ● |
| ZE502110 | 11 | 30 | 75 | 12 | ● |
| ZE502115 | 11.5 | 30 | 75 | 12 | ● |
| ZE502120 | 12 | 30 | 75 | 12 | ● |
| ZE502130S12 | 13 | 30 | 80 | 12 | ● |

ENDMILL

DRILL

| Tolerance of Mill Dia. (mm) | Tolerance of Shank Dia. |
|-----------------------------|-------------------------|
| 0 ~ -0.02 | h6 |

* For the items produced from 1st. 2010, apply to these tolerance.



ZE504



4 FLUTE, REGULAR LENGTH

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- Superior workpiece finishes.

| EDP. No. | Dia. | C.L | OAL | SH.Dia. | STOCK |
|-------------|------|-----|-----|---------|-------|
| ZE502130 | 13 | 35 | 85 | 14 | ● |
| ZE502130S16 | 13 | 35 | 90 | 16 | ● |
| ZE502140 | 14 | 35 | 85 | 14 | ● |
| ZE502140S16 | 14 | 35 | 90 | 16 | ● |
| ZE502150 | 15 | 40 | 90 | 16 | ● |
| ZE502160 | 16 | 40 | 90 | 16 | ● |
| ZE502170 | 17 | 40 | 100 | 16 | ● |
| ZE502180 | 18 | 45 | 100 | 18 | ● |
| ZE502190 | 19 | 45 | 100 | 20 | ● |
| ZE502200 | 20 | 45 | 100 | 20 | ● |
| ZE502220 | 22 | 45 | 100 | 20 | ● |
| ZE502240 | 24 | 50 | 120 | 25 | ● |
| ZE502250 | 25 | 50 | 120 | 25 | ● |

| EDP. No. | Dia. | C.L | OAL | SH.Dia. | STOCK |
|-------------|------|-----|-----|---------|-------|
| ZE504020 | 2 | 6 | 42 | 6 | ● |
| ZE504025 | 2.5 | 8 | 42 | 6 | ● |
| ZE504030 | 3 | 10 | 50 | 6 | ● |
| ZE504035 | 3.5 | 10 | 50 | 6 | ● |
| ZE504040 | 4 | 12 | 50 | 6 | ● |
| ZE504045 | 4.5 | 14 | 50 | 6 | ● |
| ZE504050 | 5 | 15 | 50 | 6 | ● |
| ZE504055 | 5.5 | 15 | 50 | 6 | ● |
| ZE504060 | 6 | 15 | 50 | 6 | ● |
| ZE504065 | 6.5 | 18 | 60 | 8 | ● |
| ZE504070 | 7 | 20 | 60 | 8 | ● |
| ZE504075 | 7.5 | 20 | 60 | 8 | ● |
| ZE504080 | 8 | 20 | 60 | 8 | ● |
| ZE504085 | 8.5 | 23 | 70 | 10 | ● |
| ZE504090 | 9 | 25 | 70 | 10 | ● |
| ZE504095 | 9.5 | 25 | 70 | 10 | ● |
| ZE504100 | 10 | 25 | 70 | 10 | ● |
| ZE504105 | 10.5 | 28 | 75 | 12 | ● |
| ZE504110 | 11 | 30 | 75 | 12 | ● |
| ZE504115 | 11.5 | 30 | 75 | 12 | ● |
| ZE504120 | 12 | 30 | 75 | 12 | ● |
| ZE504130S12 | 13 | 35 | 80 | 12 | ● |
| ZE504130 | 13 | 35 | 85 | 14 | ● |
| ZE504130S16 | 13 | 35 | 90 | 16 | ● |
| ZE504140 | 14 | 35 | 85 | 14 | ● |
| ZE504140S16 | 14 | 35 | 90 | 16 | ● |
| ZE504150 | 15 | 40 | 90 | 16 | ● |
| ZE504160 | 16 | 40 | 90 | 16 | ● |
| ZE504170 | 17 | 40 | 100 | 16 | ● |
| ZE504180 | 18 | 45 | 100 | 18 | ● |
| ZE504190 | 19 | 45 | 100 | 20 | ● |
| ZE504200 | 20 | 45 | 100 | 20 | ● |
| ZE504220 | 22 | 45 | 100 | 20 | ● |
| ZE504240 | 24 | 50 | 120 | 25 | ● |
| ZE504250 | 25 | 50 | 120 | 25 | ● |

| Tolerance of Mill Dia. (mm) | Tolerance of Shank Dia. |
|-----------------------------|-------------------------|
| 0 ~ -0.02 | h6 |

* For the items produced from 1st. 2010, apply to these tolerance.

| Tolerance of Mill Dia. (mm) | Tolerance of Shank Dia. |
|-----------------------------|-------------------------|
| 0 ~ -0.02 | h6 |

* For the items produced from 1st. 2010, apply to these tolerance.

ENDMILL

DRILL

ZE503



3 FLUTE, REGULAR LENGTH

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- Superior workpiece finishes.

| EDP. No. | Dia. | C.L | OAL | SH.Dia. | STOCK |
|----------|------|-----|-----|---------|-------|
| ZE503060 | 6 | 15 | 50 | 6 | ● |
| ZE503070 | 7 | 18 | 60 | 8 | ● |
| ZE503080 | 8 | 18 | 60 | 8 | ● |
| ZE503090 | 9 | 22 | 70 | 10 | ● |
| ZE503100 | 10 | 22 | 70 | 10 | ● |
| ZE503110 | 11 | 26 | 75 | 12 | ● |
| ZE503120 | 12 | 26 | 75 | 12 | ● |
| ZE503130 | 13 | 32 | 85 | 14 | ● |
| ZE503140 | 14 | 32 | 85 | 14 | ● |
| ZE503150 | 15 | 35 | 90 | 16 | ● |
| ZE503160 | 16 | 35 | 90 | 16 | ● |
| ZE503180 | 18 | 40 | 100 | 18 | ● |
| ZE503200 | 20 | 40 | 100 | 20 | ● |
| ZE503250 | 25 | 50 | 120 | 25 | ● |
| ZE503320 | 32 | 70 | 150 | 32 | ● |

ZE506



6 FLUTE, REGULAR & LONG LENGTH

- Designed for highly hardened materials up to HRC 55.
- Suitable for high speed & finishing machining.

| EDP. No. | Dia. | C.L | OAL | SH.Dia. | STOCK |
|----------|------|-----|-----|---------|-------|
| ZE506060 | 6 | 15 | 50 | 6 | ● |
| ZE506061 | 6 | 26 | 70 | 6 | ● |
| ZE506070 | 7 | 18 | 60 | 8 | ● |
| ZE506080 | 8 | 18 | 60 | 8 | ● |
| ZE506081 | 8 | 36 | 90 | 8 | ● |
| ZE506090 | 9 | 22 | 70 | 10 | ● |
| ZE506100 | 10 | 22 | 70 | 10 | ● |
| ZE506101 | 10 | 46 | 100 | 10 | ● |
| ZE506110 | 11 | 26 | 75 | 12 | ● |
| ZE506120 | 12 | 26 | 75 | 12 | ● |
| ZE506121 | 12 | 56 | 110 | 12 | ● |
| ZE506130 | 13 | 32 | 85 | 14 | ● |
| ZE506140 | 14 | 32 | 85 | 14 | ● |
| ZE506150 | 15 | 35 | 90 | 16 | ● |
| ZE506160 | 16 | 35 | 90 | 16 | ● |
| ZE506161 | 16 | 66 | 130 | 16 | ● |
| ZE506180 | 18 | 44 | 100 | 18 | ● |
| ZE506200 | 20 | 44 | 100 | 20 | ● |
| ZE506201 | 20 | 76 | 150 | 20 | ● |
| ZE506250 | 25 | 50 | 120 | 25 | ● |
| ZE506251 | 25 | 92 | 180 | 25 | ● |
| ZE506320 | 32 | 70 | 150 | 32 | ● |

ENDMILL

DRILL

Tolerance of Mill Dia. [mm]

0 ~ -0.03

Tolerance of Shank Dia.

h6

* For the items produced from 1st. 2010, apply to these tolerance.

Tolerance of Mill Dia. [mm]

0 ~ -0.03

Tolerance of Shank Dia.

h6

* For the items produced from 1st. 2010, apply to these tolerance.

ZM502



2 FLUTE, MEDIUM LENGTH

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- Superior workpiece finishes.

| EDP. No. | Dia. | C.L | OAL | SH.Dia. | STOCK |
|----------|------|-----|-----|---------|-------|
| ZM502020 | 2 | 8 | 40 | 4 | ● |
| ZM502030 | 3 | 12 | 50 | 6 | ● |
| ZM502040 | 4 | 15 | 50 | 6 | ● |
| ZM502050 | 5 | 20 | 60 | 6 | ● |
| ZM502060 | 6 | 20 | 60 | 6 | ● |
| ZM502080 | 8 | 25 | 70 | 8 | ● |
| ZM502100 | 10 | 30 | 90 | 10 | ● |
| ZM502120 | 12 | 30 | 90 | 12 | ● |
| ZM502140 | 14 | 40 | 110 | 16 | ● |
| ZM502160 | 16 | 50 | 110 | 16 | ● |
| ZM502180 | 18 | 50 | 110 | 20 | ● |
| ZM502200 | 20 | 55 | 110 | 20 | ● |
| ZM502250 | 25 | 75 | 140 | 25 | ● |

ZM504



4 FLUTE, MEDIUM LENGTH

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- Superior workpiece finishes.

| EDP. No. | Dia. | C.L | OAL | SH.Dia. | STOCK |
|----------|------|-----|-----|---------|-------|
| ZM504020 | 2 | 8 | 40 | 4 | ● |
| ZM504030 | 3 | 12 | 50 | 6 | ● |
| ZM504040 | 4 | 15 | 50 | 6 | ● |
| ZM504050 | 5 | 20 | 60 | 6 | ● |
| ZM504060 | 6 | 20 | 60 | 6 | ● |
| ZM504080 | 8 | 25 | 70 | 8 | ● |
| ZM504100 | 10 | 30 | 90 | 10 | ● |
| ZM504120 | 12 | 30 | 90 | 12 | ● |
| ZM504140 | 14 | 40 | 110 | 16 | ● |
| ZM504160 | 16 | 50 | 110 | 16 | ● |
| ZM504180 | 18 | 50 | 110 | 20 | ● |
| ZM504200 | 20 | 55 | 110 | 20 | ● |
| ZM504250 | 25 | 75 | 140 | 25 | ● |

| Tolerance of Mill Dia. (mm) | Tolerance of Shank Dia. |
|-----------------------------|-------------------------|
| 0 ~ -0.02 | h6 |

* For the items produced from 1st. 2010, apply to these tolerance.

| Tolerance of Mill Dia. (mm) | Tolerance of Shank Dia. |
|-----------------------------|-------------------------|
| 0 ~ -0.02 | h6 |

* For the items produced from 1st. 2010, apply to these tolerance.

ZM522**2 FLUTE, MEDIUM CUT LONG SHANK TYPE**

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- Superior workpiece finishes.

| EDP. No. | Dia. | C.L | OAL | SH.Dia. | STOCK |
|-----------------|------|-----|-----|---------|-------|
| ZM522030 | 3 | 10 | 70 | 6 | ● |
| ZM522040 | 4 | 12 | 70 | 6 | ● |
| ZM522050 | 5 | 15 | 80 | 6 | ● |
| ZM522060 | 6 | 15 | 80 | 6 | ● |
| ZM522080 | 8 | 20 | 100 | 8 | ● |
| ZM522100 | 10 | 25 | 100 | 10 | ● |
| ZM522120 | 12 | 30 | 110 | 12 | ● |
| ZM522160 | 16 | 40 | 125 | 16 | ● |
| ZM522200 | 20 | 45 | 150 | 20 | ● |

ZM524**4 FLUTE, MEDIUM CUT LONG SHANK TYPE**

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- Superior workpiece finishes.

| EDP. No. | Dia. | C.L | OAL | SH.Dia. | STOCK |
|-----------------|------|-----|-----|---------|-------|
| ZM524030 | 3 | 10 | 70 | 6 | ● |
| ZM524040 | 4 | 12 | 70 | 6 | ● |
| ZM524050 | 5 | 15 | 80 | 6 | ● |
| ZM524060 | 6 | 15 | 80 | 6 | ● |
| ZM524080 | 8 | 20 | 100 | 8 | ● |
| ZM524100 | 10 | 25 | 100 | 10 | ● |
| ZM524120 | 12 | 30 | 110 | 12 | ● |
| ZM524160 | 16 | 40 | 125 | 16 | ● |
| ZM524200 | 20 | 45 | 150 | 20 | ● |

ENDMILL

DRILL

Tolerance of Mill Dia. [mm]

0 ~ -0.02

Tolerance of Shank Dia.

h6

* For the items produced from 1st. 2010, apply to these tolerance.

Tolerance of Mill Dia. [mm]

0 ~ -0.02

Tolerance of Shank Dia.

h6

* For the items produced from 1st. 2010, apply to these tolerance.

ZE522



2 FLUTE, LONG LENGTH

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- Superior workpiece finishes.

| EDP. No. | Dia. | C.L | OAL | SH.Dia. | STOCK |
|----------|------|-----|-----|---------|-------|
| ZE522030 | 3 | 25 | 75 | 6 | ● |
| ZE522040 | 4 | 25 | 75 | 6 | ● |
| ZE522050 | 5 | 30 | 85 | 6 | ● |
| ZE522060 | 6 | 30 | 85 | 6 | ● |
| ZE522070 | 7 | 35 | 85 | 8 | ● |
| ZE522080 | 8 | 35 | 85 | 8 | ● |
| ZE522090 | 9 | 45 | 100 | 10 | ● |
| ZE522100 | 10 | 45 | 100 | 10 | ● |
| ZE522101 | 10 | 60 | 155 | 10 | ● |
| ZE522120 | 12 | 55 | 120 | 12 | ● |
| ZE522121 | 12 | 65 | 155 | 12 | ● |
| ZE522140 | 14 | 60 | 120 | 14 | ● |
| ZE522160 | 16 | 60 | 120 | 16 | ● |
| ZE522161 | 16 | 75 | 165 | 16 | ● |
| ZE522180 | 18 | 60 | 120 | 18 | ● |
| ZE522200 | 20 | 60 | 120 | 20 | ● |
| ZE522201 | 20 | 75 | 165 | 20 | ● |

| Tolerance of Mill Dia. (mm) | Tolerance of Shank Dia. |
|-----------------------------|-------------------------|
| 0 ~ -0.03 | h6 |

* For the items produced from 1st. 2010, apply to these tolerance.

ZE524



4 FLUTE, LONG LENGTH

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- Superior workpiece finishes.

| EDP. No. | Dia. | C.L | OAL | SH.Dia. | STOCK |
|----------|------|-----|-----|---------|-------|
| ZE524030 | 3 | 25 | 75 | 6 | ● |
| ZE524040 | 4 | 25 | 75 | 6 | ● |
| ZE524050 | 5 | 30 | 85 | 6 | ● |
| ZE524060 | 6 | 30 | 85 | 6 | ● |
| ZE524070 | 7 | 35 | 85 | 8 | ● |
| ZE524080 | 8 | 35 | 85 | 8 | ● |
| ZE524090 | 9 | 45 | 100 | 10 | ● |
| ZE524100 | 10 | 45 | 100 | 10 | ● |
| ZE524120 | 12 | 55 | 120 | 12 | ● |
| ZE524140 | 14 | 60 | 120 | 14 | ● |
| ZE524160 | 16 | 60 | 120 | 16 | ● |
| ZE524180 | 18 | 60 | 120 | 18 | ● |
| ZE524200 | 20 | 60 | 120 | 20 | ● |

| Tolerance of Mill Dia. (mm) | Tolerance of Shank Dia. |
|-----------------------------|-------------------------|
| 0 ~ -0.03 | h6 |

* For the items produced from 1st. 2010, apply to these tolerance.

ENDMILL

DRILL

ZE534



4 FLUTE, EXTRA LONG LENGTH

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- Superior workpiece finishes.

| EDP. No. | Dia. | C.L | OAL | SH.Dia. | STOCK |
|----------|------|-----|-----|---------|-------|
| ZE534040 | 4 | 30 | 130 | 6 | ● |
| ZE534050 | 5 | 35 | 130 | 6 | ● |
| ZE534060 | 6 | 40 | 130 | 6 | ● |
| ZE534061 | 6 | 50 | 155 | 6 | ● |
| ZE534081 | 8 | 60 | 155 | 8 | ● |
| ZE534082 | 8 | 80 | 200 | 8 | ● |
| ZE534101 | 10 | 60 | 155 | 10 | ● |
| ZE534102 | 10 | 80 | 200 | 10 | ● |
| ZE534121 | 12 | 60 | 155 | 12 | ● |
| ZE534122 | 12 | 80 | 200 | 12 | ● |
| ZE534161 | 16 | 80 | 155 | 16 | ● |
| ZE534162 | 16 | 100 | 200 | 16 | ● |
| ZE534163 | 16 | 120 | 250 | 16 | ● |
| ZE534201 | 20 | 80 | 165 | 20 | ● |
| ZE534202 | 20 | 100 | 200 | 20 | ● |
| ZE534203 | 20 | 130 | 250 | 20 | ● |
| ZE534252 | 25 | 100 | 200 | 25 | ● |
| ZE534253 | 25 | 150 | 250 | 25 | ● |

Tolerance of Mill Dia. [mm]

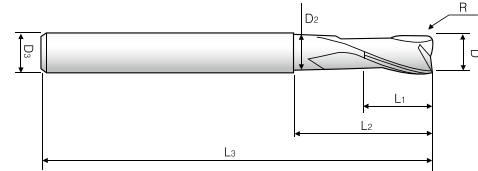
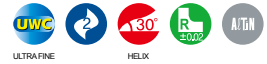
0 ~ -0.03

Tolerance of Shank Dia.

h6

* For the items produced from 1st. 2010, apply to these tolerance.

ZR502



2 FLUTE, STUB CUT LENGTH, CORNER RADIUS with EXTENDED NECK

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- Superior workpiece finishes.
- Increased feed rate.

| EDP. No. | D | R | L ₁ | L ₂ | L ₃ | D ₂ | D ₃ | STOCK |
|-----------|----|-----|----------------|----------------|----------------|----------------|----------------|-------|
| ZR5020405 | 4 | 0.5 | 6 | 10 | 55 | 3.7 | 6 | ● |
| ZR5020410 | | 1 | | | | | | ● |
| ZR5020605 | 6 | 0.5 | 8 | 15 | 55 | 5.7 | 6 | ● |
| ZR5020610 | | 1 | | | | | | ● |
| ZR5020805 | 8 | 0.5 | 10 | 20 | 65 | 7.7 | 8 | ● |
| ZR5020810 | | 1 | | | | | | ● |
| ZR5020815 | | 1.5 | | | | | | ● |
| ZR5020820 | | 2 | | | | | | ● |
| ZR5021005 | 10 | 0.5 | 12 | 28 | 80 | 9.5 | 10 | ● |
| ZR5021010 | | 1 | | | | | | ● |
| ZR5021015 | | 1.5 | | | | | | ● |
| ZR5021020 | | 2 | | | | | | ● |
| ZR5021205 | 12 | 0.5 | 15 | 30 | 82 | 11.5 | 12 | ● |
| ZR5021210 | | 1 | | | | | | ● |
| ZR5021215 | | 1.5 | | | | | | ● |
| ZR5021220 | | 2 | | | | | | ● |

Tolerance of Mill Dia. [mm]

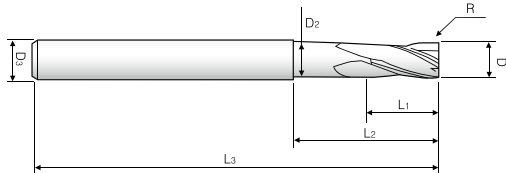
0 ~ -0.02

Tolerance of Shank Dia.

h6

* For the items produced from 1st. 2010, apply to these tolerance.

ZR504



4 FLUTE, STUB CUT LENGTH, CORNER RADIUS with EXTENDED NECK

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- Superior workpiece finishes.
- Increased feed rate.

| EDP. No. | D | R | L ₁ | L ₂ | L ₃ | D ₂ | D ₃ | STOCK |
|-----------|----|-----|----------------|----------------|----------------|----------------|----------------|-------|
| ZR5040405 | 4 | 0.5 | 6 | 10 | 55 | 3.7 | 6 | ● |
| ZR5040410 | | 1 | | | | | | ● |
| ZR5040605 | 6 | 0.5 | 8 | 15 | 55 | 5.7 | 6 | ● |
| ZR5040610 | | 1 | | | | | | ● |
| ZR5040805 | 8 | 0.5 | 10 | 20 | 65 | 7.7 | 8 | ● |
| ZR5040810 | | 1 | | | | | | ● |
| ZR5040815 | | 1.5 | | | | | | ● |
| ZR5040820 | | 2 | | | | | | ● |
| ZR5041005 | 10 | 0.5 | 12 | 28 | 80 | 9.5 | 10 | ● |
| ZR5041010 | | 1 | | | | | | ● |
| ZR5041015 | | 1.5 | | | | | | ● |
| ZR5041020 | | 2 | | | | | | ● |
| ZR5041205 | 12 | 0.5 | 15 | 30 | 82 | 11.5 | 12 | ● |
| ZR5041210 | | 1 | | | | | | ● |
| ZR5041215 | | 1.5 | | | | | | ● |
| ZR5041220 | | 2 | | | | | | ● |

| Tolerance of Mill Dia. [mm] | Tolerance of Shank Dia. |
|-----------------------------|-------------------------|
| 0 ~ -0.02 | h6 |

* For the items produced from 1st. 2010, apply to these tolerance.

ZR512



2 FLUTE, REGULAR LENGTH, CORNER RADIUS

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- Superior workpiece finishes.
- Increased feed rate.

| EDP. No. | Dia. | R | C.L | OAL | SH.Dia. | STOCK |
|-----------|------|-----|-----|-----|---------|-------|
| ZR5120605 | 6 | 0.5 | 15 | 55 | 6 | ● |
| ZR5120610 | | 1 | | | | ● |
| ZR5120805 | 8 | 0.5 | 20 | 65 | 8 | ● |
| ZR5120810 | | 1 | | | | ● |
| ZR5120815 | | 1.5 | | | | ● |
| ZR5120820 | 2 | ● | | | | |
| ZR5121005 | 10 | 0.5 | 25 | 80 | 10 | ● |
| ZR5121010 | | 1 | | | | ● |
| ZR5121015 | | 1.5 | | | | ● |
| ZR5121020 | | 2 | | | | ● |
| ZR5121025 | | 2.5 | | | | ● |
| ZR5121030 | 3 | ● | | | | |
| ZR5121205 | 12 | 0.5 | 30 | 82 | 12 | ● |
| ZR5121210 | | 1 | | | | ● |
| ZR5121215 | | 1.5 | | | | ● |
| ZR5121220 | | 2 | | | | ● |
| ZR5121225 | | 2.5 | | | | ● |
| ZR5121230 | 3 | ● | | | | |
| ZR5121605 | 16 | 0.5 | 40 | 100 | 16 | ● |
| ZR5121610 | | 1 | | | | ● |
| ZR5121615 | | 1.5 | | | | ● |
| ZR5121620 | | 2 | | | | ● |
| ZR5121630 | 3 | ● | | | | |
| ZR5122005 | 20 | 0.5 | 45 | 110 | 20 | ● |
| ZR5122010 | | 1 | | | | ● |
| ZR5122015 | | 1.5 | | | | ● |
| ZR5122020 | | 2 | | | | ● |
| ZR5122030 | 3 | ● | | | | |

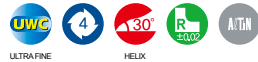
| Tolerance of Mill Dia. [mm] | Tolerance of Shank Dia. |
|-----------------------------|-------------------------|
| 0 ~ -0.02 | h6 |

* For the items produced from 1st. 2010, apply to these tolerance.

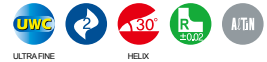
ENDMILL

DRILL

ZR514



ZR522



4 FLUTE, REGULAR LENGTH, CORNER RADIUS

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- Superior workpiece finishes.
- Increased feed rate.

| EDP. No. | Dia. | R | C.L | OAL | SH.Dia. | STOCK |
|-----------|------|-----|-----|-----|---------|-------|
| ZR5140605 | 6 | 0.5 | 15 | 55 | 6 | ● |
| ZR5140610 | | 1 | | | | ● |
| ZR5140805 | 8 | 0.5 | 20 | 65 | 8 | ● |
| ZR5140810 | | 1 | | | | ● |
| ZR5140815 | | 1.5 | | | | ● |
| ZR5140820 | | 2 | | | | ● |
| ZR5141005 | 10 | 0.5 | 25 | 80 | 10 | ● |
| ZR5141010 | | 1 | | | | ● |
| ZR5141015 | | 1.5 | | | | ● |
| ZR5141020 | | 2 | | | | ● |
| ZR5141025 | | 2.5 | | | | ● |
| ZR5141030 | | 3 | | | | ● |
| ZR5141205 | | 12 | | | | 0.5 |
| ZR5141210 | 1 | | ● | | | |
| ZR5141215 | 1.5 | | ● | | | |
| ZR5141220 | 2 | | ● | | | |
| ZR5141225 | 2.5 | | ● | | | |
| ZR5141230 | 3 | | ● | | | |
| ZR5141605 | 16 | 0.5 | 40 | 100 | 16 | ● |
| ZR5141610 | | 1 | | | | ● |
| ZR5141615 | | 1.5 | | | | ● |
| ZR5141620 | | 2 | | | | ● |
| ZR5141630 | 3 | ● | | | | |
| ZR5142005 | 20 | 0.5 | 45 | 110 | 20 | ● |
| ZR5142010 | | 1 | | | | ● |
| ZR5142015 | | 1.5 | | | | ● |
| ZR5142020 | | 2 | | | | ● |
| ZR5142030 | | 3 | | | | ● |

| | |
|-----------------------------|-------------------------|
| Tolerance of Mill Dia. [mm] | Tolerance of Shank Dia. |
| 0 ~ -0.02 | h6 |

* For the items produced from 1st. 2010, apply to these tolerance.

2 FLUTE, LONG LENGTH, CORNER RADIUS

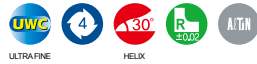
- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- Superior workpiece finishes.
- Increased feed rate.

| EDP. No. | Dia. | R | C.L | OAL | SH.Dia. | STOCK |
|-----------|------|-----|-----|-----|---------|-------|
| ZR5220302 | 3 | 0.2 | 8 | 60 | 6 | ● |
| ZR5220305 | | 0.5 | | | | ● |
| ZR5220402 | 4 | 0.2 | 11 | 70 | 6 | ● |
| ZR5220405 | | 0.5 | | | | ● |
| ZR5220410 | | 1 | | | | ● |
| ZR5220502 | 5 | 0.2 | 13 | 80 | 6 | ● |
| ZR5220505 | | 0.5 | | | | ● |
| ZR5220510 | | 1 | | | | ● |
| ZR5220602 | 6 | 0.2 | 13 | 90 | 6 | ● |
| ZR5220605 | | 0.5 | | | | ● |
| ZR5220610 | | 1 | | | | ● |
| ZR5220805 | 8 | 0.5 | 19 | 100 | 8 | ● |
| ZR5220810 | | 1 | | | | ● |
| ZR5220815 | | 1.5 | | | | ● |
| ZR5220820 | | 2 | | | | ● |
| ZR5221005 | 10 | 0.5 | 22 | 100 | 10 | ● |
| ZR5221010 | | 1 | | | | ● |
| ZR5221015 | | 1.5 | | | | ● |
| ZR5221020 | 12 | 2 | 26 | 110 | 12 | ● |
| ZR5221025 | | 2.5 | | | | ● |
| ZR5221205 | | 0.5 | | | | ● |
| ZR5221210 | 1 | ● | | | | |
| ZR5221215 | 1.5 | ● | | | | |
| ZR5221220 | 2 | ● | | | | |
| ZR5221225 | 2.5 | ● | | | | |
| ZR5221230 | 3 | ● | | | | |

| | |
|-----------------------------|-------------------------|
| Tolerance of Mill Dia. [mm] | Tolerance of Shank Dia. |
| 0 ~ -0.02 | h6 |

* For the items produced from 1st. 2010, apply to these tolerance.

ZR524



4 FLUTE, LONG LENGTH, CORNER RADIUS

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- Superior workpiece finishes.
- Increased feed rate.

| EDP. No. | Dia. | R | C.L | OAL | SH.Dia. | STOCK |
|-----------|------|-----|-----|-----|---------|-------|
| ZR5240302 | 3 | 0.2 | 8 | 60 | 6 | ● |
| ZR5240305 | | 0.5 | | | | ● |
| ZR5240402 | 4 | 0.2 | 11 | 70 | 6 | ● |
| ZR5240405 | | 0.5 | | | | ● |
| ZR5240410 | | 1 | | | | ● |
| ZR5240502 | 5 | 0.2 | 13 | 80 | 6 | ● |
| ZR5240505 | | 0.5 | | | | ● |
| ZR5240510 | | 1 | | | | ● |
| ZR5240602 | 6 | 0.2 | 13 | 90 | 6 | ● |
| ZR5240605 | | 0.5 | | | | ● |
| ZR5240610 | | 1 | | | | ● |
| ZR5240805 | 8 | 0.5 | 19 | 100 | 8 | ● |
| ZR5240810 | | 1 | | | | ● |
| ZR5240815 | | 1.5 | | | | ● |
| ZR5240820 | | 2 | | | | ● |
| ZR5241005 | 10 | 0.5 | 22 | 100 | 10 | ● |
| ZR5241010 | | 1 | | | | ● |
| ZR5241015 | | 1.5 | | | | ● |
| ZR5241020 | | 2 | | | | ● |
| ZR5241025 | | 2.5 | | | | ● |
| ZR5241205 | 12 | 0.5 | 26 | 110 | 12 | ● |
| ZR5241210 | | 1 | | | | ● |
| ZR5241215 | | 1.5 | | | | ● |
| ZR5241220 | | 2 | | | | ● |
| ZR5241225 | | 2.5 | | | | ● |
| ZR5241230 | | 3 | | | | ● |

TE503



3 FLUTE, TAPER END MILL

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- ALTiN coated for high wear resistance.

| EDP. No. | Dia. | θ° | C.L | N.D | OAL | SH.Dia. | STOCK | | |
|-----------|------|----|-----|------|-----|---------|-------|----|---|
| TE5033106 | 3 | 1 | 10 | 3.4 | 50 | 6 | ● | | |
| TE5033206 | | 2 | | 3.7 | | | ● | | |
| TE5033306 | | 3 | | 4 | | | ● | | |
| TE5033506 | | 5 | | 4.8 | | | ● | | |
| TE5034106 | 4 | 1 | 15 | 4.5 | 50 | 6 | ● | | |
| TE5034206 | | 2 | | 5 | | | ● | | |
| TE5034306 | | 3 | | 5.6 | | | ● | | |
| TE5034508 | 5 | 5 | 20 | 6.6 | 60 | 8 | ● | | |
| TE5035106 | | 1 | | 5.7 | | | 6 | ● | |
| TE5035208 | 5 | 2 | 20 | 6.4 | 60 | 8 | ● | | |
| TE5035308 | | 3 | | 7.1 | | | ● | | |
| TE5035508 | | 5 | | 8.5 | | | ● | | |
| TE5036108 | 6 | 1 | 20 | 6.7 | 60 | 8 | ● | | |
| TE5036208 | | 2 | | 7.4 | | | ● | | |
| TE5036308 | | 3 | | 8.1 | | | ● | | |
| TE5036510 | | 5 | | 9.5 | | | 70 | 10 | ● |
| TE5038110 | 8 | 1 | 25 | 8.9 | 70 | 10 | ● | | |
| TE5038210 | | 2 | | 9.8 | | | ● | | |
| TE5038312 | | 3 | | 10.6 | | | 75 | 12 | ● |
| TE5038512 | | 5 | | 12.4 | | | | | ● |
| TE5030112 | 10 | 1 | 35 | 11.2 | 90 | 12 | ● | | |
| TE5030212 | | 2 | | 28 | | | 12.4 | ● | |
| TE5030314 | | 3 | | 35 | | | 13.7 | 14 | ● |
| TE5030516 | | 5 | | 35 | | | 16.1 | 16 | ● |

ENDMILL

DRILL

| | |
|-----------------------------|-------------------------|
| Tolerance of Mill Dia. [mm] | Tolerance of Shank Dia. |
| 0 ~ -0.02 | h6 |

* For the items produced from 1st. 2010, apply to these tolerance.

TB503



TB504



3 FLUTE, TAPER BALL END MILL

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- ALTiN coated for high wear resistance.

4 FLUTE, TAPER BALL END MILL

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- ALTiN coated for high wear resistance.

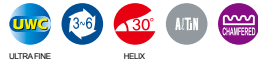
| EDP. No. | Dia. | R | θ° | C.L | OAL | SH.Dia. | STOCK |
|------------|------|-----|----------------|-----|-----|---------|-------|
| TB50315306 | 3 | 1.5 | 3° | 12 | 60 | 6 | |
| TB50320306 | 4 | 2 | | 15 | 60 | 6 | |
| TB50325308 | 5 | 2.5 | | 18 | 60 | 8 | |
| TB50330310 | 6 | 3 | | 22 | 70 | 10 | |
| TB50340312 | 8 | 4 | | 26 | 75 | 12 | |
| TB50350312 | 10 | 5 | | 19 | 75 | 12 | |
| TB50360316 | 12 | 6 | 36 | 90 | 16 | | |
| TB50315506 | 3 | 1.5 | 5° | 12 | 60 | 6 | |
| TB50320508 | 4 | 2 | | 15 | 60 | 8 | |
| TB50325510 | 5 | 2.5 | | 18 | 70 | 10 | |
| TB50330510 | 6 | 3 | | 22 | 70 | 10 | |
| TB50340512 | 8 | 4 | | 26 | 75 | 12 | |
| TB50350516 | 10 | 5 | | 30 | 90 | 16 | |
| TB50360520 | 12 | 6 | 36 | 100 | 20 | | |
| TB50315706 | 3 | 1.5 | 7° | 12 | 60 | 6 | |
| TB50320708 | 4 | 2 | | 15 | 60 | 8 | |
| TB50325710 | 5 | 2.5 | | 18 | 70 | 10 | |
| TB50330712 | 6 | 3 | | 22 | 75 | 12 | |
| TB50340716 | 8 | 4 | | 26 | 90 | 16 | |
| TB50350716 | 10 | 5 | | 30 | 90 | 16 | |
| TB50360720 | 12 | 6 | 36 | 100 | 20 | | |

| EDP. No. | Dia. | R | θ° | C.L | OAL | SH.Dia. | STOCK |
|------------|------|-----|----------------|-----|-----|---------|-------|
| TB50425308 | 5 | 2.5 | 3° | 18 | 60 | 8 | |
| TB50430310 | 6 | 3 | | 22 | 70 | 10 | |
| TB50440312 | 8 | 4 | | 26 | 75 | 12 | |
| TB50450312 | 10 | 5 | | 19 | 75 | 12 | |
| TB50460316 | 12 | 6 | 36 | 90 | 16 | | |
| TB50425510 | 5 | 2.5 | 5° | 18 | 70 | 10 | |
| TB50430510 | 6 | 3 | | 22 | 70 | 10 | |
| TB50440512 | 8 | 4 | | 26 | 75 | 12 | |
| TB50450516 | 10 | 5 | | 30 | 90 | 16 | |
| TB50460520 | 12 | 6 | 36 | 100 | 20 | | |
| TB50425710 | 5 | 2.5 | 7° | 18 | 70 | 10 | |
| TB50430712 | 6 | 3 | | 22 | 75 | 12 | |
| TB50440716 | 8 | 4 | | 26 | 90 | 16 | |
| TB50450716 | 10 | 5 | | 30 | 90 | 16 | |
| TB50460720 | 12 | 6 | 36 | 100 | 20 | | |

ENDMILL

DRILL

ZF60



ROUGHING END MILL

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- ALTiN coated for high wear resistance.
- Rough & finish type.

| EDP. No. | Dia. | C.L | OAL | SH.Dia. | Z | STOCK |
|----------|------|-----|-----|---------|---|-------|
| ZF603060 | 6 | 15 | 50 | 6 | 3 | ● |
| ZF603070 | 7 | 18 | 60 | 8 | 3 | ● |
| ZF603080 | 8 | 18 | 60 | 8 | 3 | ● |
| ZF604090 | 9 | 22 | 70 | 10 | 4 | ● |
| ZF604100 | 10 | 22 | 70 | 10 | 4 | ● |
| ZF604110 | 11 | 26 | 75 | 12 | 4 | ● |
| ZF604120 | 12 | 26 | 75 | 12 | 4 | ● |
| ZF604130 | 13 | 32 | 85 | 14 | 4 | ● |
| ZF604140 | 14 | 32 | 85 | 14 | 4 | ● |
| ZF604150 | 15 | 35 | 90 | 16 | 4 | ● |
| ZF604160 | 16 | 35 | 90 | 16 | 4 | ● |
| ZF604180 | 18 | 44 | 100 | 18 | 4 | ● |
| ZF604200 | 20 | 44 | 100 | 20 | 4 | ● |
| ZF605250 | 25 | 50 | 120 | 25 | 5 | ● |
| ZF606320 | 32 | 70 | 150 | 32 | 6 | ● |

ZF61



ROUGHING END MILL - FINE Pitch DIN6527L / DIN6535-HA, DIN6535-HB

- Designed for machine tool steel, alloy steel, mold steel and other high hardened materials.
- High velocity milling of hardened steels.
- For dry and wet milling.
- Fast chip ejection.

| EDP. No. | | Dia. | C.L | OAL | SH. Dia. | Z | STOCK |
|-------------|------------|------|-----|-----|----------|---|-------|
| PLAIN SHANK | FLAT SHANK | | | | | | |
| ZF613060 | ZF613060F | 6 | 16 | 57 | 6 | 3 | ● |
| ZF613070 | ZF613070F | 7 | 16 | 63 | 8 | 3 | ● |
| ZF613080 | ZF613080F | 8 | 16 | 63 | 8 | 3 | ● |
| ZF614090 | ZF614090F | 9 | 19 | 72 | 10 | 4 | ● |
| ZF614100 | ZF614100F | 10 | 22 | 72 | 10 | 4 | ● |
| ZF614120 | ZF614120F | 12 | 26 | 83 | 12 | 4 | ● |
| ZF614140 | ZF614140F | 14 | 32 | 83 | 14 | 4 | ● |
| ZF614160 | ZF614160F | 16 | 35 | 92 | 16 | 4 | ● |
| ZF614180 | ZF614180F | 18 | 40 | 100 | 18 | 4 | ● |
| ZF614200 | ZF614200F | 20 | 44 | 104 | 20 | 4 | ● |
| ZF615250 | ZF615250F | 25 | 50 | 120 | 25 | 5 | ● |

ENDMILL

DRILL

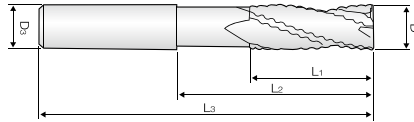
μm=1/1000mm

| Tolerance \ Dia | from 1 to 3 | over 3 to 6 | over 6 to 10 | over 10 to 18 | over 18 to 30 |
|---------------------------|-------------|-------------|--------------|---------------|---------------|
| Cutting Edge (h10) | 0 -40 | 0 -48 | 0 -58 | 0 -70 | 0 -84 |
| Shank (h6) | 0 -6 | 0 -8 | 0 -9 | 0 -11 | 0 -13 |

μm=1/1000mm

| Tolerance \ Dia | from 1 to 3 | over 3 to 6 | over 6 to 10 | over 10 to 18 | over 18 to 30 |
|---------------------------|-------------|-------------|--------------|---------------|---------------|
| Cutting Edge (h10) | 0 -40 | 0 -48 | 0 -58 | 0 -70 | 0 -84 |
| Shank (h6) | 0 -6 | 0 -8 | 0 -9 | 0 -11 | 0 -13 |

PK503



Z - AXIS ROUGHING END MILL

- Reducing cycle time by 1pass operating from Z-axis to slotting.
- Preventing the working interruption as Neck type.

| EDP. No. | D | L ₁ | L ₂ | L ₃ | d | Z | STOCK |
|-----------------|----|----------------|----------------|----------------|----|---|-------|
| PK503060 | 6 | 9 | 15 | 57 | 6 | 3 | ● |
| PK503080 | 8 | 12 | 20 | 63 | 8 | | ● |
| PK503100 | 10 | 15 | 25 | 72 | 10 | | ● |
| PK503120 | 12 | 18 | 30 | 83 | 12 | | ● |

| EDP. No. | D | L ₁ | L ₂ | L ₃ | d | Z | STOCK |
|-----------------|----|----------------|----------------|----------------|----|---|-------|
| PK503140 | 14 | 21 | 35 | 83 | 14 | 3 | ● |
| PK503160 | 16 | 24 | 40 | 92 | 16 | | ● |
| PK503200 | 20 | 30 | 50 | 104 | 20 | | ● |

ENDMILL

DRILL

µm=1/1000mm

| Tolerance \ Dia | from 1 to 3 | over 3 to 6 | over 6 to 10 | over 10 to 18 | over 18 to 30 |
|---------------------------|-------------|-------------|--------------|---------------|---------------|
| Cutting Edge (h11) | -20 -85 | -30 -105 | -40 -150 | -50 -180 | -65 -225 |
| Shank (h6) | 0 -6 | 0 -8 | 0 -9 | 0 -11 | 0 -13 |

DA302



2 FLUTE, REGULAR LENGTH, BALL NOSE

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.

| EDP. No. | Dia. | R | C.L | OAL | SH.Dia. | STOCK |
|----------|------|-------|-------|-------|---------|-------|
| DA302001 | 1/32 | R1/64 | 1/32 | 1-1/2 | 1/8 | ● |
| DA302002 | 1/16 | R1/32 | 1/16 | 1-1/2 | 1/8 | ● |
| DA302003 | 3/32 | R3/64 | 3/32 | 1-1/2 | 1/8 | ● |
| DA302004 | 1/8 | R1/16 | 5/16 | 1-1/2 | 1/8 | ● |
| DA302006 | 3/16 | R3/32 | 3/8 | 2 | 3/16 | ● |
| DA302008 | 1/4 | R1/8 | 1/2 | 2-1/2 | 1/4 | ● |
| DA302010 | 5/16 | R5/32 | 9/16 | 2-1/2 | 5/16 | ● |
| DA302012 | 3/8 | R3/16 | 3/4 | 2-1/2 | 3/8 | ● |
| DA302016 | 1/2 | R1/4 | 7/8 | 3 | 1/2 | ● |
| DA302020 | 5/8 | R5/16 | 1-1/4 | 3-1/2 | 5/8 | ● |
| DA302024 | 3/4 | R3/8 | 1-1/2 | 4 | 3/4 | ● |
| DA302032 | 1 | R1/2 | 1-1/2 | 4 | 1 | ● |

ZA302



2 FLUTE, REGULAR LENGTH

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.

| EDP. No. | Dia. | C.L | OAL | SH.Dia. | STOCK |
|----------|------|-------|-------|---------|-------|
| ZA302002 | 1/32 | 1/8 | 1-1/2 | 1/8 | ● |
| ZA302004 | 1/16 | 3/16 | 1-1/2 | 1/8 | ● |
| ZA302008 | 1/8 | 1/2 | 1-1/2 | 1/8 | ● |
| ZA302012 | 3/16 | 5/8 | 2 | 3/16 | ● |
| ZA302016 | 1/4 | 3/4 | 2-1/2 | 1/4 | ● |
| ZA302020 | 5/16 | 13/16 | 2-1/2 | 5/16 | ● |
| ZA302024 | 3/8 | 1 | 2-1/2 | 3/8 | ● |
| ZA302032 | 1/2 | 1 | 3 | 1/2 | ● |
| ZA302040 | 5/8 | 1-1/4 | 3-1/2 | 5/8 | ● |
| ZA302048 | 3/4 | 1-1/2 | 4 | 3/4 | ● |
| ZA302064 | 1 | 1-1/2 | 4 | 1 | ● |

ENDMILL

DRILL

| Tolerance of Mill Dia. (mm) | Tolerance of Shank Dia. |
|-----------------------------|-------------------------|
| 0 ~ -.0012 | h6 |

* For the items produced from 1st. 2010, apply to these tolerance.

| Tolerance of Mill Dia. (mm) | Tolerance of Shank Dia. |
|-----------------------------|-------------------------|
| 0 ~ -.0012 | h6 |

* For the items produced from 1st. 2010, apply to these tolerance.

ZA304

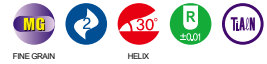


4 FLUTE, REGULAR LENGTH

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.

| EDP. No. | Dia. | C.L | OAL | SH.Dia. | STOCK |
|----------|------|-------|-------|---------|-------|
| ZA304004 | 1/16 | 3/16 | 1-1/2 | 1/8 | ● |
| ZA304008 | 1/8 | 1/2 | 1-1/2 | 1/8 | ● |
| ZA304012 | 3/16 | 5/8 | 2 | 3/16 | ● |
| ZA304016 | 1/4 | 3/4 | 2-1/2 | 1/4 | ● |
| ZA304020 | 5/16 | 13/16 | 2-1/2 | 5/16 | ● |
| ZA304024 | 3/8 | 1 | 2-1/2 | 3/8 | ● |
| ZA304032 | 1/2 | 1 | 3 | 1/2 | ● |
| ZA304040 | 5/8 | 1-1/4 | 3-1/2 | 5/8 | ● |
| ZA304048 | 3/4 | 1-1/2 | 4 | 3/4 | ● |
| ZA304064 | 1 | 1-1/2 | 4 | 1 | ● |

DB312



2 FLUTE, LONG LENGTH, BALL NOSE

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.

- Suitable for copy milling.

| EDP. No. | Dia. | R | C.L | OAL | SH.Dia. | STOCK |
|------------|------|------|-----|-----|---------|-------|
| DB312010S4 | 1 | 0.5 | 2.5 | 50 | 4 | ● |
| DB312010 | 1 | 0.5 | 2.5 | 50 | 6 | ● |
| DB312012 | 1.2 | 0.6 | 3 | 50 | 6 | ● |
| DB312015 | 1.5 | 0.75 | 4 | 50 | 6 | ● |
| DB312020S4 | 2 | 1 | 5 | 50 | 4 | ● |
| DB312020 | 2 | 1 | 5 | 50 | 6 | ● |
| DB312025 | 2.5 | 1.25 | 6 | 60 | 6 | ● |
| DB312030S3 | 3 | 1.5 | 8 | 60 | 3 | ● |
| DB312030S4 | 3 | 1.5 | 8 | 60 | 4 | ● |
| DB312030 | 3 | 1.5 | 8 | 60 | 6 | ● |
| DB312035 | 3.5 | 1.75 | 8 | 70 | 6 | ● |
| DB312040S4 | 4 | 2 | 8 | 70 | 4 | ● |
| DB312040 | 4 | 2 | 8 | 70 | 6 | ● |
| DB312045 | 4.5 | 2.25 | 8 | 70 | 6 | ● |
| DB312050 | 5 | 2.5 | 10 | 80 | 6 | ● |
| DB312055 | 5.5 | 2.75 | 10 | 80 | 6 | ● |
| DB312060S | 6 | 3 | 12 | 60 | 6 | ● |
| DB312060 | 6 | 3 | 12 | 90 | 6 | ● |
| DB312065 | 6.5 | 3.25 | 12 | 90 | 8 | ● |
| DB312070 | 7 | 3.5 | 14 | 90 | 8 | ● |
| DB312080S | 8 | 4 | 14 | 60 | 8 | ● |
| DB312080 | 8 | 4 | 14 | 100 | 8 | ● |
| DB312090 | 9 | 4.5 | 18 | 100 | 10 | ● |
| DB312100S | 10 | 5 | 18 | 60 | 10 | ● |
| DB312100 | 10 | 5 | 18 | 100 | 10 | ● |
| DB312120 | 12 | 6 | 22 | 110 | 12 | ● |
| DB312140 | 14 | 7 | 26 | 110 | 14 | ● |
| DB312160 | 16 | 8 | 30 | 140 | 16 | ● |
| DB312180 | 18 | 9 | 34 | 140 | 18 | ● |
| DB312200 | 20 | 10 | 38 | 160 | 20 | ● |

ENDMILL

DRILL

Tolerance of Mill Dia. [mm]

0 ~ -.0012

Tolerance of Shank Dia.

h6

* For the items produced from 1st. 2010, apply to these tolerance.

Tolerance of Mill Dia. [mm]

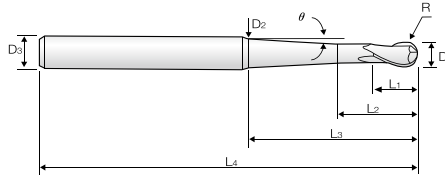
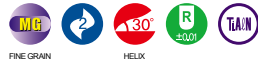
0 ~ -0.02

Tolerance of Shank Dia.

h6

* For the items produced from 1st. 2010, apply to these tolerance.

DB342



2 FLUTE, BALL NOSE with TAPER NECK

- High efficiency milling is possible in deep slotting with projection of the end mill being long.

| EDP. No. | D | R | L ₁ | L ₂ | L ₃ | L ₄ | D ₂ | D ₃ | θ | STOCK |
|------------|----|-----|----------------|----------------|----------------|----------------|----------------|----------------|--------|-------|
| DB34201015 | 1 | 0.5 | 2 | 4 | 23 | 60 | 6 | 2 | 1° 30' | ● |
| DB34201050 | 1 | 0.5 | 2 | 4 | 23 | 60 | 6 | 4.3 | 5° | ● |
| DB34201030 | 1 | 0.5 | 2 | 4 | 42 | 80 | 6 | 5 | 3° | ● |
| DB34202015 | 2 | 1 | 4 | 6 | 23 | 60 | 6 | 2.9 | 1° 30' | ● |
| DB34202050 | 2 | 1 | 4 | 6 | 23 | 60 | 6 | 5 | 5° | ● |
| DB34202030 | 2 | 1 | 4 | 6 | 41 | 80 | 6 | 5.7 | 3° | ● |
| DB34203030 | 3 | 1.5 | 6 | 8 | 32 | 70 | 6 | 5.6 | 3° | ● |
| DB34203015 | 3 | 1.5 | 6 | 8 | 52 | 90 | 6 | 5.3 | 1° 30' | ● |
| DB34204030 | 4 | 2 | 8 | 10 | 28 | 70 | 6 | 6 | 3° | ● |
| DB34204015 | 4 | 2 | 8 | 10 | 49 | 90 | 6 | 6 | 1° 30' | ● |
| DB34205030 | 5 | 2.5 | 10 | 12 | 41 | 90 | 8 | 8 | 3° | ● |
| DB34205015 | 5 | 2.5 | 10 | 12 | 61 | 110 | 8 | 7.6 | 1° 30' | ● |
| DB34206030 | 6 | 3 | 12 | 15 | 34 | 90 | 8 | 8 | 3° | ● |
| DB34206015 | 6 | 3 | 12 | 15 | 53 | 110 | 8 | 8 | 1° 30' | ● |
| DB34208030 | 8 | 4 | 14 | 17 | 36 | 100 | 10 | 10 | 3° | ● |
| DB34208015 | 8 | 4 | 14 | 17 | 55 | 120 | 10 | 10 | 1° 30' | ● |
| DB34210030 | 10 | 5 | 18 | 21 | 40 | 110 | 12 | 12 | 3° | ● |
| DB34210015 | 10 | 5 | 18 | 21 | 59 | 130 | 12 | 12 | 1° 30' | ● |
| DB34212030 | 12 | 6 | 22 | 25 | 63 | 140 | 16 | 16 | 3° | ● |
| DB34212015 | 12 | 6 | 22 | 25 | 83 | 160 | 16 | 15 | 1° 30' | ● |

| | |
|-----------------------------|-------------------------|
| Tolerance of Mill Dia. [mm] | Tolerance of Shank Dia. |
| 0 ~ -0.02 | h6 |

* For the items produced from 1st. 2010, apply to these tolerance.

ZE304



4 FLUTE, REGULAR LENGTH

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.

| EDP. No. | Dia. | C.L | OAL | SH.Dia. | STOCK |
|----------|------|-----|-----|---------|-------|
| ZE304020 | 2 | 6 | 40 | 6 | ● |
| ZE304025 | 2.5 | 8 | 40 | 6 | ● |
| ZE304030 | 3 | 8 | 45 | 6 | ● |
| ZE304035 | 3.5 | 10 | 45 | 6 | ● |
| ZE304040 | 4 | 11 | 45 | 6 | ● |
| ZE304045 | 4.5 | 11 | 45 | 6 | ● |
| ZE304050 | 5 | 13 | 50 | 6 | ● |
| ZE304055 | 5.5 | 13 | 50 | 6 | ● |
| ZE304060 | 6 | 13 | 50 | 6 | ● |
| ZE304065 | 6.5 | 16 | 60 | 8 | ● |
| ZE304070 | 7 | 16 | 60 | 8 | ● |
| ZE304075 | 7.5 | 16 | 60 | 8 | ● |
| ZE304080 | 8 | 19 | 60 | 8 | ● |
| ZE304085 | 8.5 | 19 | 70 | 10 | ● |
| ZE304090 | 9 | 19 | 70 | 10 | ● |
| ZE304095 | 9.5 | 19 | 70 | 10 | ● |
| ZE304100 | 10 | 22 | 70 | 10 | ● |
| ZE304105 | 10.5 | 22 | 75 | 12 | ● |
| ZE304110 | 11 | 22 | 75 | 12 | ● |
| ZE304115 | 11.5 | 22 | 75 | 12 | ● |
| ZE304120 | 12 | 26 | 75 | 12 | ● |
| ZE304130 | 13 | 26 | 80 | 12 | ● |
| ZE304140 | 14 | 26 | 80 | 14 | ● |
| ZE304150 | 15 | 32 | 90 | 16 | ● |
| ZE304160 | 16 | 32 | 90 | 16 | ● |
| ZE304180 | 18 | 32 | 100 | 18 | ● |
| ZE304200 | 20 | 38 | 100 | 20 | ● |

| | |
|-----------------------------|-------------------------|
| Tolerance of Mill Dia. [mm] | Tolerance of Shank Dia. |
| 0 ~ -0.02 | h6 |

* For the items produced from 1st. 2010, apply to these tolerance.

ENDMILL

DRILL

ZE322



ZE324



2 FLUTE, LONG & EXTRA LONG LENGTH

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.

4 FLUTE, LONG & EXTRA LONG LENGTH

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.

| EDP. No. | Dia. | C.L | OAL | SH.Dia. | STOCK |
|-----------|------|-----|-----|---------|-------|
| ZE322030 | 3 | 15 | 60 | 6 | ● |
| ZE322031 | | 20 | 70 | | ● |
| ZE322030S | | 20 | 100 | 3 | ● |
| ZE322040 | 4 | 15 | 60 | 6 | ● |
| ZE322041 | | 20 | 70 | | ● |
| ZE322040S | | 20 | 100 | 4 | ● |
| ZE322050 | 5 | 20 | 60 | 6 | ● |
| ZE322051 | | 20 | 80 | | ● |
| ZE322052 | | 25 | 100 | ● | |
| ZE322060 | 6 | 20 | 80 | 6 | ● |
| ZE322061 | | 30 | 100 | | ● |
| ZE322062 | | 40 | 150 | ● | |
| ZE322080 | 8 | 30 | 90 | 8 | ● |
| ZE322081 | | 35 | 100 | | ● |
| ZE322082 | | 40 | 150 | ● | |
| ZE322100 | 10 | 30 | 90 | 10 | ● |
| ZE322101 | | 35 | 100 | | ● |
| ZE322102 | | 45 | 150 | | ● |
| ZE322103 | | 55 | 180 | | ● |
| ZE322120 | 12 | 30 | 90 | 12 | ● |
| ZE322121 | | 40 | 110 | | ● |
| ZE322122 | | 50 | 150 | | ● |
| ZE322123 | | 60 | 200 | | ● |
| ZE322140 | 14 | 40 | 120 | 14 | ● |
| ZE322141 | | 60 | 150 | | ● |
| ZE322160 | 16 | 50 | 140 | 16 | ● |
| ZE322161 | | 70 | 160 | | ● |
| ZE322162 | | 80 | 200 | | ● |
| ZE322180 | | 18 | 50 | | 140 |
| ZE322200 | 20 | 60 | 150 | 20 | ● |
| ZE322201 | | 100 | 200 | | ● |
| ZE322202 | | 130 | 250 | | ● |

| EDP. No. | Dia. | C.L | OAL | SH.Dia. | STOCK |
|-----------|------|-----|-----|---------|-------|
| ZE324030 | 3 | 15 | 60 | 6 | ● |
| ZE324031 | | 20 | 70 | | ● |
| ZE324030S | | 20 | 100 | 3 | ● |
| ZE324040 | 4 | 15 | 60 | 6 | ● |
| ZE324041 | | 20 | 70 | | ● |
| ZE324040S | | 20 | 100 | 4 | ● |
| ZE324050 | 5 | 20 | 60 | 6 | ● |
| ZE324051 | | 20 | 80 | | ● |
| ZE324052 | | 25 | 100 | ● | |
| ZE324060 | 6 | 20 | 80 | 6 | ● |
| ZE324061 | | 30 | 100 | | ● |
| ZE324062 | | 40 | 150 | ● | |
| ZE324080 | 8 | 30 | 90 | 8 | ● |
| ZE324081 | | 35 | 100 | | ● |
| ZE324082 | | 40 | 150 | ● | |
| ZE324100 | 10 | 30 | 90 | 10 | ● |
| ZE324101 | | 35 | 100 | | ● |
| ZE324102 | | 45 | 150 | | ● |
| ZE324103 | | 55 | 180 | | ● |
| ZE324120 | 12 | 30 | 90 | 12 | ● |
| ZE324121 | | 40 | 110 | | ● |
| ZE324122 | | 50 | 150 | | ● |
| ZE324123 | | 60 | 200 | | ● |
| ZE324140 | 14 | 40 | 120 | 14 | ● |
| ZE324141 | | 60 | 150 | | ● |
| ZE324160 | 16 | 50 | 140 | 16 | ● |
| ZE324161 | | 70 | 160 | | ● |
| ZE324162 | | 80 | 200 | | ● |
| ZE324180 | | 18 | 50 | | 140 |
| ZE324200 | 20 | 60 | 150 | 20 | ● |
| ZE324201 | | 100 | 200 | | ● |
| ZE324202 | | 130 | 250 | | ● |

Tolerance of Mill Dia. [mm]

0 ~ -0.03

Tolerance of Shank Dia.

h6

* For the items produced from 1st. 2010, apply to these tolerance.

Tolerance of Mill Dia. [mm]

0 ~ -0.03

Tolerance of Shank Dia.

h6

* For the items produced from 1st. 2010, apply to these tolerance.

ZR322



ZR324



ENDMILL
&
DRILL

2F CORNER RADIUS LONG LENGTH

- Designed to machine tool steel, alloy steel mold steel and other high hardened materials.
- TiAlN coated for high wear resistance.

| EDP. No. | Dia. | R | C.L | OAL | SH.Dia. | STOCK |
|-----------|------|-----|-----|-----|---------|-------|
| ZR3220302 | | 0.2 | | | | ● |
| ZR3220303 | 3 | 0.3 | 8 | 60 | 6 | ● |
| ZR3220305 | | 0.5 | | | | ● |
| ZR3220402 | | 0.2 | | | | ● |
| ZR3220403 | 4 | 0.3 | 11 | 70 | 6 | ● |
| ZR3220405 | | 0.5 | | | | ● |
| ZR3220410 | | 1.0 | | | | ● |
| ZR3220502 | | 0.2 | | | | ● |
| ZR3220503 | 5 | 0.3 | 13 | 80 | 6 | ● |
| ZR3220505 | | 0.5 | | | | ● |
| ZR3220510 | | 1.0 | | | | ● |
| ZR3220602 | | 0.2 | | | | ● |
| ZR3220603 | 6 | 0.3 | 13 | 90 | 6 | ● |
| ZR3220605 | | 0.5 | | | | ● |
| ZR3220610 | | 1.0 | | | | ● |
| ZR3220803 | | 0.3 | | | | ● |
| ZR3220805 | | 0.5 | | | | ● |
| ZR3220810 | 8 | 1.0 | 19 | 100 | 8 | ● |
| ZR3220815 | | 1.5 | | | | ● |
| ZR3220820 | | 2.0 | | | | ● |
| ZR3221003 | | 0.3 | | | | ● |
| ZR3221005 | | 0.5 | | | | ● |
| ZR3221010 | 10 | 1.0 | 22 | 100 | 10 | ● |
| ZR3221015 | | 1.5 | | | | ● |
| ZR3221020 | | 2.0 | | | | ● |
| ZR3221025 | | 2.5 | | | | ● |
| ZR3221205 | | 0.5 | | | | ● |
| ZR3221210 | | 1.0 | | | | ● |
| ZR3221215 | 12 | 1.5 | 26 | 110 | 12 | ● |
| ZR3221220 | | 2.0 | | | | ● |
| ZR3221225 | | 2.5 | | | | ● |
| ZR3221230 | | 3.0 | | | | ● |

| | |
|-----------------------------|-------------------------|
| Tolerance of Mill Dia. [mm] | Tolerance of Shank Dia. |
| 0 ~ -0.03 | h6 |

* For the items produced from 1st. 2010, apply to these tolerance.

4F CORNER RADIUS LONG LENGTH

- Designed to machine tool steel, alloy steel mold steel and other high hardened materials.
- TiAlN coated for high wear resistance.

| EDP. No. | Dia. | R | C.L | OAL | SH.Dia. | STOCK |
|-----------|------|-----|-----|-----|---------|-------|
| ZR3240302 | | 0.2 | | | | ● |
| ZR3240303 | 3 | 0.3 | 8 | 60 | 6 | ● |
| ZR3240305 | | 0.5 | | | | ● |
| ZR3240402 | | 0.2 | | | | ● |
| ZR3240403 | 4 | 0.3 | 11 | 70 | 6 | ● |
| ZR3240405 | | 0.5 | | | | ● |
| ZR3240410 | | 1.0 | | | | ● |
| ZR3240502 | | 0.2 | | | | ● |
| ZR3240503 | 5 | 0.3 | 13 | 80 | 6 | ● |
| ZR3240505 | | 0.5 | | | | ● |
| ZR3240510 | | 1.0 | | | | ● |
| ZR3240602 | | 0.2 | | | | ● |
| ZR3240603 | 6 | 0.3 | 13 | 90 | 6 | ● |
| ZR3240605 | | 0.5 | | | | ● |
| ZR3240610 | | 1.0 | | | | ● |
| ZR3240803 | | 0.3 | | | | ● |
| ZR3240805 | | 0.5 | | | | ● |
| ZR3240810 | 8 | 1.0 | 19 | 100 | 8 | ● |
| ZR3240815 | | 1.5 | | | | ● |
| ZR3240820 | | 2.0 | | | | ● |
| ZR3241003 | | 0.3 | | | | ● |
| ZR3241005 | | 0.5 | | | | ● |
| ZR3241010 | 10 | 1.0 | 22 | 100 | 10 | ● |
| ZR3241015 | | 1.5 | | | | ● |
| ZR3241020 | | 2.0 | | | | ● |
| ZR3241025 | | 2.5 | | | | ● |
| ZR3241205 | | 0.5 | | | | ● |
| ZR3241210 | | 1.0 | | | | ● |
| ZR3241215 | 12 | 1.5 | 26 | 110 | 12 | ● |
| ZR3241220 | | 2.0 | | | | ● |
| ZR3241225 | | 2.5 | | | | ● |
| ZR3241230 | | 3.0 | | | | ● |

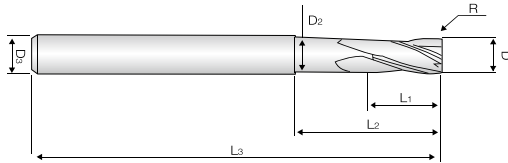
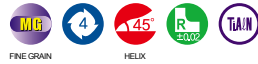
| | |
|-----------------------------|-------------------------|
| Tolerance of Mill Dia. [mm] | Tolerance of Shank Dia. |
| 0 ~ -0.03 | h6 |

* For the items produced from 1st. 2010, apply to these tolerance.

ENDMILL

DRILL

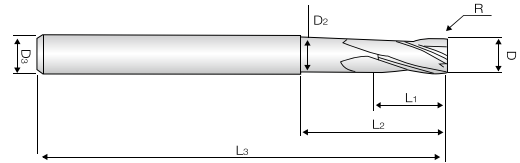
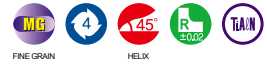
ZR304H



4 FLUTE, 45° HELIX STUB CUT LENGTH, CORNER RADIUS with EXTENDED NECK

- Designed for high hardened materials up to HRc 45.
- Suitable for high speed machining.

ZR324H



4 FLUTE, 45° HELIX STUB CUT LENGTH, CORNER RADIUS with LONG SHANK

- Designed for high hardened materials up to HRc 45.
- Suitable for high speed machining.

| EDP. No. | D | C.L | L ₁ | L ₂ | OAL | SH.Dia. | STOCK |
|------------|----|-----|----------------|----------------|-----|---------|-------|
| ZR304H0303 | 3 | 0.3 | 4 | 12 | 55 | 6 | ● |
| ZR304H0305 | | 0.5 | | | | | ● |
| ZR304H0403 | 4 | 0.3 | 5 | 16 | 55 | 6 | ● |
| ZR304H0405 | | 0.5 | | | | | ● |
| ZR304H0605 | 6 | 0.5 | 7 | 20 | 60 | 6 | ● |
| ZR304H0610 | | 1.0 | | | | | ● |
| ZR304H0805 | 8 | 0.5 | 10 | 25 | 65 | 8 | ● |
| ZR304H0810 | | 1.0 | | | | | ● |
| ZR304H1005 | 10 | 0.5 | 12 | 30 | 70 | 10 | ● |
| ZR304H1010 | | 1.0 | | | | | ● |
| ZR304H1015 | | 1.5 | | | | | ● |
| ZR304H1020 | | 2.0 | | | | | ● |
| ZR304H1205 | 12 | 0.5 | 15 | 30 | 80 | 12 | ● |
| ZR304H1210 | | 1.0 | | | | | ● |
| ZR304H1215 | | 1.5 | | | | | ● |
| ZR304H1220 | | 2.0 | | | | | ● |

| EDP. No. | D | C.L | L ₁ | L ₂ | OAL | SH.Dia. | STOCK |
|------------|----|-----|----------------|----------------|-----|---------|-------|
| ZR324H0605 | 6 | 0.5 | 9 | 20 | 90 | 6 | ● |
| ZR324H0610 | | 1.0 | | | | | ● |
| ZR324H0805 | 8 | 0.5 | 12 | 25 | 100 | 8 | ● |
| ZR324H0810 | | 1.0 | | | | | ● |
| ZR324H1005 | 10 | 0.5 | 15 | 32 | 100 | 10 | ● |
| ZR324H1010 | | 1.0 | | | | | ● |
| ZR324H1015 | | 1.5 | | | | | ● |
| ZR324H1020 | | 2.0 | | | | | ● |
| ZR324H1205 | 12 | 0.5 | 18 | 38 | 110 | 12 | ● |
| ZR324H1210 | | 1.0 | | | | | ● |
| ZR324H1215 | | 1.5 | | | | | ● |
| ZR324H1220 | | 2.0 | | | | | ● |

ENDMILL

DRILL

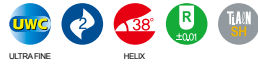
| | |
|-----------------------------|-------------------------|
| Tolerance of Mill Dia. [mm] | Tolerance of Shank Dia. |
| 0 ~ -0.03 | h6 |

* For the items produced from 1st. 2010, apply to these tolerance.

| | |
|-----------------------------|-------------------------|
| Tolerance of Mill Dia. [mm] | Tolerance of Shank Dia. |
| 0 ~ -0.03 | h6 |

* For the items produced from 1st. 2010, apply to these tolerance.

DS502



2 FLUTE, BALL NOSE REGULAR & LONG LENGTH

- Suitable for Stainless steel, Titanium, Inconel.

| EDP. No. | Dia. | R | C.L | OAL | SH.Dia. | STOCK |
|----------|------|-----|-----|-----|---------|-------|
| DS502010 | 1 | 0.5 | 3 | 50 | 6 | ● |
| DS502020 | 2 | 1 | 6 | 50 | 6 | ● |
| DS502030 | 3 | 1.5 | 8 | 50 | 6 | ● |
| DS502031 | | | | 70 | | ● |
| DS502040 | 4 | 2 | 10 | 50 | 6 | ● |
| DS502041 | | | | 70 | | ● |
| DS502050 | 5 | 2.5 | 13 | 50 | 6 | ● |
| DS502051 | | | | 80 | | ● |
| DS502060 | 6 | 3 | 13 | 50 | 6 | ● |
| DS502061 | | | | 90 | | ● |
| DS502080 | 8 | 4 | 19 | 60 | 8 | ● |
| DS502081 | | | | 100 | | ● |
| DS502100 | 1 | 5 | 22 | 70 | 10 | ● |
| DS502101 | | | | 100 | | ● |
| DS502120 | 12 | 6 | 26 | 75 | 12 | ● |
| DS502121 | | | | 110 | | ● |

| Tolerance of Mill Dia. (mm) | Tolerance of Shank Dia. |
|-----------------------------|-------------------------|
| ±0.01 | h6 |

* For the items produced from 1st. 2010, apply to these tolerance.

SM503



3 FLUTE, REGULAR LENGTH

- Suitable for Stainless steel, Titanium, Inconel.

| EDP. No. | Dia. | C.L | OAL | SH.Dia. | STOCK |
|----------|------|-----|-----|---------|-------|
| SM503020 | 2 | 6 | 45 | 6 | ● |
| SM503030 | 3 | 8 | 45 | 6 | ● |
| SM503040 | 4 | 10 | 50 | 6 | ● |
| SM503050 | 5 | 13 | 50 | 6 | ● |
| SM503060 | 6 | 13 | 50 | 6 | ● |
| SM503080 | 8 | 19 | 60 | 8 | ● |
| SM503100 | 10 | 22 | 70 | 10 | ● |
| SM503120 | 12 | 26 | 75 | 12 | ● |
| SM503140 | 14 | 30 | 82 | 14 | ● |
| SM503160 | 16 | 40 | 100 | 16 | ● |
| SM503180 | 18 | 40 | 100 | 18 | ● |
| SM503200 | 20 | 40 | 100 | 20 | ● |

| Tolerance of Mill Dia. (mm) | Tolerance of Shank Dia. |
|-----------------------------|-------------------------|
| 0 ~ -0.02 | h6 |

* For the items produced from 1st. 2010, apply to these tolerance.

ENDMILL

DRILL

SM504

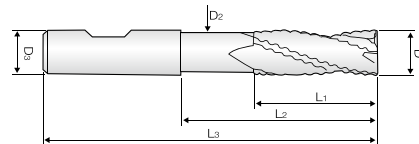


4 FLUTE, REGULAR LENGTH

- Suitable for Stainless steel, Titanium, Inconel.
- Broken Index Type.

| EDP. No. | Dia. | R | C.L | OAL | SH.Dia. | STOCK |
|----------|------|-----|-----|-----|---------|-------|
| SM504030 | 3 | 0.1 | 10 | 45 | 6 | ● |
| SM504040 | 4 | 0.2 | 12 | 50 | 6 | ● |
| SM504050 | 5 | 0.2 | 13 | 50 | 6 | ● |
| SM504060 | 6 | 0.2 | 13 | 50 | 6 | ● |
| SM504070 | 7 | 0.2 | 16 | 60 | 8 | ● |
| SM504080 | 8 | 0.2 | 16 | 60 | 8 | ● |
| SM504090 | 9 | 0.2 | 19 | 70 | 10 | ● |
| SM504100 | 10 | 0.3 | 22 | 70 | 10 | ● |
| SM504120 | 12 | 0.3 | 26 | 75 | 12 | ● |
| SM504140 | 14 | 0.3 | 26 | 82 | 14 | ● |
| SM504160 | 16 | 0.3 | 32 | 90 | 16 | ● |
| SM504180 | 18 | 0.3 | 32 | 100 | 18 | ● |
| SM504200 | 20 | 0.3 | 38 | 100 | 20 | ● |

ZF62



ROUGHING END MILL

DIN6527 / DIN6535-HA, DIN6535-HB

- Designed to machine tool steel, alloy steel, stainless steel and other high hardness materials.
- Fast chip ejection.

| EDP. No. | | D | L ₁ | L ₂ | D ₂ | L ₃ | D ₃ | Z | STOCK |
|-------------|------------|----|----------------|----------------|----------------|----------------|----------------|---|-------|
| PLAIN SHANK | FLAT SHANK | | | | | | | | |
| ZF624060 | ZF624060F | 7 | - | - | 54 | | | | ● |
| ZF624061 | ZF624061F | 6 | 16 | - | 57 | 6 | 4 | | ● |
| ZF624062 | ZF624062F | 16 | 20 | 5.5 | 57 | | | | ● |
| ZF624080 | ZF624080F | 9 | - | - | 58 | | | | ● |
| ZF624081 | ZF624081F | 8 | 16 | - | 63 | 8 | 4 | | ● |
| ZF624082 | ZF624082F | 16 | 26 | 7.5 | 63 | | | | ● |
| ZF624100 | ZF624100F | 14 | - | - | 66 | | | | ● |
| ZF624101 | ZF624101F | 10 | 22 | - | 72 | 10 | 4 | | ● |
| ZF624102 | ZF624102F | 22 | 31 | 9.5 | 72 | | | | ● |
| ZF624120 | ZF624120F | 16 | - | - | 73 | | | | ● |
| ZF624121 | ZF624121F | 12 | 26 | - | 83 | 12 | 4 | | ● |
| ZF624122 | ZF624122F | 26 | 37 | 11.5 | 83 | | | | ● |
| ZF625160 | ZF625160F | 22 | - | - | 82 | | | | ● |
| ZF625161 | ZF625161F | 16 | 32 | - | 92 | 16 | 5 | | ● |
| ZF625162 | ZF625162F | 32 | 51 | 15.5 | 100 | | | | ● |
| ZF626200 | ZF626200F | 26 | - | - | 92 | | | | ● |
| ZF626201 | ZF626201F | 20 | 38 | - | 104 | 20 | 6 | | ● |
| ZF626202 | ZF626202F | 38 | 59 | 19.2 | 110 | | | | ● |

ENDMILL

DRILL

| Tolerance of Mill Dia. (mm) | Tolerance of Shank Dia. |
|-----------------------------|-------------------------|
| 0 ~ -0.02 | h6 |

* For the items produced from 1st. 2010, apply to these tolerance.

μm=1/1000mm

| Dia | Ø1 ~ Ø3 | Ø3 ~ Ø6 | Ø6 ~ Ø10 | Ø10 ~ Ø18 | Ø18 ~ Ø30 |
|---------------------------|------------|------------|-------------|--------------|--------------|
| Cutting Edge (h10) | 0 | 0 | 0 | 0 | 0 |
| | -40 | -48 | -58 | -70 | -84 |
| Shank (h6) | 0 | 0 | 0 | 0 | 0 |
| | -6 | -8 | -9 | -11 | -13 |

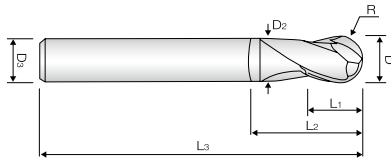
ZAMUS COPPER-MATE SERIES

METRIC

PART.
B

ENDMILL
&
DRILL

BC502



**2 FLUTE, STUB CUT LENGTH,
BALL NOSE with EXTENDED NECK**

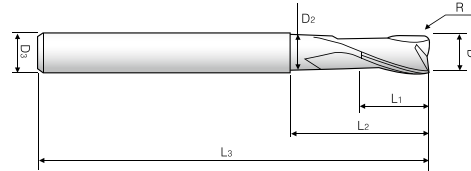
- Suitable for copper & non-ferrous material.

| EDP. No. | D | R | L ₁ | L ₂ | L ₃ | D ₂ | D ₃ | STOCK |
|----------|-----|------|----------------|----------------|----------------|----------------|----------------|-------|
| BC502010 | 1 | 0.5 | 1.5 | 3 | 50 | 0.95 | 6 | ● |
| BC502015 | 1.5 | 0.75 | 2 | 4 | 50 | 1.45 | 6 | ● |
| BC502020 | 2 | 1 | 2.5 | 5 | 50 | 1.95 | 6 | ● |
| BC502025 | 2.5 | 1.25 | 3 | 7 | 50 | 2.45 | 6 | ● |
| BC502030 | 3 | 1.5 | 4 | 10 | 60 | 2.9 | 6 | ● |
| BC502040 | 4 | 2 | 5 | 10 | 60 | 3.9 | 6 | ● |
| BC502050 | 5 | 2.5 | 6 | 12 | 60 | 4.9 | 6 | ● |
| BC502060 | 6 | 3 | 7 | 12 | 60 | 5.9 | 6 | ● |
| BC502061 | 6 | 3 | 7 | 12 | 90 | 5.9 | 6 | ● |
| BC502080 | 8 | 4 | 9 | 15 | 70 | 7.9 | 8 | ● |
| BC502081 | 8 | 4 | 9 | 16 | 100 | 7.9 | 8 | ● |
| BC502100 | 10 | 5 | 11 | 25 | 75 | 9.9 | 10 | ● |
| BC502101 | 10 | 5 | 11 | 25 | 100 | 9.9 | 10 | ● |
| BC502120 | 12 | 6 | 12 | 25 | 80 | 11.9 | 12 | ● |
| BC502121 | 12 | 6 | 12 | 25 | 110 | 11.9 | 12 | ● |

| Tolerance of Mill Dia. [mm] | Tolerance of Shank Dia. |
|-----------------------------|-------------------------|
| ±0.01 | h6 |

* For the items produced from 1st. 2010, apply to these tolerance.

RC502



**2 FLUTE, STUB CUT LENGTH,
CORNER RADIUS with EXTENDED NECK**

- Suitable for copper & non-ferrous material.

| EDP. No. | D | R | L ₁ | L ₂ | L ₃ | D ₂ | D ₃ | STOCK |
|--------------|----|-----|----------------|----------------|----------------|----------------|----------------|-------|
| RC5020200509 | 2 | 0.5 | 3 | 9 | 55 | 1.8 | 6 | ● |
| RC5020300509 | 3 | 0.5 | 4 | 9 | 55 | 2.8 | 6 | ● |
| RC5020300516 | 3 | 0.5 | 4 | 16 | 55 | 2.8 | 6 | ● |
| RC5020300520 | 3 | 0.5 | 4 | 20 | 55 | 2.8 | 6 | ● |
| RC5020400512 | 4 | 0.5 | 5 | 12 | 55 | 3.7 | 6 | ● |
| RC5020400516 | 4 | 0.5 | 5 | 16 | 55 | 3.7 | 6 | ● |
| RC5020400520 | 4 | 0.5 | 5 | 20 | 55 | 3.7 | 6 | ● |
| RC5020600520 | 6 | 0.5 | 7 | 20 | 60 | 5.5 | 6 | ● |
| RC5020601020 | 6 | 1 | 7 | 20 | 60 | 5.5 | 6 | ● |
| RC5020800525 | 8 | 0.5 | 9 | 25 | 60 | 7.4 | 8 | ● |
| RC5020801025 | 8 | 1 | 9 | 25 | 60 | 7.4 | 8 | ● |
| RC5021000532 | 10 | 0.5 | 11 | 32 | 70 | 9.2 | 10 | ● |
| RC5021001032 | 10 | 1 | 11 | 32 | 70 | 9.2 | 10 | ● |
| RC5021200538 | 12 | 0.5 | 12 | 38 | 80 | 11 | 12 | ● |
| RC5021201038 | 12 | 1 | 12 | 38 | 80 | 11 | 12 | ● |

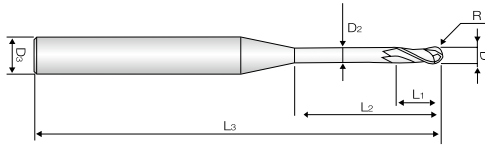
| Tolerance of Mill Dia. [mm] | | Tolerance of Shank Dia. |
|-----------------------------|------------|-------------------------|
| Diameter | Tolerance | |
| up to 6 | 0 ~ -0.012 | h6 |
| over 6 | 0 ~ -0.015 | |

* For the items produced from 1st. 2010, apply to these tolerance.

ENDMILL

DRILL

G



2 FLUTE, DIAMOND COATING BALL NOSE

- High performance on graphite, wrought aluminum, bakelite, plastics, wood, brass etc.

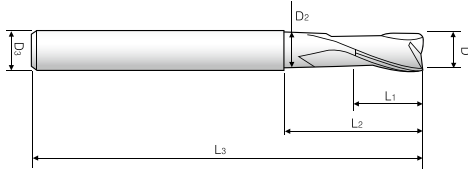
| EDP. No. | D | R | L ₁ | L ₂ | L ₃ | D ₂ | D ₃ | STOCK |
|-----------|-----|------|----------------|----------------|----------------|----------------|----------------|-------|
| G00501003 | | | | 3 | | | | ● |
| G00501006 | 0.5 | 0.25 | 1 | 6 | 50 | 0.45 | 4 | ● |
| G00501010 | | | | 10 | | | | ● |
| G00601203 | | | | 3 | | | | ● |
| G00601206 | | | | 6 | | | | ● |
| G00601208 | 0.6 | 0.3 | 1.2 | 8 | 50 | 0.55 | 4 | ● |
| G00601210 | | | | 10 | | | | ● |
| G00601212 | | | | 12 | | | | ● |
| G0080164 | 0.8 | 0.4 | 1.6 | 4 | 50 | 0.75 | 4 | ● |
| G0100306 | | | | 6 | | | | ● |
| G0100308 | | | | 8 | | | | ● |
| G0100310 | | | | 10 | | | | ● |
| G0100312 | | | | 12 | | | | ● |
| G0100314 | 1 | 0.5 | 3 | 14 | 60 | 0.95 | 4 | ● |
| G0100316 | | | | 16 | | | | ● |
| G0100318 | | | | 18 | | | | ● |
| G0100320 | | | | 20 | | | | ● |
| G0120410 | 1.2 | 0.6 | 4 | 10 | 70 | 1.15 | 4 | ● |
| G0150510 | | | | 10 | | | | ● |
| G0150512 | | | | 12 | | | | ● |
| G0150516 | | | | 16 | 60 | | | ● |
| G0150520 | 1.5 | 0.75 | 5 | 20 | | 1.45 | 4 | ● |
| G0150525 | | | | 25 | | | | ● |
| G0150530 | | | | 30 | 70 | | | ● |
| G0200812 | | | | 12 | | | | ● |
| G0200816 | | | | 16 | 60 | | | ● |
| G0200820 | | | | 20 | | | | ● |
| G0200825 | | | 8 | 25 | | | | ● |
| G0200830 | 2 | 1 | | 30 | 70 | 1.95 | 4 | ● |
| G0200835 | | | | 35 | | | | ● |
| G0200840 | | | | 40 | 80 | | | ● |
| G0201020 | | | | 20 | 80 | | | ● |
| G0201020L | | | 10 | 20 | 100 | | | ● |

| EDP. No. | D | R | L ₁ | L ₂ | L ₃ | D ₂ | D ₃ | STOCK |
|-----------|-----|------|----------------|----------------|----------------|----------------|----------------|-------|
| G0251020 | 2.5 | 1.25 | 10 | 20 | 80 | 2.43 | 4 | ● |
| G0301216 | | | | 16 | 60 | | | ● |
| G0301220 | | | | 20 | 70 | | | ● |
| G0301225 | | | | 25 | | | | ● |
| G0301230 | 3 | 1.5 | 12 | 30 | 80 | 2.9 | 6 | ● |
| G0301235 | | | | 35 | | | | ● |
| G0301240 | | | | 40 | 90 | | | ● |
| G0301245 | | | | 45 | | | | ● |
| G0301525 | | | 15 | 25 | 80 | | 4 | ● |
| G04015S | | | | - | 50 | - | | ● |
| G04015M | | | | - | 80 | - | 4 | ● |
| G04015L | | | | - | 120 | - | | ● |
| G0401520 | | | | 20 | 60 | | | ● |
| G0401525 | | | | 25 | 70 | | | ● |
| G0401530 | 4 | 2 | 15 | 30 | 80 | 3.9 | 6 | ● |
| G0401535 | | | | 35 | | | | ● |
| G0401540 | | | | 40 | 90 | | | ● |
| G0401545 | | | | 45 | | | | ● |
| G0401550 | | | | 50 | 100 | | | ● |
| G0402030 | | | 20 | 30 | 80 | | 4 | ● |
| G0503050 | 5 | 2.5 | 30 | 50 | 100 | 4.8 | 6 | ● |
| G0503050L | | | | | 150 | | | ● |
| G06020S | | | | - | 70 | - | | ● |
| G06020M | | | 20 | - | 100 | - | | ● |
| G06020L | 6 | 3 | | - | 150 | - | 6 | ● |
| G0603050 | | | 30 | 50 | 100 | 5.8 | | ● |
| G0603050L | | | | | 150 | | | ● |
| G08025S | | | | - | 70 | - | | ● |
| G08025M | | | 25 | - | 110 | - | | ● |
| G08025L | 8 | 4 | | - | 160 | - | 8 | ● |
| G0804060 | | | 40 | 60 | 110 | 7.8 | | ● |
| G0804060L | | | | | 200 | | | ● |
| G10030S | | | | - | 80 | - | | ● |
| G10030M | | | 30 | - | 120 | - | | ● |
| G10030L | 10 | 5 | | - | 170 | - | 10 | ● |
| G1005070 | | | 50 | 70 | 120 | 9.7 | | ● |
| G1005070L | | | | | 200 | | | ● |
| G12035S | | | | - | 80 | - | | ● |
| G12035M | | | 35 | - | 130 | - | | ● |
| G12035L | 12 | 6 | | - | 180 | - | 12 | ● |
| G1205575 | | | 55 | 75 | 130 | 11.7 | | ● |
| G1205575L | | | | | 200 | | | ● |

| Tolerance of Mill Dia. [mm] | Tolerance of Shank Dia. |
|-----------------------------|-------------------------|
| 0 ~ -0.03 | h6 |

* For the items produced from 1st. 2010, apply to these tolerance.

GE



2 FLUTE, DIAMOND COATING END MILL

- High performance on graphite, wrought aluminum, bakelite, plastics, wood, brass etc.

| EDP. No. | D | L ₁ | L ₂ | L ₃ | D ₂ | D ₃ | STOCK | |
|-------------|-----|----------------|----------------|----------------|----------------|----------------|-------|---|
| GE00501006 | 0.5 | 1 | 6 | 50 | 0.45 | 4 | • | |
| GE00601206 | 0.6 | 1.2 | 6 | 50 | 0.55 | 4 | • | |
| GE00601210 | | | 10 | | | | • | |
| GE00701506 | 0.7 | 1.5 | 6 | 50 | 0.65 | 4 | • | |
| GE00802006 | 0.8 | 2 | 6 | 50 | 0.75 | 4 | • | |
| GE0100308 | 1 | 3 | 8 | 60 | 0.95 | 4 | • | |
| GE0100310 | | | 10 | | | | • | |
| GE0100312 | | | 12 | | | | • | |
| GE0150412 | 1.5 | 4 | 12 | 60 | 1.45 | 4 | • | |
| GE0200612 | 2 | 6 | 12 | 60 | 1.95 | 4 | • | |
| GE0200612S6 | | | 12 | | | | 6 | • |
| GE0250812 | 2.5 | 8 | 12 | 60 | 2.43 | 4 | • | |
| GE0301012 | 3 | 10 | 12 | 60 | 2.9 | 4 | • | |
| GE0301016 | | | 16 | | | | • | |
| GE0301012S6 | | | 12 | | | | 6 | • |
| GE0301016S6 | | | 16 | | | | • | |
| GE0401212 | 4 | 12 | 12 | 60 | 3.9 | 6 | • | |
| GE0401216 | | | 16 | | | | • | |
| GE0401220 | | | 20 | | | | • | |
| GE0501520 | 5 | 15 | 20 | 60 | 4.8 | 6 | • | |
| GE06020S | 6 | 20 | - | 60 | 5.8 | 6 | • | |
| GE0602030 | | | 30 | 80 | | | • | |
| GE0603050 | | | 30 | 50 | | | 150 | • |
| GE08025S | 8 | 25 | - | 70 | 7.8 | 8 | • | |
| GE0802540 | | | 40 | 100 | | | • | |
| GE0804070 | | | 40 | 70 | | | 150 | • |
| GE10030S | 10 | 30 | - | 80 | 9.7 | 10 | • | |
| GE1003050 | | | 50 | 100 | | | • | |
| GE1004580 | | | 45 | 80 | | | 160 | • |
| GE12030S | 12 | 30 | - | 80 | 11.7 | 12 | • | |
| GE1203050 | | | 50 | 110 | | | • | |
| GE1205080 | | | 50 | 80 | | | 160 | • |

ENDMILL
&
DRILL

ENDMILL

DRILL

| Tolerance of Mill Dia. (mm) | Tolerance of Shank Dia. |
|-----------------------------|-------------------------|
| 0 ~ -0.03 | h6 |

* For the items produced from 1st. 2010, apply to these tolerance.

AE302



2 FLUTE, LONG LENGTH - for Aluminum

AE30(2)3



3 FLUTE, LONG & EXTRA LONG LENGTH - for Aluminum

| EDP. No. | Dia. | C.L | OAL | SH.Dia. | STOCK |
|------------|------|-----|-----|---------|-------|
| AE302010 | 1 | 3 | 40 | 4 | ● |
| AE302020S4 | 2 | 6 | 40 | 4 | ● |
| AE302020 | 2 | 6 | 57 | 6 | ● |
| AE302030 | 3 | 12 | 57 | 6 | ● |
| AE302040 | 4 | 14 | 57 | 6 | ● |
| AE302050 | 5 | 16 | 57 | 6 | ● |
| AE302060 | 6 | 16 | 57 | 6 | ● |
| AE302070 | 7 | 20 | 63 | 8 | ● |
| AE302080 | 8 | 22 | 63 | 8 | ● |
| AE302090 | 9 | 25 | 72 | 10 | ● |
| AE302100 | 10 | 28 | 72 | 10 | ● |
| AE302110 | 11 | 30 | 80 | 12 | ● |
| AE302120 | 12 | 32 | 80 | 12 | ● |
| AE302130 | 13 | 35 | 85 | 14 | ● |
| AE302140 | 14 | 35 | 85 | 14 | ● |
| AE302150 | 15 | 40 | 90 | 16 | ● |
| AE302160 | 16 | 45 | 90 | 16 | ● |
| AE302180 | 18 | 45 | 100 | 18 | ● |
| AE302200 | 20 | 50 | 100 | 20 | ● |
| AE302250 | 25 | 50 | 120 | 25 | ● |

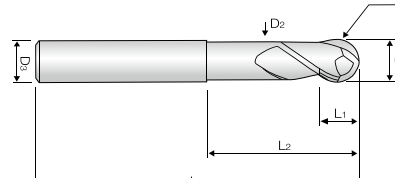
| EDP. No. | D | C.L | OAL | SH.Dia. | STOCK |
|----------|----|-----|-----|---------|-------|
| AE303030 | 3 | 12 | 57 | 6 | ● |
| AE303031 | | 15 | 57 | | ● |
| AE323030 | | 20 | 62 | | ● |
| AE323031 | | 25 | 62 | | ● |
| AE303040 | 4 | 14 | 57 | 6 | ● |
| AE303041 | | 20 | 57 | | ● |
| AE323040 | | 25 | 62 | | ● |
| AE323041 | | 30 | 70 | | ● |
| AE303050 | 5 | 16 | 57 | 6 | ● |
| AE303051 | | 20 | 57 | | ● |
| AE303052 | | 25 | 62 | | ● |
| AE323050 | | 30 | 70 | | ● |
| AE323051 | | 35 | 70 | | ● |
| AE303060 | 6 | 16 | 57 | 6 | ● |
| AE303061 | | 20 | 57 | | ● |
| AE303062 | | 25 | 62 | | ● |
| AE303063 | | 30 | 70 | | ● |
| AE323060 | | 35 | 80 | | ● |
| AE323061 | | 42 | 90 | | ● |
| AE303070 | 7 | 20 | 63 | 8 | ● |
| AE303080 | 8 | 22 | 63 | 8 | ● |
| AE303081 | | 30 | 70 | | ● |
| AE303082 | | 35 | 80 | | ● |
| AE323080 | | 40 | 100 | | ● |
| AE323081 | | 45 | 100 | | ● |
| AE303090 | 9 | 25 | 72 | 10 | ● |
| AE303100 | 10 | 28 | 72 | 10 | ● |
| AE303101 | | 35 | 80 | | ● |
| AE303102 | | 45 | 100 | | ● |
| AE323100 | | 55 | 110 | | ● |
| AE323101 | | 65 | 120 | | ● |
| AE303110 | 11 | 30 | 80 | 12 | ● |

| Tolerance of Mill Dia. [mm] | Tolerance of Shank Dia. |
|-----------------------------|-------------------------|
| 0 ~ -0.03 | h6 |

* For the items produced from 1st. 2010, apply to these tolerance.

| EDP. No. | D | C.L | OAL | SH.Dia. | STOCK |
|----------|----|-----|-----|---------|-------|
| AE303120 | 12 | 32 | 80 | 12 | ● |
| AE303121 | | 40 | 90 | | ● |
| AE303122 | | 45 | 100 | | ● |
| AE303123 | | 55 | 110 | | ● |
| AE323120 | | 65 | 120 | | ● |
| AE323121 | | 75 | 125 | | ● |
| AE303130 | 13 | 35 | 85 | 14 | ● |
| AE303140 | 14 | 35 | 85 | 14 | ● |
| AE303150 | 15 | 40 | 90 | 16 | ● |
| AE303160 | 16 | 45 | 90 | 16 | ● |
| AE303161 | | 55 | 110 | | ● |
| AE303162 | | 65 | 125 | | ● |
| AE303163 | | 75 | 130 | | ● |
| AE323160 | | 85 | 150 | | ● |
| AE303180 | | 18 | 45 | | 100 |
| AE303200 | 20 | 50 | 100 | 20 | ● |
| AE303201 | | 60 | 110 | | ● |
| AE303202 | | 70 | 130 | | ● |
| AE323200 | | 80 | 150 | | ● |
| AE323201 | | 90 | 160 | | ● |
| AE323202 | | 100 | 160 | | ● |
| AE303250 | 25 | 50 | 120 | 25 | ● |

AB302



2 FLUTE, STUB CUT BALL NOSE - for Aluminum

- Excellent cutting qualities on aluminum & copper.

| EDP. No. | D | R | L ₁ | L ₂ | L ₃ | D ₂ | D ₃ | STOCK |
|----------|----|----|----------------|----------------|----------------|----------------|----------------|-------|
| AB302060 | 6 | 3 | 5.5 | 25 | 55 | 5.4 | 6 | ● |
| AB302061 | 6 | 3 | 5.5 | 40 | 90 | 5.4 | 6 | ● |
| AB302080 | 8 | 4 | 7 | 30 | 65 | 7.2 | 8 | ● |
| AB302081 | 8 | 4 | 7 | 50 | 100 | 7.2 | 8 | ● |
| AB302100 | 10 | 5 | 8.5 | 35 | 75 | 9 | 10 | ● |
| AB302101 | 10 | 5 | 10 | 50 | 100 | 9 | 10 | ● |
| AB302102 | 10 | 5 | 10 | 60 | 150 | 9 | 10 | ● |
| AB302120 | 12 | 6 | 10.5 | 40 | 75 | 11 | 12 | ● |
| AB302121 | 12 | 6 | 12 | 50 | 110 | 11 | 12 | ● |
| AB302122 | 12 | 6 | 12 | 60 | 150 | 11 | 12 | ● |
| AB302160 | 16 | 8 | 14 | 50 | 90 | 14.5 | 16 | ● |
| AB302161 | 16 | 8 | 16 | 70 | 150 | 14.5 | 16 | ● |
| AB302162 | 16 | 8 | 16 | 90 | 200 | 14.5 | 16 | ● |
| AB302200 | 20 | 10 | 17 | 50 | 100 | 18 | 20 | ● |

ENDMILL

DRILL

| Tolerance of Mill Dia. (mm) | Tolerance of Shank Dia. |
|-----------------------------|-------------------------|
| 0 ~ -0.02 | h6 |

* For the items produced from 1st. 2010, apply to these tolerance.

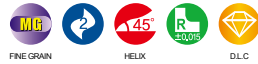
| Tolerance of Mill Dia. (mm) | Tolerance of Shank Dia. |
|-----------------------------|-------------------------|
| ±0.02 | h6 |

* For the items produced from 1st. 2010, apply to these tolerance.

ALU-WAVE SERIES

METRIC

AR502

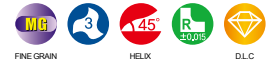


2 FLUTE, CORNER RADIUS, LONG LENGTH

- Suitable for aluminium, aluminium alloy, copper & non-ferrous material.
- Corner radius against chipping in high speed machining.

| EDP. No. | Dia. | R | C.L | OAL | SH.Dia. | STOCK |
|----------|------|------|-----|-----|---------|-------|
| AR502010 | 1 | 0.05 | 3 | 40 | 6 | ● |
| AR502015 | 1.5 | 0.05 | 5 | 40 | 6 | ● |
| AR502020 | 2 | 0.1 | 6 | 40 | 6 | ● |
| AR502021 | 2 | 0.1 | 12 | 50 | 6 | ● |
| AR502030 | 3 | 0.1 | 10 | 50 | 6 | ● |
| AR502031 | 3 | 0.1 | 20 | 60 | 6 | ● |
| AR502040 | 4 | 0.1 | 12 | 50 | 6 | ● |
| AR502041 | 4 | 0.1 | 20 | 60 | 6 | ● |
| AR502050 | 5 | 0.1 | 15 | 57 | 6 | ● |
| AR502060 | 6 | 0.1 | 15 | 57 | 6 | ● |
| AR502061 | 6 | 0.1 | 22 | 65 | 6 | ● |
| AR502070 | 7 | 0.1 | 20 | 63 | 8 | ● |
| AR502080 | 8 | 0.1 | 20 | 63 | 8 | ● |
| AR502081 | 8 | 0.1 | 28 | 70 | 8 | ● |
| AR502090 | 9 | 0.1 | 25 | 72 | 10 | ● |
| AR502100 | 10 | 0.2 | 28 | 72 | 10 | ● |
| AR502101 | 10 | 0.2 | 32 | 80 | 10 | ● |
| AR502110 | 11 | 0.2 | 30 | 80 | 12 | ● |
| AR502120 | 12 | 0.2 | 32 | 80 | 12 | ● |
| AR502121 | 12 | 0.2 | 40 | 100 | 12 | ● |

AR503



3 FLUTE, CORNER RADIUS, LONG LENGTH

- Suitable for aluminium, aluminium alloy, copper & non-ferrous material.
- Corner radius against chipping in high speed machining.

| EDP. No. | Dia. | R | C.L | OAL | SH.Dia. | STOCK |
|----------|------|-----|-----|-----|---------|-------|
| AR503040 | 4 | 0.5 | 14 | 57 | 6 | ● |
| AR503041 | 4 | 1 | 25 | 62 | 6 | ● |
| AR503060 | 6 | 0.5 | 16 | 57 | 6 | ● |
| AR503061 | 6 | 1 | 25 | 62 | 6 | ● |
| AR503080 | 8 | 0.5 | 22 | 63 | 8 | ● |
| AR503081 | 8 | 1 | 35 | 80 | 8 | ● |
| AR503100 | 10 | 0.5 | 28 | 72 | 10 | ● |
| AR503101 | 10 | 1 | 45 | 100 | 10 | ● |
| AR503120 | 12 | 0.5 | 32 | 80 | 12 | ● |
| AR503121 | 12 | 1 | 45 | 100 | 12 | ● |
| AR503160 | 16 | 0.5 | 45 | 90 | 16 | ● |
| AR503161 | 16 | 1 | 65 | 125 | 16 | ● |
| AR503200 | 20 | 0.5 | 50 | 100 | 20 | ● |
| AR503201 | 20 | 1 | 70 | 130 | 20 | ● |

ENDMILL

DRILL

Tolerance of Mill Dia. [mm]

0 ~ -0.02

Tolerance of Shank Dia.

h6

* For the items produced from 1st. 2010, apply to these tolerance.

Tolerance of Mill Dia. [mm]

0 ~ -0.02

Tolerance of Shank Dia.

h6

* For the items produced from 1st. 2010, apply to these tolerance.

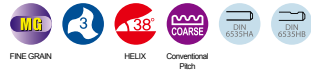
ALU-WAVE SERIES

METRIC

PART.
B

ENDMILL
&
DRILL

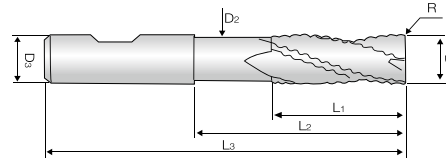
AF303



ROUGHING END MILL - for Aluminum
DIN6527L / DIN6535-HA, DIN6535-HB

| EDP. No. | | D | C.L | OAL | SH. Dia. | STOCK |
|-------------|------------|----|-----|-----|----------|-------|
| PLAIN SHANK | FLAT SHANK | | | | | |
| AF303060 | AF303060F | 6 | 16 | 57 | 6 | ● |
| AF303070 | AF303070F | 7 | 16 | 63 | 8 | ● |
| AF303080 | AF303080F | 8 | 16 | 63 | 8 | ● |
| AF303090 | AF303090F | 9 | 19 | 72 | 10 | ● |
| AF303100 | AF303100F | 10 | 22 | 72 | 10 | ● |
| AF303120 | AF303120F | 12 | 26 | 83 | 12 | ● |
| AF303140 | AF303140F | 14 | 26 | 83 | 14 | ● |
| AF303160 | AF303160F | 16 | 32 | 92 | 16 | ● |
| AF303180 | AF303180F | 18 | 32 | 92 | 18 | ● |
| AF303200 | AF303200F | 20 | 38 | 104 | 20 | ● |

AF313



ROUGHING END MILL - for Aluminum
DIN6527L / DIN6535-HA, DIN6535-HB

| EDP. No. | | Dia. | C.L | OAL | SH. Dia. | Z | Z | Z | STOCK |
|-------------|------------|------|-----|-----|----------|-----|------|----|-------|
| PLAIN SHANK | FLAT SHANK | | | | | | | | |
| AF313060 | AF313060F | 6 | 0.2 | 9 | 21 | 57 | 5.5 | 6 | |
| AF313080 | AF313080F | 8 | 0.2 | 12 | 27 | 63 | 7.5 | 8 | |
| AF313100 | AF313100F | 10 | 0.2 | 12 | 31 | 72 | 9.5 | 10 | |
| AF313120 | AF313120F | 12 | 0.2 | 12 | 37 | 83 | 11.5 | 12 | |
| AF313160 | AF313160F | 16 | 0.2 | 14 | 43 | 92 | 15.5 | 16 | |
| AF313200 | AF313200F | 20 | 0.2 | 17 | 53 | 104 | 19.2 | 20 | |

ENDMILL

DRILL

μm=1/1000mm

| Tolerance \ Dia. | from 1 to 3 | over 3 to 6 | over 6 to 10 | over 10 to 18 | over 18 to 30 |
|---------------------------|-------------|-------------|--------------|---------------|---------------|
| Cutting Edge (h10) | 0 -40 | 0 -48 | 0 -58 | 0 -70 | 0 -84 |
| Shank (h6) | 0 -6 | 0 -8 | 0 -9 | 0 -11 | 0 -13 |

μm=1/1000mm

| Tolerance \ Dia. | from 1 to 3 | over 3 to 6 | over 6 to 10 | over 10 to 18 | over 18 to 30 |
|---------------------------|-------------|-------------|--------------|---------------|---------------|
| Cutting Edge (h10) | 0 -40 | 0 -48 | 0 -58 | 0 -70 | 0 -84 |
| Shank (h6) | 0 -6 | 0 -8 | 0 -9 | 0 -11 | 0 -13 |

E302



2 FLUTE, REGULAR LENGTH

| EDP. No. | Dia. | C.L | OAL | SH.Dia. | STOCK |
|------------|------|-----|-----|---------|-------|
| E302010S4 | 1 | 3 | 42 | 4 | ● |
| E302010 | 1 | 3 | 42 | 6 | ● |
| E302015S4 | 1.5 | 4 | 42 | 4 | ● |
| E302015 | 1.5 | 4 | 42 | 6 | ● |
| E302020S4 | 2 | 6 | 42 | 4 | ● |
| E302020 | 2 | 6 | 42 | 6 | ● |
| E302025S4 | 2.5 | 8 | 42 | 4 | ● |
| E302025 | 2.5 | 8 | 42 | 6 | ● |
| E302030 | 3 | 10 | 50 | 6 | ● |
| E302035 | 3.5 | 10 | 50 | 6 | ● |
| E302040 | 4 | 12 | 50 | 6 | ● |
| E302045 | 4.5 | 14 | 50 | 6 | ● |
| E302050 | 5 | 15 | 50 | 6 | ● |
| E302055 | 5.5 | 15 | 50 | 6 | ● |
| E302060 | 6 | 15 | 50 | 6 | ● |
| E302065 | 6.5 | 18 | 60 | 8 | ● |
| E302070 | 7 | 20 | 60 | 8 | ● |
| E302075 | 7.5 | 20 | 60 | 8 | ● |
| E302080 | 8 | 20 | 60 | 8 | ● |
| E302085 | 8.5 | 23 | 70 | 10 | ● |
| E302090 | 9 | 25 | 70 | 10 | ● |
| E302095 | 9.5 | 25 | 70 | 10 | ● |
| E302100 | 10 | 25 | 70 | 10 | ● |
| E302105 | 10.5 | 28 | 75 | 12 | ● |
| E302110 | 11 | 30 | 75 | 12 | ● |
| E302115 | 11.5 | 30 | 75 | 12 | ● |
| E302120 | 12 | 30 | 75 | 12 | ● |
| E302130 | 13 | 35 | 85 | 14 | ● |
| E302130S16 | 13 | 35 | 90 | 16 | ● |
| E302140 | 14 | 35 | 85 | 14 | ● |
| E302140S16 | 14 | 35 | 90 | 16 | ● |
| E302150 | 15 | 40 | 90 | 16 | ● |
| E302160 | 16 | 40 | 90 | 16 | ● |
| E302180 | 18 | 45 | 100 | 18 | ● |
| E302200 | 20 | 45 | 100 | 20 | ● |
| E302250 | 25 | 50 | 120 | 25 | ● |

μm=1/1000mm

| Tolerance | Dia. | from 1 to 3 | over 3 to 6 | over 6 to 10 | over 10 to 18 | over 18 to 30 |
|--------------------|------|-------------|-------------|--------------|---------------|---------------|
| Cutting Edge (h10) | | 0 | 0 | 0 | 0 | 0 |
| | | -40 | -48 | -58 | -70 | -84 |
| Shank (h6) | | 0 | 0 | 0 | 0 | 0 |
| | | -6 | -8 | -9 | -11 | -13 |

E304



4 FLUTE, REGULAR LENGTH

| EDP. No. | Dia. | C.L | OAL | SH.Dia. | STOCK |
|------------|------|-----|-----|---------|-------|
| E304020S4 | 2 | 6 | 42 | 4 | ● |
| E304020 | 2 | 6 | 42 | 6 | ● |
| E304025 | 2.5 | 8 | 42 | 6 | ● |
| E304030 | 3 | 10 | 50 | 6 | ● |
| E304035 | 3.5 | 10 | 50 | 6 | ● |
| E304040 | 4 | 12 | 50 | 6 | ● |
| E304045 | 4.5 | 14 | 50 | 6 | ● |
| E304050 | 5 | 15 | 50 | 6 | ● |
| E304055 | 5.5 | 15 | 50 | 6 | ● |
| E304060 | 6 | 15 | 50 | 6 | ● |
| E304065 | 6.5 | 18 | 60 | 8 | ● |
| E304070 | 7 | 20 | 60 | 8 | ● |
| E304075 | 7.5 | 20 | 60 | 8 | ● |
| E304080 | 8 | 20 | 60 | 8 | ● |
| E304085 | 8.5 | 23 | 70 | 10 | ● |
| E304090 | 9 | 25 | 70 | 10 | ● |
| E304095 | 9.5 | 25 | 70 | 10 | ● |
| E304100 | 10 | 25 | 70 | 10 | ● |
| E304105 | 10.5 | 28 | 75 | 12 | ● |
| E304110 | 11 | 30 | 75 | 12 | ● |
| E304115 | 11.5 | 30 | 75 | 12 | ● |
| E304120 | 12 | 30 | 75 | 12 | ● |
| E304130 | 13 | 35 | 85 | 14 | ● |
| E304130S16 | 13 | 35 | 90 | 16 | ● |
| E304140 | 14 | 35 | 85 | 14 | ● |
| E404140S16 | 14 | 35 | 90 | 16 | ● |
| E304150 | 15 | 40 | 90 | 16 | ● |
| E304160 | 16 | 40 | 90 | 16 | ● |
| E304180 | 18 | 45 | 100 | 18 | ● |
| E304200 | 20 | 45 | 100 | 20 | ● |
| E304250 | 25 | 50 | 120 | 25 | ● |

μm=1/1000mm

| Tolerance | Dia. | from 1 to 3 | over 3 to 6 | over 6 to 10 | over 10 to 18 | over 18 to 30 |
|--------------------|------|-------------|-------------|--------------|---------------|---------------|
| Cutting Edge (h10) | | 0 | 0 | 0 | 0 | 0 |
| | | -40 | -48 | -58 | -70 | -84 |
| Shank (h6) | | 0 | 0 | 0 | 0 | 0 |
| | | -6 | -8 | -9 | -11 | -13 |

STANDARD ENDMILL SERIES

METRIC

PART.
B

ENDMILL
&
DRILL

B302



2 FLUTE, BALL NOSE LONG LENGTH

| EDP. No. | Dia. | R | C.L | OAL | SH.Dia. | STOCK |
|----------|------|------|-----|-----|---------|-------|
| B302010 | 1 | 0.5 | 3 | 50 | 6 | ● |
| B302015 | 1.5 | 0.75 | 4 | 50 | 6 | ● |
| B302020 | 2 | 1 | 6 | 60 | 6 | ● |
| B302025 | 2.5 | 1.25 | 6 | 60 | 6 | ● |
| B302030 | 3 | 1.5 | 8 | 70 | 6 | ● |
| B302035 | 3.5 | 1.75 | 8 | 70 | 6 | ● |
| B302040 | 4 | 2 | 8 | 70 | 6 | ● |
| B302045 | 4.5 | 2.25 | 10 | 70 | 6 | ● |
| B302050 | 5 | 2.5 | 12 | 80 | 6 | ● |
| B302055 | 5.5 | 2.75 | 12 | 80 | 6 | ● |
| B302060 | 6 | 3 | 12 | 90 | 6 | ● |
| B302065 | 6.5 | 3.25 | 12 | 90 | 8 | ● |
| B302070 | 7 | 3.5 | 20 | 90 | 8 | ● |
| B302080 | 8 | 4 | 20 | 100 | 8 | ● |
| B302090 | 9 | 4.5 | 25 | 100 | 10 | ● |
| B302100 | 10 | 5 | 25 | 100 | 10 | ● |
| B302110 | 11 | 5.5 | 30 | 110 | 12 | ● |
| B302120 | 12 | 6 | 30 | 110 | 12 | ● |
| B302130 | 13 | 6.5 | 35 | 120 | 14 | ● |
| B302140 | 14 | 7 | 35 | 120 | 14 | ● |
| B302150 | 15 | 7.5 | 40 | 140 | 16 | ● |
| B302160 | 16 | 8 | 40 | 140 | 16 | ● |
| B302180 | 18 | 9 | 45 | 150 | 18 | ● |
| B302200 | 20 | 10 | 45 | 160 | 20 | ● |
| B302250 | 25 | 12.5 | 50 | 180 | 25 | ● |

μm=1/1000mm

| Tolerance | Dia. | μm=1/1000mm | | | | |
|--------------------|------|-------------|-------------|--------------|---------------|---------------|
| | | from 1 to 3 | over 3 to 6 | over 6 to 10 | over 10 to 18 | over 18 to 30 |
| Cutting Edge (h10) | | 0 | 0 | 0 | 0 | 0 |
| | | -40 | -48 | -58 | -70 | -84 |
| Shank (h6) | | 0 | 0 | 0 | 0 | 0 |
| | | -6 | -8 | -9 | -11 | -13 |

B304



4 FLUTE, BALL NOSE LONG LENGTH

| EDP. No. | Dia. | R | C.L | OAL | SH.Dia. | STOCK |
|----------|------|------|-----|-----|---------|-------|
| B304030 | 3 | 1.5 | 8 | 70 | 6 | ● |
| B304040 | 4 | 2 | 8 | 70 | 6 | ● |
| B304050 | 5 | 2.5 | 12 | 80 | 6 | ● |
| B304060 | 6 | 3 | 12 | 90 | 6 | ● |
| B304070 | 7 | 3.5 | 20 | 90 | 8 | ● |
| B304080 | 8 | 4 | 20 | 100 | 8 | ● |
| B304090 | 9 | 4.5 | 25 | 100 | 10 | ● |
| B304100 | 10 | 5 | 25 | 100 | 10 | ● |
| B304110 | 11 | 5.5 | 30 | 110 | 12 | ● |
| B304120 | 12 | 6 | 30 | 110 | 12 | ● |
| B304130 | 13 | 6.5 | 35 | 120 | 14 | ● |
| B304140 | 14 | 7 | 35 | 120 | 14 | ● |
| B304150 | 15 | 7.5 | 40 | 140 | 16 | ● |
| B304160 | 16 | 8 | 40 | 140 | 16 | ● |
| B304180 | 18 | 9 | 45 | 150 | 18 | ● |
| B304200 | 20 | 10 | 45 | 160 | 20 | ● |
| B304250 | 25 | 12.5 | 50 | 180 | 25 | ● |

μm=1/1000mm

| Tolerance | Dia. | μm=1/1000mm | | | | |
|--------------------|------|-------------|-------------|--------------|---------------|---------------|
| | | from 1 to 3 | over 3 to 6 | over 6 to 10 | over 10 to 18 | over 18 to 30 |
| Cutting Edge (h10) | | 0 | 0 | 0 | 0 | 0 |
| | | -40 | -48 | -58 | -70 | -84 |
| Shank (h6) | | 0 | 0 | 0 | 0 | 0 |
| | | -6 | -8 | -9 | -11 | -13 |

ENDMILL

DRILL

STANDARD ENDMILL SERIES

METRIC

E322



2 FLUTE, LONG LENGTH

| EDP. No. | Dia. | C.L | OAL | SH.Dia. | STOCK |
|----------|------|-----|-----|---------|-------|
| E322030 | 3 | 25 | 75 | 6 | ● |
| E322040 | 4 | 25 | 75 | 6 | ● |
| E322050 | 5 | 30 | 85 | 6 | ● |
| E322060 | 6 | 30 | 85 | 6 | ● |
| E322070 | 7 | 35 | 85 | 8 | ● |
| E322080 | 8 | 35 | 85 | 8 | ● |
| E322090 | 9 | 45 | 100 | 10 | ● |
| E322100 | 10 | 45 | 100 | 10 | ● |
| E322101 | 10 | 60 | 155 | 10 | ● |
| E322120 | 12 | 55 | 120 | 12 | ● |
| E322121 | 12 | 65 | 155 | 12 | ● |
| E322140 | 14 | 60 | 120 | 14 | ● |
| E322160 | 16 | 60 | 120 | 16 | ● |
| E322161 | 16 | 75 | 165 | 16 | ● |
| E322180 | 18 | 60 | 120 | 18 | ● |
| E322200 | 20 | 60 | 120 | 20 | ● |
| E322201 | 20 | 75 | 165 | 20 | ● |

E324



4 FLUTE, LONG LENGTH

| EDP. No. | Dia. | C.L | OAL | SH.Dia. | STOCK |
|----------|------|-----|-----|---------|-------|
| E324030 | 3 | 25 | 75 | 6 | ● |
| E324040 | 4 | 25 | 75 | 6 | ● |
| E324050 | 5 | 30 | 85 | 6 | ● |
| E324060 | 6 | 30 | 85 | 6 | ● |
| E324070 | 7 | 35 | 85 | 8 | ● |
| E324080 | 8 | 35 | 85 | 8 | ● |
| E324090 | 9 | 45 | 100 | 10 | ● |
| E324100 | 10 | 45 | 100 | 10 | ● |
| E324101 | 10 | 60 | 155 | 10 | ● |
| E324120 | 12 | 55 | 120 | 12 | ● |
| E324121 | 12 | 65 | 155 | 12 | ● |
| E324140 | 14 | 60 | 120 | 14 | ● |
| E324160 | 16 | 60 | 120 | 16 | ● |
| E324161 | 16 | 75 | 165 | 16 | ● |
| E324180 | 18 | 60 | 120 | 18 | ● |
| E324200 | 20 | 60 | 120 | 20 | ● |
| E324201 | 20 | 75 | 165 | 20 | ● |

ENDMILL

DRILL

μm=1/1000mm

| Tolerance \ Dia. | from 1 to 3 | over 3 to 6 | over 6 to 10 | over 10 to 18 | over 18 to 30 |
|---------------------------|-------------|-------------|--------------|---------------|---------------|
| Cutting Edge (h10) | 0 -40 | 0 -48 | 0 -58 | 0 -70 | 0 -84 |
| Shank (h6) | 0 -6 | 0 -8 | 0 -9 | 0 -11 | 0 -13 |

μm=1/1000mm

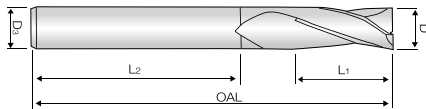
| Tolerance \ Dia. | from 1 to 3 | over 3 to 6 | over 6 to 10 | over 10 to 18 | over 18 to 30 |
|---------------------------|-------------|-------------|--------------|---------------|---------------|
| Cutting Edge (h10) | 0 -40 | 0 -48 | 0 -58 | 0 -70 | 0 -84 |
| Shank (h6) | 0 -6 | 0 -8 | 0 -9 | 0 -11 | 0 -13 |

STANDARD ENDMILL SERIES

METRIC

PART.
B

EB302



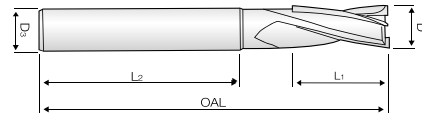
2 FLUTE, REGULAR LENGTH - BRAZED TYPE

| EDP. No. | D | L ₂ | L ₁ | OAL | D ₃ | STOCK |
|----------|----|----------------|----------------|-----|----------------|-------|
| EB302140 | 14 | 60 | 28 | 98 | 16 | ● |
| EB302150 | 15 | 60 | 28 | 98 | 16 | ● |
| EB302160 | 16 | 60 | 28 | 98 | 16 | ● |
| EB302170 | 17 | 70 | 32 | 115 | 20 | ● |
| EB302180 | 18 | 70 | 32 | 115 | 20 | ● |
| EB302190 | 19 | 70 | 32 | 115 | 20 | ● |
| EB302200 | 20 | 70 | 32 | 115 | 20 | ● |
| EB302220 | 22 | 70 | 32 | 115 | 20 | ● |
| EB302230 | 23 | 85 | 40 | 140 | 25 | ● |
| EB302240 | 24 | 85 | 40 | 140 | 25 | ● |
| EB302250 | 25 | 85 | 40 | 140 | 25 | ● |
| EB302260 | 26 | 85 | 40 | 140 | 25 | ● |
| EB302280 | 28 | 85 | 40 | 140 | 25 | ● |
| EB302300 | 30 | 85 | 50 | 150 | 32 | ● |
| EB302320 | 32 | 85 | 50 | 150 | 32 | ● |
| EB302350 | 35 | 85 | 50 | 150 | 32 | ● |
| EB302360 | 36 | 85 | 50 | 150 | 32 | ● |
| EB302380 | 38 | 85 | 55 | 155 | 32 | ● |
| EB302400 | 40 | 85 | 55 | 155 | 32 | ● |
| EB302450 | 45 | 85 | 63 | 160 | 32 | ● |
| EB302500 | 50 | 85 | 63 | 160 | 32 | ● |

| | |
|-----------------------------|-------------------------|
| Tolerance of Mill Dia. (mm) | Tolerance of Shank Dia. |
| 0 ~ -0.05 | h7 |

* For the items produced from 1st. 2010, apply to these tolerance.

EB304



4 FLUTE, REGULAR LENGTH - BRAZED TYPE

| EDP. No. | D | L ₁ | L ₂ | OAL | D ₃ | STOCK |
|----------|----|----------------|----------------|-----|----------------|-------|
| EB304140 | 14 | 28 | 60 | 98 | 16 | ● |
| EB304150 | 15 | 28 | 60 | 98 | 16 | ● |
| EB304160 | 16 | 28 | 60 | 98 | 16 | ● |
| EB304170 | 17 | 32 | 70 | 115 | 20 | ● |
| EB304180 | 18 | 32 | 70 | 115 | 20 | ● |
| EB304190 | 19 | 32 | 70 | 115 | 20 | ● |
| EB304200 | 20 | 32 | 70 | 115 | 20 | ● |
| EB304220 | 22 | 32 | 70 | 115 | 20 | ● |
| EB304230 | 23 | 40 | 85 | 140 | 25 | ● |
| EB304240 | 24 | 40 | 85 | 140 | 25 | ● |
| EB304250 | 25 | 40 | 85 | 140 | 25 | ● |
| EB304260 | 26 | 40 | 85 | 140 | 25 | ● |
| EB304280 | 28 | 40 | 85 | 140 | 25 | ● |
| EB304300 | 30 | 50 | 85 | 150 | 32 | ● |
| EB304320 | 32 | 50 | 85 | 150 | 32 | ● |
| EB304350 | 35 | 50 | 85 | 150 | 32 | ● |
| EB304360 | 36 | 50 | 85 | 150 | 32 | ● |
| EB304380 | 38 | 55 | 85 | 155 | 32 | ● |
| EB304400 | 40 | 55 | 85 | 155 | 32 | ● |
| EB304450 | 45 | 63 | 85 | 160 | 32 | ● |
| EB304500 | 50 | 63 | 85 | 160 | 32 | ● |

| | |
|-----------------------------|-------------------------|
| Tolerance of Mill Dia. (mm) | Tolerance of Shank Dia. |
| 0 ~ -0.05 | h7 |

* For the items produced from 1st. 2010, apply to these tolerance.

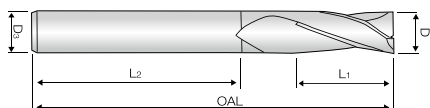
ENDMILL

DRILL

STANDARD ENDMILL SERIES

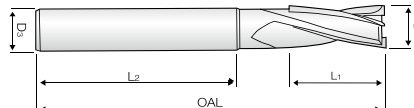
METRIC

EB322



2 FLUTE, LONG LENGTH - BRAZED TYPE

EB324



4 FLUTE, LONG LENGTH - BRAZED TYPE

| EDP. No. | D | L ₁ | L ₂ | OAL | D ₃ | STOCK |
|----------|----|----------------|----------------|-----|----------------|-------|
| EB322140 | 14 | 50 | 60 | 130 | 16 | ● |
| EB322150 | 15 | 50 | 60 | 130 | 16 | ● |
| EB322160 | 16 | 60 | 60 | 140 | 16 | ● |
| EB322180 | 18 | 65 | 60 | 145 | 20 | ● |
| EB322200 | 20 | 65 | 60 | 145 | 20 | ● |
| EB322220 | 22 | 65 | 60 | 145 | 25 | ● |
| EB322240 | 24 | 70 | 60 | 150 | 25 | ● |
| EB322250 | 25 | 70 | 60 | 150 | 25 | ● |
| EB322260 | 26 | 70 | 60 | 150 | 32 | ● |
| EB322280 | 28 | 70 | 60 | 150 | 32 | ● |
| EB322300 | 30 | 80 | 70 | 180 | 32 | ● |
| EB322320 | 32 | 90 | 70 | 190 | 32 | ● |
| EB322350 | 35 | 100 | 70 | 200 | 32 | ● |
| EB322380 | 38 | 120 | 70 | 220 | 32 | ● |
| EB322400 | 40 | 120 | 70 | 220 | 32 | ● |
| EB322450 | 45 | 120 | 80 | 230 | 32 | ● |

| EDP. No. | D | L ₁ | L ₂ | OAL | D ₃ | STOCK |
|----------|----|----------------|----------------|-----|----------------|-------|
| EB324140 | 14 | 50 | 60 | 130 | 16 | ● |
| EB324150 | 15 | 50 | 60 | 130 | 16 | ● |
| EB324160 | 16 | 60 | 60 | 140 | 16 | ● |
| EB324180 | 18 | 65 | 60 | 145 | 20 | ● |
| EB324200 | 20 | 65 | 60 | 145 | 20 | ● |
| EB324220 | 22 | 65 | 60 | 145 | 25 | ● |
| EB324240 | 24 | 70 | 60 | 150 | 25 | ● |
| EB324250 | 25 | 70 | 60 | 150 | 25 | ● |
| EB324260 | 26 | 70 | 60 | 150 | 32 | ● |
| EB324280 | 28 | 70 | 60 | 150 | 32 | ● |
| EB324300 | 30 | 80 | 70 | 180 | 32 | ● |
| EB324320 | 32 | 90 | 70 | 190 | 32 | ● |
| EB324350 | 35 | 100 | 70 | 200 | 32 | ● |
| EB324380 | 38 | 120 | 70 | 220 | 32 | ● |
| EB324400 | 40 | 120 | 70 | 220 | 32 | ● |
| EB324450 | 45 | 120 | 80 | 230 | 32 | ● |

ENDMILL

DRILL

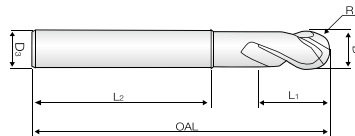
| Tolerance of Mill Dia. [mm] | Tolerance of Shank Dia. |
|-----------------------------|-------------------------|
| 0 ~ -0.05 | h7 |

* For the items produced from 1st. 2010, apply to these tolerance.

| Tolerance of Mill Dia. [mm] | Tolerance of Shank Dia. |
|-----------------------------|-------------------------|
| 0 ~ -0.05 | h7 |

* For the items produced from 1st. 2010, apply to these tolerance.

BB302



2 FLUTE, BALL NOSE REGULAR LENGTH - BRAZED TYPE

| EDP. No. | D | R | L ₂ | L ₁ | L ₃ | OAL | STOCK |
|-----------------|----|-----|----------------|----------------|----------------|-----|-------|
| BB302150 | 15 | 7.5 | 55 | 28 | 16 | 100 | |
| BB302160 | 16 | 8 | 55 | 28 | 16 | 100 | |
| BB302180 | 18 | 9 | 55 | 29 | 20 | 110 | |
| BB302200 | 20 | 10 | 55 | 29 | 20 | 110 | |
| BB302220 | 22 | 11 | 60 | 36 | 25 | 110 | |

| EDP. No. | D | R | L ₂ | L ₁ | L ₃ | OAL | STOCK |
|-----------------|----|------|----------------|----------------|----------------|-----|-------|
| BB302240 | 24 | 12 | 60 | 37 | 25 | 110 | |
| BB302250 | 25 | 12.5 | 60 | 38 | 25 | 120 | |
| BB302280 | 28 | 14 | 65 | 40 | 32 | 120 | |
| BB302300 | 30 | 15 | 65 | 46 | 32 | 130 | |
| BB302320 | 32 | 16 | 65 | 47 | 32 | 140 | |

ENDMILL

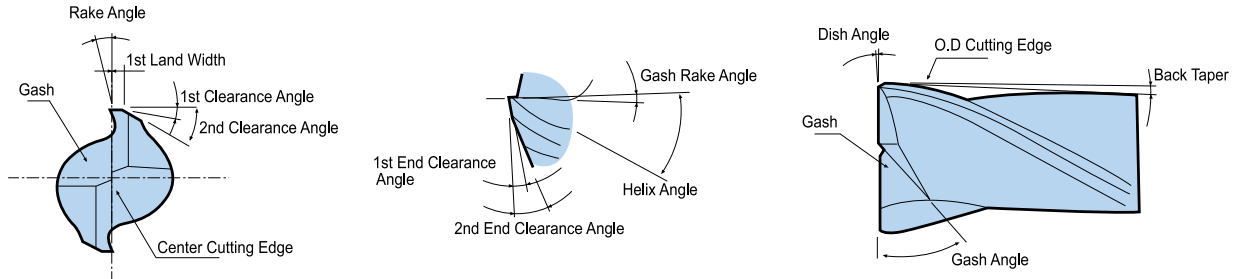
DRILL

| Tolerance of Mill Dia. (mm) | Tolerance of Shank Dia. |
|-----------------------------|-------------------------|
| 0 ~ -0.05 | h7 |

* For the items produced from 1st. 2010, apply to these tolerance.

TECHNICAL DATA

NOMENCLATURE OF ENDMILL



APPLICATION RANGE OF GRADE

| WORKPIECE | GRADE |
|---|--|
| Carbon Steel, Alloy Steel, Tool Steel, Metal Mold Steel | <ul style="list-style-type: none"> • Micro Grain Carbide • P30 |
| Cast Iron, Ductile | <ul style="list-style-type: none"> • Micro Grain Carbide • K10 |
| Heat Treatment Steel(HRC 40-60) | <ul style="list-style-type: none"> • Ultrafinest Carbide |
| Aluminium, Nonferrous Material | <ul style="list-style-type: none"> • Micro Grain Carbide • K10 |

ENDMILL

FORMULA OF ENDMILLING

| | |
|---|--|
| 1) Cutting Speed $V = \frac{\pi \times D \times N}{1000}$ (m/min) | <p>V : Cutting Speed (m/min) D : Diameter of End Mill (mm) N : End Mill revolution (RPM)</p> |
| 2) Feed per tooth $f_z = \frac{F}{Z \times N}$ (mm/tooth) | <p>fz : Feed per tooth (mm/tooth) Z : No. of teeth N : End Mill revolution (RPM)</p> |
| 3) Table Feed rate $F = f_z \times Z \times N$ | <p>F : Feed rate (mm/min) fz : Feed per tooth (mm/tooth) Z : No. of teeth N : End Mill revolution (RPM)</p> |
| 4) Cutting Time $T_c = \frac{L}{F}$ | <p>Tc: Cutting Time (min) F : Table feed rate (m/min) L : Length of cut (workpiece Length + Diameter of Endmill +)</p> |

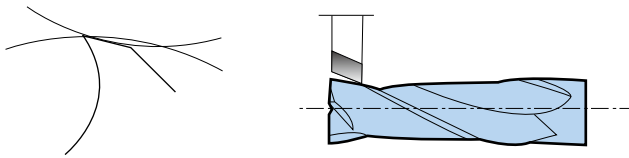
DRILL

FOR REGRINDING

1. Regrinding range

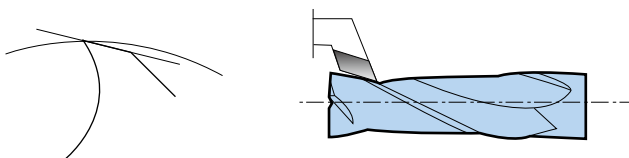
| APPLICATION RANGE | CUTTER Dia. | AMOUNT OF FLANK WEAR |
|-------------------|-------------|----------------------|
| Finish Machining | ~ Ø10 | 0.05 ~ 0.1 |
| | Ø11 ~ Ø30 | 0.1 ~ 0.25 |
| | Ø31 ~ Ø50 | 0.2 ~ 0.35 |
| Rough Machining | ~ Ø10 | 0.08 ~ 0.15 |
| | Ø11 ~ Ø30 | 0.15 ~ 0.35 |
| | Ø31 ~ Ø50 | 0.3 ~ 0.45 |

2. Regrinding Method of Relief



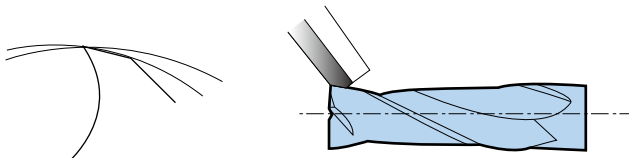
(1) Concave method

- In case when precise outer Diameter dimension is required.
- In case of aluminium machining.



(2) Flat method

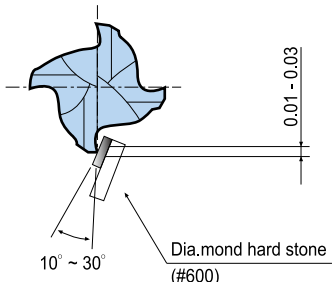
- Excellent machinability
 - Applicable to ball end mill and taper end mill.
- Secondary clearance angle work is required.
 - When Diameter is large.



(3) Eccentric method

- Excellent toughness and surface roughness.
- Secondary clearance angle work is not required.

3. Honing



- 1) Recommend honing for machining mold metal and high hardness workpiece.
 - The amount of honing shall be less than that of feed per blade.
- 2) When using end mill without honing, machine for 10 to 30 seconds at feed rate of less than 0.01 mm/blade and then machine at normal feed rate.
- 3) Honing is not required for machining aluminium and non-ferrous metal.

TROUBLE SHOOTING FOR ENDMILLING

| Problems | Cause | Cutting Conditions | | | | | Tool shape | | | | | Grade | | The Others | | | | |
|-----------------------|---|--------------------|-----------|--------------|---------|---------------|--------------|------------|----------------|------------------|--------|-------------|-----------|------------|---------------------|-----------------------|-------------------|----------|
| | | Cutting Speed | Feed Rate | Depth of Cut | Coolant | Up & Down Cut | Relief Angle | Lead Angle | Cutting Length | Numbers of Teeth | Honing | Chip Pocket | Toughness | Hardness | Machanical Rigidity | Machanical Chattering | Workpiece Setting | Overhang |
| Cutting edge breakage | Excessive wear on periphery | ▼ | ▲ | | ⊙ | | | | | | | | | ▲ | | | | |
| | Chipping | | ▼ | | | ▼ | ▼ | | | ⊙ | | | ▲ | | ▼ | ▲ | ▼ | |
| | Breakage while cutting | | ▼ | ▼ | | | | ▼ | | | | ▲ | | ▲ | | ▲ | ▼ | |
| Poor surface finish | Generation of built-up edge | ▲ | ▲ | | ⊙ | | | ▲ | | ⊙ | | | | | | | | |
| | Generation of chattering | ▼ | | | ○ | ▼ | | ▼ | | | | | | ▲ | ⊙ | ▲ | ▼ | |
| | Surface Squarence | | ▼ | ▼ | | ▲ | | ▲ | ▼ | | | | | | | | ▼ | |
| Oversize or undersize | Improper cutting conditions Improper choice of endmill type | ▲ | ▼ | | | ▼ | | ▼ | ▲ | | | | | ▲ | ▼ | | ▼ | |
| Poor chip control | Excessive cutting rate Improper chip Pocket Improper cutting conditions | | ▼ | ▼ | | | | | ▼ | | | ▲ | | | | | | |

▲ : Increase ▼ : Decrease ○ : Application ⊙ : Proper application

TECHNICAL DATA

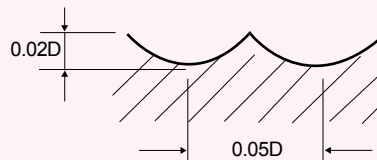
PART.
B

ENDMILL
&
DRILL

DA702

| MATERIAL | HARDENED STEELS HEAT RESISTANT STEELS | | HARDENED STEELS | | HARDENED STEELS | | HARDENED STEELS | | HARDENED STEELS | | HARDENED STEELS | |
|----------------|---|--------|--------------------|--------|--------------------|--------|--------------------|--------|--------------------|--------|--------------------|-------|
| HARDNESS | HRc 30 ~ HRc 40 | | HRc 40 ~ HRc 50 | | HRc 50 ~ HRc 55 | | HRc 55 ~ HRc 60 | | HRc 60 ~ HRc 65 | | HRc 65 ~ HRc 70 | |
| DIAMETER(inch) | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| R1/64×1/32 | 50000 | 188.98 | 50000 | 165.35 | 45000 | 149.61 | 40000 | 118.11 | 35000 | 102.36 | 35000 | 90.55 |
| R1/32×1/16 | 49700 | 224.41 | 47800 | 188.98 | 40000 | 157.48 | 35000 | 124.02 | 32000 | 110.24 | 28500 | 90.55 |
| R3/64×3/32 | 49700 | 224.41 | 47800 | 188.98 | 40000 | 157.48 | 35000 | 124.02 | 32000 | 110.24 | 28500 | 90.55 |
| R1/16×1/8 | 33100 | 236.22 | 31800 | 208.66 | 26500 | 157.48 | 23500 | 124.02 | 21000 | 110.24 | 19000 | 90.55 |
| R3/32×3/16 | 18600 | 228.35 | 17800 | 192.91 | 15000 | 147.64 | 13500 | 120.08 | 11500 | 100.39 | 10500 | 82.68 |
| R1/8×1/4 | 13900 | 190.94 | 13400 | 161.42 | 11000 | 122.05 | 10000 | 98.43 | 8800 | 84.65 | 8000 | 68.90 |
| R5/32×5/16 | 11100 | 165.35 | 10700 | 137.80 | 9000 | 106.30 | 8000 | 84.65 | 7000 | 72.83 | 6500 | 61.02 |
| R3/16×3/8 | 9300 | 145.67 | 8900 | 122.05 | 7500 | 94.49 | 6600 | 74.80 | 5800 | 64.96 | 5300 | 54.33 |
| R1/4×1/2 | 6950 | 116.14 | 6680 | 98.43 | 5600 | 74.80 | 5000 | 61.02 | 4400 | 49.21 | 4000 | 41.34 |

RPM : Revolution Per Min
FEED : inch / min

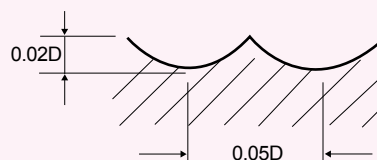


※The feed, in long & extra long types, should be reduced by around 50%

DB702

| MATERIAL | HARDENED STEELS HEAT RESISTANT STEELS | | HARDENED STEELS | | HARDENED STEELS | | HARDENED STEELS | | HARDENED STEELS | | HARDENED STEELS | |
|--------------|---|------|--------------------|------|--------------------|------|--------------------|------|--------------------|------|--------------------|------|
| HARDNESS | HRc 30 ~ HRc 40 | | HRc 40 ~ HRc 50 | | HRc 50 ~ HRc 55 | | HRc 55 ~ HRc 60 | | HRc 60 ~ HRc 65 | | HRc 65 ~ HRc 70 | |
| DIAMETER(mm) | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 1 | 50000 | 4800 | 50000 | 4200 | 45000 | 3800 | 40000 | 3000 | 35000 | 2600 | 35000 | 2300 |
| 2 | 49700 | 5700 | 47800 | 4800 | 40000 | 4000 | 35000 | 3150 | 32000 | 2800 | 28500 | 2300 |
| 3 | 33100 | 6000 | 31800 | 5300 | 26500 | 4000 | 23500 | 3150 | 21000 | 2800 | 19000 | 2300 |
| 4 | 24900 | 6000 | 23900 | 5300 | 20000 | 4000 | 17500 | 3150 | 16000 | 2800 | 14500 | 2300 |
| 5 | 18600 | 5800 | 17800 | 4900 | 15000 | 3750 | 13500 | 3050 | 11500 | 2550 | 10500 | 2100 |
| 6 | 13900 | 4850 | 13400 | 4100 | 11000 | 3100 | 10000 | 2500 | 8800 | 2150 | 8000 | 1750 |
| 8 | 11100 | 4200 | 10700 | 3500 | 9000 | 2700 | 8000 | 2150 | 7000 | 1850 | 6500 | 1550 |
| 10 | 9300 | 3700 | 8900 | 3100 | 7500 | 2400 | 6600 | 1900 | 5800 | 1650 | 5300 | 1380 |
| 12 | 6950 | 2950 | 6680 | 2500 | 5600 | 1900 | 5000 | 1550 | 4400 | 1250 | 4000 | 1050 |
| 16 | 5570 | 2650 | 5350 | 2200 | 4500 | 1700 | 4000 | 1350 | 3500 | 1000 | 3200 | 850 |
| 20 | 4450 | 2350 | 4300 | 1950 | 3600 | 1500 | 3200 | 1200 | 2800 | 800 | 2550 | 660 |

RPM = rev. / min.
FEED = mm / min.



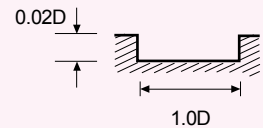
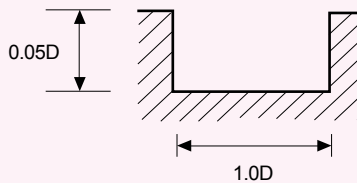
ENDMILL

DRILL

ZE702, ZE752, ZE712 - SLOTTING

| MATERIAL | HARDENED STEELS HEAT RESISTANT STEELS | | HARDENED STEELS | | HARDENED STEELS | | HARDENED STEELS | | HARDENED STEELS | | HARDENED STEELS | |
|--------------|---|------|--------------------|------|--------------------|------|--------------------|------|--------------------|------|--------------------|------|
| HARDNESS | HRc 30 ~ HRc 40 | | HRc 40 ~ HRc 50 | | HRc 50 ~ HRc 55 | | HRc 55 ~ HRc 60 | | HRc 60 ~ HRc 65 | | HRc 65 ~ HRc 70 | |
| DIAMETER(mm) | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 1 | 48000 | 750 | 38000 | 570 | 25500 | 360 | 20500 | 215 | 16000 | 135 | 12500 | 85 |
| 2 | 33300 | 850 | 26000 | 680 | 17500 | 420 | 14500 | 260 | 11000 | 160 | 9500 | 115 |
| 3 | 21800 | 850 | 17300 | 680 | 11500 | 420 | 9500 | 260 | 7500 | 160 | 6400 | 115 |
| 4 | 16700 | 880 | 13200 | 700 | 8800 | 440 | 7200 | 270 | 5600 | 170 | 4750 | 118 |
| 5 | 15700 | 1000 | 12500 | 805 | 8300 | 500 | 6400 | 285 | 5100 | 180 | 4450 | 132 |
| 6 | 13100 | 950 | 10350 | 770 | 6900 | 480 | 5300 | 280 | 4200 | 180 | 3700 | 130 |
| 8 | 9880 | 930 | 7800 | 720 | 5200 | 445 | 4000 | 255 | 3200 | 165 | 2800 | 120 |
| 10 | 7800 | 850 | 6150 | 680 | 4100 | 415 | 3200 | 240 | 2550 | 155 | 2200 | 112 |
| 12 | 6650 | 850 | 5250 | 680 | 3500 | 415 | 2650 | 240 | 2100 | 155 | 1860 | 112 |
| 16 | 4900 | 730 | 3900 | 580 | 2600 | 365 | 2000 | 210 | 1600 | 135 | 1400 | 95 |
| 20 | 3900 | 660 | 3100 | 525 | 2050 | 335 | 1600 | 195 | 1300 | 125 | 1100 | 85 |

RPM = rev. / min.
FEED = mm / min.

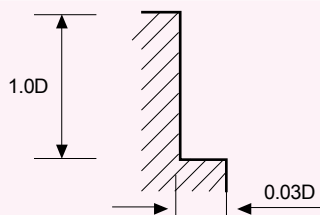


ZE702, ZE752, ZE712 - SIDE CUTTING

ENDMILL

| MATERIAL | HARDENED STEELS HEAT RESISTANT STEELS | | HARDENED STEELS | | HARDENED STEELS | | HARDENED STEELS | | HARDENED STEELS | | HARDENED STEELS | |
|--------------|---|------|--------------------|------|--------------------|------|--------------------|------|--------------------|------|--------------------|------|
| HARDNESS | HRc 30 ~ HRc 40 | | HRc 40 ~ HRc 50 | | HRc 50 ~ HRc 55 | | HRc 55 ~ HRc 60 | | HRc 60 ~ HRc 65 | | HRc 65 ~ HRc 70 | |
| DIAMETER(mm) | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 1 | 48000 | 1050 | 38000 | 820 | 25500 | 510 | 20500 | 310 | 16000 | 190 | 12500 | 125 |
| 2 | 33300 | 1200 | 26000 | 970 | 17500 | 600 | 14500 | 370 | 11000 | 230 | 9500 | 165 |
| 3 | 21800 | 1200 | 17300 | 970 | 11500 | 600 | 9500 | 370 | 7500 | 230 | 6400 | 165 |
| 4 | 16700 | 1250 | 13200 | 1000 | 8800 | 625 | 7200 | 385 | 5600 | 240 | 4750 | 170 |
| 5 | 15700 | 1450 | 12500 | 1150 | 8300 | 710 | 6400 | 410 | 5100 | 260 | 4450 | 190 |
| 6 | 13100 | 1350 | 10350 | 1100 | 6900 | 690 | 5300 | 400 | 4200 | 255 | 3700 | 185 |
| 8 | 9880 | 1320 | 7800 | 1030 | 5200 | 635 | 4000 | 365 | 3200 | 235 | 2800 | 170 |
| 10 | 7800 | 1200 | 6150 | 970 | 4100 | 590 | 3200 | 340 | 2550 | 220 | 2200 | 160 |
| 12 | 6650 | 1200 | 5250 | 970 | 3500 | 590 | 2650 | 340 | 2100 | 220 | 1860 | 160 |
| 16 | 4900 | 1050 | 3900 | 840 | 2600 | 520 | 2000 | 300 | 1600 | 190 | 1400 | 140 |
| 20 | 3900 | 950 | 3100 | 750 | 2050 | 475 | 1600 | 275 | 1300 | 175 | 1100 | 125 |

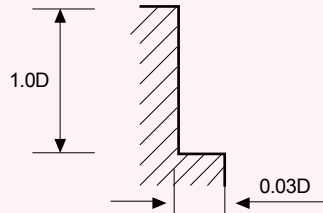
RPM = rev. / min.
FEED = mm / min.



ZE704, ZE754, ZE714 - SIDE CUTTING

| MATERIAL | HARDENED STEELS HEAT RESISTANT STEELS | | HARDENED STEELS | | HARDENED STEELS | | HARDENED STEELS | | HARDENED STEELS | | HARDENED STEELS | |
|--------------|---|------|--------------------|------|--------------------|------|--------------------|------|--------------------|------|--------------------|------|
| HARDNESS | HRc 30 ~ HRc 40 | | HRc 40 ~ HRc 50 | | HRc 50 ~ HRc 55 | | HRc 55 ~ HRc 60 | | HRc 60 ~ HRc 65 | | HRc 65 ~ HRc 70 | |
| DIAMETER(mm) | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 1 | 48000 | 1480 | 38000 | 1050 | 25500 | 710 | 20500 | 430 | 16000 | 270 | 12500 | 175 |
| 2 | 33300 | 1750 | 26000 | 1250 | 17500 | 840 | 14500 | 520 | 11000 | 320 | 9500 | 230 |
| 3 | 21800 | 1750 | 17300 | 1250 | 11500 | 840 | 9500 | 520 | 7500 | 320 | 6400 | 230 |
| 4 | 16700 | 1800 | 13200 | 1300 | 8800 | 880 | 7200 | 540 | 5600 | 335 | 4750 | 240 |
| 5 | 15700 | 2000 | 12500 | 1500 | 8300 | 1000 | 6400 | 580 | 5100 | 370 | 4450 | 270 |
| 6 | 13100 | 1950 | 10350 | 1400 | 6900 | 950 | 5300 | 560 | 4200 | 350 | 3700 | 260 |
| 8 | 9880 | 1880 | 7800 | 1350 | 5200 | 900 | 4000 | 520 | 3200 | 330 | 2800 | 240 |
| 10 | 7800 | 1750 | 6150 | 1260 | 4100 | 840 | 3200 | 480 | 2550 | 310 | 2200 | 220 |
| 12 | 6650 | 1750 | 5250 | 1260 | 3500 | 840 | 2650 | 480 | 2100 | 300 | 1860 | 220 |
| 16 | 4900 | 1500 | 3900 | 1100 | 2600 | 730 | 2000 | 420 | 1600 | 270 | 1400 | 200 |
| 20 | 3900 | 1300 | 3100 | 970 | 2050 | 650 | 1600 | 380 | 1300 | 250 | 1100 | 180 |

RPM = rev. / min.
FEED = mm / min.



ENDMILL
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DRILL

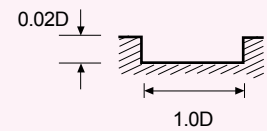
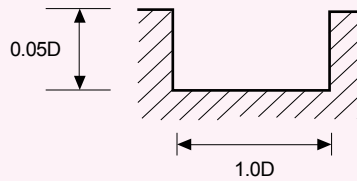
ENDMILL

DRILL

ZR702 - SLOTTING

| MATERIAL | HARDENED STEELS HEAT RESISTANT STEELS | | HARDENED STEELS | | HARDENED STEELS | | HARDENED STEELS | | HARDENED STEELS | | HARDENED STEELS | |
|--------------|---|------|--------------------|------|--------------------|------|--------------------|------|--------------------|------|--------------------|------|
| HARDNESS | HRc 30 ~ HRc 40 | | HRc 40 ~ HRc 50 | | HRc 50 ~ HRc 55 | | HRc 55 ~ HRc 60 | | HRc 60 ~ HRc 65 | | HRc 65 ~ HRc 70 | |
| DIAMETER(mm) | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 2 | 33300 | 680 | 26000 | 544 | 17500 | 336 | 14500 | 208 | 11000 | 128 | 9500 | 92 |
| 3 | 21800 | 680 | 17300 | 544 | 11500 | 336 | 9500 | 208 | 7500 | 128 | 6400 | 92 |
| 4 | 16700 | 704 | 13200 | 560 | 8800 | 352 | 7200 | 216 | 5600 | 136 | 4750 | 94 |
| 5 | 15700 | 800 | 12500 | 644 | 8300 | 400 | 6400 | 228 | 5100 | 144 | 4450 | 106 |
| 6 | 13100 | 760 | 10350 | 616 | 6900 | 384 | 5300 | 224 | 4200 | 144 | 3700 | 104 |
| 8 | 9880 | 744 | 7800 | 576 | 5200 | 356 | 4000 | 204 | 3200 | 132 | 2800 | 96 |
| 10 | 7800 | 680 | 6150 | 544 | 4100 | 332 | 3200 | 192 | 2550 | 124 | 2200 | 90 |
| 12 | 6650 | 680 | 5250 | 544 | 3500 | 332 | 2650 | 192 | 2100 | 124 | 1860 | 90 |
| 16 | 4900 | 584 | 3900 | 464 | 2600 | 292 | 2000 | 168 | 1600 | 108 | 1400 | 78 |
| 20 | 3900 | 528 | 3100 | 420 | 2050 | 268 | 1600 | 168 | 1300 | 100 | 1100 | 70 |

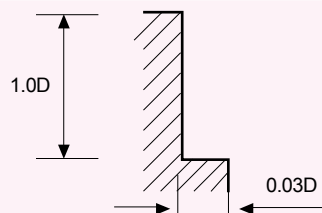
RPM = rev. / min.
FEED = mm / min.



ZE702, ZE752 , ZE712 - SIDE CUTTING

| MATERIAL | HARDENED STEELS HEAT RESISTANT STEELS | | HARDENED STEELS | | HARDENED STEELS | | HARDENED STEELS | | HARDENED STEELS | | HARDENED STEELS | |
|--------------|---|------|--------------------|------|--------------------|------|--------------------|------|--------------------|------|--------------------|------|
| HARDNESS | HRc 30 ~ HRc 40 | | HRc 40 ~ HRc 50 | | HRc 50 ~ HRc 55 | | HRc 55 ~ HRc 60 | | HRc 60 ~ HRc 65 | | HRc 65 ~ HRc 70 | |
| DIAMETER(mm) | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 2 | 33300 | 960 | 26000 | 776 | 17500 | 480 | 14500 | 296 | 11000 | 184 | 9500 | 132 |
| 3 | 21800 | 960 | 17300 | 776 | 11500 | 480 | 9500 | 296 | 7500 | 184 | 6400 | 132 |
| 4 | 16700 | 1000 | 13200 | 800 | 8800 | 500 | 7200 | 308 | 5600 | 192 | 4750 | 136 |
| 5 | 15700 | 1160 | 12500 | 920 | 8300 | 568 | 6400 | 328 | 5100 | 208 | 4450 | 152 |
| 6 | 13100 | 1080 | 10350 | 880 | 6900 | 552 | 5300 | 320 | 4200 | 204 | 3700 | 148 |
| 8 | 9880 | 1056 | 7800 | 824 | 5200 | 508 | 4000 | 292 | 3200 | 188 | 2800 | 136 |
| 10 | 7800 | 960 | 6150 | 776 | 4100 | 472 | 3200 | 272 | 2550 | 176 | 2200 | 128 |
| 12 | 6650 | 960 | 5250 | 776 | 3500 | 472 | 2650 | 272 | 2100 | 176 | 1860 | 128 |
| 16 | 4900 | 840 | 3900 | 672 | 2600 | 416 | 2000 | 240 | 1600 | 152 | 1400 | 112 |
| 20 | 3900 | 760 | 3100 | 600 | 2050 | 380 | 1600 | 220 | 1300 | 140 | 1100 | 100 |

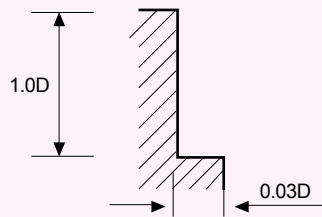
RPM = rev. / min.
FEED = mm / min.



ZS104, ZS204 - SIDE CUTTING

| MATERIAL | HARDENED STEELS | | HARDENED STEELS | | HARDENED STEELS | | HARDENED STEELS | | HARDENED STEELS | |
|--------------|-----------------|------|-----------------|------|-----------------|------|-----------------|------|-----------------|------|
| HARDNESS | HRc 40 ~ HRc 50 | | HRc 50 ~ HRc 55 | | HRc 55 ~ HRc 60 | | HRc 60 ~ HRc 65 | | HRc 65 ~ HRc 70 | |
| DIAMETER(mm) | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 4 | 17200 | 1690 | 11440 | 1140 | 9360 | 700 | 7280 | 430 | 6170 | 310 |
| 6 | 13450 | 1820 | 8970 | 1230 | 6890 | 720 | 5460 | 450 | 4810 | 330 |
| 8 | 9100 | 1750 | 6760 | 1170 | 5200 | 670 | 4160 | 420 | 3640 | 310 |
| 10 | 8000 | 1630 | 5330 | 1090 | 4160 | 620 | 3320 | 400 | 2860 | 280 |
| 12 | 6830 | 1630 | 4550 | 1010 | 3450 | 580 | 2730 | 370 | 2420 | 260 |

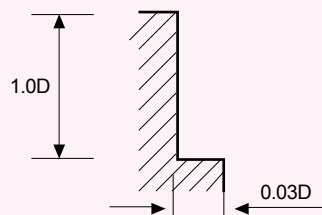
RPM = rev. / min.
FEED = mm / min.



ZR704, ZR724

| MATERIAL | HARDENED STEELS HEAT RESISTANT STEELS | | HARDENED STEELS | | HARDENED STEELS | | HARDENED STEELS | | HARDENED STEELS | | HARDENED STEELS | |
|--------------|---|------|--------------------|------|--------------------|------|--------------------|------|--------------------|------|--------------------|------|
| HARDNESS | HRc 30 ~ HRc 40 | | HRc 40 ~ HRc 50 | | HRc 50 ~ HRc 55 | | HRc 55 ~ HRc 60 | | HRc 60 ~ HRc 65 | | HRc 65 ~ HRc 70 | |
| DIAMETER(mm) | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 3 | 21800 | 1400 | 17300 | 1000 | 11500 | 672 | 9500 | 416 | 7500 | 256 | 6400 | 184 |
| 4 | 16700 | 1440 | 13200 | 1040 | 8800 | 704 | 7200 | 432 | 5600 | 268 | 4750 | 192 |
| 5 | 15700 | 1600 | 12500 | 1200 | 8300 | 800 | 6400 | 464 | 5100 | 296 | 4450 | 216 |
| 6 | 13100 | 1560 | 10350 | 1120 | 6900 | 760 | 5300 | 448 | 4200 | 280 | 3700 | 208 |
| 8 | 9880 | 1504 | 7800 | 1080 | 5200 | 720 | 4000 | 416 | 3200 | 264 | 2800 | 192 |
| 10 | 7800 | 1400 | 6150 | 1008 | 4100 | 672 | 3200 | 384 | 2550 | 248 | 2200 | 176 |
| 12 | 6650 | 1400 | 5250 | 1008 | 3500 | 672 | 2650 | 384 | 2100 | 240 | 1860 | 176 |
| 16 | 4900 | 1200 | 3900 | 880 | 2600 | 584 | 2000 | 336 | 1600 | 216 | 1400 | 160 |
| 20 | 3900 | 1040 | 3100 | 776 | 2050 | 520 | 1600 | 304 | 1300 | 200 | 1100 | 144 |

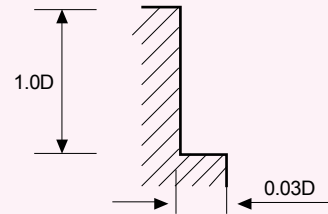
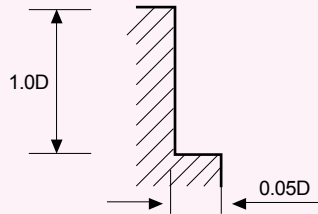
RPM = rev. / min.
FEED = mm / min.



ZR706, ZE716

| MATERIAL | HARDENED STEELS HEAT RESISTANT STEELS | | HARDENED STEELS | | HARDENED STEELS | | HARDENED STEELS | | HARDENED STEELS | | HARDENED STEELS | |
|--------------|---|------|--------------------|------|--------------------|------|--------------------|------|--------------------|------|--------------------|------|
| HARDNESS | HRc 30 ~ HRc 40 | | HRc 40 ~ HRc 50 | | HRc 50 ~ HRc 55 | | HRc 55 ~ HRc 60 | | HRc 60 ~ HRc 65 | | HRc 65 ~ HRc 70 | |
| DIAMETER(mm) | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 6 | 24800 | 5350 | 23500 | 4900 | 16000 | 4900 | 13500 | 3300 | 10500 | 2100 | 8000 | 1450 |
| 8 | 20000 | 5500 | 19000 | 5000 | 12000 | 4600 | 10000 | 3100 | 8000 | 2000 | 6000 | 1400 |
| 10 | 16000 | 4900 | 15500 | 4500 | 9500 | 4100 | 8000 | 2900 | 6400 | 1800 | 4800 | 1300 |
| 12 | 13000 | 4500 | 12500 | 4100 | 8000 | 3800 | 6600 | 2500 | 5300 | 1600 | 4000 | 1150 |
| 16 | 10000 | 4000 | 9700 | 3700 | 6000 | 3400 | 5000 | 2300 | 4000 | 1250 | 3000 | 870 |
| 20 | 8000 | 3350 | 7800 | 3400 | 4800 | 3200 | 4000 | 2100 | 3200 | 1020 | 2400 | 690 |

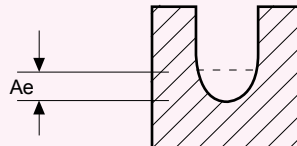
RPM = rev. / min.
FEED = mm / min.



ZSLNB

| MATERIAL | ALLOY STEELS HEAT RESISTANT STEELS | | | HARDENED STEELS | | | HARDENED STEELS | | | COPPER | | |
|--------------|--|----------|-------------|-----------------|---------|-------------|-----------------|---------|-------------|-------------|-----------|-------------|
| HARDNESS | HRc 30 ~ HRc 45 | | | HRc 45 ~ HRc 55 | | | HRc 55 ~ HRc 65 | | | | | |
| DIAMETER(mm) | RPM | RPM | FEED | RPM | RPM | FEED | RPM | RPM | FEED | RPM | RPM | FEED |
| 0.5 | 34100~49500 | 600~870 | 0.007~0.028 | 31900~35200 | 490~540 | 0.005~0.023 | 31900~35200 | 440~480 | 0.005~0.021 | 49000~50000 | 1100~1400 | 0.010~0.042 |
| 0.6 | 28600~40700 | 590~850 | 0.007~0.034 | 26400~29700 | 480~540 | 0.006~0.028 | 26400~29700 | 400~480 | 0.006~0.025 | 42000~50000 | 1100~1700 | 0.011~0.050 |
| 0.8 | 22000~30800 | 640~890 | 0.016~0.064 | 19800~22000 | 490~550 | 0.013~0.052 | 19800~22000 | 440~500 | 0.012~0.048 | 31000~50000 | 1100~2250 | 0.024~0.096 |
| 1.0 | 17600~24200 | 600~850 | 0.008~0.080 | 15400~17600 | 470~540 | 0.007~0.065 | 15400~17600 | 440~500 | 0.006~0.060 | 24000~49500 | 1100~2200 | 0.012~0.120 |
| 1.2 | 14300~18700 | 590~780 | 0.024~0.032 | 12000~14000 | 480~540 | 0.020~0.026 | 12000~14000 | 420~480 | 0.018~0.024 | 28500~38500 | 1480~1950 | 0.036~0.048 |
| 1.5 | 11000~14300 | 580~760 | 0.031~0.048 | 10000~11500 | 480~540 | 0.025~0.039 | 10000~11500 | 420~480 | 0.023~0.036 | 17000~28500 | 1100~1950 | 0.046~0.072 |
| 2.0 | 8500~11000 | 590~800 | 0.024~0.160 | 7900~8800 | 470~530 | 0.020~0.130 | 7900~8800 | 440~480 | 0.018~0.120 | 12600~24000 | 1100~2150 | 0.036~0.240 |
| 3.0 | 5700~8200 | 730~1000 | 0.064~0.24 | 5300~5800 | 590~650 | 0.052~0.195 | 5300~5800 | 550~620 | 0.048~0.120 | 11900~17000 | 1850~2700 | 0.096~0.360 |
| 4.0 | 4300~6200 | 680~990 | 0.080~0.320 | 3950~4400 | 550~620 | 0.065~0.260 | 3850~4400 | 530~570 | 0.060~0.240 | 6600~12500 | 1260~2500 | 0.120~0.480 |

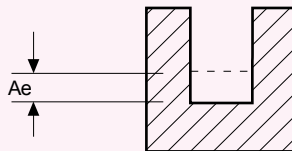
RPM = rev. / min.
FEED = mm / min.



ZSLNS

| MATERIAL | ALLOY STEELS HEAT RESISTANT STEELS | | | HARDENED STEELS | | | HARDENED STEELS | | | COPPER | | |
|--------------|---------------------------------------|---------|-------------|-----------------|---------|-------------|-----------------|---------|-------------|-------------|-----------|-------------|
| | HRc 30 ~ HRc 45 | | | HRc 45 ~ HRc 55 | | | HRc 55 ~ HRc 65 | | | | | |
| HARDNESS | | | | | | | | | | | | |
| DIAMETER(mm) | RPM | RPM | FEED | RPM | RPM | FEED | RPM | RPM | FEED | RPM | RPM | FEED |
| 0.4 | 34100~50000 | 350~590 | 0.005~0.028 | 30500~35200 | 295~340 | 0.003~0.020 | 18300~24600 | 120~200 | 0.002~0.012 | 48000~50000 | 790~920 | 0.008~0.048 |
| 0.5 | 25650~33000 | 370~470 | 0.006~0.035 | 23750~26000 | 285~315 | 0.004~0.025 | 14200~18000 | 115~130 | 0.003~0.015 | 44000~50000 | 800~1150 | 0.010~0.060 |
| 0.6 | 20900~35200 | 330~560 | 0.007~0.030 | 19900~22000 | 260~290 | 0.005~0.021 | 11900~15500 | 100~120 | 0.003~0.013 | 37500~50000 | 770~1250 | 0.011~0.051 |
| 0.8 | 16150~26400 | 360~590 | 0.009~0.040 | 15200~16700 | 280~310 | 0.006~0.028 | 9000~11700 | 110~125 | 0.004~0.017 | 28500~47000 | 770~1300 | 0.015~0.068 |
| 1.0 | 12300~18700 | 350~540 | 0.011~0.028 | 10500~11500 | 250~280 | 0.008~0.020 | 6300~8050 | 100~115 | 0.005~0.012 | 22500~34000 | 810~1300 | 0.018~0.048 |
| 1.2 | 10450~17600 | 350~590 | 0.025~0.070 | 9100~10000 | 250~280 | 0.015~0.042 | 5400~7000 | 100~115 | 0.009~0.026 | 22500~31500 | 950~1350 | 0.036~0.101 |
| 1.5 | 9100~17600 | 430~830 | 0.017~0.077 | 7000~8000 | 250~280 | 0.012~0.055 | 4300~5500 | 100~115 | 0.007~0.033 | 14500~25000 | 770~1320 | 0.028~0.132 |
| 2.0 | 6350~10550 | 340~570 | 0.021~0.140 | 6100~6700 | 270~300 | 0.015~0.100 | 3600~4700 | 100~120 | 0.009~0.060 | 11500~18500 | 770~1250 | 0.036~0.240 |
| 3.0 | 4300~7050 | 550~900 | 0.056~0.210 | 3990~4600 | 445~515 | 0.040~0.150 | 2400~3200 | 105~310 | 0.024~0.090 | 9000~13000 | 1400~2110 | 0.096~0.360 |
| 4.0 | 3200~5300 | 400~675 | 0.074~0.280 | 3000~3400 | 335~380 | 0.053~0.200 | 1800~2400 | 75~230 | 0.032~0.120 | 6750~9750 | 1050~1575 | 0.128~0.480 |

RPM = rev. / min.
FEED = mm / min.



ENDMILL
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DRILL

ENDMILL

DRILL

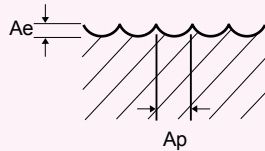
DA412 - GENERAL SPEED CUTTING

| MATERIAL | HARDENED STEELS | | HARDENED STEELS | | HARDENED STEELS | | HARDENED STEELS | |
|----------------|-----------------|-------|-----------------|-------|-----------------|-------|-----------------|-------|
| HARDNESS | HRc 45~HRc 50 | | HRc 50~HRc 55 | | HRc 55~HRc 60 | | HRc 60~HRc 65 | |
| STRENGTH | 1500~1750N/mm2 | | 1750~2000N/mm2 | | 2000~2080N/mm2 | | 2080N/mm2 | |
| DIAMETER[inch] | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| R1/16×1/8 | 12700 | 43.30 | 12300 | 41.30 | 11800 | 39.40 | 8400 | 26.00 |
| R3/32×3/16 | 9400 | 43.30 | 9050 | 41.30 | 8600 | 37.40 | 5600 | 26.80 |
| R1/8×1/4 | 8600 | 45.30 | 8250 | 43.30 | 7850 | 37.40 | 4850 | 27.60 |
| R5/32×5/16 | 7000 | 41.30 | 6700 | 39.40 | 6350 | 37.40 | 3800 | 25.60 |
| R3/16×3/8 | 6050 | 39.40 | 5800 | 37.80 | 5450 | 35.40 | 3200 | 24.40 |
| R1/4×1/2 | 5450 | 39.40 | 5200 | 37.80 | 4900 | 35.40 | 2750 | 24.40 |
| R5/16×5/8 | 4350 | 34.30 | 4150 | 32.70 | 3900 | 32.30 | 2150 | 10.40 |
| R3/8×3/4 | 3500 | 27.20 | 3300 | 25.60 | 3150 | 24.80 | 1700 | 8.70 |
| R1/2×1 | 2800 | 27.20 | 2650 | 25.60 | 2520 | 24.80 | 1360 | 8.70 |

RPM = rev. / min.
FEED = inch / min.

Ae : D1/8=.006
D3/16 ~ D5/16=.010
D3/8 ~ D1=.012

Ap : 0.1×D



DA412 - HIGH SPEED CUTTING

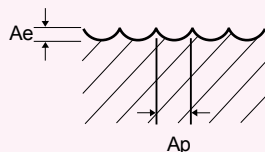
ENDMILL

| MATERIAL | HARDENED STEELS | | HARDENED STEELS | | HARDENED STEELS | |
|----------------|-----------------|-------|-----------------|-------|-----------------|-------|
| HARDNESS | HRc 45~HRc 50 | | HRc 50~HRc 55 | | HRc 55~HRc 65 | |
| STRENGTH | 1500~1750N/mm2 | | 1750~2000N/mm2 | | 2000~2080N/mm2 | |
| DIAMETER[inch] | RPM | FEED | RPM | FEED | RPM | FEED |
| R1/16×1/8 | 12700 | 68.90 | 12300 | 65.70 | 11800 | 39.90 |
| R3/32×3/16 | 9400 | 65.00 | 9050 | 61.80 | 8600 | 29.50 |
| R1/8×1/4 | 8600 | 68.90 | 8250 | 65.70 | 7850 | 27.60 |
| R5/32×5/16 | 7000 | 61.00 | 6700 | 57.50 | 6350 | 25.60 |
| R3/16×3/8 | 6050 | 57.10 | 5800 | 53.50 | 5450 | 24.40 |
| R1/4×1/2 | 5450 | 55.90 | 5200 | 52.40 | 4900 | 24.00 |
| R5/16×5/8 | 4350 | 48.40 | 4150 | 44.50 | 3900 | 10.40 |
| R3/8×3/4 | 3500 | 39.40 | 3300 | 35.40 | 3150 | 8.70 |
| R1/2×1 | 2800 | 39.40 | 2640 | 35.40 | 2520 | 8.70 |

RPM = rev. / min.
FEED = inch / min.

Ae : D1/8=.006
D3/16 ~ D5/16=.010
D3/8 ~ D1=.012

Ap : 0.1×D



RPM = rev. / min.
FEED = mm / min.

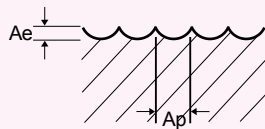
DB412

| MATERIAL | HARDENED STEELS | | HARDENED STEELS | | HARDENED STEELS | | HARDENED STEELS | |
|--------------|----------------------------|------|----------------------------|------|----------------------------|------|-----------------------|------|
| HARDNESS | HRc 45~HRc 50 | | HRc 50~HRc 55 | | HRc 55~HRc 60 | | HRc 60~HRc 65 | |
| STRENGTH | 1500~1750N/mm ² | | 1750~2000N/mm ² | | 2000~2080N/mm ² | | 2080N/mm ² | |
| DIAMETER(mm) | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 1 | 20000 | 460 | 20000 | 400 | 20000 | 350 | 20000 | 240 |
| 1.5 | 16300 | 640 | 16100 | 580 | 16000 | 570 | 14200 | 360 |
| 2 | 14500 | 800 | 14200 | 740 | 13850 | 760 | 11300 | 465 |
| 2.5 | 13400 | 950 | 13000 | 890 | 12600 | 920 | 9600 | 560 |
| 3 | 12700 | 1100 | 12300 | 1050 | 11800 | 1000 | 8400 | 660 |
| 4 | 10600 | 1100 | 10300 | 1050 | 9800 | 1000 | 6650 | 650 |
| 5 | 9400 | 1100 | 9050 | 1050 | 8600 | 950 | 5600 | 680 |
| 6 | 8600 | 1150 | 8250 | 1100 | 7850 | 950 | 4850 | 700 |
| 8 | 7000 | 1050 | 6700 | 1000 | 6350 | 950 | 3800 | 650 |
| 10 | 6050 | 1000 | 5800 | 960 | 5450 | 900 | 3200 | 620 |
| 12 | 5450 | 1000 | 5200 | 960 | 4900 | 900 | 2750 | 610 |

RPM = rev. / min.
FEED = mm / min.

Ae : D1 ~ D4=0.05×D
D5 ~ D8=0.025mm
D10 ~ D20=0.30mm

Ap : D1 ~ D20=0.1×D

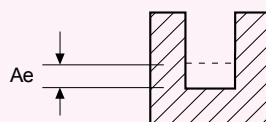


RPM = rev. / min.
FEED = mm / min.

DB602, DB302

| MATERIAL | NON-ALLOYED STEELS ALLOY STEELS · CAST IRON | | | ALLOY STEELS HEAT RESISTANT STEELS | | | HARDENED STEELS | | |
|--------------|--|---------|-------------|---------------------------------------|---------|-------------|----------------------------|----------|-------------|
| HARDNESS | ~HRc 30 | | | HRc 30~HRc 45 | | | HRc 45~HRc 55 | | |
| STRENGTH | ~1000N/mm ² | | | 1000~1500N/mm ² | | | 1500~2000N/mm ² | | |
| DIAMETER(mm) | RPM | FEED | Ae(mm) | RPM | FEED | Ae(mm) | RPM | FEED | Ae(mm) |
| 0.5 | 33000-42000 | 200-540 | 0.023-0.045 | 24000-30000 | 100-300 | 0.023-0.045 | 15000-19000 | 100-2000 | 0.005-0.009 |
| 0.6 | 33000-42000 | 250-700 | 0.027-0.054 | 24000-30000 | 120-385 | 0.027-0.054 | 15000-19000 | 120-250 | 0.005-0.011 |
| 0.8 | 33000-42000 | 250-700 | 0.036-0.072 | 24000-30000 | 120-385 | 0.036-0.072 | 15000-19000 | 120-250 | 0.007-0.014 |
| 1.0 | 30000-38000 | 275-770 | 0.045-0.090 | 22000-27000 | 140-430 | 0.045-0.090 | 13500-17500 | 140-280 | 0.009-0.018 |
| 1.2 | 25000-32000 | 275-860 | 0.055-0.100 | 18000-23000 | 140-430 | 0.055-0.100 | 11500-14500 | 140-280 | 0.010-0.022 |
| 1.4 | 22000-27000 | 275-860 | 0.062-0.125 | 16000-19000 | 140-430 | 0.062-0.125 | 10000-12500 | 140-280 | 0.012-0.025 |
| 1.5 | 20000-25000 | 275-860 | 0.070-0.135 | 14500-18500 | 140-430 | 0.070-0.135 | 9500-11500 | 140-280 | 0.014-0.028 |
| 1.6 | 19000-25000 | 275-860 | 0.075-0.145 | 14000-17500 | 140-430 | 0.075-0.145 | 9000-11000 | 140-280 | 0.015-0.030 |
| 1.8 | 18000-23000 | 275-860 | 0.080-0.160 | 12500-16000 | 140-430 | 0.080-0.160 | 8000-10000 | 140-280 | 0.016-0.032 |
| 2 | 16000-20000 | 275-860 | 0.090-0.180 | 11500-14500 | 140-430 | 0.090-0.180 | 7500-9000 | 140-280 | 0.018-0.035 |
| 3 | 11000-14000 | 275-860 | 0.135-0.270 | 7500-9500 | 140-430 | 0.135-0.270 | 5000-6000 | 140-280 | 0.028-0.055 |
| 4 | 9000-12000 | 275-860 | 0.180-0.360 | 6100-8200 | 140-430 | 0.180-0.360 | 4000-5000 | 140-280 | 0.035-0.070 |

RPM = rev. / min.
FEED = mm / min.

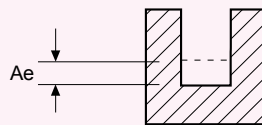


RPM = rev. / min.
FEED = mm / min.

ZE602, ZE302 - RIB PROCESSING

| MATERIAL | NON-ALLOYED STEELS ALLOY STEELS · CAST IRON | | | ALLOY STEELS HEAT RESISTANT STEELS | | | HARDENED STEELS | | |
|--------------|--|---------|-------------|---------------------------------------|---------|-------------|----------------------------|--------|-------------|
| HARDNESS | ~HRc 30 | | | HRc 30~HRc 45 | | | HRc 45~HRc 55 | | |
| STRENGTH | ~1000N/mm ² | | | 1000~1500N/mm ² | | | 1500~2000N/mm ² | | |
| DIAMETER(mm) | RPM | FEED | Ae(mm) | RPM | FEED | Ae(mm) | RPM | FEED | Ae(mm) |
| 0.4 | 33000~42000 | 220~490 | 0.007~0.018 | 24000~30000 | 100~375 | 0.007~0.018 | 15000~18000 | 35~100 | 0.004~0.008 |
| 0.5 | 33000~42000 | 220~190 | 0.009~0.022 | 24000~30000 | 100~375 | 0.009~0.022 | 15000~18000 | 35~100 | 0.004~0.009 |
| 0.6 | 33000~42000 | 275~630 | 0.011~0.026 | 24000~30000 | 120~485 | 0.011~0.026 | 15000~18000 | 45~120 | 0.005~0.011 |
| 0.7 | 33000~42000 | 275~630 | 0.012~0.031 | 24000~30000 | 120~485 | 0.012~0.031 | 15000~18000 | 45~120 | 0.006~0.013 |
| 0.8 | 28500~37000 | 310~700 | 0.014~0.035 | 20500~26000 | 130~530 | 0.014~0.035 | 13000~15500 | 50~140 | 0.007~0.015 |
| 0.9 | 26000~33000 | 310~800 | 0.030~0.060 | 19000~24000 | 180~600 | 0.030~0.060 | 11500~13500 | 60~145 | 0.008~0.016 |
| 1.0 | 24000~30000 | 310~900 | 0.045~0.090 | 16500~21000 | 210~660 | 0.045~0.090 | 10500~13500 | 75~145 | 0.009~0.018 |
| 1.2 | 19500~24000 | 310~990 | 0.055~0.100 | 14000~17000 | 210~660 | 0.055~0.100 | 9000~11000 | 75~145 | 0.010~0.022 |
| 1.4 | 17000~21000 | 310~990 | 0.062~0.125 | 12000~15000 | 210~660 | 0.062~0.125 | 7500~9500 | 75~145 | 0.012~0.025 |
| 1.5 | 15500~20000 | 310~990 | 0.070~0.135 | 11000~14500 | 210~660 | 0.070~0.135 | 7000~8500 | 75~145 | 0.014~0.028 |
| 1.6 | 15000~19000 | 310~990 | 0.075~0.145 | 11000~13500 | 210~660 | 0.075~0.145 | 6500~8500 | 75~145 | 0.015~0.030 |
| 1.8 | 14000~18000 | 310~990 | 0.080~0.160 | 10000~12000 | 210~660 | 0.080~0.160 | 6000~7500 | 75~145 | 0.016~0.032 |
| 2.0 | 12500~15500 | 310~990 | 0.090~0.180 | 9000~11000 | 210~660 | 0.090~0.180 | 5500~7000 | 75~145 | 0.018~0.035 |
| 2.5 | 10000~13000 | 310~990 | 0.112~0.235 | 7000~9000 | 210~660 | 0.112~0.235 | 4500~5500 | 75~145 | 0.022~0.045 |
| 3.0 | 8500~10500 | 310~990 | 0.135~0.270 | 6000~7500 | 210~660 | 0.135~0.270 | 3500~4500 | 75~145 | 0.028~0.055 |
| 4.0 | 6500~8000 | 310~990 | 0.180~0.360 | 4500~5500 | 210~660 | 0.180~0.360 | 2700~3500 | 75~145 | 0.036~0.072 |

RPM = rev. / min.
FEED = mm / min.



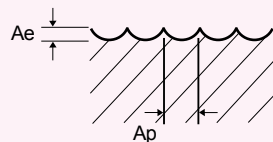
DA512, DA302 - GENERAL SPEED CUTTING

| MATERIAL | NON-ALLOYED STEELS ALLOY STEELS · CAST IRON | | ALLOY STEELS HEAT RESISTANT STEELS | | HARDENED STEELS | |
|----------------|--|-------|---------------------------------------|-------|-----------------|------|
| HARDNESS | ~HRc 30 | | HRc 30~HRc 40 | | HRc 45~HRc 65 | |
| STRENGTH | ~1000N/mm2 | | 1000~1250N/mm2 | | 1500N/mm2 | |
| DIAMETER[inch] | RPM | FEED | RPM | FEED | RPM | FEED |
| R1/64×1/32 | 15760 | 9.80 | 12720 | 7.80 | 5800 | 3.80 |
| R1/32×1/16 | 15760 | 13.80 | 12140 | 1.60 | 5320 | 4.70 |
| R3/64×3/32 | 14400 | 29.50 | 10700 | 19.30 | 4680 | 5.90 |
| R1/16×1/8 | 13100 | 26.70 | 10000 | 18.10 | 4520 | 5.90 |
| R3/32×3/16 | 9140 | 32.30 | 7300 | 22.80 | 3680 | 7.10 |
| R1/8×1/4 | 7780 | 33.00 | 6300 | 24.80 | 3160 | 7.50 |
| R5/32×5/16 | 5260 | 37.50 | 4420 | 26.00 | 2100 | 7.50 |
| R3/16×3/8 | 4620 | 40.10 | 3780 | 28.00 | 1780 | 7.50 |
| R1/4×1/2 | 3780 | 35.40 | 2940 | 26.00 | 1360 | 7.50 |
| R5/16×5/8 | 2740 | 36.20 | 2320 | 26.00 | 1160 | 7.50 |
| R3/8×3/4 | 2100 | 33.00 | 1900 | 25.00 | 840 | 7.50 |

RPM = rev. / min.
FEED = inch / min.

Ae : D1/32 ~ D1/4=.008inch
D5/16 ~ D3/4=.012inch

Ap : 0.2×D



Ae : D1/32 ~ D1/4=.008inch
D5/16 ~ D3/4=.012inch

Ap : 0.1×D

RPM = rev. / min.
FEED = mm / min.

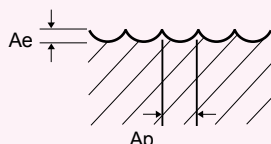
DA512, DA302 - HIGH SPEED CUTTING

| MATERIAL | NON-ALLOYED STEELS ALLOY STEELS · CAST IRON | | HARDENED STEELS | |
|----------------|--|--------|-----------------------|-------|
| HARDNESS | ~ HRc 45 | | HRc 45~HRc 65 | |
| STRENGTH | ~ 1500N/mm ² | | 1500N/mm ² | |
| DIAMETER[inch] | RPM | FEED | RPM | FEED |
| R1/64×1/32 | 25000 | 25.60 | 25000 | 15.70 |
| R1/32×1/16 | 23000 | 27.50 | 23000 | 16.90 |
| R3/64×3/32 | 21000 | 34.60 | 19000 | 19.30 |
| R1/16×1/8 | 21000 | 39.40 | 17000 | 20.50 |
| R3/32×3/16 | 21000 | 70.90 | 12000 | 23.60 |
| R1/8×1/4 | 21000 | 90.90 | 10500 | 24.80 |
| R5/32×5/16 | 15760 | 111.80 | 7880 | 29.10 |
| R3/16×3/8 | 13660 | 120.00 | 6300 | 33.00 |
| R1/4×1/2 | 10500 | 103.50 | 5260 | 33.00 |
| R5/16×5/8 | 8200 | 103.50 | 3780 | 28.00 |
| R3/8×3/4 | 6300 | 99.00 | 2940 | 20.80 |

RPM = rev. / min.
FEED = inch / min.

Ae : D1/32 ~ D1/4=.008inch
D5/16 ~ D3/4=.012inch

Ap : 0.05×D



RPM = rev. / min.
FEED = mm / min.

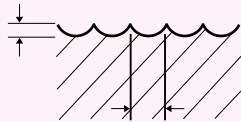
DA514 - GENERAL SPEED CUTTING

| MATERIAL | NON-ALLOYED STEELS ALLOY STEELS · CAST IRON | | ALLOY STEELS TOOL STEELS | | HARDENED STEELS | |
|--------------|--|-------|-----------------------------|-------|------------------------|-------|
| HARDNESS | ~HRc 30 | | HRc 30~HRc 40 | | HRc 45~HRc 65 | |
| STRENGTH | ~1000N/mm ² | | 1000~1250N/mm ² | | ~1500N/mm ² | |
| DIAMETER(mm) | RPM | FEED | RPM | FEED | RPM | FEED |
| R1/16×1/8 | 13100 | 40.10 | 10000 | 27.00 | 4520 | 8.85 |
| R3/32×3/16 | 9140 | 48.50 | 7300 | 34.00 | 3680 | 10.50 |
| R1/8×1/4 | 7780 | 49.50 | 6300 | 37.00 | 3160 | 11.25 |
| R5/32×5/16 | 5260 | 56.00 | 4420 | 39.00 | 2100 | 11.25 |
| R3/16×3/8 | 4620 | 60.00 | 3780 | 42.00 | 1780 | 11.25 |
| R1/4×1/2 | 3780 | 53.00 | 2940 | 39.00 | 1360 | 11.25 |
| R5/16×5/8 | 2740 | 54.50 | 2320 | 38.50 | 1160 | 11.25 |

RPM = rev. / min.
FEED = inch / min.

Ae : D1/8 ~ D1/4=.008inch
D5/16 ~ D5/8=.012inch

Ap : 0.02×D



Ae : D1/8 ~ D1/4=.008inch
D5/16 ~ D5/8=.012inch

Ap : 0.1×D

RPM = rev. / min.
FEED = mm / min.

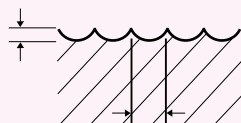
DA514 - HIGH SPEED CUTTING

| MATERIAL | CARBON STEELS ALLOY STEELS · CAST IRON | | ALLOY STEELS TOOL STEELS | |
|----------------|---|--------|-----------------------------|-------|
| HARDNESS | ~ HRc 45 | | HRc 45~HRc 65 | |
| STRENGTH | ~ 1500N/mm ² | | ~ 1500N/mm ² | |
| DIAMETER(inch) | RPM | FEED | RPM | FEED |
| R1/16×1/8 | 21000 | 59.00 | 17000 | 30.50 |
| R3/32×3/16 | 21000 | 106.25 | 12000 | 35.50 |
| R1/8×1/4 | 21000 | 136.50 | 10500 | 37.00 |
| R5/32×5/16 | 15760 | 167.50 | 7800 | 43.50 |
| R3/16×3/8 | 13660 | 180.00 | 6300 | 49.50 |
| R1/4×1/2 | 10500 | 155.50 | 5260 | 49.50 |
| R5/16×5/8 | 8200 | 155.50 | 3780 | 42.00 |

RPM = rev. / min.
FEED = inch / min.

Ae : D1/8 ~ D1/4=.008inch
D5/16 ~ D5/8=.012inch

Ap : 0.05×D



RPM = rev. / min.
FEED = mm / min.

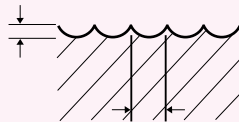
DA522 - GENERAL SPEED CUTTING

| MATERIAL | ALLOY STEELS HEAT RESISTANT STEELS | | HARDENED STEELS | | HARDENED STEELS | |
|----------------|---------------------------------------|-------|----------------------------|-------|----------------------------|-------|
| HARDNESS | HRc 30~HRc 40 | | HRc 45~HRc 50 | | HRc 45~HRc 65 | |
| STRENGTH | 1000~1250N/mm ² | | 1500~1750N/mm ² | | 1750~2000N/mm ² | |
| DIAMETER(inch) | RPM | FEED | RPM | FEED | RPM | FEED |
| R1/16×1/8 | 10000 | 18.10 | 12700 | 43.30 | 12300 | 41.30 |
| R3/32×3/16 | 7300 | 22.80 | 9400 | 43.30 | 9050 | 41.30 |
| R1/8×1/4 | 6300 | 24.80 | 8600 | 45.30 | 8250 | 43.30 |
| R5/32×5/16 | 4420 | 26.00 | 7000 | 41.30 | 6700 | 39.40 |
| R3/16×3/8 | 3780 | 28.00 | 6050 | 39.40 | 5800 | 37.80 |
| R1/4×1/2 | 2940 | 26.00 | 5450 | 39.40 | 5200 | 37.80 |
| R5/16×5/8 | 2320 | 26.00 | 4350 | 34.30 | 4150 | 32.70 |
| R3/8×3/4 | 1900 | 25.00 | 3500 | 27.20 | 3300 | 25.60 |
| R1/2×1 | 1520 | 25.00 | 2800 | 27.20 | 2650 | 25.60 |

RPM = rev. / min.
FEED = inch / min.

Ae : D1/8 ~ D1/4=.008
D5/16 ~ D1=.012

Ap : 0.2×D



Ae : D1/8=.006
D3/16 ~ D5/16=.010
D3/8 ~ D1=.012

Ap : 0.1×D

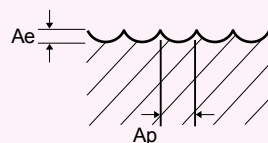
DA522 - HIGH SPEED CUTTING

| MATERIAL | ALLOY STEELS HEAT RESISTANT STEELS | | HARDENED STEELS | | HARDENED STEELS | |
|----------------|---------------------------------------|--------|----------------------------|-------|----------------------------|-------|
| HARDNESS | HRc 30~HRc 40 | | HRc 45~HRc 50 | | HRc 45~HRc 55 | |
| STRENGTH | 1000~1250N/mm ² | | 1500~1750N/mm ² | | 1750~2000N/mm ² | |
| DIAMETER(inch) | RPM | FEED | RPM | FEED | RPM | FEED |
| R1/16×1/8 | 21000 | 39.40 | 12700 | 68.90 | 12300 | 65.70 |
| R3/32×3/16 | 21000 | 70.90 | 9400 | 65.00 | 9050 | 61.80 |
| R1/8×1/4 | 21000 | 90.90 | 8600 | 69.00 | 8250 | 65.70 |
| R5/32×5/16 | 15760 | 111.80 | 7000 | 61.00 | 6700 | 57.50 |
| R3/16×3/8 | 13660 | 120.10 | 6050 | 57.10 | 5800 | 53.50 |
| R1/4×1/2 | 10500 | 103.50 | 5450 | 55.90 | 5200 | 52.40 |
| R5/16×5/8 | 8200 | 103.50 | 4350 | 48.40 | 4150 | 44.50 |
| R3/8×3/4 | 6300 | 99.20 | 3500 | 39.40 | 3300 | 35.40 |
| R1/2×1 | 5040 | 99.20 | 2800 | 39.40 | 2650 | 35.40 |

RPM = rev. / min.
FEED = inch / min.

Ae : D1/8 ~ D1/4=.008
D5/16 ~ D1=.012

Ap : 0.05×D



Ae : D1/8=.006
D3/16 ~ D5/16=.010
D3/8 ~ D1=.012

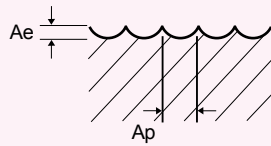
Ap : 0.05×D

DA514 - HIGH SPEED CUTTING

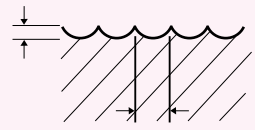
| MATERIAL | NON-ALLOYED STEELS ALLOY STEELS · CAST IRON | | HARDENED STEELS | |
|----------------|--|-------|------------------------------|-------|
| HARDNESS | HRc 30 ~ HRc45 | | HRc 45 ~ HRc 55 | |
| STRENGTH | 1000 ~ 1500N/mm ² | | 1500 ~ 2000N/mm ² | |
| DIAMETER(inch) | RPM | FEED | RPM | FEED |
| R.012×.024 | 30000 | 23.60 | 30000 | 11.80 |
| R.0155×.031 | 27000 | 25.60 | 27000 | 15.00 |
| R.020×.040 | 25000 | 25.60 | 25000 | 15.70 |
| R.0235×.047 | 24000 | 26.40 | 24000 | 16.50 |
| R.031×.062 | 23000 | 27.60 | 23000 | 16.90 |

RPM = rev. / min.
FEED = inch / min.

D < .040
Ae : 0.05×D
Ap : 0.15×D
D ≥ .040
Ae : 0.075×D
Ap : 0.15×D



D < .040
Ae : 0.05×D
Ap : 0.1×D
D ≥ .040
Ae : 0.05×D
Ap : 0.15×D



ENDMILL

DRILL

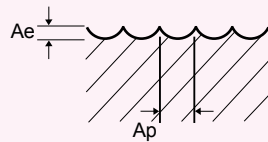
DA542 - GENERAL SPEED CUTTING

| MATERIAL | ALLOY STEELS HEAT RESISTANT STEELS | | HARDENED STEELS | | HARDENED STEELS | |
|----------------|---------------------------------------|-------|----------------------------|-------|----------------------------|-------|
| HARDNESS | HRc 30~HRc 40 | | HRc 45~HRc 50 | | HRc 50~HRc 55 | |
| STRENGTH | 1000~1250N/mm ² | | 1250~1750N/mm ² | | 1750~2000N/mm ² | |
| DIAMETER(inch) | RPM | FEED | RPM | FEED | RPM | FEED |
| R1/32×1/16 | 97000 | 8.30 | 13800 | 19.90 | 13600 | 17.90 |
| R1/16×1/8 | 8000 | 14.60 | 10200 | 34.60 | 9800 | 33.50 |
| R3/32×3/16 | 5840 | 18.10 | 7500 | 34.60 | 7200 | 33.50 |
| R1/8×1/4 | 5040 | 19.70 | 6900 | 36.20 | 6500 | 34.60 |
| R5/32×5/16 | 3540 | 20.90 | 5600 | 33.10 | 5300 | 31.50 |
| R3/16×3/8 | 3020 | 22.40 | 4850 | 31.50 | 4650 | 30.30 |
| R1/4×1/2 | 2350 | 20.90 | 4350 | 31.50 | 4150 | 30.30 |

RPM = rev. / min.
FEED = inch / min.

Ae : D1/16 ~ D1/4=.008
D5/16 ~ D1/2=.012

Ap : 0.2×D



Ae : D1/16 ~ D1/8=0.05×D
D3/16 ~ D5/16=.010
D3/8 ~ D1/2=.012

Ap : 0.1×D

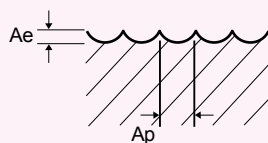
DA542 - HIGH SPEED CUTTING

| MATERIAL | ALLOY STEELS HEAT RESISTANT STEELS | | HARDENED STEELS | | HARDENED STEELS | |
|----------------|---------------------------------------|-------|----------------------------|-------|----------------------------|-------|
| HARDNESS | ~HRc 45 | | HRc 45~HRc 50 | | HRc 50~HRc 55 | |
| STRENGTH | 1500N/mm ² | | 1250~1750N/mm ² | | 1750~2000N/mm ² | |
| DIAMETER(inch) | RPM | FEED | RPM | FEED | RPM | FEED |
| R1/32×1/16 | 18400 | 21.90 | 13800 | 28.90 | 13600 | 30.10 |
| R1/16×1/8 | 16800 | 31.50 | 10200 | 55.10 | 9800 | 51.20 |
| R3/32×3/16 | 16800 | 56.70 | 7500 | 52.00 | 7200 | 49.20 |
| R1/8×1/4 | 16800 | 72.80 | 6900 | 55.10 | 6500 | 53.10 |
| R5/32×5/16 | 12600 | 89.40 | 5600 | 49.20 | 5300 | 45.30 |
| R3/16×3/8 | 10930 | 96.10 | 4850 | 45.30 | 4650 | 43.30 |
| R1/4×1/2 | 8400 | 82.70 | 4350 | 44.50 | 4150 | 41.30 |

RPM = rev. / min.
FEED = inch / min.

Ae : D1/16 ~ D1/4=.008
D5/16 ~ D1/2=.012

Ap : 0.052×D



Ae : D1/16 ~ D1/8=0.052×D
D3/16 ~ D5/16=.010
D3/8 ~ D1/2=.012

Ap : 0.052×D

ENDMILL

DRILL

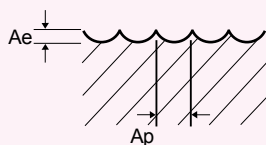
DA552 - GENERAL SPEED CUTTING

| MATERIAL | ALLOY STEELS HEAT RESISTANT STEELS | | HARDENED STEELS | | HARDENED STEELS | |
|----------------|---------------------------------------|-------|----------------------------|-------|----------------------------|-------|
| HARDNESS | HRc 30~HRc 40 | | HRc 40~HRc 50 | | HRc 50~HRc 55 | |
| STRENGTH | 1000~1250N/mm ² | | 1250~1750N/mm ² | | 1750~2000N/mm ² | |
| DIAMETER[inch] | RPM | FEED | RPM | FEED | RPM | FEED |
| R3/32×3/16 | 4670 | 14.50 | 6000 | 27.70 | 5760 | 26.80 |
| R1/8×1/4 | 4030 | 15.80 | 5520 | 29.00 | 5200 | 27.70 |
| R5/32×5/16 | 2830 | 16.70 | 4480 | 26.50 | 4240 | 25.20 |
| R3/16×3/8 | 2420 | 17.90 | 3880 | 25.20 | 3720 | 24.20 |
| R1/4×1/2 | 1880 | 16.70 | 3480 | 25.20 | 3320 | 24.20 |

RPM = rev. / min.
FEED = inch / min.

Ae : D3/16 ~ D1/4=.008
D5/16 ~ D1/2=.012

Ap : 0.22×D



Ae : D3/16 ~ D5/16=.010
D3/8 ~ D1/2=.012

Ap : 0.12×D

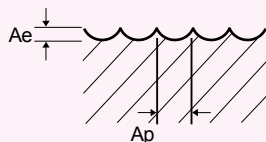
DA552 - HIGH SPEED CUTTING

| MATERIAL | ALLOY STEELS HEAT RESISTANT STEELS | | HARDENED STEELS | | HARDENED STEELS | |
|----------------|---------------------------------------|-------|----------------------------|-------|----------------------------|-------|
| HARDNESS | HRc 45 | | HRc 45~HRc 50 | | HRc 50~HRc 55 | |
| STRENGTH | ~1500N/mm ² | | 1250~1750N/mm ² | | 1750~2000N/mm ² | |
| DIAMETER[inch] | RPM | FEED | RPM | FEED | RPM | FEED |
| R3/32×3/16 | 13440 | 45.40 | 6000 | 41.60 | 5760 | 39.40 |
| R1/8×1/4 | 13440 | 58.20 | 5520 | 44.10 | 5200 | 42.50 |
| R5/32×5/16 | 10080 | 71.50 | 4480 | 39.40 | 4240 | 36.20 |
| R3/16×3/8 | 8740 | 76.90 | 3880 | 36.30 | 3720 | 34.60 |
| R1/4×1/2 | 6720 | 66.20 | 3480 | 35.60 | 3320 | 33.00 |

RPM = rev. / min.
FEED = inch / min.

Ae : D3/16 ~ D1/4=.008
D5/16 ~ D1/2=.012

Ap : 0.52×D



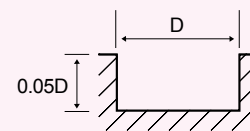
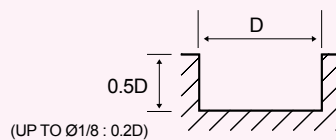
Ae : D3/16 ~ D5/16=.010
D3/8 ~ D1/2=.012

Ap : 0.052×D

ZA502, ZA302

| MATERIAL | CARBON STEELS ALLOY STEELS · CAST IRON | | ALLOY STEELS TOOL STEELS | | STAINLESS STEELS | | HARDENED STEELS | | HARDENED STEELS | |
|--------------|---|-------|------------------------------|------|---------------------|------|------------------------------|------|-----------------------|------|
| HARDNESS | ff HRc 30 | | HRc 30 ~ HRc 45 | | | | HRc 45 ~ HRc 55 | | HRc 55 ~ HRc 65 | |
| STRENGTH | ~ 1000N/mm ² | | 1000 ~ 1500N/mm ² | | | | 1500 ~ 2000N/mm ² | | 2000N/mm ² | |
| DIAMETER(mm) | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 1/16 | 11560 | 7.50 | 7560 | 4.70 | 6300 | 3.55 | 5040 | 1.40 | | |
| 1/8 | 8920 | 8.25 | 5560 | 5.50 | 4620 | 4.70 | 3360 | 1.55 | 1900 | 1.55 |
| 3/16 | 6300 | 12.60 | 3780 | 7.50 | 3160 | 6.30 | 2320 | 1.95 | 1260 | 1.55 |
| 1/4 | 5560 | 13.80 | 3360 | 8.65 | 2840 | 7.10 | 2000 | 2.15 | 1100 | 1.55 |
| 5/16 | 4200 | 14.95 | 2520 | 7.85 | 2100 | 7.10 | 1680 | 2.95 | 840 | 1.55 |
| 3/8 | 3260 | 13.00 | 2000 | 6.30 | 1680 | 6.30 | 1360 | 2.35 | 680 | 1.40 |
| 1/2 | 2740 | 11.00 | 1680 | 5.10 | 1360 | 5.10 | 1160 | 2.15 | 560 | 1.40 |
| 5/8 | 2200 | 8.65 | 1360 | 4.30 | 1060 | 4.30 | 900 | 1.55 | 440 | 0.80 |
| 3/4 | 1680 | 6.70 | 1060 | 3.15 | 840 | 3.15 | 680 | 1.20 | 320 | 0.80 |
| 1 | 1360 | 5.10 | 840 | 2.75 | 680 | 2.35 | 540 | 0.80 | 260 | 0.60 |

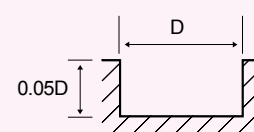
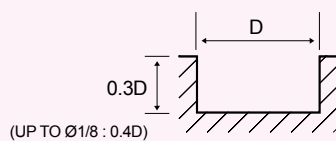
RPM = rev. / min.
FEED = inch / min.



ZA522

| MATERIAL | CARBON STEELS ALLOY STEELS · CAST IRON | | ALLOY STEELS TOOL STEELS | | HARDENED STEELS | |
|----------------|---|------|------------------------------|------|------------------------------|------|
| HARDNESS | ~ HRc 30 | | HRc 30 ~ HRc 40 | | HRc 45 ~ HRc 55 | |
| STRENGTH | ~ 1000N/mm ² | | 1000 ~ 1500N/mm ² | | 1500 ~ 2000N/mm ² | |
| DIAMETER(inch) | RPM | FEED | RPM | FEED | RPM | FEED |
| 1/8 | 4410 | 7.8 | 3570 | 2.4 | 2200 | 1.2 |
| 3/16 | 3050 | 4.1 | 2420 | 3.3 | 1580 | 1.6 |
| 1/4 | 2630 | 4.9 | 2100 | 4.1 | 1370 | 2.0 |
| 5/16 | 2000 | 5.3 | 1580 | 4.1 | 1050 | 2.0 |
| 3/8 | 1680 | 5.3 | 1370 | 4.1 | 840 | 2.0 |
| 1/2 | 1370 | 4.1 | 1160 | 3.7 | 700 | 1.6 |
| 5/8 | 1160 | 3.7 | 890 | 3.0 | 560 | 1.4 |
| 3/4 | 840 | 2.8 | 680 | 2.0 | 420 | 1.0 |
| 1 | 610 | 2.0 | 540 | 1.6 | 330 | 0.7 |

RPM = rev. / min.
FEED = inch / min.



ENDMILL

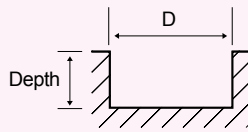
DRILL

MZ502

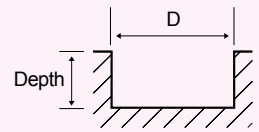
| MATERIAL | ALLOY STEELS TOOL STEELS | | ALLOY STEELS TOOL STEELS | |
|----------------|------------------------------|-------|------------------------------|------|
| HARDNESS | HRc 30 ~ HRc45 | | HRc 45 ~ HRc 55 | |
| STRENGTH | 1000 ~ 1500N/mm ² | | 1500 ~ 2000N/mm ² | |
| DIAMETER(inch) | RPM | FEED | RPM | FEED |
| .016 | 30000 | 7.10 | 23000 | 3.90 |
| .031 | 24000 | 11.80 | 18000 | 5.10 |
| .040 | 20000 | 12.60 | 15000 | 5.90 |
| .047 | 16000 | 12.60 | 12000 | 5.90 |
| .062 | 12000 | 11.80 | 9000 | 5.50 |

RPM = rev. / min.
FEED = inch / min.

D < .040
Depth=0.15×D
D ≥ .040
Depth=0.25×D



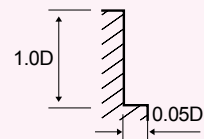
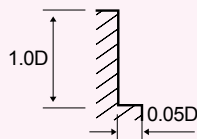
D < .040
Depth=0.02×D
D ≥ .040
Depth=0.05×D



ZA504, ZA304

| MATERIAL | CARBON STEELS ALLOY STEELS · CAST IRON | | ALLOY STEELS TOOL STEELS | | STAINLESS STEELS | | HARDENED STEELS | | HARDENED STEELS | |
|--------------|---|-------|------------------------------|-------|---------------------|-------|------------------------------|------|-----------------------|------|
| HARDNESS | ~ HRc 30 | | HRc 30 ~ HRc 45 | | | | HRc 45 ~ HRc 55 | | HRc 55 ~ HRc 65 | |
| STRENGTH | ~ 1000N/mm ² | | 1000 ~ 1500N/mm ² | | | | 1500 ~ 2000N/mm ² | | 2000N/mm ² | |
| DIAMETER(mm) | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 1/16 | 11560 | 11.00 | 7560 | 6.70 | 6300 | 5.50 | 5040 | 1.95 | | |
| 1/8 | 8920 | 12.60 | 5560 | 7.85 | 4620 | 6.70 | 3360 | 2.35 | 1900 | 2.35 |
| 3/16 | 6300 | 23.60 | 3780 | 14.15 | 3160 | 11.80 | 2320 | 2.75 | 1260 | 2.35 |
| 1/4 | 5560 | 26.00 | 3360 | 16.15 | 2840 | 13.00 | 2000 | 3.15 | 1100 | 2.35 |
| 5/16 | 4200 | 27.95 | 2520 | 14.95 | 2100 | 13.80 | 1680 | 4.30 | 840 | 2.35 |
| 3/8 | 3260 | 24.00 | 2000 | 11.80 | 1680 | 11.80 | 1360 | 3.55 | 680 | 1.95 |
| 1/2 | 2740 | 20.50 | 1680 | 9.85 | 1360 | 9.45 | 1160 | 3.15 | 560 | 1.95 |
| 5/8 | 2200 | 16.15 | 1360 | 7.85 | 1060 | 7.85 | 900 | 2.35 | 440 | 1.20 |
| 3/4 | 1680 | 12.60 | 1060 | 6.30 | 840 | 5.90 | 680 | 1.55 | 320 | 1.20 |
| 1 | 1360 | 9.85 | 840 | 5.10 | 680 | 4.70 | 540 | 1.20 | 260 | 0.80 |

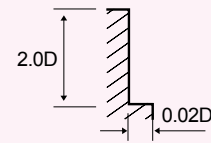
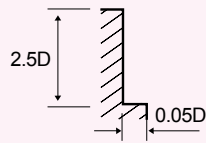
RPM = rev. / min.
FEED = inch / min.



ZA524

| MATERIAL | CARBON STEELS ALLOY STEELS · CAST IRON | | ALLOY STEELS TOOL STEELS | | HARDENED STEELS | | HARDENED STEELS | |
|----------------|---|------|-----------------------------|------|----------------------------|------|-----------------------|------|
| HARDNESS | ~ HRc 30 | | HRc 30 ~ HRc 45 | | HRc 45 ~ HRc 55 | | HRc 55 ~ HRc 65 | |
| STRENGTH | ~1000N/mm ² | | 1000~1500N/mm ² | | 1500~2000N/mm ² | | 2000N/mm ² | |
| DIAMETER(inch) | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 1/8 | 4410 | 4.5 | 3570 | 3.9 | 2200 | 2.2 | 1890 | 1.2 |
| 3/16 | 3050 | 7.1 | 2420 | 5.5 | 1580 | 2.8 | 1260 | 1.6 |
| 1/4 | 2630 | 8.5 | 2100 | 7.1 | 1370 | 3.5 | 1160 | 2.0 |
| 5/16 | 2000 | 9.1 | 1580 | 7.1 | 1050 | 3.5 | 840 | 2.0 |
| 3/8 | 1680 | 9.1 | 1370 | 7.1 | 840 | 3.5 | 670 | 2.0 |
| 1/2 | 1370 | 7.1 | 1160 | 6.3 | 700 | 2.8 | 560 | 1.6 |
| 5/8 | 1160 | 6.3 | 890 | 4.9 | 560 | 2.4 | 440 | 1.4 |
| 3/4 | 840 | 4.5 | 680 | 3.5 | 420 | 1.8 | 340 | 1.0 |
| 1 | 670 | 4.5 | 540 | 3.5 | 340 | 1.8 | 270 | 1.0 |

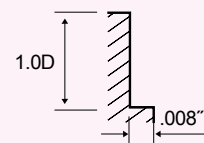
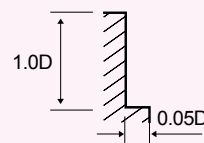
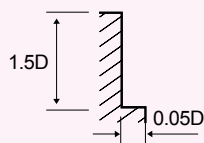
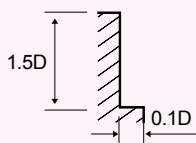
RPM = rev. / min.
FEED = inch / min.



ZA506(8) - GENERAL SPEED CUTTING

| MATERIAL | CARBON STEELS ALLOY STEELS · CAST IRON | | ALLOY STEELS TOOL STEELS | | HARDENED STEELS | | HARDENED STEELS | |
|----------------|---|-------|-----------------------------|-------|----------------------------|------|-----------------------|------|
| HARDNESS | ~ HRc 30 | | HRc 30 ~ HRc 45 | | HRc 45 ~ HRc 55 | | HRc 60 ~ HRc 65 | |
| STRENGTH | ~1000N/mm ² | | 1000~1750N/mm ² | | 1750~2080N/mm ² | | 2080N/mm ² | |
| DIAMETER(inch) | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 1/4 | 5560 | 79.00 | 3880 | 54.00 | 1580 | 8.25 | 1100 | 5.10 |
| 5/16 | 4200 | 79.00 | 2940 | 54.00 | 1160 | 8.25 | 840 | 5.10 |
| 3/8 | 3360 | 79.00 | 2320 | 54.00 | 1000 | 8.25 | 680 | 5.10 |
| 1/2 | 2840 | 66.00 | 2000 | 46.00 | 840 | 7.10 | 560 | 4.35 |
| 5/8 | 2100 | 50.00 | 1480 | 35.00 | 640 | 5.10 | 420 | 2.75 |
| 3/4 | 1680 | 40.00 | 1160 | 27.00 | 500 | 4.35 | 320 | 2.35 |
| 1 | 1260 | 25.00 | 870 | 17.50 | 375 | 3.00 | 240 | 1.54 |

RPM = rev. / min.
FEED = inch / min.



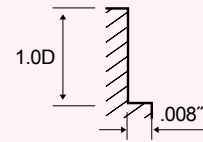
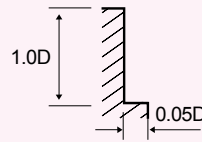
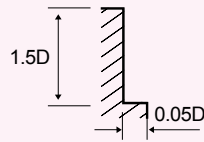
ENDMILL

DRILL

ZA506(8) - HIGH SPEED CUTTING

| MATERIAL | CARBON STEELS TOOL STEELS | | HARDENED STEELS | | HARDENED STEELS | |
|----------------|------------------------------|--------|----------------------------|--------|-----------------------|-------|
| HARDNESS | ~HRc 50 | | HRc 50~HRc 60 | | HRc 60 | |
| STRENGTH | 1750N/mm ² | | 1750~2080N/mm ² | | 2080N/mm ² | |
| DIAMETER(inch) | RPM | FEED | RPM | FEED | RPM | FEED |
| 1/4 | 16800 | 240.00 | 8400 | 120.00 | 4200 | 58.00 |
| 5/16 | 12600 | 240.00 | 6300 | 120.00 | 3160 | 58.00 |
| 3/8 | 9980 | 235.00 | 5040 | 120.00 | 2520 | 58.00 |
| 1/2 | 8400 | 199.00 | 4200 | 100.00 | 2100 | 50.00 |
| 5/8 | 6300 | 149.00 | 3160 | 75.00 | 1580 | 37.00 |
| 3/4 | 5040 | 120.00 | 2520 | 58.00 | 1260 | 30.00 |
| 1 | 3790 | 75.00 | 1890 | 38.00 | 950 | 19.00 |

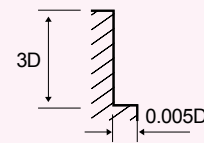
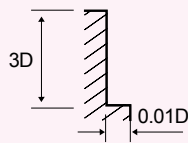
RPM = rev. / min.
FEED = inch / min.



ZA526(8)

| MATERIAL | NON-ALLOYED STEELS ALLOY STEELS · CAST IRON | | ALLOY STEELS HEAT RESISTANT STEELS | | HARDENED STEELS | | HARDENED STEELS | |
|----------------|--|-------|---------------------------------------|-------|----------------------------|-------|-----------------------|------|
| HARDNESS | ~ HRc 40 | | HRc 40 ~ HRc 50 | | HRc 50 ~ HRc 60 | | HRc 60 ~ HRc 65 | |
| STRENGTH | ~1250N/mm ² | | 1250~1750N/mm ² | | 1750~2080N/mm ² | | 2080N/mm ² | |
| DIAMETER(inch) | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 1/4 | 2230 | 19.00 | 1670 | 14.00 | 1390 | 10.00 | 1110 | 8.00 |
| 5/16 | 1670 | 18.00 | 1250 | 13.00 | 1050 | 9.50 | 840 | 7.00 |
| 3/8 | 1330 | 17.00 | 1000 | 12.00 | 840 | 9.00 | 680 | 6.30 |
| 1/2 | 1110 | 16.00 | 840 | 11.00 | 690 | 8.50 | 560 | 6.00 |
| 5/8 | 840 | 13.00 | 630 | 9.00 | 530 | 6.50 | 420 | 5.00 |
| 3/4 | 670 | 11.00 | 500 | 8.00 | 420 | 6.00 | 320 | 4.70 |
| 1 | 540 | 9.50 | 400 | 6.50 | 340 | 5.00 | 270 | 3.70 |

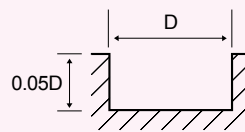
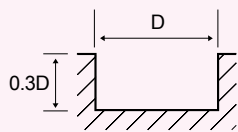
RPM = rev. / min.
FEED = inch / min.



ZR502A, ZR522A, ZR532A

| MATERIAL | CARBON STEELS ALLOY STEELS · CAST IRON | | ALLOY STEELS TOOL STEELS | | HARDENED STEELS | | HARDENED STEELS | |
|----------------|---|------|-----------------------------|------|----------------------------|------|-----------------------|------|
| HARDNESS | ~ HRc 30 | | HRc 30 ~ HRc 38 | | HRc 45 ~ HRc 55 | | HRc 55 ~ HRc 65 | |
| STRENGTH | ~1000N/mm ² | | 1000~1200N/mm ² | | 1400~2000N/mm ² | | 2000N/mm ² | |
| DIAMETER[inch] | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 1/4 | 2630 | 4.90 | 2100 | 4.20 | 1370 | 2.00 | 1160 | 1.40 |
| 5/16 | 2000 | 5.30 | 1580 | 4.20 | 1050 | 2.00 | 840 | 1.40 |
| 3/8 | 1680 | 5.30 | 1370 | 4.20 | 840 | 2.00 | 670 | 1.40 |
| 1/2 | 1370 | 4.20 | 1160 | 3.80 | 700 | 1.50 | 550 | 1.00 |

RPM = rev. / min.
FEED = inch / min.

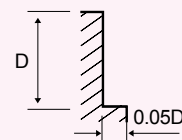
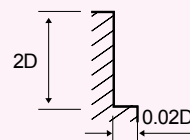
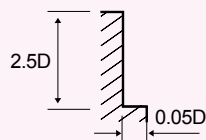


ENDMILL
&
DRILL

ZR504A, ZR524A, ZR534A

| MATERIAL | CARBON STEELS ALLOY STEELS · CAST IRON | | ALLOY STEELS TOOL STEELS | | HARDENED STEELS | | HARDENED STEELS | |
|----------------|---|------|-----------------------------|------|----------------------------|------|-----------------------|------|
| HARDNESS | ~ HRc 30 | | HRc 30 ~ HRc 50 | | HRc 50 ~ HRc 55 | | HRc 55 ~ HRc 65 | |
| STRENGTH | ~1000N/mm ² | | 1000~1750N/mm ² | | 1750~2000N/mm ² | | 2000N/mm ² | |
| DIAMETER[inch] | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 1/4 | 2630 | 8.50 | 2100 | 7.10 | 1370 | 3.30 | 1160 | 2.00 |
| 5/16 | 2000 | 9.00 | 1580 | 7.10 | 1050 | 3.30 | 840 | 2.00 |
| 3/8 | 1680 | 9.00 | 1370 | 7.10 | 840 | 3.30 | 670 | 2.00 |
| 1/2 | 1370 | 7.10 | 1160 | 6.30 | 700 | 2.80 | 550 | 1.50 |

RPM = rev. / min.
FEED = inch / min.



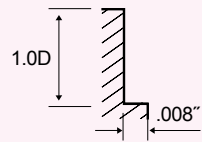
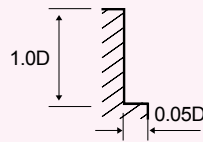
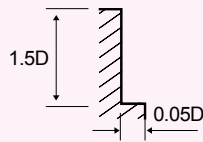
ENDMILL

DRILL

ZR506(8)A - HIGH SPEED CUTTING

| MATERIAL | CARBON STEELS ALLOY STEELS · CAST IRON | | ALLOY STEELS TOOL STEELS | | HARDENED STEELS | |
|----------------|---|--------|-----------------------------|--------|-------------------------|-------|
| HARDNESS | ~HRc 50 | | HRc 50~HRc 60 | | HRc 60~HRc 65 | |
| STRENGTH | 1750N/mm ² | | 1750N/mm ² | | 2080N/mm ² ~ | |
| DIAMETER(inch) | RPM | FEED | RPM | FEED | RPM | FEED |
| 1/4 | 16800 | 240.00 | 8400 | 120.00 | 4200 | 58.00 |
| 5/16 | 12600 | 240.00 | 6300 | 120.00 | 3200 | 58.00 |
| 3/8 | 10000 | 235.00 | 5000 | 120.00 | 2500 | 58.00 |
| 1/2 | 8400 | 200.00 | 4200 | 100.00 | 2100 | 50.00 |
| 5/8 | 6300 | 150.00 | 3150 | 75.00 | 1600 | 37.00 |
| 3/4 | 5000 | 120.00 | 2500 | 58.00 | 1260 | 30.00 |

RPM = rev. / min.
FEED = inch / min.



ZR506(8)A

| MATERIAL | NON-ALLOYED STEELS ALLOY STEELS · CAST IRON | | ALLOY STEELS HEAT RESISTANT STEELS | | ALLOY STEELS HEAT RESISTANT STEELS | | HARDENED STEELS | | HARDENED STEELS | |
|----------------|--|-------|---------------------------------------|-------|---------------------------------------|-------|----------------------------|-------|-----------------------|------|
| HARDNESS | ~ HRc 30 | | HRc 30 ~ HRc 38 | | HRc 38 ~ HRc 45 | | HRc 45 ~ HRc 55 | | HRc 55 ~ HRc 65 | |
| STRENGTH | ~1000N/mm ² | | 1000~1200N/mm ² | | 1200~1400N/mm ² | | 1400~2000N/mm ² | | 2000N/mm ² | |
| DIAMETER(inch) | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 1/4 | 15600 | 91.35 | 12400 | 33.10 | 8400 | 22.45 | 3400 | 10.25 | 2400 | 7.50 |
| 5/16 | 11600 | 91.35 | 9200 | 33.10 | 6300 | 22.45 | 2400 | 9.50 | 1800 | 7.10 |
| 3/8 | 9200 | 91.35 | 7600 | 33.10 | 5100 | 22.45 | 2000 | 11.40 | 1300 | 7.50 |
| 1/2 | 8000 | 94.50 | 6000 | 31.50 | 4200 | 22.45 | 1680 | 10.25 | 1200 | 7.50 |
| 5/8 | 6000 | 94.50 | 4800 | 29.90 | 3300 | 20.05 | 1200 | 6.30 | 800 | 4.35 |
| 3/4 | 5200 | 91.35 | 4400 | 28.35 | 2700 | 16.55 | 1100 | 5.90 | 700 | 3.95 |
| 1 | 4800 | 85.05 | 3600 | 22.05 | 2400 | 14.15 | 1000 | 5.90 | 660 | 3.95 |

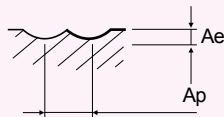
DB512, DB502, DB522, DB312 - GENERAL CUTTING

| MATERIAL | NON-ALLOYED STEELS ALLOY STEELS · CAST IRON | | ALLOY STEELS HEAT RESISTANT STEELS | | HARDENED STEELS | |
|----------------|--|------|---------------------------------------|------|-----------------------|------|
| HARDNESS | ~HRc 30 | | HRc 30~HRc 40 | | HRc 45~HRc 65 | |
| STRENGTH | ~1000N/mm ² | | 1000 ~1250N/mm ² | | 1500N/mm ² | |
| DIAMETER[inch] | RPM | FEED | RPM | FEED | RPM | FEED |
| 1 | 16500 | 290 | 13300 | 230 | 6100 | 105 |
| 1.5 | 16500 | 405 | 12700 | 310 | 5590 | 140 |
| 2 | 15100 | 865 | 11200 | 565 | 4900 | 175 |
| 2.5 | 15100 | 865 | 11200 | 565 | 4900 | 175 |
| 3 | 13800 | 780 | 10500 | 530 | 4750 | 175 |
| 4 | 11000 | 850 | 8800 | 610 | 4410 | 205 |
| 5 | 9600 | 945 | 7600 | 665 | 3860 | 205 |
| 6 | 8900 | 1150 | 7200 | 955 | 3340 | 220 |
| 8 | 7500 | 1500 | 6050 | 1060 | 2590 | 255 |
| 10 | 6700 | 1750 | 5300 | 1170 | 2140 | 260 |
| 12 | 6150 | 2000 | 4900 | 1280 | 1840 | 280 |
| 16 | 5000 | 1950 | 3900 | 1220 | 1420 | 280 |
| 20 | 4350 | 1900 | 3400 | 1200 | 1170 | 290 |

RPM = rev. / min.
FEED = mm / min.

Ae : D1 ~ D6=0.2mm
D8 ~ D20=0.3mm

Ap : 0.2×D



Ae : D1 ~ D6=0.2mm
D8 ~ D20=0.3mm

Ap : 0.1×D

• Please reduce cutting speed around 20~30% above the table in case of DB522 series.

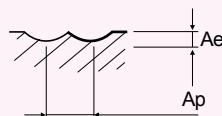
DB512, DB502, DB522, DB312 - HIGH SPEED CUTTING

| MATERIAL | NON-ALLOYED STEELS ALLOY STEELS · CAST IRON | | ALLOY STEELS HEAT RESISTANT STEELS | |
|----------------|--|------|---------------------------------------|------|
| HARDNESS | ~ HRc45 | | HRc 30 ~ HRc 40 | |
| STRENGTH | ~ 1500N/mm ² | | 1500 ~ 2000N/mm ² | |
| DIAMETER[inch] | RPM | FEED | RPM | FEED |
| 1 | 26000 | 1500 | 26000 | 920 |
| 1.5 | 24000 | 1600 | 24000 | 990 |
| 2 | 22000 | 1700 | 22000 | 1080 |
| 2.5 | 22000 | 2000 | 20000 | 1130 |
| 3 | 22000 | 2300 | 17800 | 1200 |
| 4 | 22000 | 3350 | 14300 | 1300 |
| 5 | 22000 | 4150 | 12600 | 1380 |
| 6 | 22000 | 4600 | 11000 | 1440 |
| 8 | 17500 | 4600 | 8800 | 1440 |
| 10 | 14700 | 4450 | 7350 | 1380 |
| 12 | 12800 | 4450 | 6400 | 1330 |
| 16 | 10000 | 4000 | 5000 | 1150 |
| 20 | 8350 | 3650 | 4150 | 1060 |

RPM = rev. / min.
FEED = mm / min.

Ae : D1 ~ D6=0.2mm
D8 ~ D20=0.3mm

Ap : 0.2×D



• Please reduce cutting speed around 20~30% above the table in case of DB522 series.

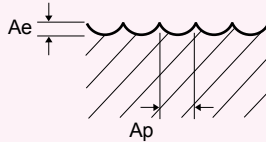
DB514 - GENERAL SPEED CUTTING

| MATERIAL | NON-ALLOYED STEELS ALLOY STEELS · CAST IRON | | ALLOY STEELS HEAT RESISTANT STEELS | | HARDENED STEELS | |
|----------------|--|------|---------------------------------------|------|-------------------------|------|
| HARDNESS | ~HRc 30 | | HRc 30~HRc 40 | | HRc 45~HRc 65 | |
| STRENGTH | ~1000N/mm ² | | 1000 ~ 1250N/mm ² | | ~ 1500N/mm ² | |
| DIAMETER(inch) | RPM | FEED | RPM | FEED | RPM | FEED |
| 3 | 13100 | 1020 | 10000 | 690 | 4520 | 220 |
| 4 | 10500 | 1110 | 8400 | 800 | 4200 | 270 |
| 5 | 9140 | 1230 | 7300 | 870 | 3680 | 270 |
| 6 | 7780 | 1260 | 6300 | 950 | 3160 | 280 |
| 8 | 5260 | 1430 | 4420 | 990 | 2100 | 280 |
| 10 | 4620 | 1530 | 3780 | 1070 | 1780 | 280 |
| 12 | 3780 | 1350 | 2940 | 990 | 1360 | 280 |
| 16 | 2740 | 1380 | 2320 | 980 | 1160 | 280 |
| 20 | 2100 | 1260 | 1900 | 950 | 840 | 280 |

RPM = rev. / min.
FEED = mm / min.

Ae : D1 ~ D6=0.2mm
D8 ~ D20=0.3mm

Ap : 0.2×D



Ae : D1 ~ D6=0.2mm
D8 ~ D20=0.3mm

Ap : 0.1×D

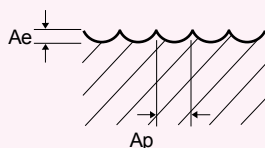
DB514 - HIGH SPEED CUTTING

| MATERIAL | NON-ALLOYED STEELS ALLOY STEELS · CAST IRON | | HARDENED STEELS | |
|----------------|--|------|---------------------------|------|
| HARDNESS | ~ HRc 45 | | HRc 45 ~ HRc 65 | |
| STRENGTH | ~ 1500N/mm ² | | ~ 1500N/mm ² ~ | |
| DIAMETER(inch) | RPM | FEED | RPM | FEED |
| 3 | 21000 | 1500 | 17000 | 780 |
| 4 | 21000 | 2210 | 13660 | 870 |
| 5 | 21000 | 2700 | 12000 | 900 |
| 6 | 21000 | 3470 | 10500 | 940 |
| 8 | 15760 | 4260 | 7880 | 1110 |
| 10 | 13660 | 4580 | 6300 | 1260 |
| 12 | 10500 | 3950 | 5260 | 1260 |
| 16 | 8200 | 3950 | 3780 | 1060 |
| 20 | 6300 | 3780 | 2940 | 790 |

RPM = rev. / min.
FEED = mm / min.

Ae : D1 ~ D6=0.2mm
D8 ~ D20=0.3mm

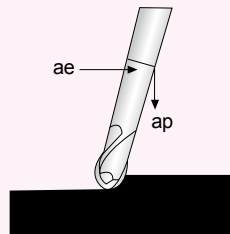
Ap : 0.05×D



DB532 - GENERAL CUTTING

| MATERIAL | NON-ALLOYED STEELS ALLOY STEELS · CAST IRON | | ALLOY STEELS HEAT RESISTANT STEELS | | HARDENED STEELS | |
|----------------|--|------|---------------------------------------|------|-----------------------|------|
| HARDNESS | ~HRc 30 | | HRc 30~HRc 40 | | HRc 45~HRc 65 | |
| STRENGTH | ~1000N/mm ² | | 1000 ~1250N/mm ² | | 1500N/mm ² | |
| DIAMETER(inch) | RPM | FEED | RPM | FEED | RPM | FEED |
| 3 | 35000 | 2800 | 33000 | 2600 | 12000 | 900 |
| 4 | 26000 | 2300 | 25000 | 2200 | 9000 | 800 |
| 5 | 21000 | 2100 | 20000 | 2000 | 7000 | 700 |
| 6 | 17000 | 1900 | 16000 | 1800 | 6000 | 650 |
| 8 | 13000 | 1700 | 12000 | 1600 | 4500 | 550 |
| 10 | 10500 | 1450 | 10000 | 1400 | 3500 | 500 |
| 12 | 9000 | 1400 | 8000 | 1300 | 3000 | 450 |
| 16 | 6000 | 1200 | 5500 | 1100 | 2000 | 400 |

RPM = rev. / min.
FEED = mm / min.

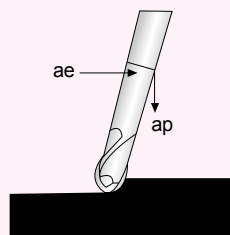


ae: 0.05×d1
ap: 0.02×d1

DB532 - HIGH SPEED CUTTING

| MATERIAL | NON-ALLOYED STEELS ALLOY STEELS · CAST IRON | | ALLOY STEELS HEAT RESISTANT STEELS | | HARDENED STEELS | |
|----------------|--|------|---------------------------------------|------|-----------------------|------|
| HARDNESS | ~HRc 30 | | HRc 30~HRc 40 | | HRc 45~HRc 65 | |
| STRENGTH | ~1000N/mm ² | | 1000 ~1250N/mm ² | | 1500N/mm ² | |
| DIAMETER(inch) | RPM | FEED | RPM | FEED | RPM | FEED |
| 3 | 47000 | 3700 | 44000 | 3500 | 17000 | 1400 |
| 4 | 35000 | 3200 | 33000 | 3000 | 13000 | 1200 |
| 5 | 28000 | 2800 | 27000 | 2600 | 10000 | 1100 |
| 6 | 23000 | 2600 | 22000 | 2400 | 8000 | 950 |
| 8 | 18000 | 2300 | 17000 | 2100 | 6000 | 850 |
| 10 | 14000 | 2000 | 13000 | 1900 | 5000 | 750 |
| 12 | 12000 | 1800 | 11000 | 1800 | 4000 | 700 |
| 16 | 9000 | 1600 | 8000 | 1500 | 3300 | 600 |

RPM = rev. / min.
FEED = mm / min.

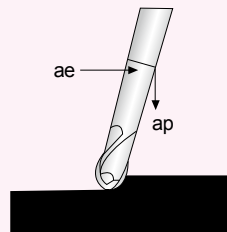


ae: 0.05×d1
ap: 0.02×d1

DB534 - GENERAL CUTTING

| MATERIAL | NON-ALLOYED STEELS ALLOY STEELS · CAST IRON | | ALLOY STEELS HEAT RESISTANT STEELS | | HARDENED STEELS | |
|----------------|--|------|---------------------------------------|------|-----------------------|------|
| HARDNESS | ~HRc 30 | | HRc 30~HRc 40 | | HRc 45~HRc 65 | |
| STRENGTH | ~1000N/mm ² | | 1000 ~ 1250N/mm ² | | 1500N/mm ² | |
| DIAMETER[inch] | RPM | FEED | RPM | FEED | RPM | FEED |
| 5 | 21000 | 4000 | 20000 | 4000 | 7000 | 1400 |
| 6 | 17000 | 4000 | 16000 | 3500 | 6000 | 1300 |
| 8 | 13000 | 3500 | 12000 | 3000 | 4500 | 1100 |
| 10 | 10500 | 3000 | 10000 | 2500 | 3500 | 1000 |
| 12 | 9000 | 2800 | 8000 | 2500 | 3000 | 950 |
| 16 | 6000 | 2800 | 5500 | 2200 | 2000 | 800 |

RPM = rev. / min.
FEED = mm / min.



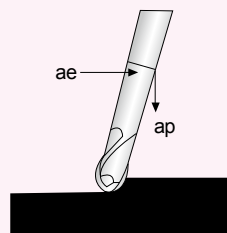
ae: 0.05×d1

ap: 0.02×d1

DB534- HIGH SPEED CUTTING

| MATERIAL | NON-ALLOYED STEELS ALLOY STEELS · CAST IRON | | ALLOY STEELS HEAT RESISTANT STEELS | | HARDENED STEELS | |
|----------------|--|------|---------------------------------------|------|-----------------------|------|
| HARDNESS | ~HRc 30 | | HRc 30~HRc 40 | | HRc 45~HRc 65 | |
| STRENGTH | ~1000N/mm ² | | 1000 ~ 1250N/mm ² | | 1500N/mm ² | |
| DIAMETER[inch] | RPM | FEED | RPM | FEED | RPM | FEED |
| 5 | 28000 | 5600 | 27000 | 5300 | 11000 | 2100 |
| 6 | 23000 | 5100 | 22000 | 4900 | 9000 | 1900 |
| 8 | 18000 | 4600 | 17000 | 4300 | 7000 | 1700 |
| 10 | 14000 | 3900 | 13000 | 3700 | 5000 | 1400 |
| 12 | 12000 | 3700 | 11000 | 3500 | 4500 | 1300 |
| 16 | 9000 | 3100 | 8000 | 3000 | 3300 | 1100 |

RPM = rev. / min.
FEED = mm / min.



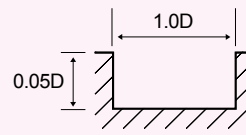
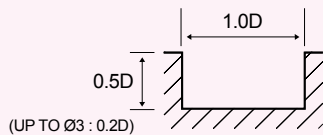
ae: 0.05×d1

ap: 0.02×d1

ZE502, ZE522, ZE302, ZE322 - GENERAL CUTTING

| MATERIAL | ALLOY STEELS HEAT RESISTANT STEELS | | HARDENED STEELS | | | | STAINLESS STEELS | |
|----------------|---------------------------------------|------|------------------------------|------|------------------------------|------|------------------|------|
| | HRc 30 ~ HRc 40 | | HRc 40 ~ HRc 50 | | HRc 40 ~ HRc 55 | | | |
| STRENGTH | 1000 ~ 1250N/mm ² | | 1250 ~ 1750N/mm ² | | 1750 ~ 2000N/mm ² | | | |
| DIAMETER(inch) | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 2 | 9700 | 220 | 6350 | 135 | 2500 | 46 | 5300 | 105 |
| 3 | 7500 | 240 | 4670 | 160 | 2000 | 46 | 3880 | 135 |
| 4 | 6350 | 345 | 3880 | 205 | 1550 | 46 | 3250 | 175 |
| 5 | 5300 | 370 | 3170 | 220 | 1320 | 46 | 2650 | 185 |
| 6 | 4670 | 405 | 2830 | 255 | 1150 | 46 | 2380 | 205 |
| 8 | 3530 | 435 | 2120 | 230 | 880 | 46 | 1760 | 205 |
| 10 | 2730 | 380 | 1680 | 185 | 715 | 40 | 1420 | 185 |
| 12 | 2310 | 320 | 1420 | 150 | 590 | 40 | 1140 | 150 |
| 16 | 1850 | 255 | 1140 | 125 | 460 | 23 | 890 | 125 |
| 20 | 1420 | 195 | 890 | 90 | 335 | 23 | 705 | 90 |
| 25 | 1150 | 150 | 705 | 80 | 275 | 17 | 580 | 70 |

RPM = rev. / min.
FEED = mm / min.

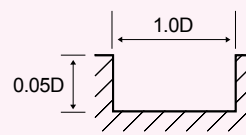
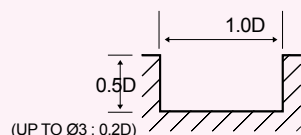


• Please reduce cutting speed around 20~30% from the above table in case of ZE522, ZE322 series.

ZE502, ZE522, ZE302, ZE322 - HIGH SPEED CUTTING

| MATERIAL | ALLOY STEELS HEAT RESISTANT STEELS | | HARDENED STEELS | | | | STAINLESS STEELS | |
|----------------|---------------------------------------|------|------------------------------|------|------------------------------|------|------------------|------|
| | HRc 30 ~ HRc 40 | | HRc 40 ~ HRc 50 | | HRc 40 ~ HRc 55 | | | |
| STRENGTH | 1000 ~ 1250N/mm ² | | 1250 ~ 1750N/mm ² | | 1750 ~ 2000N/mm ² | | | |
| DIAMETER(inch) | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 2 | 18000 | 665 | 11800 | 415 | 8700 | 175 | 9800 | 345 |
| 3 | 11000 | 655 | 6800 | 435 | 5600 | 185 | 6200 | 370 |
| 4 | 10300 | 725 | 6300 | 430 | 4300 | 185 | 5300 | 370 |
| 5 | 9350 | 715 | 5570 | 420 | 3700 | 185 | 4620 | 355 |
| 6 | 8200 | 750 | 4930 | 470 | 3250 | 185 | 4100 | 390 |
| 8 | 6300 | 770 | 3780 | 410 | 2470 | 185 | 3120 | 355 |
| 10 | 4830 | 750 | 2940 | 360 | 2000 | 160 | 2470 | 310 |
| 12 | 4100 | 750 | 2520 | 345 | 1680 | 160 | 2100 | 300 |
| 16 | 3260 | 715 | 2000 | 355 | 1890 | 150 | 1940 | 290 |
| 20 | 2520 | 665 | 1580 | 310 | 1680 | 150 | 1630 | 275 |
| 25 | 2000 | 635 | 1260 | 340 | 1570 | 150 | 1420 | 290 |

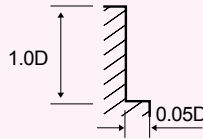
RPM = rev. / min.
FEED = mm / min.



ZE503 - SIDE CUTTING

| MATERIAL | CARBON STEELS ALLOY STEELS · CAST IRON | | ALLOY STEELS HEAT RESISTANT STEELS | | STAINLESS STEELS | | HARDENED STEELS | | HARDENED STEELS | |
|--------------|---|------|---------------------------------------|------|---------------------|------|------------------------------|------|-------------------------|------|
| HARDNESS | ~ HRc 30 | | HRc 30 ~ HRc 45 | | | | HRc 45 ~ HRc 55 | | HRc 55 ~ HRc 65 | |
| STRENGTH | ~ 1000N/mm ² | | 1000 ~ 1500N/mm ² | | | | 1500 ~ 2000N/mm ² | | 2000N/mm ² ~ | |
| DIAMETER(mm) | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 6 | 5560 | 500 | 3360 | 310 | 2840 | 250 | 2000 | 60 | 1100 | 45 |
| 8 | 4200 | 530 | 2520 | 290 | 2100 | 265 | 1680 | 80 | 840 | 45 |
| 10 | 3260 | 460 | 2000 | 230 | 1680 | 230 | 1360 | 70 | 680 | 35 |
| 12 | 2740 | 390 | 1680 | 190 | 1360 | 180 | 1160 | 60 | 560 | 35 |
| 16 | 2200 | 310 | 1360 | 150 | 1060 | 150 | 900 | 45 | 440 | 20 |
| 18 | 1940 | 280 | 1210 | 135 | 950 | 130 | 790 | 35 | 380 | 20 |
| 20 | 1680 | 240 | 1060 | 120 | 840 | 115 | 680 | 30 | 320 | 20 |

RPM = rev. / min.
FEED = mm / min.

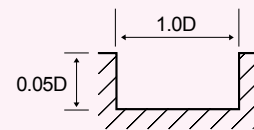
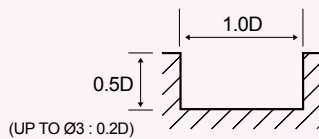


ZE503 - SLOTTING

ENDMILL

| MATERIAL | CARBON STEELS ALLOY STEELS · CAST IRON | | ALLOY STEELS HEAT RESISTANT STEELS | | STAINLESS STEELS | | HARDENED STEELS | | HARDENED STEELS | |
|--------------|---|------|---------------------------------------|------|---------------------|------|------------------------------|------|-------------------------|------|
| HARDNESS | ~ HRc 30 | | HRc 30 ~ HRc 45 | | | | HRc 45 ~ HRc 55 | | HRc 55 ~ HRc 65 | |
| STRENGTH | ~ 1000N/mm ² | | 1000 ~ 1500N/mm ² | | | | 1500 ~ 2000N/mm ² | | 2000N/mm ² ~ | |
| DIAMETER(mm) | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 6 | 5560 | 310 | 3360 | 200 | 2840 | 160 | 2000 | 50 | 1100 | 35 |
| 8 | 4200 | 340 | 2520 | 180 | 2100 | 160 | 1680 | 65 | 840 | 35 |
| 10 | 3260 | 300 | 2000 | 140 | 1680 | 145 | 1360 | 55 | 680 | 30 |
| 12 | 2740 | 250 | 1680 | 120 | 1360 | 120 | 1160 | 50 | 560 | 30 |
| 16 | 2200 | 200 | 1360 | 100 | 1060 | 100 | 900 | 35 | 440 | 20 |
| 18 | 1940 | 175 | 1210 | 85 | 950 | 85 | 790 | 30 | 380 | 20 |
| 20 | 1680 | 150 | 1060 | 70 | 840 | 70 | 680 | 25 | 320 | 20 |

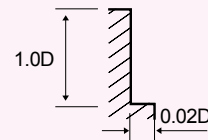
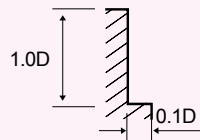
RPM = rev. / min.
FEED = mm / min.



ZE504, ZE524, ZE304, ZE324 - GENERAL CUTTING

| MATERIAL | NON-ALLOYED STEELS ALLOY STEELS - CAST IRON | | HARDENED STEELS | | | | STAINLESS STEELS | |
|----------------|--|------|-----------------------------|------|-----------------------------|------|------------------|------|
| | ~ HRc 30 | | HRc 30 ~ HRc 45 | | HRc 45 ~ HRc 55 | | | |
| HARDNESS | | | | | | | | |
| STRENGTH | ~1000N/mm ² | | 1000 ~1500N/mm ² | | 1500 ~2000N/mm ² | | | |
| DIAMETER(inch) | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 2 | 12100 | 320 | 7900 | 195 | 2700 | 47 | 6600 | 160 |
| 3 | 9400 | 370 | 5840 | 230 | 2000 | 58 | 4850 | 195 |
| 4 | 7900 | 655 | 4850 | 405 | 1500 | 58 | 4070 | 320 |
| 5 | 6600 | 690 | 3970 | 415 | 1300 | 58 | 3320 | 345 |
| 6 | 5830 | 760 | 3530 | 470 | 1150 | 58 | 2980 | 380 |
| 8 | 4410 | 815 | 2650 | 435 | 880 | 58 | 2200 | 405 |
| 10 | 3420 | 700 | 2100 | 345 | 720 | 46 | 1760 | 345 |
| 12 | 2880 | 600 | 1760 | 290 | 590 | 46 | 1430 | 275 |
| 16 | 2310 | 470 | 1430 | 230 | 460 | 29 | 1150 | 230 |
| 20 | 1760 | 370 | 1110 | 185 | 340 | 29 | 880 | 175 |
| 25 | 1430 | 290 | 880 | 150 | 270 | 23 | 715 | 140 |

RPM = rev. / min.
FEED = mm / min.

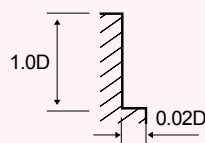


• Please reduce cutting speed around 20~30% from the above table in case of ZE524, ZE324 series.

ZE504, ZE524, ZE304, ZE324 - HIGH SPEED CUTTING

| MATERIAL | NON-ALLOYED STEELS ALLOY STEELS - CAST IRON | | HARDENED STEELS | | | | STAINLESS STEELS | |
|----------------|--|------|-----------------------------|------|-----------------------------|------|------------------|------|
| | ~ HRc 30 | | HRc 30 ~ HRc 45 | | HRc 45 ~ HRc 55 | | | |
| HARDNESS | | | | | | | | |
| STRENGTH | ~1000N/mm ² | | 1000 ~1500N/mm ² | | 1500 ~2000N/mm ² | | | |
| DIAMETER(inch) | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 2 | 31400 | 1230 | 23500 | 520 | 12600 | 275 | 21600 | 465 |
| 3 | 19300 | 1210 | 13600 | 735 | 8900 | 390 | 13500 | 660 |
| 4 | 18100 | 1330 | 12600 | 865 | 7090 | 465 | 11800 | 775 |
| 5 | 16400 | 1310 | 11100 | 1010 | 6040 | 530 | 10300 | 910 |
| 6 | 14400 | 1380 | 9900 | 1100 | 5300 | 580 | 9100 | 990 |
| 8 | 11000 | 1430 | 7600 | 1090 | 3990 | 575 | 6900 | 980 |
| 10 | 8500 | 1380 | 5880 | 1110 | 3150 | 580 | 5420 | 1000 |
| 12 | 7200 | 1380 | 5040 | 1090 | 2620 | 575 | 4600 | 985 |
| 16 | 5700 | 1320 | 3990 | 1010 | 2000 | 535 | 3590 | 910 |
| 20 | 4400 | 1270 | 3150 | 930 | 1580 | 490 | 2840 | 840 |
| 25 | 3500 | 1170 | 2520 | 755 | 1260 | 390 | 2270 | 680 |

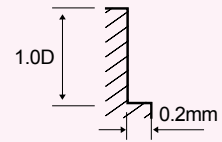
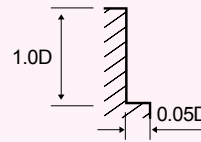
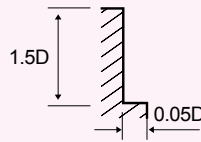
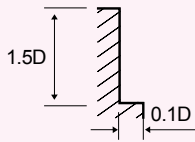
RPM = rev. / min.
FEED = mm / min.



ZE506 - GENERAL SPEED CUTTING

| MATERIAL | NON-ALLOYED STEELS ALLOY STEELS · CAST IRON | | ALLOY STEELS HEAT RESISTANT STEELS | | HARDENED STEELS | | HARDENED STEELS | |
|----------------|--|------|---------------------------------------|------|----------------------------|------|-----------------------|------|
| HARDNESS | ~ HRc 30 | | HRc 30 ~ HRc 50 | | HRc 50 ~ HRc 60 | | HRc 60 ~ HRc 65 | |
| STRENGTH | ~1000N/mm ² | | 1000~1750N/mm ² | | 1750~2080N/mm ² | | 2080N/mm ² | |
| DIAMETER[inch] | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 6 | 5560 | 2000 | 3880 | 1370 | 1580 | 210 | 1100 | 130 |
| 8 | 4200 | 2000 | 2940 | 1370 | 1160 | 210 | 840 | 130 |
| 10 | 3360 | 2000 | 2320 | 1370 | 1000 | 210 | 680 | 130 |
| 12 | 2840 | 1680 | 2000 | 1160 | 840 | 180 | 560 | 110 |
| 16 | 2100 | 1260 | 1480 | 880 | 640 | 130 | 420 | 70 |
| 20 | 1680 | 1010 | 1160 | 690 | 500 | 110 | 320 | 60 |
| 25 | 1500 | 900 | 1100 | 600 | 430 | 90 | 260 | 50 |

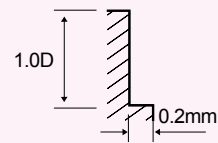
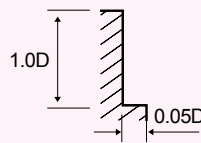
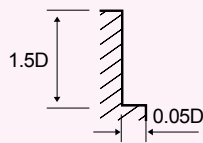
RPM = rev. / min.
FEED = mm / min.



ZE506 - HIGH SPEED CUTTING

| MATERIAL | HEAT RESISTANT STEELS HARDENED STEELS | | HARDENED STEELS | | HARDENED STEELS | |
|----------------|--|------|-----------------------------|------|-----------------------|------|
| HARDNESS | ~HRc 50 | | HRc 50~HRc 60 | | HRc 60 ~ HRc 65 | |
| STRENGTH | ~1750N/mm ² | | 1750 ~2080N/mm ² | | 2080N/mm ² | |
| DIAMETER[inch] | RPM | FEED | RPM | FEED | RPM | FEED |
| 6 | 16800 | 6090 | 8400 | 3050 | 4200 | 1470 |
| 8 | 12600 | 6090 | 6300 | 3050 | 3160 | 1470 |
| 10 | 9980 | 5990 | 5040 | 3050 | 2520 | 1470 |
| 12 | 8400 | 5040 | 4200 | 2520 | 2100 | 1260 |
| 16 | 6300 | 3780 | 3160 | 1890 | 1580 | 950 |
| 20 | 5040 | 3050 | 2520 | 1470 | 1260 | 760 |
| 25 | 4500 | 2750 | 2200 | 1300 | 1120 | 670 |

RPM = rev. / min.
FEED = mm / min.

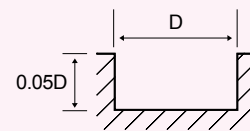
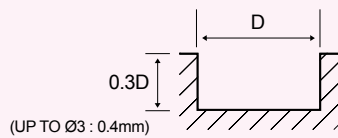


• Please reduce cutting speed around 20~30% from the above table in case of Extra long series.

ZM502, ZM522

| MATERIAL | NON-ALLOYED STEELS ALLOY STEELS · CAST IRON | | ALLOY STEELS HEAT RESISTANT STEELS | | HARDENED STEELS | |
|----------------|--|------|---------------------------------------|------|------------------------------|------|
| HARDNESS | ~HRc 30 | | HRc 30~HRc 45 | | HRc 45 ~ HRc 55 | |
| STRENGTH | ~1000N/mm ² | | 1000~1500N/mm ² | | 1500 ~ 2000N/mm ² | |
| DIAMETER(inch) | RPM | FEED | RPM | FEED | RPM | FEED |
| 2 | 6300 | 60 | 5040 | 50 | 3150 | 25 |
| 3 | 4410 | 70 | 3570 | 60 | 2200 | 30 |
| 4 | 3570 | 85 | 2840 | 70 | 1790 | 35 |
| 5 | 3050 | 105 | 2420 | 85 | 1580 | 40 |
| 6 | 2630 | 125 | 2100 | 105 | 1370 | 50 |
| 8 | 2000 | 135 | 1580 | 105 | 1050 | 50 |
| 10 | 1680 | 135 | 1370 | 105 | 840 | 50 |
| 12 | 1370 | 105 | 1160 | 95 | 700 | 40 |
| 16 | 1160 | 95 | 890 | 75 | 560 | 35 |
| 20 | 840 | 70 | 680 | 50 | 420 | 25 |

RPM = rev. / min.
FEED = mm / min.

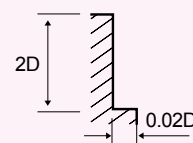
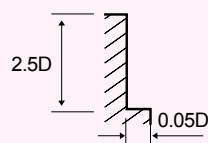


ENDMILL
&
DRILL

ZM504, ZM524

| MATERIAL | NON-ALLOYED STEELS ALLOY STEELS · CAST IRON | | ALLOY STEELS HEAT RESISTANT STEELS | | HARDENED STEELS | | HARDENED STEELS | |
|----------------|--|------|---------------------------------------|------|------------------------------|------|-------------------------|------|
| HARDNESS | ~ HRc 30 | | HRc 30 ~ HRc 45 | | HRc 45 ~ HRc 55 | | HRc 55 ~ HRc 65 | |
| STRENGTH | ~1000N/mm ² | | 1000~1500N/mm ² | | 1500 ~ 2000N/mm ² | | 2000N/mm ² ~ | |
| DIAMETER(inch) | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 2 | 6300 | 100 | 5040 | 80 | 3150 | 45 | | |
| 3 | 4410 | 115 | 3570 | 100 | 2200 | 55 | 1890 | 30 |
| 4 | 3570 | 140 | 2840 | 115 | 1790 | 60 | 1470 | 35 |
| 5 | 3050 | 180 | 2420 | 140 | 1580 | 70 | 1260 | 40 |
| 6 | 2630 | 215 | 2100 | 180 | 1370 | 90 | 1160 | 50 |
| 8 | 2000 | 230 | 1580 | 180 | 1050 | 90 | 840 | 50 |
| 10 | 1680 | 230 | 1370 | 180 | 840 | 90 | 670 | 50 |
| 12 | 1370 | 180 | 1160 | 160 | 700 | 70 | 560 | 40 |
| 16 | 1160 | 160 | 890 | 125 | 560 | 60 | 440 | 35 |
| 20 | 840 | 115 | 680 | 90 | 420 | 45 | 340 | 25 |

RPM = rev. / min.
FEED = mm / min.



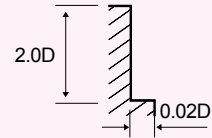
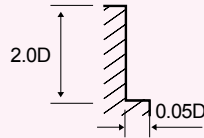
ENDMILL

DRILL

ZR502, ZR512, ZR522, ZR322 - SIDE CUTTING

| MATERIAL | NON-ALLOYED STEELS ALLOY STEELS · CAST IRON | | ALLOY STEELS HEAT RESISTANT STEELS | | HARDENED STEELS | |
|----------------|--|------|---------------------------------------|------|------------------------------|------|
| HARDNESS | ~HRc 30 | | HRc 30~HRc 45 | | HRc 45 ~ HRc 55 | |
| STRENGTH | ~1000N/mm ² | | 1000 ~ 1500N/mm ² | | 1500 ~ 2000N/mm ² | |
| DIAMETER[inch] | RPM | FEED | RPM | FEED | RPM | FEED |
| 3 | 6950 | 195 | 4500 | 150 | 3300 | 100 |
| 4 | 5600 | 240 | 3600 | 170 | 2700 | 105 |
| 5 | 4800 | 250 | 3050 | 210 | 2350 | 125 |
| 6 | 4150 | 250 | 2650 | 210 | 2050 | 125 |
| 8 | 3150 | 265 | 2000 | 210 | 1600 | 125 |
| 10 | 2150 | 265 | 1700 | 210 | 1250 | 125 |
| 12 | 1800 | 210 | 1500 | 185 | 1050 | 105 |
| 16 | 1800 | 185 | 1100 | 140 | 840 | 90 |
| 20 | 1300 | 130 | 860 | 105 | 625 | 65 |

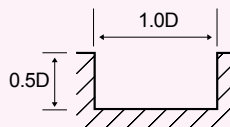
RPM = rev. / min.
FEED = mm / min.



ZR502, ZR512, ZR522, ZR322 - SLOTTING

| MATERIAL | NON-ALLOYED STEELS ALLOY STEELS · CAST IRON | | ALLOY STEELS HEAT RESISTANT STEELS | | HARDENED STEELS | |
|----------------|--|------|---------------------------------------|------|------------------------------|------|
| HARDNESS | ~HRc 30 | | HRc 30~HRc 45 | | HRc 45 ~ HRc 55 | |
| STRENGTH | ~1000N/mm ² | | 1000 ~ 1500N/mm ² | | 1500 ~ 2000N/mm ² | |
| DIAMETER[inch] | RPM | FEED | RPM | FEED | RPM | FEED |
| 3 | 6950 | 160 | 4500 | 80 | 3300 | 55 |
| 4 | 5600 | 195 | 3600 | 100 | 2700 | 60 |
| 5 | 4800 | 240 | 3050 | 115 | 2350 | 75 |
| 6 | 4150 | 290 | 2650 | 145 | 2050 | 90 |
| 8 | 3150 | 210 | 2000 | 145 | 1600 | 90 |
| 10 | 2150 | 250 | 1700 | 140 | 1250 | 90 |
| 12 | 1800 | 200 | 1500 | 135 | 1050 | 75 |
| 16 | 1800 | 215 | 1100 | 100 | 840 | 60 |
| 20 | 1300 | 160 | 860 | 70 | 625 | 45 |

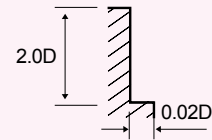
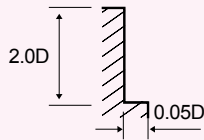
RPM = rev. / min.
FEED = mm / min.



ZR504, ZR514, ZR524, ZR324

| MATERIAL | NON-ALLOYED STEELS ALLOY STEELS · CAST IRON | | ALLOY STEELS HEAT RESISTANT STEELS | | HARDENED STEELS | |
|----------------|--|------|---------------------------------------|------|------------------------------|------|
| HARDNESS | ~HRc 30 | | HRc 30~HRc 45 | | HRc 45 ~ HRc 55 | |
| STRENGTH | ~1000N/mm ² | | 1000 ~1500N/mm ² | | 1500 ~ 2000N/mm ² | |
| DIAMETER(inch) | RPM | FEED | RPM | FEED | RPM | FEED |
| 3 | 6950 | 195 | 4500 | 150 | 3300 | 100 |
| 4 | 5600 | 240 | 3600 | 170 | 2700 | 105 |
| 5 | 4800 | 250 | 3050 | 210 | 2350 | 125 |
| 6 | 4150 | 250 | 2650 | 210 | 2050 | 125 |
| 8 | 3150 | 265 | 2000 | 210 | 1600 | 125 |
| 10 | 2150 | 265 | 1700 | 210 | 1250 | 125 |
| 12 | 1800 | 210 | 1500 | 185 | 1050 | 105 |
| 16 | 1880 | 185 | 1100 | 140 | 840 | 90 |
| 20 | 1300 | 130 | 860 | 105 | 625 | 65 |

RPM = rev. / min.
FEED = mm / min.

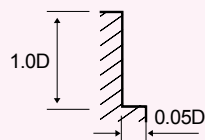


ENDMILL
&
DRILL

ZR304H, ZR324H

| MATERIAL | NON-ALLOYED STEELS ALLOY STEELS · CAST IRON | | ALLOY STEELS HEAT RESISTANT STEELS | | HARDENED STEELS | |
|----------------|--|------|---------------------------------------|------|------------------------------|------|
| HARDNESS | ~HRc 30 | | HRc 30~HRc 45 | | HRc 45 ~ HRc 55 | |
| STRENGTH | ~1000N/mm ² | | 1000 ~1500N/mm ² | | 1500 ~ 2000N/mm ² | |
| DIAMETER(inch) | RPM | FEED | RPM | FEED | RPM | FEED |
| 6 | 7000 | 910 | 4200 | 560 | 3000 | 140 |
| 8 | 5300 | 980 | 3200 | 530 | 2500 | 190 |
| 10 | 4100 | 840 | 2500 | 410 | 2050 | 165 |
| 12 | 3500 | 730 | 2100 | 340 | 1700 | 140 |

RPM = rev. / min.
FEED = mm / min.



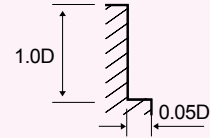
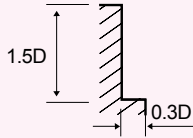
ENDMILL

DRILL

ZF60, ZF61

| MATERIAL | NON-ALLOYED STEELS ALLOY STEELS · CAST IRON | | ALLOY STEELS HEAT RESISTANT STEELS | | STAINLESS STEELS | | HARDENED STEELS | | HARDENED STEELS | |
|--------------|--|------|---------------------------------------|------|------------------------------|------|------------------------------|------|-------------------------|------|
| HARDNESS | ~ HRc 30 | | HRc 30 ~ HRc 38 | | HRc 38 ~ HRc 45 | | HRc 45 ~ HRc 55 | | HRc 55 ~ HRc 65 | |
| STRENGTH | ~ 1000N/mm ² | | 1000 ~ 1200N/mm ² | | 1200 ~ 1400N/mm ² | | 1400 ~ 2000N/mm ² | | 2000N/mm ² ~ | |
| DIAMETER(mm) | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 6 | 15600 | 2320 | 12400 | 840 | 8400 | 570 | 3400 | 260 | 2400 | 190 |
| 8 | 11600 | 2320 | 9200 | 840 | 6300 | 570 | 2400 | 240 | 1800 | 180 |
| 10 | 9200 | 2320 | 7600 | 840 | 5100 | 570 | 2000 | 290 | 1300 | 190 |
| 12 | 8000 | 2400 | 6000 | 800 | 4200 | 570 | 1680 | 260 | 1200 | 190 |
| 14 | 6800 | 2400 | 5200 | 840 | 3600 | 570 | 1400 | 200 | 900 | 130 |
| 16 | 6000 | 2400 | 4800 | 760 | 3300 | 510 | 1200 | 160 | 800 | 110 |
| 18 | 5200 | 2320 | 4400 | 720 | 2700 | 420 | 1100 | 150 | 700 | 100 |
| 20 | 4800 | 2160 | 3600 | 560 | 2400 | 360 | 1000 | 150 | 660 | 100 |
| 25 | 4300 | 2150 | 3200 | 620 | 2160 | 410 | 900 | 160 | 600 | 100 |

RPM = rev. / min.
FEED = mm / min.



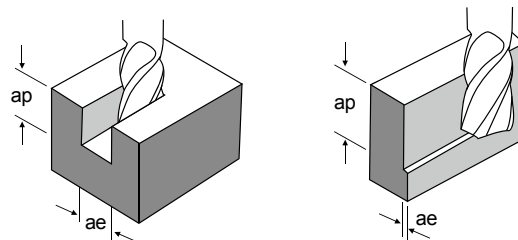
ENDMILL

DRILL

PK503

| MATERIAL | | Alloy Steels · High Carbon Steels | | | Prehardened Steels · Tool Steels | | | |
|--------------|----------|-----------------------------------|--------------|-------|----------------------------------|-------|--------------|-------|
| HARDNESS | | 130 ~ 150 | | | HRc 30 ~ 40 | | | |
| [V]m/min | | 130 ~ 150 | | | 100 ~ 120 | | | |
| DIAMETER(mm) | [r.p.m.] | fz | | | [r.p.m.] | fz | | |
| | | Slot | Side Cutting | Slot | | Slot | Side Cutting | Slot |
| 6 | 7,400 | 0.030 | 0.045 | 0.018 | 5,800 | 0.025 | 0.030 | 0.012 |
| 8 | 5,600 | 0.035 | 0.062 | 0.025 | 4,400 | 0.030 | 0.045 | 0.018 |
| 10 | 4,600 | 0.045 | 0.075 | 0.030 | 3,500 | 0.040 | 0.048 | 0.019 |
| 12 | 3,700 | 0.050 | 0.087 | 0.035 | 3,000 | 0.045 | 0.052 | 0.020 |
| 14 | 3,200 | 0.055 | 0.090 | 0.036 | 2,500 | 0.053 | 0.056 | 0.022 |
| 16 | 2,800 | 0.055 | 0.090 | 0.036 | 2,200 | 0.060 | 0.060 | 0.024 |
| 20 | 2,200 | 0.080 | 0.095 | 0.038 | 1,800 | 0.066 | 0.066 | 0.026 |
| | ap | 1.0D | 1.0D | 0.5D | | 1.0D | 1.0D | 0.5D |
| | ae | 1.0D | 0.5D | 1.0D | | 1.0D | 0.3D | 1.0D |

| MATERIAL | | Alloy Steels · High Carbon Steels | | | Prehardened Steels · Tool Steels | | | |
|--------------|----------|-----------------------------------|--------------|-------|----------------------------------|-------|--------------|-------|
| HARDNESS | | HRc 40 ~ 45 | | | 100 ~ 120 | | | |
| [V]m/min | | 130 ~ 150 | | | 100 ~ 120 | | | |
| DIAMETER(mm) | [r.p.m.] | fz | | | [r.p.m.] | fz | | |
| | | Slot | Side Cutting | Slot | | Slot | Side Cutting | Slot |
| 6 | 3,200 | 0.020 | 0.030 | 0.012 | 2,100 | 0.017 | 0.020 | 0.008 |
| 8 | 2,400 | 0.030 | 0.040 | 0.016 | 1,600 | 0.025 | 0.025 | 0.010 |
| 10 | 1,900 | 0.040 | 0.055 | 0.022 | 1,300 | 0.035 | 0.040 | 0.016 |
| 12 | 1,600 | 0.045 | 0.065 | 0.026 | 1,100 | 0.040 | 0.050 | 0.020 |
| 14 | 1,360 | 0.048 | 0.070 | 0.028 | 900 | 0.043 | 0.053 | 0.021 |
| 16 | 1,200 | 0.050 | 0.075 | 0.030 | 800 | 0.045 | 0.055 | 0.022 |
| 20 | 1,000 | 0.052 | 0.083 | 0.033 | 600 | 0.050 | 0.057 | 0.023 |
| | ap | 0.5D | 1.0D | 0.5D | | 0.5D | 1.0D | 0.5D |
| | ae | 1.0D | 0.5D | 1.0D | | 1.0D | 0.3D | 1.0D |



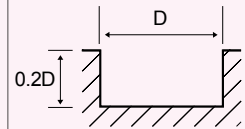
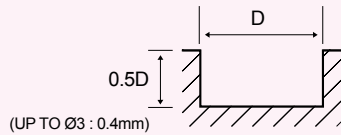
ENDMILL

DRILL

SM503 - SLOTTING

| MATERIAL | CARBON STEELS ALLOY STEELS · TOOL STEELS | | | | | | CAST IRON | | STAINLESS STEELS | | COOPER ALLOYS | | TITANIUM ALLOYS | | INCONEL | |
|--------------|---|------|---------------------------|------|---------------------------|------|-----------|------|---------------------|------|------------------|------|--------------------|------|---------|------|
| | ~ HRC20 | | HRC20 ~ HRC30 | | HRC30 ~ HRC45 | | | | | | | | | | | |
| HARDNESS | 1000N/mm ² | | 800~1000N/mm ² | | 800~1000N/mm ² | | | | | | | | | | | |
| STRENGTH | 1000N/mm ² | | 800~1000N/mm ² | | 800~1000N/mm ² | | | | | | | | | | | |
| DIAMETER(mm) | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 3 | 10080 | 950 | 7750 | 740 | 5550 | 395 | 6700 | 520 | 5550 | 320 | 8300 | 360 | 5550 | 395 | 2200 | 100 |
| 4 | 7550 | 1400 | 5850 | 1100 | 4200 | 595 | 5050 | 550 | 4200 | 320 | 6200 | 400 | 4200 | 595 | 1650 | 105 |
| 6 | 5050 | 1650 | 3850 | 1250 | 2800 | 700 | 3350 | 660 | 2800 | 370 | 4100 | 440 | 2800 | 700 | 1150 | 130 |
| 8 | 3750 | 1700 | 2950 | 1330 | 2100 | 710 | 2500 | 665 | 2100 | 375 | 3100 | 500 | 2100 | 710 | 850 | 120 |
| 10 | 3050 | 1650 | 2300 | 1250 | 1650 | 655 | 2000 | 630 | 1650 | 355 | 2500 | 530 | 1650 | 665 | 650 | 120 |
| 12 | 2500 | 1500 | 2000 | 1200 | 1350 | 605 | 1650 | 570 | 1350 | 320 | 2000 | 550 | 1350 | 605 | 555 | 110 |

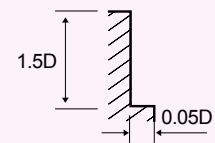
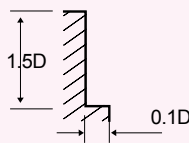
RPM = rev. / min.
FEED = mm / min.



SM503 - SIDE CUTTING

| MATERIAL | CARBON STEELS ALLOY STEELS · TOOL STEELS | | | | | | CAST IRON | | STAINLESS STEELS | | COOPER ALLOYS | | TITANIUM ALLOYS | | INCONEL | |
|--------------|---|------|---------------------------|------|---------------------------|------|-----------|------|---------------------|------|------------------|------|--------------------|------|---------|------|
| | ~ HRC20 | | HRC20 ~ HRC30 | | HRC30 ~ HRC45 | | | | | | | | | | | |
| HARDNESS | 1000N/mm ² | | 800~1000N/mm ² | | 800~1000N/mm ² | | | | | | | | | | | |
| STRENGTH | 1000N/mm ² | | 800~1000N/mm ² | | 800~1000N/mm ² | | | | | | | | | | | |
| DIAMETER(mm) | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 3 | 10080 | 950 | 7750 | 740 | 5550 | 395 | 6700 | 520 | 5550 | 320 | 8300 | 360 | 5550 | 395 | 2200 | 100 |
| 4 | 7550 | 1400 | 5850 | 1100 | 4200 | 595 | 5050 | 550 | 4200 | 320 | 6200 | 400 | 4200 | 595 | 1650 | 105 |
| 6 | 5050 | 1650 | 3850 | 1250 | 2800 | 700 | 3350 | 660 | 2800 | 370 | 4100 | 440 | 2800 | 700 | 1150 | 130 |
| 8 | 3750 | 1700 | 2950 | 1330 | 2100 | 710 | 2500 | 665 | 2100 | 375 | 3100 | 500 | 2100 | 710 | 850 | 120 |
| 10 | 3050 | 1650 | 2300 | 1250 | 1650 | 655 | 2000 | 630 | 1650 | 355 | 2500 | 530 | 1650 | 665 | 650 | 120 |
| 12 | 2500 | 1500 | 2000 | 1200 | 1350 | 605 | 1650 | 570 | 1350 | 320 | 2000 | 550 | 1350 | 605 | 555 | 110 |

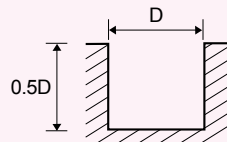
RPM = rev. / min.
FEED = mm / min.



SM504

| MATERIAL | ALLOY STEELS - CAST IRON | | STAINLESS STEEL 300 SERIES TITANIUM | | STAINLESS STEELS 400 SERIES | |
|--------------|--------------------------|------|--|------|-----------------------------|------|
| HARDNESS | ~ HB230 | | | | | |
| DIAMETER(mm) | RPM | FEED | RPM | FEED | RPM | FEED |
| 3 | 6950 | 195 | 4500 | 150 | 3300 | 100 |
| 4 | 5600 | 240 | 3600 | 170 | 2700 | 105 |
| 5 | 4800 | 250 | 3050 | 210 | 2350 | 125 |
| 6 | 4150 | 250 | 2650 | 210 | 2050 | 125 |
| 8 | 3150 | 265 | 2000 | 210 | 1600 | 125 |
| 10 | 2150 | 265 | 1700 | 210 | 1250 | 125 |
| 12 | 1800 | 210 | 1500 | 185 | 1050 | 105 |
| 16 | 1880 | 185 | 1100 | 140 | 840 | 90 |
| 20 | 1300 | 130 | 860 | 105 | 625 | 65 |

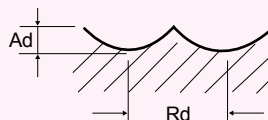
RPM = rev. / min.
FEED = mm / min.



BC502

| MATERIAL | | UNALLOYED COPPER | | | |
|----------|----------------|------------------|------|-------|-------|
| R | DIAMETER(inch) | RPM | FEED | RPM | FEED |
| 0.5 | 1 | 41000 | 1660 | 0.040 | 0.063 |
| 0.75 | 1.5 | 27000 | 1830 | 0.068 | 0.087 |
| 1 | 2 | 20000 | 1780 | 0.089 | 0.112 |
| 1.25 | 2.5 | 16000 | 1840 | 0.115 | 0.090 |
| 1.5 | 3 | 13000 | 2220 | 0.171 | 0.168 |
| 2 | 4 | 10000 | 2080 | 0.208 | 0.200 |
| 2.5 | 5 | 8300 | 1990 | 0.240 | 0.200 |
| 3 | 6 | 6900 | 1940 | 0.281 | 0.250 |
| 4 | 8 | 5720 | 1000 | 0.175 | 0.400 |
| 5 | 10 | 4550 | 700 | 0.154 | 0.500 |
| 6 | 12 | 3770 | 600 | 0.159 | 0.600 |

RPM = rev. / min.
FEED = mm / min.



ENDMILL
&
DRILL

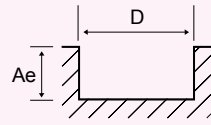
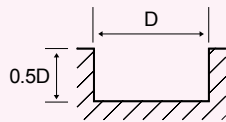
ENDMILL

DRILL

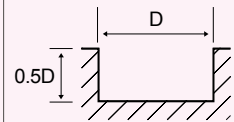
ZF62 - SLOTTING

| MATERIAL | NON-ALLOYED STEELS ALLOY STEELS · CAST IRON | | ALLOY STEELS HEAT RESISTANT STEELS | | STAINLESS STEELS | | INCONEL | |
|--------------|--|------|---------------------------------------|------|------------------|------|---------|------|
| HARDNESS | ~ HRc 30 | | HRc 30 ~ HRc 50 | | | | | |
| STRENGTH | ~1000N/mm ² | | 1000~1500N/mm ² | | | | | |
| DIAMETER(mm) | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 6 | 16380 | 2680 | 13020 | 970 | 8820 | 670 | 3000 | 285 |
| 8 | 12180 | 2680 | 9660 | 970 | 6615 | 670 | 2250 | 270 |
| 10 | 9660 | 2680 | 7980 | 970 | 5355 | 660 | 1625 | 285 |
| 12 | 8400 | 2770 | 6300 | 925 | 4410 | 660 | 1500 | 285 |
| 16 | 6300 | 2770 | 5040 | 880 | 3465 | 590 | 1000 | 165 |
| 20 | 5040 | 2495 | 3780 | 650 | 2520 | 415 | 825 | 150 |

RPM = rev. / min.
FEED = mm / min.



Ae : $\varnothing 4 \sim \varnothing 10 = 0.25 \times D$
 $\varnothing 12 \sim \varnothing 16 = 0.15 \times D$
 $\varnothing 18 \sim \varnothing 20 = 0.10 \times D$

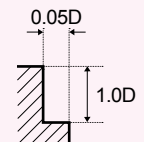
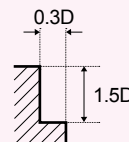
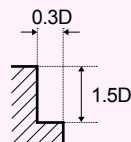


ZF62 - SIDE CUTTING

ENDMILL

| MATERIAL | NON-ALLOYED STEELS ALLOY STEELS · CAST IRON | | ALLOY STEELS HEAT RESISTANT STEELS | | STAINLESS STEELS | | INCONEL | |
|--------------|--|------|---------------------------------------|------|------------------|------|---------|------|
| HARDNESS | ~ HRc 30 | | HRc 30 ~ HRc 45 | | | | | |
| STRENGTH | ~1000N/mm ² | | 1000~1500N/mm ² | | | | | |
| DIAMETER(mm) | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 6 | 16380 | 2680 | 13020 | 970 | 8820 | 670 | 3000 | 285 |
| 8 | 12180 | 2680 | 9660 | 970 | 6615 | 670 | 2250 | 270 |
| 10 | 9660 | 2680 | 7980 | 970 | 5355 | 660 | 1625 | 285 |
| 12 | 8400 | 2770 | 6300 | 925 | 4410 | 660 | 1500 | 285 |
| 16 | 6300 | 2770 | 5040 | 880 | 3465 | 590 | 1000 | 165 |
| 20 | 5040 | 2495 | 3780 | 650 | 2520 | 415 | 825 | 150 |

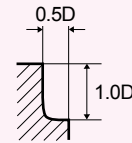
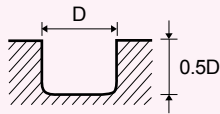
RPM = rev. / min.
FEED = mm / min.



RC502

| MATERIAL | UNALLOYED COPPER | | | |
|----------------|------------------|------|-------|------|
| DIAMETER(inch) | RPM | FEED | RPM | FEED |
| 3 | 44500 | 2350 | 50000 | 3700 |
| 4 | 33400 | 2100 | 50000 | 4700 |
| 6 | 22300 | 2100 | 33400 | 4900 |
| 8 | 16700 | 2100 | 25000 | 4700 |
| 10 | 13370 | 2100 | 20000 | 4800 |
| 12 | 11100 | 2100 | 16700 | 4700 |

RPM = rev. / min.
FEED = mm / min.

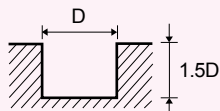


ENDMILL
&
DRILL

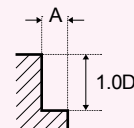
AE302

| MATERIAL | ALLOY STEELS · CAST IRON | | ALUMINUM | |
|--------------|--------------------------|------|----------|------|
| HARDNESS | ~ HB230 | | | |
| DIAMETER(mm) | RPM | FEED | RPM | FEED |
| 1.0 | 16870 | 505 | 16870 | 845 |
| 1.5 | 13150 | 525 | 13150 | 790 |
| 2.0 | 11300 | 565 | 11300 | 790 |
| 2.5 | 10565 | 635 | 10565 | 845 |
| 3.0 | 10000 | 700 | 10000 | 900 |
| 4.0 | 10000 | 900 | 10000 | 1100 |
| 5.0 | 10000 | 1000 | 10000 | 1300 |
| 6.0 | 10000 | 1200 | 10000 | 1500 |
| 7.0 | 8850 | 1240 | 8850 | 1505 |
| 8.0 | 8000 | 1400 | 8000 | 1800 |
| 9.0 | 8000 | 1550 | 8000 | 1680 |
| 10.0 | 8000 | 1700 | 8000 | 2100 |
| 12.0 | 8000 | 2100 | 8000 | 2600 |
| 14.0 | 6000 | 1800 | 6000 | 2200 |
| 16.0 | 6000 | 1900 | 6000 | 2400 |
| 18.0 | 4000 | 1400 | 4000 | 1800 |
| 20.0 | 4000 | 1600 | 4000 | 1900 |

RPM = rev. / min.
FEED = mm / min.



Ae : Ø3 ~ Ø10=0.25×D
Ø12 ~ Ø20=0.5×D



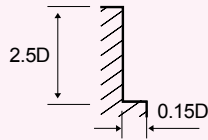
ENDMILL

DRILL

AE303, AE323 - SIDE CUTTING

| MATERIAL | ALUMINUM - NONFERROUS METALS | |
|--------------|------------------------------|------|
| DIAMETER(mm) | RPM | FEED |
| 3 | 7000 | 455 |
| 4 | 7000 | 546 |
| 5 | 7000 | 651 |
| 6 | 7000 | 756 |
| 8 | 5600 | 861 |
| 10 | 5600 | 1050 |
| 12 | 5600 | 882 |
| 14 | 4200 | 1106 |
| 16 | 4200 | 1211 |
| 18 | 2800 | 910 |
| 20 | 2800 | 956 |

RPM = rev. / min.
FEED = mm / min.

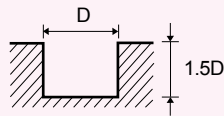


• Please reduce cutting speed around 20~30% from the above table in case of AE303 series.

AE303, AE323 - SLOTTING

| MATERIAL | ALUMINUM - NONFERROUS METALS | |
|--------------|------------------------------|------|
| DIAMETER(mm) | RPM | FEED |
| 3 | 7000 | 350 |
| 4 | 7000 | 441 |
| 5 | 7000 | 504 |
| 6 | 7000 | 606 |
| 8 | 5600 | 700 |
| 10 | 5600 | 854 |
| 12 | 5600 | 1050 |
| 14 | 4200 | 903 |
| 16 | 4200 | 945 |
| 18 | 2800 | 700 |
| 20 | 2800 | 805 |

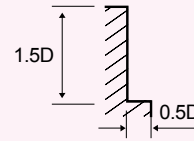
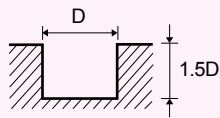
RPM = rev. / min.
FEED = mm / min.



AF303, AF313 - SLOTTING

| MATERIAL | ALUMINUM - NONFERROUS METALS | | | |
|--------------|------------------------------|------|-------|------|
| DIAMETER(mm) | RPM | FEED | RPM | FEED |
| 6 | 10500 | 800 | 13500 | 1050 |
| 8 | 8000 | 700 | 10500 | 900 |
| 10 | 6500 | 750 | 8500 | 950 |
| 12 | 5250 | 800 | 6800 | 1050 |
| 16 | 4000 | 800 | 5200 | 1050 |
| 20 | 3200 | 800 | 4200 | 1050 |

RPM = rev. / min.
FEED = mm / min.

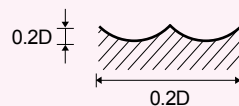


ENDMILL
&
DRILL

G

| MATERIAL | GRAPHITE | |
|--------------|----------|------|
| DIAMETER(mm) | RPM | FEED |
| R0.5 | 16000 | 480 |
| R0.75 | 16000 | 640 |
| R1 | 16000 | 800 |
| R1.5 | 16000 | 1450 |
| R2 | 16000 | 2100 |
| R3 | 15000 | 2950 |
| R4 | 13000 | 3000 |
| R5 | 11500 | 3050 |
| R6 | 10500 | 3150 |
| R8 | 8555 | 2960 |

RPM = rev. / min.
FEED = mm / min.



ENDMILL

DRILL

POWER MAX DRILL SERIES

PF503



POWER MAX DRILL - STUB / HIGH SPEED MACHINING

- Suitable for high speed cutting due to newly developed raw-material and new coating.

| EDP. No. | Dia. | F.L. | OAL | SH.Dia. | STOCK |
|----------|------|------|-----|---------|-------|
| PF503020 | 2.0 | 14 | 50 | 3 | ● |
| PF503021 | 2.1 | | | | ● |
| PF503022 | 2.2 | | | | ● |
| PF503023 | 2.3 | | | | ● |
| PF503024 | 2.4 | | | | ● |
| PF503025 | 2.5 | | | | ● |
| PF503026 | 2.6 | | | | ● |
| PF503027 | 2.7 | | | | ● |
| PF503028 | 2.8 | | | | ● |
| PF503029 | 2.9 | | | | ● |
| PF503030 | 3.0 | 18 | 60 | 4 | ● |
| PF503031 | 3.1 | 20 | 60 | | ● |
| PF503032 | 3.2 | | | | ● |
| PF503033 | 3.3 | | | | ● |
| PF503034 | 3.4 | | | | ● |
| PF503035 | 3.5 | 22 | | | ● |
| PF503036 | 3.6 | | | | ● |
| PF503037 | 3.7 | | | | ● |
| PF503038 | 3.8 | | | | ● |
| PF50039 | 3.9 | 24 | | | ● |
| PF503040 | 4.0 | | | ● | |
| PF503041 | 4.1 | | ● | | |
| PF503042 | 4.2 | 26 | 62 | 5 | ● |
| PF503043 | 4.3 | | | | ● |
| PF503044 | 4.4 | | | | ● |
| PF503045 | 4.5 | | | | ● |
| PF503046 | 4.6 | | | | ● |
| PF503047 | 4.7 | | | | ● |
| PF503048 | 4.8 | | | | ● |
| PF503049 | 4.9 | | | | ● |
| PF503050 | 5.0 | | | | ● |
| PF503051 | 5.1 | | | | ● |

| EDP. No. | Dia. | F.L. | OAL | SH.Dia. | STOCK |
|----------|------|------|-----|---------|-------|
| PF503052 | 5.2 | 28 | 66 | 6 | ● |
| PF503053 | 5.3 | | | | ● |
| PF503054 | 5.4 | | | | ● |
| PF503055 | 5.5 | | | | ● |
| PF503056 | 5.6 | | | | ● |
| PF503057 | 5.7 | | | | ● |
| PF503058 | 5.8 | 30 | | | ● |
| PF503059 | 5.9 | | | | ● |
| PF503060 | 6.0 | | | | ● |
| PF503061 | 6.1 | | | | ● |
| PF503062 | 6.2 | 34 | 74 | 7 | ● |
| PF503063 | 6.3 | | | | ● |
| PF503064 | 6.4 | | | | ● |
| PF503065 | 6.5 | | | | ● |
| PF503066 | 6.6 | | | | ● |
| PF503067 | 6.7 | | | | 37 |
| PF503068 | 6.8 | ● | | | |
| PF503069 | 6.9 | ● | | | |
| PF503070 | 7.0 | ● | | | |
| PF503071 | 7.1 | ● | | | |
| PF503072 | 7.2 | 40 | 79 | 8 | ● |
| PF503073 | 7.3 | | | | ● |
| PF503074 | 7.4 | | | | ● |
| PF503075 | 7.5 | | | | ● |
| PF503076 | 7.6 | | | | ● |
| PF503077 | 7.7 | | | | ● |
| PF503078 | 7.8 | | | | ● |
| PF503079 | 7.9 | | | | ● |
| PF503080 | 8.0 | | | | ● |
| PF503081 | 8.1 | | | | 43 |
| PF503082 | 8.2 | ● | | | |
| PF503083 | 8.3 | ● | | | |
| PF503084 | 8.4 | ● | | | |
| PF503085 | 8.5 | ● | | | |
| PF503086 | 8.6 | ● | | | |
| PF503087 | 8.7 | ● | | | |
| PF503088 | 8.8 | ● | | | |
| PF503089 | 8.9 | ● | | | |
| PF503090 | 9.0 | ● | | | |
| PF503091 | 9.1 | 47 | 89 | 10 | ● |
| PF503092 | 9.2 | | | | ● |
| PF503093 | 9.3 | | | | ● |
| PF503094 | 9.4 | | | | ● |
| PF503095 | 9.5 | | | | ● |
| PF503096 | 9.6 | | | | ● |
| PF503097 | 9.7 | | | | ● |
| PF503098 | 9.8 | | | | ● |
| PF503099 | 9.9 | | | | ● |
| PF503100 | 10.0 | | | | ● |
| PF503101 | 10.1 | ● | | | |

POWER MAX DRILL SERIES

PART.
B

ENDMILL
&
DRILL

| EDP. No. | Dia. | F.L | OAL | SH.Dia. | STOCK |
|----------|------|-----|-----|---------|-------|
| PF503102 | 10.2 | 51 | 95 | 11 | ● |
| PF503103 | 10.3 | | | | ● |
| PF503104 | 10.4 | | | | ● |
| PF503105 | 10.5 | | | | ● |
| PF503106 | 10.6 | | | | ● |
| PF503107 | 10.7 | | | | ● |
| PF503108 | 10.8 | | | | ● |
| PF503109 | 10.9 | | | | ● |
| PF503110 | 11.0 | | | | ● |
| PF503111 | 11.1 | | | | ● |
| PF503112 | 11.2 | 54 | 102 | 12 | ● |
| PF503113 | 11.3 | | | | ● |
| PF503114 | 11.4 | | | | ● |
| PF503115 | 11.5 | | | | ● |
| PF503116 | 11.6 | | | | ● |
| PF503117 | 11.7 | | | | ● |
| PF503118 | 11.8 | | | | ● |
| PF503119 | 11.9 | | | | ● |
| PF503120 | 12.0 | | | | ● |
| PF503121 | 12.1 | | | | ● |
| PF503122 | 12.2 | 57 | 102 | 13 | ● |
| PF503123 | 12.3 | | | | ● |
| PF503124 | 12.4 | | | | ● |
| PF503125 | 12.5 | | | | ● |
| PF503126 | 12.6 | | | | ● |
| PF503127 | 12.7 | | | | ● |
| PF503128 | 12.8 | | | | ● |
| PF503129 | 12.9 | | | | ● |
| PF503130 | 13.0 | | | | ● |
| PF503131 | 13.1 | | | | ● |
| PF503132 | 13.2 | 60 | 107 | 14 | ● |
| PF503133 | 13.3 | | | | ● |
| PF503134 | 13.4 | | | | ● |
| PF503135 | 13.5 | | | | ● |
| PF503136 | 13.6 | | | | ● |
| PF503137 | 13.7 | | | | ● |
| PF503138 | 13.8 | | | | ● |
| PF503139 | 13.9 | | | | ● |
| PF503140 | 14.0 | | | | ● |
| PF503141 | 14.1 | | | | ● |
| PF503142 | 14.2 | 62 | 111 | 15 | ● |
| PF503143 | 14.3 | | | | ● |
| PF503144 | 14.4 | | | | ● |
| PF503145 | 14.5 | | | | ● |
| PF503146 | 14.6 | | | | ● |
| PF503147 | 14.7 | | | | ● |
| PF503148 | 14.8 | | | | ● |
| PF503149 | 14.9 | | | | ● |
| PF503150 | 15.0 | | | | ● |
| PF503151 | 15.1 | | | | ● |

| EDP. No. | Dia. | F.L | OAL | SH.Dia. | STOCK | | | |
|----------|------|-----|-----|---------|-------|-----|----|---|
| PF503152 | 15.2 | 64 | 115 | 16 | ● | | | |
| PF503154 | 15.4 | | | | ● | | | |
| PF503155 | 15.5 | | | | ● | | | |
| PF503156 | 15.6 | | | | ● | | | |
| PF503157 | 15.7 | | | | ● | | | |
| PF503158 | 15.8 | | | | ● | | | |
| PF503160 | 16.0 | | | | ● | | | |
| PF503161 | 16.1 | | | | ● | | | |
| PF503163 | 16.3 | | | | 66 | 119 | 17 | ● |
| PF503165 | 16.5 | | | | | | | ● |
| PF503170 | 17.0 | ● | | | | | | |
| PF503171 | 17.1 | ● | | | | | | |
| PF503172 | 17.2 | 66 | 123 | 18 | ● | | | |
| PF503175 | 17.5 | | | | ● | | | |
| PF503177 | 17.7 | | | | ● | | | |
| PF503178 | 17.8 | | | | ● | | | |
| PF503180 | 18.0 | | | | ● | | | |
| PF503181 | 18.1 | | | | ● | | | |
| PF503182 | 18.2 | | | | 70 | 127 | 19 | ● |
| PF503185 | 18.5 | | | | | | | ● |
| PF503190 | 19.0 | ● | | | | | | |
| PF503191 | 19.1 | 70 | 131 | 20 | ● | | | |
| PF503195 | 19.5 | | | | ● | | | |
| PF503197 | 19.7 | | | | ● | | | |
| PF503200 | 20.0 | | | | ● | | | |

ENDMILL

DRILL

μm=1/1000mm

| Tolerance \ Dia. | from 1 to 3 | over 3 to 6 | over 6 to 10 | over 10 to 18 | over 18 to 30 |
|--------------------------|-------------|-------------|--------------|---------------|---------------|
| Cutting Edge (h8) | 0 -14 | 0 -18 | 0 -22 | 0 -27 | 0 -33 |
| Shank (h6) | 0 -6 | 0 -8 | 0 -9 | 0 -11 | 0 -13 |

POWER MAX DRILL SERIES

PF505



POWER MAX DRILL - MEDIUM / HIGH SPEED MACHINING

- Suitable for high speed cutting due to newly developed raw-material and new coating.

| EDP. No. | Dia. | F.L. | OAL | SH.Dia. | STOCK | | | |
|----------|------|------|-----|---------|-------|----|----|----|
| PF505030 | 3.0 | 25 | 60 | 3 | ● | | | |
| PF505031 | 3.1 | 27 | | 4 | ● | | | |
| PF505032 | 3.2 | | | | ● | | | |
| PF505033 | 3.3 | | | | ● | | | |
| PF505034 | 3.4 | 30 | 65 | | ● | | | |
| PF505035 | 3.5 | | | 33 | 71 | ● | | |
| PF505036 | 3.6 | | | | | 36 | 71 | ● |
| PF505037 | 3.7 | | | | | | | 39 |
| PF505038 | 3.8 | 39 | 71 | | | | | |
| PF505039 | 3.9 | | | 43 | 83 | | | |
| PF505040 | 4.0 | | | | | 43 | 83 | |
| PF505041 | 4.1 | | | | | | | 43 |
| PF505042 | 4.2 | 43 | 83 | | | | | |
| PF505043 | 4.3 | | | 43 | 83 | | | |
| PF505044 | 4.4 | | | | | 43 | 83 | |
| PF505045 | 4.5 | | | | | | | 43 |
| PF505046 | 4.6 | 43 | 83 | | | | | |
| PF505047 | 4.7 | | | 43 | 83 | | | |
| PF505048 | 4.8 | | | | | 43 | 83 | |
| PF505049 | 4.9 | | | | | | | 43 |
| PF505050 | 5.0 | 43 | 83 | | | | | |
| PF505051 | 5.1 | | | 43 | 83 | | | |
| PF505052 | 5.2 | | | | | 43 | 83 | |
| PF505053 | 5.3 | | | | | | | 43 |
| PF505054 | 5.4 | 43 | 83 | | | | | |
| PF505055 | 5.5 | | | 43 | 83 | | | |
| PF505056 | 5.6 | | | | | 43 | 83 | |
| PF505057 | 5.7 | | | | | | | 43 |
| PF505058 | 5.8 | 43 | 83 | | | | | |
| PF505059 | 5.9 | | | 43 | 83 | | | |
| PF505060 | 6.0 | | | | | 43 | 83 | |

| EDP. No. | Dia. | F.L. | OAL | SH.Dia. | STOCK |
|----------|------|------|-----|---------|-------|
| PF505061 | 6.1 | 47 | 87 | 7 | ● |
| PF505062 | 6.2 | | | | ● |
| PF505063 | 6.3 | | | | ● |
| PF505064 | 6.4 | | | | ● |
| PF505065 | 6.5 | | | | ● |
| PF505066 | 6.6 | | | | ● |
| PF505067 | 6.7 | | | | ● |
| PF505068 | 6.8 | | | | ● |
| PF505069 | 6.9 | | | | ● |
| PF505070 | 7.0 | | | | ● |
| PF505071 | 7.1 | 52 | 92 | 8 | ● |
| PF505072 | 7.2 | | | | ● |
| PF505073 | 7.3 | | | | ● |
| PF505074 | 7.4 | | | | ● |
| PF505075 | 7.5 | | | | ● |
| PF505076 | 7.6 | | | | ● |
| PF505077 | 7.7 | | | | ● |
| PF505078 | 7.8 | | | | ● |
| PF505079 | 7.9 | | | | ● |
| PF505080 | 8.0 | | | | ● |
| PF505081 | 8.1 | 56 | 96 | 9 | ● |
| PF505082 | 8.2 | | | | ● |
| PF505083 | 8.3 | | | | ● |
| PF505084 | 8.4 | | | | ● |
| PF505085 | 8.5 | | | | ● |
| PF505086 | 8.6 | | | | ● |
| PF505087 | 8.7 | | | | ● |
| PF505088 | 8.8 | | | | ● |
| PF505089 | 8.9 | | | | ● |
| PF505090 | 9.0 | | | | ● |
| PF505091 | 9.1 | 62 | 105 | 10 | ● |
| PF505092 | 9.2 | | | | ● |
| PF505093 | 9.3 | | | | ● |
| PF505094 | 9.4 | | | | ● |
| PF505095 | 9.5 | | | | ● |
| PF505096 | 9.6 | | | | ● |
| PF505097 | 9.7 | | | | ● |
| PF505098 | 9.8 | | | | ● |
| PF505099 | 9.9 | | | | ● |
| PF505100 | 10.0 | | | | ● |
| PF505101 | 10.1 | 68 | 115 | 11 | ● |
| PF505102 | 10.2 | | | | ● |
| PF505103 | 10.3 | | | | ● |
| PF505104 | 10.4 | | | | ● |
| PF505105 | 10.5 | | | | ● |
| PF505106 | 10.6 | | | | ● |
| PF505107 | 10.7 | | | | ● |
| PF505108 | 10.8 | | | | ● |
| PF505109 | 10.9 | | | | ● |
| PF505110 | 11.0 | | | | ● |

POWER MAX DRILL SERIES

PART.
B

ENDMILL
&
DRILL

| EDP. No. | Dia. | F.L | OAL | SH.Dia. | STOCK |
|----------|------|-----|-----|---------|-------|
| PF505111 | 11.1 | 71 | 121 | 12 | ● |
| PF505112 | 11.2 | | | | ● |
| PF505113 | 11.3 | | | | ● |
| PF505114 | 11.4 | | | | ● |
| PF505115 | 11.5 | | | | ● |
| PF505116 | 11.6 | | | | ● |
| PF505117 | 11.7 | | | | ● |
| PF505118 | 11.8 | | | | ● |
| PF505119 | 11.9 | | | | ● |
| PF505120 | 12.0 | | | | ● |
| PF505121 | 12.1 | 75 | 125 | 13 | ● |
| PF505122 | 12.2 | | | | ● |
| PF505123 | 12.3 | | | | ● |
| PF505124 | 12.4 | | | | ● |
| PF505125 | 12.5 | | | | ● |
| PF505126 | 12.6 | | | | ● |
| PF505127 | 12.7 | | | | ● |
| PF505128 | 12.8 | | | | ● |
| PF505129 | 12.9 | | | | ● |
| PF505130 | 13.0 | | | | ● |
| PF505131 | 13.1 | 80 | 134 | 14 | ● |
| PF505132 | 13.2 | | | | ● |
| PF505133 | 13.3 | | | | ● |
| PF505134 | 13.4 | | | | ● |
| PF505135 | 13.5 | | | | ● |
| PF505136 | 13.6 | | | | ● |
| PF505137 | 13.7 | | | | ● |
| PF505138 | 13.8 | | | | ● |
| PF505139 | 13.9 | | | | ● |
| PF505140 | 14.0 | | | | ● |
| PF505141 | 14.1 | 83 | 143 | 15 | ● |
| PF505142 | 14.2 | | | | ● |
| PF505143 | 14.3 | | | | ● |
| PF505144 | 14.4 | | | | ● |
| PF505145 | 14.5 | | | | ● |
| PF505146 | 14.6 | | | | ● |
| PF505147 | 14.7 | | | | ● |
| PF505148 | 14.8 | | | | ● |
| PF505149 | 14.9 | | | | ● |
| PF505150 | 15.0 | | | | ● |
| PF505151 | 15.1 | 90 | 152 | 16 | ● |
| PF505152 | 15.2 | | | | ● |
| PF505154 | 15.4 | | | | ● |
| PF505155 | 15.5 | | | | ● |
| PF505156 | 15.6 | | | | ● |
| PF505157 | 15.7 | | | | ● |
| PF505158 | 15.8 | | | | ● |
| PF505160 | 16.0 | | | | ● |

| EDP. No. | Dia. | F.L | OAL | SH.Dia. | STOCK | | | |
|----------|------|-----|-----|---------|-------|-----|----|---|
| PF505161 | 16.1 | 95 | 155 | 17 | ● | | | |
| PF505163 | 16.3 | | | | ● | | | |
| PF505165 | 16.5 | | | | ● | | | |
| PF505170 | 17.0 | | | | ● | | | |
| PF505171 | 17.1 | | | | ● | | | |
| PF505172 | 17.2 | 100 | 157 | 18 | ● | | | |
| PF505175 | 17.5 | | | | ● | | | |
| PF505177 | 17.7 | | | | ● | | | |
| PF505178 | 17.8 | | | | ● | | | |
| PF505180 | 18.0 | | | | ● | | | |
| PF505181 | 18.1 | | | | 105 | 160 | 19 | ● |
| PF505182 | 18.2 | | | | | | | ● |
| PF505185 | 18.5 | | | | | | | ● |
| PF505190 | 19.0 | ● | | | | | | |
| PF505191 | 19.1 | 110 | 163 | 20 | ● | | | |
| PF505195 | 19.5 | | | | ● | | | |
| PF505197 | 19.7 | | | | ● | | | |
| PF505200 | 20.0 | | | | ● | | | |

ENDMILL

DRILL

μm=1/1000mm

| Tolerance \ Dia. | from 1 to 3 | over 3 to 6 | over 6 to 10 | over 10 to 18 | over 18 to 30 |
|--------------------------|-------------|-------------|--------------|---------------|---------------|
| Cutting Edge (h8) | 0 -14 | 0 -18 | 0 -22 | 0 -27 | 0 -33 |
| Shank (h6) | 0 -6 | 0 -8 | 0 -9 | 0 -11 | 0 -13 |

POWER MAX DRILL SERIES

SF503



POWER MAX DRILL - STUB / INTERNAL COOLANT

- Suitable for high speed cutting due to newly developed raw-material and new coating.

| EDP. No. | Dia. | F.L | OAL | SH.Dia. | STOCK |
|----------|------|-----|-----|---------|-------|
| SF503030 | 3.0 | 18 | 60 | 3 | ● |
| SF503031 | 3.1 | 20 | | | ● |
| SF503032 | 3.2 | | | | ● |
| SF503033 | 3.3 | ● | | | |
| SF503034 | 3.4 | 22 | 60 | 4 | ● |
| SF503035 | 3.5 | | | | ● |
| SF503036 | 3.6 | | | | ● |
| SF503037 | 3.7 | | | | ● |
| SF503038 | 3.8 | 24 | 60 | 4 | ● |
| SF503039 | 3.9 | | | | ● |
| SF503040 | 4.0 | | | | ● |
| SF503041 | 4.1 | | | | ● |
| SF503042 | 4.2 | 26 | 62 | 5 | ● |
| SF503043 | 4.3 | | | | ● |
| SF503044 | 4.4 | | | | ● |
| SF503045 | 4.5 | | | | ● |
| SF503046 | 4.6 | | | | ● |
| SF503047 | 4.7 | | | | ● |
| SF503048 | 4.8 | | | | ● |
| SF503049 | 4.9 | | | | ● |
| SF503050 | 5.0 | | | | ● |
| SF503051 | 5.1 | | | | 28 |
| SF503052 | 5.2 | ● | | | |
| SF503053 | 5.3 | ● | | | |
| SF503054 | 5.4 | ● | | | |
| SF503055 | 5.5 | ● | | | |
| SF503056 | 5.6 | ● | | | |
| SF503057 | 5.7 | 30 | 66 | 6 | ● |
| SF503058 | 5.8 | | | | ● |
| SF503059 | 5.9 | | | | ● |
| SF503060 | 6.0 | | | | ● |

| EDP. No. | Dia. | F.L | OAL | SH.Dia. | STOCK |
|----------|------|-----|-----|---------|-------|
| SF503061 | 6.1 | 34 | 74 | 7 | ● |
| SF503062 | 6.2 | | | | ● |
| SF503063 | 6.3 | | | | ● |
| SF503064 | 6.4 | | | | ● |
| SF503065 | 6.5 | | | | ● |
| SF503066 | 6.6 | | | | ● |
| SF503067 | 6.7 | 37 | 74 | 7 | ● |
| SF503068 | 6.8 | | | | ● |
| SF503069 | 6.9 | | | | ● |
| SF503070 | 7.0 | | | | ● |
| SF503071 | 7.1 | 40 | 79 | 8 | ● |
| SF503072 | 7.2 | | | | ● |
| SF503073 | 7.3 | | | | ● |
| SF503074 | 7.4 | | | | ● |
| SF503075 | 7.5 | | | | ● |
| SF503076 | 7.6 | | | | ● |
| SF503077 | 7.7 | | | | ● |
| SF503078 | 7.8 | | | | ● |
| SF503079 | 7.9 | | | | ● |
| SF503080 | 8.0 | | | | ● |
| SF503081 | 8.1 | 43 | 84 | 9 | ● |
| SF503082 | 8.2 | | | | ● |
| SF503083 | 8.3 | | | | ● |
| SF503084 | 8.4 | | | | ● |
| SF503085 | 8.5 | | | | ● |
| SF503086 | 8.6 | | | | ● |
| SF503087 | 8.7 | | | | ● |
| SF503088 | 8.8 | | | | ● |
| SF503089 | 8.9 | | | | ● |
| SF503090 | 9.0 | | | | ● |
| SF503091 | 9.1 | 47 | 89 | 10 | ● |
| SF503092 | 9.2 | | | | ● |
| SF503093 | 9.3 | | | | ● |
| SF503094 | 9.4 | | | | ● |
| SF503095 | 9.5 | | | | ● |
| SF503096 | 9.6 | | | | ● |
| SF503097 | 9.7 | | | | ● |
| SF503098 | 9.8 | | | | ● |
| SF503099 | 9.9 | | | | ● |
| SF503100 | 10.0 | | | | ● |
| SF503101 | 10.1 | 51 | 95 | 11 | ● |
| SF503102 | 10.2 | | | | ● |
| SF503103 | 10.3 | | | | ● |
| SF503104 | 10.4 | | | | ● |
| SF503105 | 10.5 | | | | ● |
| SF503106 | 10.6 | | | | ● |
| SF503107 | 10.7 | | | | ● |
| SF503108 | 10.8 | | | | ● |
| SF503109 | 10.9 | | | | ● |
| SF503110 | 11.0 | | | | ● |

POWER MAX DRILL SERIES

PART.
B

ENDMILL
&
DRILL

| EDP. No. | Dia. | F.L | OAL | SH.Dia. | STOCK |
|----------|------|-----|-----|---------|-------|
| SF503111 | 11.1 | 54 | 102 | 12 | ● |
| SF503112 | 11.2 | | | | ● |
| SF503113 | 11.3 | | | | ● |
| SF503114 | 11.4 | | | | ● |
| SF503115 | 11.5 | | | | ● |
| SF503116 | 11.6 | | | | ● |
| SF503117 | 11.7 | | | | ● |
| SF503118 | 11.8 | | | | ● |
| SF503119 | 11.9 | | | | ● |
| SF503120 | 12.0 | | | | ● |
| SF503121 | 12.1 | 57 | 102 | 13 | ● |
| SF503122 | 12.2 | | | | ● |
| SF503123 | 12.3 | | | | ● |
| SF503124 | 12.4 | | | | ● |
| SF503125 | 12.5 | | | | ● |
| SF503126 | 12.6 | | | | ● |
| SF503127 | 12.7 | | | | ● |
| SF503128 | 12.8 | | | | ● |
| SF503129 | 12.9 | | | | ● |
| SF503130 | 13.0 | | | | ● |
| SF503131 | 13.1 | 60 | 107 | 14 | ● |
| SF503132 | 13.2 | | | | ● |
| SF503133 | 13.3 | | | | ● |
| SF503134 | 13.4 | | | | ● |
| SF503135 | 13.5 | | | | ● |
| SF503136 | 13.6 | | | | ● |
| SF503137 | 13.7 | | | | ● |
| SF503138 | 13.8 | | | | ● |
| SF503139 | 13.9 | | | | ● |
| SF503140 | 14.0 | | | | ● |
| SF503141 | 14.1 | 62 | 111 | 15 | ● |
| SF503142 | 14.2 | | | | ● |
| SF503143 | 14.3 | | | | ● |
| SF503144 | 14.4 | | | | ● |
| SF503145 | 14.5 | | | | ● |
| SF503146 | 14.6 | | | | ● |
| SF503147 | 14.7 | | | | ● |
| SF503148 | 14.8 | | | | ● |
| SF503149 | 14.9 | | | | ● |
| SF503150 | 15.0 | | | | ● |
| SF503151 | 15.1 | 64 | 115 | 16 | ● |
| SF503152 | 15.2 | | | | ● |
| SF503154 | 15.4 | | | | ● |
| SF503155 | 15.5 | | | | ● |
| SF503156 | 15.6 | | | | ● |
| SF503157 | 15.7 | | | | ● |
| SF503158 | 15.8 | | | | ● |
| SF503160 | 16.0 | | | | ● |

| EDP. No. | Dia. | F.L | OAL | SH.Dia. | STOCK |
|----------|------|-----|-----|---------|-------|
| SF503161 | 16.1 | 66 | 119 | 17 | ● |
| SF503163 | 16.3 | | | | ● |
| SF503165 | 16.5 | | | | ● |
| SF503170 | 17.0 | | | | ● |
| SF503171 | 17.1 | | | | ● |
| SF503172 | 17.2 | 66 | 123 | 18 | ● |
| SF503175 | 17.5 | | | | ● |
| SF503177 | 17.7 | | | | ● |
| SF503178 | 17.8 | | | | ● |
| SF503180 | 18.0 | | | | ● |
| SF503181 | 18.1 | | | | 70 |
| SF503182 | 18.2 | ● | | | |
| SF503185 | 18.5 | ● | | | |
| SF503190 | 19.0 | ● | | | |
| SF503191 | 19.1 | 70 | 131 | 20 | ● |
| SF503195 | 19.5 | | | | ● |
| SF503197 | 19.7 | | | | ● |
| SF503200 | 20.0 | | | | ● |

μm=1/1000mm

| Tolerance \ Dia. | from 1 to 3 | over 3 to 6 | over 6 to 10 | over 10 to 18 | over 18 to 30 |
|--------------------------|-------------|-------------|--------------|---------------|---------------|
| Cutting Edge (h8) | 0 -14 | 0 -18 | 0 -22 | 0 -27 | 0 -33 |
| Shank (h6) | 0 -6 | 0 -8 | 0 -9 | 0 -11 | 0 -13 |

ENDMILL

DRILL

POWER MAX DRILL SERIES

SF505



POWER MAX DRILL - MEDIUM / INTERNAL COOLANT

- Suitable for high speed cutting due to newly developed raw-material and new coating.

| EDP. No. | Dia. | F.L | OAL | SH.Dia. | STOCK | | |
|----------|------|-----|-----|---------|-------|----|---|
| SF505031 | 3.1 | 27 | 74 | 4 | ● | | |
| SF505032 | 3.2 | | | | ● | | |
| SF505033 | 3.3 | | | | ● | | |
| SF505034 | 3.4 | 30 | | | 80 | 5 | ● |
| SF505035 | 3.5 | | | | | | ● |
| SF505036 | 3.6 | | | | | | ● |
| SF505037 | 3.7 | 33 | 87 | 6 | | | ● |
| SF505038 | 3.8 | | | | | | ● |
| SF505039 | 3.9 | | | | | | ● |
| SF505040 | 4.0 | 36 | | | 93 | 7 | ● |
| SF505041 | 4.1 | | | | | | ● |
| SF505042 | 4.2 | | | | | | ● |
| SF505043 | 4.3 | 39 | 100 | 8 | | | ● |
| SF505044 | 4.4 | | | | | | ● |
| SF505045 | 4.5 | | | | | | ● |
| SF505046 | 4.6 | 42 | | | 107 | 9 | ● |
| SF505047 | 4.7 | | | | | | ● |
| SF505048 | 4.8 | | | | | | ● |
| SF505049 | 4.9 | 45 | 114 | 10 | | | ● |
| SF505050 | 5.0 | | | | | | ● |
| SF505051 | 5.1 | | | | | | ● |
| SF505052 | 5.2 | 48 | | | 121 | 11 | ● |
| SF505053 | 5.3 | | | | | | ● |
| SF505054 | 5.4 | | | | | | ● |
| SF505055 | 5.5 | 51 | 128 | 12 | | | ● |
| SF505056 | 5.6 | | | | | | ● |
| SF505057 | 5.7 | | | | | | ● |
| SF505058 | 5.8 | 54 | | | 135 | 13 | ● |
| SF505059 | 5.9 | | | | | | ● |
| SF505060 | 6.0 | | | | | | ● |

| EDP. No. | Dia. | F.L | OAL | SH.Dia. | STOCK |
|----------|------|-----|-----|---------|-------|
| SF505061 | 6.1 | 47 | 95 | 7 | ● |
| SF505062 | 6.2 | | | | ● |
| SF505063 | 6.3 | | | | ● |
| SF505064 | 6.4 | | | | ● |
| SF505065 | 6.5 | | | | ● |
| SF505066 | 6.6 | | | | ● |
| SF505067 | 6.7 | | | | ● |
| SF505068 | 6.8 | | | | ● |
| SF505069 | 6.9 | | | | ● |
| SF505070 | 7.0 | | | | ● |
| SF505071 | 7.1 | 52 | 103 | 8 | ● |
| SF505072 | 7.2 | | | | ● |
| SF505073 | 7.3 | | | | ● |
| SF505074 | 7.4 | | | | ● |
| SF505075 | 7.5 | | | | ● |
| SF505076 | 7.6 | | | | ● |
| SF505077 | 7.7 | | | | ● |
| SF505078 | 7.8 | | | | ● |
| SF505079 | 7.9 | | | | ● |
| SF505080 | 8.0 | | | | ● |
| SF505081 | 8.1 | 56 | 105 | 9 | ● |
| SF505082 | 8.2 | | | | ● |
| SF505083 | 8.3 | | | | ● |
| SF505084 | 8.4 | | | | ● |
| SF505085 | 8.5 | | | | ● |
| SF505086 | 8.6 | | | | ● |
| SF505087 | 8.7 | | | | ● |
| SF505088 | 8.8 | | | | ● |
| SF505089 | 8.9 | | | | ● |
| SF505090 | 9.0 | | | | ● |
| SF505091 | 9.1 | 62 | 108 | 10 | ● |
| SF505092 | 9.2 | | | | ● |
| SF505093 | 9.3 | | | | ● |
| SF505094 | 9.4 | | | | ● |
| SF505095 | 9.5 | | | | ● |
| SF505096 | 9.6 | | | | ● |
| SF505097 | 9.7 | | | | ● |
| SF505098 | 9.8 | | | | ● |
| SF505099 | 9.9 | | | | ● |
| SF505100 | 10.0 | | | | ● |
| SF505101 | 10.1 | 68 | 125 | 11 | ● |
| SF505102 | 10.2 | | | | ● |
| SF505103 | 10.3 | | | | ● |
| SF505104 | 10.4 | | | | ● |
| SF505105 | 10.5 | | | | ● |
| SF505106 | 10.6 | | | | ● |
| SF505107 | 10.7 | | | | ● |
| SF505108 | 10.8 | | | | ● |
| SF505109 | 10.9 | | | | ● |
| SF505110 | 11.0 | | | | ● |

ENDMILL

DRILL

POWER MAX DRILL SERIES

PART.
B

ENDMILL
&
DRILL

| EDP. No. | Dia. | F.L | OAL | SH.Dia. | STOCK |
|----------|------|-----|-----|---------|-------|
| SF505111 | 11.1 | 71 | 133 | 12 | ● |
| SF505112 | 11.2 | | | | ● |
| SF505113 | 11.3 | | | | ● |
| SF505114 | 11.4 | | | | ● |
| SF505115 | 11.5 | | | | ● |
| SF505116 | 11.6 | | | | ● |
| SF505117 | 11.7 | | | | ● |
| SF505118 | 11.8 | | | | ● |
| SF505119 | 11.9 | | | | ● |
| SF505120 | 12.0 | | | | ● |
| SF505121 | 12.1 | 75 | 137 | 13 | ● |
| SF505122 | 12.2 | | | | ● |
| SF505123 | 12.3 | | | | ● |
| SF505124 | 12.4 | | | | ● |
| SF505125 | 12.5 | | | | ● |
| SF505126 | 12.6 | | | | ● |
| SF505127 | 12.7 | | | | ● |
| SF505128 | 12.8 | | | | ● |
| SF505129 | 12.9 | | | | ● |
| SF505130 | 13.0 | | | | ● |
| SF505131 | 13.1 | 80 | 142 | 14 | ● |
| SF505132 | 13.2 | | | | ● |
| SF505133 | 13.3 | | | | ● |
| SF505134 | 13.4 | | | | ● |
| SF505135 | 13.5 | | | | ● |
| SF505136 | 13.6 | | | | ● |
| SF505137 | 13.7 | | | | ● |
| SF505138 | 13.8 | | | | ● |
| SF505139 | 13.9 | | | | ● |
| SF505140 | 14.0 | | | | ● |
| SF505141 | 14.1 | 83 | 148 | 15 | ● |
| SF505142 | 14.2 | | | | ● |
| SF505143 | 14.3 | | | | ● |
| SF505144 | 14.4 | | | | ● |
| SF505145 | 14.5 | | | | ● |
| SF505146 | 14.6 | | | | ● |
| SF505147 | 14.7 | | | | ● |
| SF505148 | 14.8 | | | | ● |
| SF505149 | 14.9 | | | | ● |
| SF505150 | 15.0 | | | | ● |
| SF505151 | 15.1 | 90 | 152 | 16 | ● |
| SF505152 | 15.2 | | | | ● |
| SF505154 | 15.4 | | | | ● |
| SF505155 | 15.5 | | | | ● |
| SF505156 | 15.6 | | | | ● |
| SF505157 | 15.7 | | | | ● |
| SF505158 | 15.8 | | | | ● |
| SF505160 | 16.0 | | | | ● |

| EDP. No. | Dia. | F.L | OAL | SH.Dia. | STOCK |
|----------|------|-----|-----|---------|-------|
| SF505161 | 16.1 | 95 | 155 | 17 | ● |
| SF505163 | 16.3 | | | | ● |
| SF505165 | 16.5 | | | | ● |
| SF505170 | 17.0 | | | | ● |
| SF505171 | 17.1 | | | | ● |
| SF505172 | 17.2 | 100 | 157 | 18 | ● |
| SF505175 | 17.5 | | | | ● |
| SF505177 | 17.7 | | | | ● |
| SF505178 | 17.8 | | | | ● |
| SF505180 | 18.0 | | | | ● |
| SF505181 | 18.1 | | | | ● |
| SF505182 | 18.2 | 105 | 160 | 19 | ● |
| SF505185 | 18.5 | | | | ● |
| SF505190 | 19.0 | | | | ● |
| SF505191 | 19.1 | 110 | 163 | 20 | ● |
| SF505195 | 19.5 | | | | ● |
| SF505197 | 19.7 | | | | ● |
| SF505200 | 20.0 | | | | ● |

μm=1/1000mm

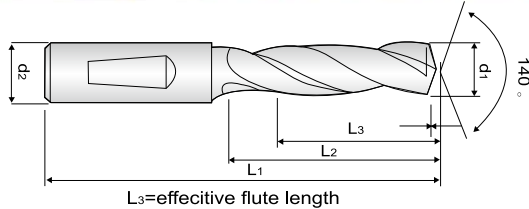
| Tolerance \ Dia. | from 1 to 3 | over 3 to 6 | over 6 to 10 | over 10 to 18 | over 18 to 30 |
|--------------------------|-------------|-------------|--------------|---------------|---------------|
| Cutting Edge (h8) | 0 -14 | 0 -18 | 0 -22 | 0 -27 | 0 -33 |
| Shank (h6) | 0 -6 | 0 -8 | 0 -9 | 0 -11 | 0 -13 |

ENDMILL

DRILL

POWER MAX DRILL SERIES

P503A
P503F



POWER MAX DRILL - STUB / DIN 6537K

■ **Shank Form**

- **P503A** : DIN 6535 HA - straight A type
- **P503F** : DIN 6535 HE - 2° Whistle Flat F type

| EDP. No. | EDP. No. | d ₁ (m7) | d ₂ (h6) | L ₁ | L ₂ | L ₃ | STOCK |
|----------|----------|---------------------|---------------------|----------------|----------------|----------------|-------|
| P503A030 | P503F030 | 3.0 | | | | | |
| P503A031 | P503F031 | 3.1 | | | | | |
| P503A032 | P503F032 | 3.2 | | | | | |
| P503A033 | P503F033 | 3.3 | 6 | 62 | 20 | 14 | |
| P503A034 | P503F034 | 3.4 | | | | | |
| P503A035 | P503F035 | 3.5 | | | | | |
| P503A036 | P503F036 | 3.6 | | | | | |
| P503A037 | P503F037 | 3.7 | | | | | |
| P503A038 | P503F038 | 3.8 | | | | | |
| P503A039 | P503F039 | 3.9 | | | | | |
| P503A040 | P503F040 | 4.0 | | | | | |
| P503A041 | P503F041 | 4.1 | | | | | |
| P503A042 | P503F042 | 4.2 | 6 | 66 | 24 | 17 | |
| P503A043 | P503F043 | 4.3 | | | | | |
| P503A044 | P503F044 | 4.4 | | | | | |
| P503A045 | P503F045 | 4.5 | | | | | |
| P503A046 | P503F046 | 4.6 | | | | | |
| P503A047 | P503F047 | 4.7 | | | | | |
| P503A048 | P503F048 | 4.8 | | | | | |
| P503A049 | P503F049 | 4.9 | | | | | |
| P503A050 | P503F050 | 5.0 | | | | | |
| P503A051 | P503F051 | 5.1 | | | | | |
| P503A052 | P503F052 | 5.2 | | | | | |
| P503A053 | P503F053 | 5.3 | | | | | |
| P503A054 | P503F054 | 5.4 | 6 | 66 | 28 | 20 | |
| P503A055 | P503F055 | 5.5 | | | | | |
| P503A056 | P503F056 | 5.6 | | | | | |
| P503A057 | P503F057 | 5.7 | | | | | |
| P503A058 | P503F058 | 5.8 | | | | | |
| P503A059 | P503F059 | 5.9 | | | | | |
| P503A060 | P503F060 | 6.0 | | | | | |

| EDP. No. | EDP. No. | d ₁ (m7) | d ₂ (h6) | L ₁ | L ₂ | L ₃ | STOCK |
|----------|----------|---------------------|---------------------|----------------|----------------|----------------|-------|
| P503A061 | P503F061 | 6.1 | | | | | |
| P503A062 | P503F062 | 6.2 | | | | | |
| P503A063 | P503F063 | 6.3 | | | | | |
| P503A064 | P503F064 | 6.4 | | | | | |
| P503A065 | P503F065 | 6.5 | 8 | 79 | 34 | 24 | |
| P503A066 | P503F066 | 6.6 | | | | | |
| P503A067 | P503F067 | 6.7 | | | | | |
| P503A068 | P503F068 | 6.8 | | | | | |
| P503A069 | P503F069 | 6.9 | | | | | |
| P503A070 | P503F070 | 7.0 | | | | | |
| P503A071 | P503F071 | 7.1 | | | | | |
| P503A072 | P503F072 | 7.2 | | | | | |
| P503A073 | P503F073 | 7.3 | | | | | |
| P503A074 | P503F074 | 7.4 | | | | | |
| P503A075 | P503F075 | 7.5 | 8 | 79 | 41 | 29 | |
| P503A076 | P503F076 | 7.6 | | | | | |
| P503A077 | P503F077 | 7.7 | | | | | |
| P503A078 | P503F078 | 7.8 | | | | | |
| P503A079 | P503F079 | 7.9 | | | | | |
| P503A080 | P503F080 | 8.0 | | | | | |
| P503A081 | P503F081 | 8.1 | | | | | |
| P503A082 | P503F082 | 8.2 | | | | | |
| P503A083 | P503F083 | 8.3 | | | | | |
| P503A084 | P503F084 | 8.4 | | | | | |
| P503A085 | P503F085 | 8.5 | 10 | 89 | 47 | 35 | |
| P503A086 | P503F086 | 8.6 | | | | | |
| P503A087 | P503F087 | 8.7 | | | | | |
| P503A088 | P503F088 | 8.8 | | | | | |
| P503A089 | P503F089 | 8.9 | | | | | |
| P503A090 | P503F090 | 9.0 | | | | | |
| P503A091 | P503F091 | 9.1 | | | | | |
| P503A092 | P503F092 | 9.2 | | | | | |
| P503A093 | P503F093 | 9.3 | | | | | |
| P503A094 | P503F094 | 9.4 | | | | | |
| P503A095 | P503F095 | 9.5 | 10 | 89 | 47 | 35 | |
| P503A096 | P503F096 | 9.6 | | | | | |
| P503A097 | P503F097 | 9.7 | | | | | |
| P503A098 | P503F098 | 9.8 | | | | | |
| P503A099 | P503F099 | 9.9 | | | | | |
| P503A100 | P503F100 | 10.0 | | | | | |
| P503A101 | P503F101 | 10.1 | | | | | |
| P503A102 | P503F102 | 10.2 | | | | | |
| P503A103 | P503F103 | 10.3 | | | | | |
| P503A104 | P503F104 | 10.4 | | | | | |
| P503A105 | P503F105 | 10.5 | 12 | 102 | 55 | 40 | |
| P503A106 | P503F106 | 10.6 | | | | | |
| P503A107 | P503F107 | 10.7 | | | | | |
| P503A108 | P503F108 | 10.8 | | | | | |
| P503A109 | P503F109 | 10.9 | | | | | |
| P503A110 | P503F110 | 11.0 | | | | | |

ENDMILL

DRILL

POWER MAX DRILL SERIES

PART.
B

ENDMILL
&
DRILL

| EDP. No. | EDP. No. | d ₁ {m7} | d ₂ {h6} | L ₁ | L ₂ | L ₃ | STOCK |
|----------|----------|---------------------|---------------------|----------------|----------------|----------------|-------|
| P503A111 | P503F111 | 11.1 | | | | | |
| P503A112 | P503F112 | 11.2 | | | | | |
| P503A113 | P503F113 | 11.3 | | | | | |
| P503A114 | P503F114 | 11.4 | | | | | |
| P503A115 | P503F115 | 11.5 | 12 | 102 | 55 | 40 | |
| P503A116 | P503F116 | 11.6 | | | | | |
| P503A117 | P503F117 | 11.7 | | | | | |
| P503A118 | P503F118 | 11.8 | | | | | |
| P503A119 | P503F119 | 11.9 | | | | | |
| P503A120 | P503F120 | 12.0 | | | | | |
| P503A121 | P503F121 | 12.1 | | | | | |
| P503A122 | P503F122 | 12.2 | | | | | |
| P503A123 | P503F123 | 12.3 | | | | | |
| P503A124 | P503F124 | 12.4 | | | | | |
| P503A125 | P503F125 | 12.5 | 14 | 107 | 60 | 43 | |
| P503A126 | P503F126 | 12.6 | | | | | |
| P503A127 | P503F127 | 12.7 | | | | | |
| P503A128 | P503F128 | 12.8 | | | | | |
| P503A129 | P503F129 | 12.9 | | | | | |
| P503A130 | P503F130 | 13.0 | | | | | |
| P503A131 | P503F131 | 13.1 | | | | | |
| P503A132 | P503F132 | 13.2 | | | | | |
| P503A133 | P503F133 | 13.3 | | | | | |
| P503A134 | P503F134 | 13.4 | | | | | |
| P503A135 | P503F135 | 13.5 | 14 | 107 | 60 | 43 | |
| P503A136 | P503F136 | 13.6 | | | | | |
| P503A137 | P503F137 | 13.7 | | | | | |
| P503A138 | P503F138 | 13.8 | | | | | |
| P503A139 | P503F139 | 13.9 | | | | | |
| P503A140 | P503F140 | 14.0 | | | | | |
| P503A141 | P503F141 | 14.1 | | | | | |
| P503A142 | P503F142 | 14.2 | | | | | |
| P503A143 | P503F143 | 14.3 | | | | | |
| P503A144 | P503F144 | 14.4 | | | | | |
| P503A145 | P503F145 | 14.5 | 16 | 115 | 65 | 45 | |
| P503A146 | P503F146 | 14.6 | | | | | |
| P503A147 | P503F147 | 14.7 | | | | | |
| P503A148 | P503F148 | 14.8 | | | | | |
| P503A149 | P503F149 | 14.9 | | | | | |
| P503A150 | P503F150 | 15.0 | | | | | |
| P503A151 | P503F151 | 15.1 | | | | | |
| P503A152 | P503F152 | 15.2 | | | | | |
| P503A153 | P503F153 | 15.3 | | | | | |
| P503A154 | P503F154 | 15.4 | | | | | |
| P503A155 | P503F155 | 15.5 | 16 | 115 | 65 | 45 | |
| P503A156 | P503F156 | 15.6 | | | | | |
| P503A157 | P503F157 | 15.7 | | | | | |
| P503A158 | P503F158 | 15.8 | | | | | |
| P503A159 | P503F159 | 15.9 | | | | | |
| P503A160 | P503F160 | 16.0 | | | | | |

| EDP. No. | EDP. No. | d ₁ {m7} | d ₂ {h6} | L ₁ | L ₂ | L ₃ | STOCK |
|----------|----------|---------------------|---------------------|----------------|----------------|----------------|-------|
| P503A161 | P503F161 | 16.1 | | | | | |
| P503A163 | P503F163 | 16.3 | | | | | |
| P503A165 | P503F165 | 16.5 | 18 | 123 | 73 | 51 | |
| P503A170 | P503F170 | 17.0 | | | | | |
| P503A171 | P503F171 | 17.1 | | | | | |
| P503A172 | P503F172 | 17.2 | | | | | |
| P503A175 | P503F175 | 17.5 | 18 | 123 | 73 | 51 | |
| P503A177 | P503F177 | 17.7 | | | | | |
| P503A178 | P503F178 | 17.8 | | | | | |
| P503A180 | P503F180 | 18.0 | | | | | |
| P503A181 | P503F181 | 18.1 | | | | | |
| P503A182 | P503F182 | 18.2 | 20 | 131 | 79 | 55 | |
| P503A185 | P503F185 | 18.5 | | | | | |
| P503A190 | P503F190 | 19.0 | | | | | |
| P503A191 | P503F191 | 19.1 | | | | | |
| P503A195 | P503F195 | 19.5 | 20 | 131 | 79 | 55 | |
| P503A197 | P503F197 | 19.7 | | | | | |
| P503A200 | P503F200 | 20.0 | | | | | |

µm=1/1000mm

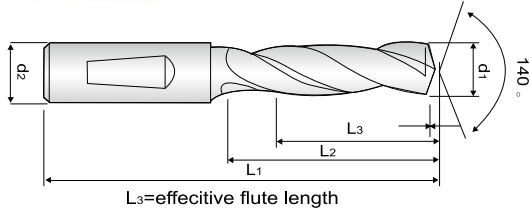
| Tolerance \ Dia. | from 1 to 3 | over 3 to 6 | over 6 to 10 | over 10 to 18 | over 18 to 30 |
|--------------------------|-------------|-------------|--------------|---------------|---------------|
| Cutting Edge (h7) | +12 +2 | +16 +4 | +21 +6 | +25 +7 | +29 +8 |
| Shank (h6) | 0 -6 | 0 -8 | 0 -9 | 0 -11 | 0 -13 |

ENDMILL

DRILL

POWER MAX DRILL SERIES

PI503A
PI503F



POWER MAX DRILL
- STUB INTERNAL COOLANT/ DIN 6537K

■ **Shank Form**

- **PI503A** : DIN 6535 HA - straight A type
- **PI503F** : DIN 6535 HE - 2° Whistle Flat F type

| EDP. No. | EDP. No. | d ₁ (m7) | d ₂ (h6) | L ₁ | L ₂ | L ₃ | STOCK |
|-----------|-----------|---------------------|---------------------|----------------|----------------|----------------|-------|
| PI503A030 | PI503F030 | 3.0 | | | | | |
| PI503A031 | PI503F031 | 3.1 | | | | | |
| PI503A032 | PI503F032 | 3.2 | | | | | |
| PI503A033 | PI503F033 | 3.3 | | | | | |
| PI503A034 | PI503F034 | 3.4 | 6 | 62 | 20 | 14 | |
| PI503A035 | PI503F035 | 3.5 | | | | | |
| PI503A036 | PI503F036 | 3.6 | | | | | |
| PI503A037 | PI503F037 | 3.7 | | | | | |
| PI503A038 | PI503F038 | 3.8 | | | | | |
| PI503A039 | PI503F039 | 3.9 | | | | | |
| PI503A040 | PI503F040 | 4.0 | | | | | |
| PI503A041 | PI503F041 | 4.1 | | | | | |
| PI503A042 | PI503F042 | 4.2 | | | | | |
| PI503A043 | PI503F043 | 4.3 | 6 | 66 | 24 | 17 | |
| PI503A044 | PI503F044 | 4.4 | | | | | |
| PI503A045 | PI503F045 | 4.5 | | | | | |
| PI503A046 | PI503F046 | 4.6 | | | | | |
| PI503A047 | PI503F047 | 4.7 | | | | | |
| PI503A048 | PI503F048 | 4.8 | | | | | |
| PI503A049 | PI503F049 | 4.9 | | | | | |
| PI503A050 | PI503F050 | 5.0 | | | | | |
| PI503A051 | PI503F051 | 5.1 | | | | | |
| PI503A052 | PI503F052 | 5.2 | | | | | |
| PI503A053 | PI503F053 | 5.3 | | | | | |
| PI503A054 | PI503F054 | 5.4 | 6 | 66 | 28 | 20 | |
| PI503A055 | PI503F055 | 5.5 | | | | | |
| PI503A056 | PI503F056 | 5.6 | | | | | |
| PI503A057 | PI503F057 | 5.7 | | | | | |
| PI503A058 | PI503F058 | 5.8 | | | | | |
| PI503A059 | PI503F059 | 5.9 | | | | | |
| PI503A060 | PI503F060 | 6.0 | | | | | |

| EDP. No. | EDP. No. | d ₁ (m7) | d ₂ (h6) | L ₁ | L ₂ | L ₃ | STOCK |
|-----------|-----------|---------------------|---------------------|----------------|----------------|----------------|-------|
| PI503A061 | PI503F061 | 6.1 | | | | | |
| PI503A062 | PI503F062 | 6.2 | | | | | |
| PI503A063 | PI503F063 | 6.3 | | | | | |
| PI503A064 | PI503F064 | 6.4 | | | | | |
| PI503A065 | PI503F065 | 6.5 | | | | | |
| PI503A066 | PI503F066 | 6.6 | 8 | 79 | 34 | 24 | |
| PI503A067 | PI503F067 | 6.7 | | | | | |
| PI503A068 | PI503F068 | 6.8 | | | | | |
| PI503A069 | PI503F069 | 6.9 | | | | | |
| PI503A070 | PI503F070 | 7.0 | | | | | |
| PI503A071 | PI503F071 | 7.1 | | | | | |
| PI503A072 | PI503F072 | 7.2 | | | | | |
| PI503A073 | PI503F073 | 7.3 | | | | | |
| PI503A074 | PI503F074 | 7.4 | | | | | |
| PI503A075 | PI503F075 | 7.5 | | | | | |
| PI503A076 | PI503F076 | 7.6 | 8 | 79 | 41 | 29 | |
| PI503A077 | PI503F077 | 7.7 | | | | | |
| PI503A078 | PI503F078 | 7.8 | | | | | |
| PI503A079 | PI503F079 | 7.9 | | | | | |
| PI503A080 | PI503F080 | 8.0 | | | | | |
| PI503A081 | PI503F081 | 8.1 | | | | | |
| PI503A082 | PI503F082 | 8.2 | | | | | |
| PI503A083 | PI503F083 | 8.3 | | | | | |
| PI503A084 | PI503F084 | 8.4 | | | | | |
| PI503A085 | PI503F085 | 8.5 | | | | | |
| PI503A086 | PI503F086 | 8.6 | 10 | 89 | 47 | 35 | |
| PI503A087 | PI503F087 | 8.7 | | | | | |
| PI503A088 | PI503F088 | 8.8 | | | | | |
| PI503A089 | PI503F089 | 8.9 | | | | | |
| PI503A090 | PI503F090 | 9.0 | | | | | |
| PI503A091 | PI503F091 | 9.1 | | | | | |
| PI503A092 | PI503F092 | 9.2 | | | | | |
| PI503A093 | PI503F093 | 9.3 | | | | | |
| PI503A094 | PI503F094 | 9.4 | | | | | |
| PI503A095 | PI503F095 | 9.5 | | | | | |
| PI503A096 | PI503F096 | 9.6 | 10 | 89 | 47 | 35 | |
| PI503A097 | PI503F097 | 9.7 | | | | | |
| PI503A098 | PI503F098 | 9.8 | | | | | |
| PI503A099 | PI503F099 | 9.9 | | | | | |
| PI503A100 | PI503F100 | 10.0 | | | | | |
| PI503A101 | PI503F101 | 10.1 | | | | | |
| PI503A102 | PI503F102 | 10.2 | | | | | |
| PI503A103 | PI503F103 | 10.3 | | | | | |
| PI503A104 | PI503F104 | 10.4 | | | | | |
| PI503A105 | PI503F105 | 10.5 | | | | | |
| PI503A106 | PI503F106 | 10.6 | 12 | 102 | 55 | 40 | |
| PI503A107 | PI503F107 | 10.7 | | | | | |
| PI503A108 | PI503F108 | 10.8 | | | | | |
| PI503A109 | PI503F109 | 10.9 | | | | | |
| PI503A110 | PI503F110 | 11.0 | | | | | |

ENDMILL

DRILL

POWER MAX DRILL SERIES

PART.
B

ENDMILL
&
DRILL

| EDP. No. | EDP. No. | d ₁ [m7] | d ₂ [h6] | L ₁ | L ₂ | L ₃ | STOCK |
|-----------|-----------|---------------------|---------------------|----------------|----------------|----------------|-------|
| PI503A111 | PI503F111 | 11.1 | | | | | |
| PI503A112 | PI503F112 | 11.2 | | | | | |
| PI503A113 | PI503F113 | 11.3 | | | | | |
| PI503A114 | PI503F114 | 11.4 | | | | | |
| PI503A115 | PI503F115 | 11.5 | 12 | 102 | 55 | 40 | |
| PI503A116 | PI503F116 | 11.6 | | | | | |
| PI503A117 | PI503F117 | 11.7 | | | | | |
| PI503A118 | PI503F118 | 11.8 | | | | | |
| PI503A119 | PI503F119 | 11.9 | | | | | |
| PI503A120 | PI503F120 | 12.0 | | | | | |
| PI503A121 | PI503F121 | 12.1 | | | | | |
| PI503A122 | PI503F122 | 12.2 | | | | | |
| PI503A123 | PI503F123 | 12.3 | | | | | |
| PI503A124 | PI503F124 | 12.4 | | | | | |
| PI503A125 | PI503F125 | 12.5 | 14 | 107 | 60 | 43 | |
| PI503A126 | PI503F126 | 12.6 | | | | | |
| PI503A127 | PI503F127 | 12.7 | | | | | |
| PI503A128 | PI503F128 | 12.8 | | | | | |
| PI503A129 | PI503F129 | 12.9 | | | | | |
| PI503A130 | PI503F130 | 13.0 | | | | | |
| PI503A131 | PI503F131 | 13.1 | | | | | |
| PI503A132 | PI503F132 | 13.2 | | | | | |
| PI503A133 | PI503F133 | 13.3 | | | | | |
| PI503A134 | PI503F134 | 13.4 | | | | | |
| PI503A135 | PI503F135 | 13.5 | 14 | 107 | 60 | 43 | |
| PI503A136 | PI503F136 | 13.6 | | | | | |
| PI503A137 | PI503F137 | 13.7 | | | | | |
| PI503A138 | PI503F138 | 13.8 | | | | | |
| PI503A139 | PI503F139 | 13.9 | | | | | |
| PI503A140 | PI503F140 | 14.0 | | | | | |
| PI503A141 | PI503F141 | 14.1 | | | | | |
| PI503A142 | PI503F142 | 14.2 | | | | | |
| PI503A143 | PI503F143 | 14.3 | | | | | |
| PI503A144 | PI503F144 | 14.4 | | | | | |
| PI503A145 | PI503F145 | 14.5 | 16 | 115 | 65 | 45 | |
| PI503A146 | PI503F146 | 14.6 | | | | | |
| PI503A147 | PI503F147 | 14.7 | | | | | |
| PI503A148 | PI503F148 | 14.8 | | | | | |
| PI503A149 | PI503F149 | 14.9 | | | | | |
| PI503A150 | PI503F150 | 15.0 | | | | | |
| PI503A151 | PI503F151 | 15.1 | | | | | |
| PI503A152 | PI503F152 | 15.2 | | | | | |
| PI503A153 | PI503F153 | 15.3 | | | | | |
| PI503A154 | PI503F154 | 15.4 | | | | | |
| PI503A155 | PI503F155 | 15.5 | 16 | 115 | 65 | 45 | |
| PI503A156 | PI503F156 | 15.6 | | | | | |
| PI503A157 | PI503F157 | 15.7 | | | | | |
| PI503A158 | PI503F158 | 15.8 | | | | | |
| PI503A159 | PI503F159 | 15.9 | | | | | |
| PI503A160 | PI503F160 | 16.0 | | | | | |

| EDP. No. | EDP. No. | d ₁ [m7] | d ₂ [h6] | L ₁ | L ₂ | L ₃ | STOCK |
|-----------|-----------|---------------------|---------------------|----------------|----------------|----------------|-------|
| PI503A161 | PI503F161 | 16.1 | | | | | |
| PI503A163 | PI503F163 | 16.3 | 18 | 123 | 73 | 51 | |
| PI503A165 | PI503F165 | 16.5 | | | | | |
| PI503A170 | PI503F170 | 17.0 | | | | | |
| PI503A171 | PI503F171 | 17.1 | | | | | |
| PI503A172 | PI503F172 | 17.2 | | | | | |
| PI503A175 | PI503F175 | 17.5 | 18 | 123 | 73 | 51 | |
| PI503A177 | PI503F177 | 17.7 | | | | | |
| PI503A178 | PI503F178 | 17.8 | | | | | |
| PI503A180 | PI503F180 | 18.0 | | | | | |
| PI503A181 | PI503F181 | 18.1 | | | | | |
| PI503A182 | PI503F182 | 18.2 | 20 | 131 | 79 | 55 | |
| PI503A185 | PI503F185 | 18.5 | | | | | |
| PI503A190 | PI503F190 | 19.0 | | | | | |
| PI503A191 | PI503F191 | 19.1 | | | | | |
| PI503A195 | PI503F195 | 19.5 | 20 | 131 | 79 | 55 | |
| PI503A197 | PI503F197 | 19.7 | | | | | |
| PI503A200 | PI503F200 | 20.0 | | | | | |

µm=1/1000mm

| Tolerance \ Dia. | from 1 to 3 | over 3 to 6 | over 6 to 10 | over 10 to 18 | over 18 to 30 |
|--------------------------|-------------|-------------|--------------|---------------|---------------|
| Cutting Edge (h7) | +12 +2 | +16 +4 | +21 +6 | +25 +7 | +29 +8 |
| Shank (h6) | 0 -6 | 0 -8 | 0 -9 | 0 -11 | 0 -13 |

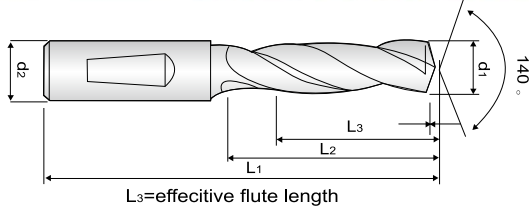
ENDMILL

DRILL

POWER MAX DRILL SERIES

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&
DRILL

PI505A
PI505F



POWER MAX DRILL
- MEDIUM INTERNAL COOLANT/ DIN 6537L

■ **Shank Form**

- **PI505A** : DIN 6535 HA - straight A type
- **PI505F** : DIN 6535 HE - 2° Whistle Flat F type

| EDP. No. | EDP. No. | d ₁ (m7) | d ₂ (h6) | L ₁ | L ₂ | L ₃ | STOCK |
|-----------|-----------|---------------------|---------------------|----------------|----------------|----------------|-------|
| PI505A040 | PI505F040 | 4.0 | | | | | |
| PI505A041 | PI505F041 | 4.1 | | | | | |
| PI505A042 | PI505F042 | 4.2 | | | | | |
| PI505A043 | PI505F043 | 4.3 | 6 | 74 | 36 | 29 | |
| PI505A044 | PI505F044 | 4.4 | | | | | |
| PI505A045 | PI505F045 | 4.5 | | | | | |
| PI505A046 | PI505F046 | 4.6 | | | | | |
| PI505A047 | PI505F047 | 4.7 | | | | | |
| PI505A048 | PI505F048 | 4.8 | | | | | |
| PI505A049 | PI505F049 | 4.9 | | | | | |
| PI505A050 | PI505F050 | 5.0 | | | | | |
| PI505A051 | PI505F051 | 5.1 | | | | | |
| PI505A052 | PI505F052 | 5.2 | | | | | |
| PI505A053 | PI505F053 | 5.3 | | | | | |
| PI505A054 | PI505F054 | 5.4 | 6 | 82 | 44 | 35 | |
| PI505A055 | PI505F055 | 5.5 | | | | | |
| PI505A056 | PI505F056 | 5.6 | | | | | |
| PI505A057 | PI505F057 | 5.7 | | | | | |
| PI505A058 | PI505F058 | 5.8 | | | | | |
| PI505A059 | PI505F059 | 5.9 | | | | | |
| PI505A060 | PI505F060 | 6.0 | | | | | |
| PI505A061 | PI505F061 | 6.1 | | | | | |
| PI505A062 | PI505F062 | 6.2 | | | | | |
| PI505A063 | PI505F063 | 6.3 | | | | | |
| PI505A064 | PI505F064 | 6.4 | | | | | |
| PI505A065 | PI505F065 | 6.5 | 8 | 91 | 53 | 43 | |
| PI505A066 | PI505F066 | 6.6 | | | | | |
| PI505A067 | PI505F067 | 6.7 | | | | | |
| PI505A068 | PI505F068 | 6.8 | | | | | |
| PI505A069 | PI505F069 | 6.9 | | | | | |
| PI505A070 | PI505F070 | 7.0 | | | | | |

| EDP. No. | EDP. No. | d ₁ (m7) | d ₂ (h6) | L ₁ | L ₂ | L ₃ | STOCK |
|-----------|-----------|---------------------|---------------------|----------------|----------------|----------------|-------|
| PI505A071 | PI505F071 | 7.1 | | | | | |
| PI505A072 | PI505F072 | 7.2 | | | | | |
| PI505A073 | PI505F073 | 7.3 | | | | | |
| PI505A074 | PI505F074 | 7.4 | | | | | |
| PI505A075 | PI505F075 | 7.5 | 8 | 91 | 53 | 43 | |
| PI505A076 | PI505F076 | 7.6 | | | | | |
| PI505A077 | PI505F077 | 7.7 | | | | | |
| PI505A078 | PI505F078 | 7.8 | | | | | |
| PI505A079 | PI505F079 | 7.9 | | | | | |
| PI505A080 | PI505F080 | 8.0 | | | | | |
| PI505A081 | PI505F081 | 8.1 | | | | | |
| PI505A082 | PI505F082 | 8.2 | | | | | |
| PI505A083 | PI505F083 | 8.3 | | | | | |
| PI505A084 | PI505F084 | 8.4 | | | | | |
| PI505A085 | PI505F085 | 8.5 | 10 | 103 | 61 | 49 | |
| PI505A086 | PI505F086 | 8.6 | | | | | |
| PI505A087 | PI505F087 | 8.7 | | | | | |
| PI505A088 | PI505F088 | 8.8 | | | | | |
| PI505A089 | PI505F089 | 8.9 | | | | | |
| PI505A090 | PI505F090 | 9.0 | | | | | |
| PI505A091 | PI505F091 | 9.1 | | | | | |
| PI505A092 | PI505F092 | 9.2 | | | | | |
| PI505A093 | PI505F093 | 9.3 | | | | | |
| PI505A094 | PI505F094 | 9.4 | | | | | |
| PI505A095 | PI505F095 | 9.5 | 10 | 103 | 61 | 49 | |
| PI505A096 | PI505F096 | 9.6 | | | | | |
| PI505A097 | PI505F097 | 9.7 | | | | | |
| PI505A098 | PI505F098 | 9.8 | | | | | |
| PI505A099 | PI505F099 | 9.9 | | | | | |
| PI505A100 | PI505F100 | 10.0 | | | | | |
| PI505A101 | PI505F101 | 10.1 | | | | | |
| PI505A102 | PI505F102 | 10.2 | | | | | |
| PI505A103 | PI505F103 | 10.3 | | | | | |
| PI505A104 | PI505F104 | 10.4 | | | | | |
| PI505A105 | PI505F105 | 10.5 | 12 | 118 | 71 | 56 | |
| PI505A106 | PI505F106 | 10.6 | | | | | |
| PI505A107 | PI505F107 | 10.7 | | | | | |
| PI505A108 | PI505F108 | 10.8 | | | | | |
| PI505A109 | PI505F109 | 10.9 | | | | | |
| PI505A110 | PI505F110 | 11.0 | | | | | |
| PI505A111 | PI505F111 | 11.1 | | | | | |
| PI505A112 | PI505F112 | 11.2 | | | | | |
| PI505A113 | PI505F113 | 11.3 | | | | | |
| PI505A114 | PI505F114 | 11.4 | | | | | |
| PI505A115 | PI505F115 | 11.5 | 12 | 118 | 71 | 56 | |
| PI505A116 | PI505F116 | 11.6 | | | | | |
| PI505A117 | PI505F117 | 11.7 | | | | | |
| PI505A118 | PI505F118 | 11.8 | | | | | |
| PI505A119 | PI505F119 | 11.9 | | | | | |
| PI505A120 | PI505F120 | 12.0 | | | | | |

ENDMILL

DRILL

POWER MAX DRILL SERIES

PART.
B

ENDMILL
&
DRILL

| EDP. No. | EDP. No. | d ₁ (m7) | d ₂ (h6) | L ₁ | L ₂ | L ₃ | STOCK |
|-----------|-----------|---------------------|---------------------|----------------|----------------|----------------|-------|
| PI505A121 | PI505F121 | 12.1 | | | | | |
| PI505A122 | PI505F122 | 12.2 | | | | | |
| PI505A123 | PI505F123 | 12.3 | | | | | |
| PI505A124 | PI505F124 | 12.4 | | | | | |
| PI505A125 | PI505F125 | 12.5 | 14 | 124 | 77 | 60 | |
| PI505A126 | PI505F126 | 12.6 | | | | | |
| PI505A127 | PI505F127 | 12.7 | | | | | |
| PI505A128 | PI505F128 | 12.8 | | | | | |
| PI505A129 | PI505F129 | 12.9 | | | | | |
| PI505A130 | PI505F130 | 13.0 | | | | | |
| PI505A131 | PI505F131 | 13.1 | | | | | |
| PI505A132 | PI505F132 | 13.2 | | | | | |
| PI505A133 | PI505F133 | 13.3 | | | | | |
| PI505A134 | PI505F134 | 13.4 | | | | | |
| PI505A135 | PI505F135 | 13.5 | 14 | 124 | 77 | 60 | |
| PI505A136 | PI505F136 | 13.6 | | | | | |
| PI505A137 | PI505F137 | 13.7 | | | | | |
| PI505A138 | PI505F138 | 13.8 | | | | | |
| PI505A139 | PI505F139 | 13.9 | | | | | |
| PI505A140 | PI505F140 | 14.0 | | | | | |
| PI505A141 | PI505F141 | 14.1 | | | | | |
| PI505A142 | PI505F142 | 14.2 | | | | | |
| PI505A143 | PI505F143 | 14.3 | | | | | |
| PI505A144 | PI505F144 | 14.4 | | | | | |
| PI505A145 | PI505F145 | 14.5 | 16 | 133 | 83 | 63 | |
| PI505A146 | PI505F146 | 14.6 | | | | | |
| PI505A147 | PI505F147 | 14.7 | | | | | |
| PI505A148 | PI505F148 | 14.8 | | | | | |
| PI505A149 | PI505F149 | 14.9 | | | | | |
| PI505A150 | PI505F150 | 15.0 | | | | | |
| PI505A151 | PI505F151 | 15.1 | | | | | |
| PI505A152 | PI505F152 | 15.2 | | | | | |
| PI505A153 | PI505F153 | 15.3 | | | | | |
| PI505A154 | PI505F154 | 15.4 | | | | | |
| PI505A155 | PI505F155 | 15.5 | 16 | 133 | 83 | 63 | |
| PI505A156 | PI505F156 | 15.6 | | | | | |
| PI505A157 | PI505F157 | 15.7 | | | | | |
| PI505A158 | PI505F158 | 15.8 | | | | | |
| PI505A159 | PI505F159 | 15.9 | | | | | |
| PI505A160 | PI505F160 | 16.0 | | | | | |

| EDP. No. | EDP. No. | d ₁ (m7) | d ₂ (h6) | L ₁ | L ₂ | L ₃ | STOCK |
|-----------|-----------|---------------------|---------------------|----------------|----------------|----------------|-------|
| PI505A161 | PI505F161 | 16.1 | | | | | |
| PI505A163 | PI505F163 | 16.3 | 18 | 143 | 93 | 71 | |
| PI505A165 | PI505F165 | 16.5 | | | | | |
| PI505A170 | PI505F170 | 17.0 | | | | | |
| PI505A171 | PI505F171 | 17.1 | | | | | |
| PI505A172 | PI505F172 | 17.2 | | | | | |
| PI505A175 | PI505F175 | 17.5 | 18 | 143 | 93 | 71 | |
| PI505A177 | PI505F177 | 17.7 | | | | | |
| PI505A178 | PI505F178 | 17.8 | | | | | |
| PI505A180 | PI505F180 | 18.0 | | | | | |
| PI505A181 | PI505F181 | 18.1 | | | | | |
| PI505A182 | PI505F182 | 18.2 | 20 | 153 | 101 | 77 | |
| PI505A185 | PI505F185 | 18.5 | | | | | |
| PI505A190 | PI505F190 | 19.0 | | | | | |
| PI505A191 | PI505F191 | 19.1 | | | | | |
| PI505A195 | PI505F195 | 19.5 | 20 | 153 | 101 | 77 | |
| PI505A197 | PI505F197 | 19.7 | | | | | |
| PI505A200 | PI505F200 | 20.0 | | | | | |

ENDMILL

DRILL

µm=1/1000mm

| Tolerance \ Dia. | from 1 to 3 | over 3 to 6 | over 6 to 10 | over 10 to 18 | over 18 to 30 |
|--------------------------|-------------|-------------|--------------|---------------|---------------|
| Cutting Edge (h7) | +12 +2 | +16 +4 | +21 +6 | +25 +7 | +29 +8 |
| Shank (h6) | 0 -6 | 0 -8 | 0 -9 | 0 -11 | 0 -13 |

POWER DRILL SERIES

PDS



POWER DRILL - STUB

| EDP. No. | Dia. | F.L. | OAL | SH.Dia. | STOCK | | | |
|----------|------|------|-----|---------|-------|----|---|---|
| PDS 020 | 2.0 | 14 | 50 | 3 | ● | | | |
| PDS 021 | 2.1 | | | | ● | | | |
| PDS 022 | 2.2 | | | | ● | | | |
| PDS 023 | 2.3 | | | | ● | | | |
| PDS 024 | 2.4 | | | | ● | | | |
| PDS 025 | 2.5 | | | | ● | | | |
| PDS 026 | 2.6 | | | | ● | | | |
| PDS 027 | 2.7 | | | | ● | | | |
| PDS 028 | 2.8 | | | | ● | | | |
| PDS 029 | 2.9 | | | | ● | | | |
| PDS 030 | 3.0 | 18 | 60 | ● | | | | |
| PDS 031 | 3.1 | 20 | 60 | 4 | ● | | | |
| PDS 032 | 3.2 | | | | ● | | | |
| PDS 033 | 3.3 | | | | ● | | | |
| PDS 034 | 3.4 | | | | 22 | 60 | 4 | ● |
| PDS 035 | 3.5 | | | | | | | ● |
| PDS 036 | 3.6 | | | | | | | ● |
| PDS 037 | 3.7 | | | | 24 | 60 | 4 | ● |
| PDS 038 | 3.8 | ● | | | | | | |
| PDS 039 | 3.9 | ● | | | | | | |
| PDS 040 | 4.0 | ● | | | | | | |
| PDS 041 | 4.1 | 24 | 62 | 5 | ● | | | |
| PDS 042 | 4.2 | 26 | | | 62 | 5 | ● | |
| PDS 043 | 4.3 | | | | | | ● | |
| PDS 044 | 4.4 | | | | | | ● | |
| PDS 045 | 4.5 | | | | | | ● | |
| PDS 046 | 4.6 | | | | | | ● | |
| PDS 047 | 4.7 | | | | | | ● | |
| PDS 048 | 4.8 | | | | | | ● | |
| PDS 049 | 4.9 | | | | | | ● | |
| PDS 050 | 5.0 | | | | | | ● | |

| EDP. No. | Dia. | F.L. | OAL | SH.Dia. | STOCK | | | |
|----------|------|------|-----|---------|-------|----|---|---|
| PDS 051 | 5.1 | 28 | 66 | 6 | ● | | | |
| PDS 052 | 5.2 | | | | ● | | | |
| PDS 053 | 5.3 | | | | ● | | | |
| PDS 054 | 5.4 | | | | ● | | | |
| PDS 055 | 5.5 | | | | ● | | | |
| PDS 056 | 5.6 | | | | ● | | | |
| PDS 057 | 5.7 | 30 | 66 | 6 | ● | | | |
| PDS 058 | 5.8 | | | | ● | | | |
| PDS 059 | 5.9 | | | | ● | | | |
| PDS 060 | 6.0 | | | | ● | | | |
| PDS 061 | 6.1 | 34 | 74 | 7 | ● | | | |
| PDS 062 | 6.2 | | | | ● | | | |
| PDS 063 | 6.3 | | | | ● | | | |
| PDS 064 | 6.4 | | | | ● | | | |
| PDS 065 | 6.5 | | | | ● | | | |
| PDS 066 | 6.6 | | | | 37 | 74 | 7 | ● |
| PDS 067 | 6.7 | | | | | | | ● |
| PDS 068 | 6.8 | | | | | | | ● |
| PDS 069 | 6.9 | | | | | | | ● |
| PDS 070 | 7.0 | | | | ● | | | |
| PDS 071 | 7.1 | 40 | 79 | 8 | ● | | | |
| PDS 072 | 7.2 | | | | ● | | | |
| PDS 073 | 7.3 | | | | ● | | | |
| PDS 074 | 7.4 | | | | ● | | | |
| PDS 075 | 7.5 | | | | ● | | | |
| PDS 076 | 7.6 | | | | ● | | | |
| PDS 077 | 7.7 | | | | ● | | | |
| PDS 078 | 7.8 | | | | ● | | | |
| PDS 079 | 7.9 | | | | ● | | | |
| PDS 080 | 8.0 | | | | ● | | | |
| PDS 081 | 8.1 | 43 | 84 | 9 | ● | | | |
| PDS 082 | 8.2 | | | | ● | | | |
| PDS 083 | 8.3 | | | | ● | | | |
| PDS 084 | 8.4 | | | | ● | | | |
| PDS 085 | 8.5 | | | | ● | | | |
| PDS 086 | 8.6 | | | | ● | | | |
| PDS 087 | 8.7 | | | | ● | | | |
| PDS 088 | 8.8 | | | | ● | | | |
| PDS 089 | 8.9 | | | | ● | | | |
| PDS 090 | 9.0 | | | | ● | | | |
| PDS 091 | 9.1 | 47 | 89 | 10 | ● | | | |
| PDS 092 | 9.2 | | | | ● | | | |
| PDS 093 | 9.3 | | | | ● | | | |
| PDS 094 | 9.4 | | | | ● | | | |
| PDS 095 | 9.5 | | | | ● | | | |
| PDS 096 | 9.6 | | | | ● | | | |
| PDS 097 | 9.7 | | | | ● | | | |
| PDS 098 | 9.8 | | | | ● | | | |
| PDS 099 | 9.9 | | | | ● | | | |
| PDS 100 | 10.0 | | | | ● | | | |

ENDMILL

DRILL

POWER DRILL SERIES

PART.
B

ENDMILL
&
DRILL

| EDP. No. | Dia. | F.L | OAL | SH.Dia. | STOCK |
|----------|------|-----|-----|---------|-------|
| PDS 101 | 10.1 | 51 | 95 | 11 | ● |
| PDS 102 | 10.2 | | | | ● |
| PDS 103 | 10.3 | | | | ● |
| PDS 104 | 10.4 | | | | ● |
| PDS 105 | 10.5 | | | | ● |
| PDS 106 | 10.6 | | | | ● |
| PDS 107 | 10.7 | | | | ● |
| PDS 108 | 10.8 | | | | ● |
| PDS 109 | 10.9 | | | | ● |
| PDS 110 | 11.0 | | | | ● |
| PDS 111 | 11.1 | 54 | 102 | 12 | ● |
| PDS 112 | 11.2 | | | | ● |
| PDS 113 | 11.3 | | | | ● |
| PDS 114 | 11.4 | | | | ● |
| PDS 115 | 11.5 | | | | ● |
| PDS 116 | 11.6 | | | | ● |
| PDS 117 | 11.7 | | | | ● |
| PDS 118 | 11.8 | | | | ● |
| PDS 119 | 11.9 | | | | ● |
| PDS 120 | 12.0 | | | | ● |
| PDS 121 | 12.1 | 57 | 102 | 13 | ● |
| PDS 122 | 12.2 | | | | ● |
| PDS 123 | 12.3 | | | | ● |
| PDS 124 | 12.4 | | | | ● |
| PDS 125 | 12.5 | | | | ● |
| PDS 126 | 12.6 | | | | ● |
| PDS 127 | 12.7 | | | | ● |
| PDS 128 | 12.8 | | | | ● |
| PDS 129 | 12.9 | | | | ● |
| PDS 130 | 13.0 | | | | ● |
| PDS 131 | 13.1 | 60 | 107 | 14 | ● |
| PDS 132 | 13.2 | | | | ● |
| PDS 133 | 13.3 | | | | ● |
| PDS 132 | 13.4 | | | | ● |
| PDS 135 | 13.5 | | | | ● |
| PDS 136 | 13.6 | | | | ● |
| PDS 137 | 13.7 | | | | ● |
| PDS 138 | 13.8 | | | | ● |
| PDS 139 | 13.9 | | | | ● |
| PDS 140 | 14.0 | | | | ● |
| PDS 141 | 14.1 | 62 | 111 | 15 | ● |
| PDS 142 | 14.2 | | | | ● |
| PDS 143 | 14.3 | | | | ● |
| PDS 144 | 14.4 | | | | ● |
| PDS 145 | 14.5 | | | | ● |
| PDS 146 | 14.6 | | | | ● |
| PDS 147 | 14.7 | | | | ● |
| PDS 148 | 14.8 | | | | ● |
| PDS 149 | 14.9 | | | | ● |
| PDS 150 | 15.0 | | | | ● |

| EDP. No. | Dia. | F.L | OAL | SH.Dia. | STOCK | | | |
|----------|------|-----|-----|---------|-------|-----|----|---|
| PDS 151 | 15.1 | 64 | 115 | 16 | ● | | | |
| PDS 152 | 15.2 | | | | ● | | | |
| PDS 154 | 15.4 | | | | ● | | | |
| PDS 155 | 15.5 | | | | ● | | | |
| PDS 156 | 15.6 | | | | ● | | | |
| PDS 157 | 15.7 | | | | ● | | | |
| PDS 158 | 15.8 | | | | ● | | | |
| PDS 160 | 16.0 | | | | ● | | | |
| PDS 161 | 16.1 | | | | 66 | 119 | 17 | ● |
| PDS 163 | 16.3 | | | | | | | ● |
| PDS 165 | 16.5 | ● | | | | | | |
| PDS 170 | 17.0 | 66 | 123 | 18 | ● | | | |
| PDS 171 | 17.1 | | | | ● | | | |
| PDS 172 | 17.2 | | | | ● | | | |
| PDS 175 | 17.5 | | | | ● | | | |
| PDS 177 | 17.7 | | | | ● | | | |
| PDS 178 | 17.8 | | | | ● | | | |
| PDS 180 | 18.0 | | | | ● | | | |
| PDS 181 | 18.1 | | | | 70 | 127 | 19 | ● |
| PDS 182 | 18.2 | | | | | | | ● |
| PDS 185 | 18.5 | | | | | | | ● |
| PDS 190 | 19.0 | 70 | 131 | 20 | ● | | | |
| PDS 191 | 19.1 | | | | ● | | | |
| PDS 195 | 19.5 | | | | ● | | | |
| PDS 197 | 19.7 | | | | ● | | | |
| PDS 200 | 20.0 | | | | ● | | | |

ENDMILL

DRILL

μm=1/1000mm

| Tolerance \ Dia. | from 1 to 3 | over 3 to 6 | over 6 to 10 | over 10 to 18 | over 18 to 30 |
|--------------------------|-------------|-------------|--------------|---------------|---------------|
| Cutting Edge (h8) | 0 -14 | 0 -18 | 0 -22 | 0 -27 | 0 -33 |
| Shank (h6) | 0 -6 | 0 -8 | 0 -9 | 0 -11 | 0 -13 |

POWER DRILL SERIES

ENDMILL
&
DRILL

PDM



POWER DRILL - MEDIUM

| EDP. No. | Dia. | F.L. | OAL | SH.Dia. | STOCK | | |
|----------|------|------|-----|---------|-------|----|----|
| PDM 030 | 3.0 | 25 | 60 | 3 | ● | | |
| PDM 031 | 3.1 | 27 | | | 4 | ● | |
| PDM 032 | 3.2 | | | | | 30 | ● |
| PDM 033 | 3.3 | | | | | | ● |
| PDM 034 | 3.4 | 33 | 65 | ● | | | |
| PDM 035 | 3.5 | | | 36 | 5 | ● | |
| PDM 036 | 3.6 | | | | | 39 | ● |
| PDM 037 | 3.7 | | | ● | | | |
| PDM 038 | 3.8 | 71 | 71 | ● | | | |
| PDM 039 | 3.9 | | | 36 | 6 | ● | |
| PDM 040 | 4.0 | | | | | 39 | ● |
| PDM 041 | 4.1 | | | ● | | | |
| PDM 042 | 4.2 | 71 | 71 | ● | | | |
| PDM 043 | 4.3 | | | 36 | 5 | ● | |
| PDM 044 | 4.4 | | | | | 39 | ● |
| PDM 045 | 4.5 | | | ● | | | |
| PDM 046 | 4.6 | 39 | 83 | 6 | | ● | |
| PDM 047 | 4.7 | | | | 43 | 6 | ● |
| PDM 048 | 4.8 | | | | | | 43 |
| PDM 049 | 4.9 | | | | ● | | |
| PDM 050 | 5.0 | 43 | 83 | 6 | ● | | |
| PDM 051 | 5.1 | | | | 39 | 6 | ● |
| PDM 052 | 5.2 | | | | | | 43 |
| PDM 053 | 5.3 | | | | ● | | |
| PDM 054 | 5.4 | 43 | 83 | 6 | ● | | |
| PDM 055 | 5.5 | | | | 43 | 6 | ● |
| PDM 056 | 5.6 | | | | | | 43 |
| PDM 057 | 5.7 | | | | ● | | |
| PDM 058 | 5.8 | 43 | 83 | 6 | ● | | |
| PDM 059 | 5.9 | | | | 43 | 6 | ● |
| PDM 060 | 6.0 | | | | | | 43 |

| EDP. No. | Dia. | F.L. | OAL | SH.Dia. | STOCK |
|----------|------|------|-----|---------|-------|
| PDM 061 | 6.1 | 47 | 87 | 7 | ● |
| PDM 062 | 6.2 | | | | ● |
| PDM 063 | 6.3 | | | | ● |
| PDM 064 | 6.4 | | | | ● |
| PDM 065 | 6.5 | | | | ● |
| PDM 066 | 6.6 | | | | ● |
| PDM 067 | 6.7 | | | | ● |
| PDM 068 | 6.8 | | | | ● |
| PDM 069 | 6.9 | | | | ● |
| PDM 070 | 7.0 | | | | ● |
| PDM 071 | 7.1 | 52 | 92 | 8 | ● |
| PDM 072 | 7.2 | | | | ● |
| PDM 073 | 7.3 | | | | ● |
| PDM 074 | 7.4 | | | | ● |
| PDM 075 | 7.5 | | | | ● |
| PDM 076 | 7.6 | | | | ● |
| PDM 077 | 7.7 | | | | ● |
| PDM 078 | 7.8 | | | | ● |
| PDM 079 | 7.9 | | | | ● |
| PDM 080 | 8.0 | | | | ● |
| PDM 081 | 8.1 | 56 | 96 | 9 | ● |
| PDM 082 | 8.2 | | | | ● |
| PDM 083 | 8.3 | | | | ● |
| PDM 084 | 8.4 | | | | ● |
| PDM 085 | 8.5 | | | | ● |
| PDM 086 | 8.6 | | | | ● |
| PDM 087 | 8.7 | | | | ● |
| PDM 088 | 8.8 | | | | ● |
| PDM 089 | 8.9 | | | | ● |
| PDM 090 | 9.0 | | | | ● |
| PDM 091 | 9.1 | 62 | 105 | 10 | ● |
| PDM 092 | 9.2 | | | | ● |
| PDM 093 | 9.3 | | | | ● |
| PDM 094 | 9.4 | | | | ● |
| PDM 095 | 9.5 | | | | ● |
| PDM 096 | 9.6 | | | | ● |
| PDM 097 | 9.7 | | | | ● |
| PDM 098 | 9.8 | | | | ● |
| PDM 099 | 9.9 | | | | ● |
| PDM 100 | 10.0 | | | | ● |
| PDM 101 | 10.1 | 68 | 115 | 11 | ● |
| PDM 102 | 10.2 | | | | ● |
| PDM 103 | 10.3 | | | | ● |
| PDM 104 | 10.4 | | | | ● |
| PDM 105 | 10.5 | | | | ● |
| PDM 106 | 10.6 | | | | ● |
| PDM 107 | 10.7 | | | | ● |
| PDM 108 | 10.8 | | | | ● |
| PDM 109 | 10.9 | | | | ● |
| PDM 110 | 11.0 | | | | ● |

ENDMILL

DRILL

POWER DRILL SERIES

PART.
B

ENDMILL
&
DRILL

| EDP. No. | Dia. | F.L | OAL | SH.Dia. | STOCK |
|----------|------|-----|-----|---------|-------|
| PDM 111 | 11.1 | 71 | 121 | 12 | ● |
| PDM 112 | 11.2 | | | | ● |
| PDM 113 | 11.3 | | | | ● |
| PDM 114 | 11.4 | | | | ● |
| PDM 115 | 11.5 | | | | ● |
| PDM 116 | 11.6 | | | | ● |
| PDM 117 | 11.7 | | | | ● |
| PDM 118 | 11.8 | | | | ● |
| PDM 119 | 11.9 | | | | ● |
| PDM 120 | 12.0 | | | | ● |
| PDM 121 | 12.1 | 75 | 125 | 13 | ● |
| PDM 122 | 12.2 | | | | ● |
| PDM 123 | 12.3 | | | | ● |
| PDM 124 | 12.4 | | | | ● |
| PDM 125 | 12.5 | | | | ● |
| PDM 126 | 12.6 | | | | ● |
| PDM 127 | 12.7 | | | | ● |
| PDM 128 | 12.8 | | | | ● |
| PDM 129 | 12.9 | | | | ● |
| PDM 130 | 13.0 | | | | ● |
| PDM 131 | 13.1 | 80 | 134 | 14 | ● |
| PDM 132 | 13.2 | | | | ● |
| PDM 133 | 13.3 | | | | ● |
| PDM 134 | 13.4 | | | | ● |
| PDM 135 | 13.5 | | | | ● |
| PDM 136 | 13.6 | | | | ● |
| PDM 137 | 13.7 | | | | ● |
| PDM 138 | 13.8 | | | | ● |
| PDM 139 | 13.9 | | | | ● |
| PDM 140 | 14.0 | | | | ● |
| PDM 141 | 14.1 | 83 | 143 | 15 | ● |
| PDM 142 | 14.2 | | | | ● |
| PDM 143 | 14.3 | | | | ● |
| PDM 144 | 14.4 | | | | ● |
| PDM 145 | 14.5 | | | | ● |
| PDM 146 | 14.6 | | | | ● |
| PDM 147 | 14.7 | | | | ● |
| PDM 148 | 14.8 | | | | ● |
| PDM 149 | 14.9 | | | | ● |
| PDM 150 | 15.0 | | | | ● |
| PDM 151 | 15.1 | 90 | 152 | 16 | ● |
| PDM 152 | 15.2 | | | | ● |
| PDM 154 | 15.4 | | | | ● |
| PDM 155 | 15.5 | | | | ● |
| PDM 156 | 15.6 | | | | ● |
| PDM 157 | 15.7 | | | | ● |
| PDM 158 | 15.8 | | | | ● |
| PDM 160 | 16.0 | | | | ● |

| EDP. No. | Dia. | F.L | OAL | SH.Dia. | STOCK |
|----------|------|-----|-----|---------|-------|
| PDM 161 | 16.1 | 95 | 155 | 17 | ● |
| PDM 163 | 16.3 | | | | ● |
| PDM 165 | 16.5 | | | | ● |
| PDM 170 | 17.0 | | | | ● |
| PDM 171 | 17.1 | | | | ● |
| PDM 172 | 17.2 | 100 | 157 | 18 | ● |
| PDM 175 | 17.5 | | | | ● |
| PDM 177 | 17.7 | | | | ● |
| PDM 178 | 17.8 | | | | ● |
| PDM 180 | 18.0 | | | | ● |
| PDM 181 | 18.1 | 105 | 160 | 19 | ● |
| PDM 182 | 18.2 | | | | ● |
| PDM 185 | 18.5 | | | | ● |
| PDM 190 | 19.0 | | | | ● |
| PDM 191 | 19.1 | | | | 110 |
| PDM 195 | 19.5 | ● | | | |
| PDM 197 | 19.7 | ● | | | |
| PDM 200 | 20.0 | ● | | | |

μm=1/1000mm

| Tolerance \ Dia. | from 1 to 3 | over 3 to 6 | over 6 to 10 | over 10 to 18 | over 18 to 30 |
|--------------------------|-------------|-------------|--------------|---------------|---------------|
| Cutting Edge (h8) | 0 -14 | 0 -18 | 0 -22 | 0 -27 | 0 -33 |
| Shank (h6) | 0 -6 | 0 -8 | 0 -9 | 0 -11 | 0 -13 |

ENDMILL

DRILL

POWER DRILL SERIES

PDSI



POWER DRILL - STUB / INTERNAL COOLANT

| EDP. No. | Dia. | F.L. | OAL | SH.Dia. | STOCK | | |
|----------|------|------|-----|---------|-------|---|---|
| PDSI 030 | 3.0 | 18 | 60 | 3 | ● | | |
| PDSI 031 | 3.1 | 20 | | 4 | ● | | |
| PDSI 032 | 3.2 | | | | ● | | |
| PDSI 033 | 3.3 | | | | ● | | |
| PDSI 034 | 3.4 | 22 | | | 5 | ● | |
| PDSI 035 | 3.5 | | | | | ● | |
| PDSI 036 | 3.6 | | | | | ● | |
| PDSI 037 | 3.7 | | | | | ● | |
| PDSI 038 | 3.8 | 24 | | | | 6 | ● |
| PDSI 039 | 3.9 | | | | | | ● |
| PDSI 040 | 4.0 | | ● | | | | |
| PDSI 041 | 4.1 | 24 | 62 | ● | | | |
| PDSI 042 | 4.2 | 26 | | 5 | | | ● |
| PDSI 043 | 4.3 | | | | | | ● |
| PDSI 044 | 4.4 | | | | ● | | |
| PDSI 045 | 4.5 | | | | ● | | |
| PDSI 046 | 4.6 | | | | ● | | |
| PDSI 047 | 4.7 | | | | ● | | |
| PDSI 048 | 4.8 | | | | ● | | |
| PDSI 049 | 4.9 | | | | ● | | |
| PDSI 050 | 5.0 | 28 | | | 66 | ● | |
| PDSI 051 | 5.1 | | 30 | | | 6 | ● |
| PDSI 052 | 5.2 | | | ● | | | |
| PDSI 053 | 5.3 | | | ● | | | |
| PDSI 054 | 5.4 | | | ● | | | |
| PDSI 055 | 5.5 | | | ● | | | |
| PDSI 056 | 5.6 | | | ● | | | |
| PDSI 057 | 5.7 | | | ● | | | |
| PDSI 058 | 5.8 | | | ● | | | |
| PDSI 059 | 5.9 | | ● | | | | |
| PDSI 060 | 6.0 | ● | | | | | |

| EDP. No. | Dia. | F.L. | OAL | SH.Dia. | STOCK | | | |
|----------|------|------|-----|---------|-------|----|---|---|
| PDSI 061 | 6.1 | 34 | 74 | 7 | ● | | | |
| PDSI 062 | 6.2 | | | | ● | | | |
| PDSI 063 | 6.3 | | | | ● | | | |
| PDSI 064 | 6.4 | | | | ● | | | |
| PDSI 065 | 6.5 | | | | ● | | | |
| PDSI 066 | 6.6 | | | | ● | | | |
| PDSI 067 | 6.7 | | | | 37 | 79 | 8 | ● |
| PDSI 068 | 6.8 | | | | | | | ● |
| PDSI 069 | 6.9 | | | | | | | ● |
| PDSI 070 | 7.0 | | | | | | | ● |
| PDSI 071 | 7.1 | 40 | 79 | 8 | ● | | | |
| PDSI 072 | 7.2 | | | | ● | | | |
| PDSI 073 | 7.3 | | | | ● | | | |
| PDSI 074 | 7.4 | | | | ● | | | |
| PDSI 075 | 7.5 | | | | ● | | | |
| PDSI 076 | 7.6 | | | | ● | | | |
| PDSI 077 | 7.7 | | | | ● | | | |
| PDSI 078 | 7.8 | | | | ● | | | |
| PDSI 079 | 7.9 | | | | ● | | | |
| PDSI 080 | 8.0 | | | | 43 | 84 | 9 | ● |
| PDSI 081 | 8.1 | ● | | | | | | |
| PDSI 082 | 8.2 | ● | | | | | | |
| PDSI 083 | 8.3 | ● | | | | | | |
| PDSI 084 | 8.4 | ● | | | | | | |
| PDSI 085 | 8.5 | ● | | | | | | |
| PDSI 086 | 8.6 | ● | | | | | | |
| PDSI 087 | 8.7 | ● | | | | | | |
| PDSI 088 | 8.8 | ● | | | | | | |
| PDSI 089 | 8.9 | ● | | | | | | |
| PDSI 090 | 9.0 | 47 | 89 | 10 | ● | | | |
| PDSI 091 | 9.1 | | | | ● | | | |
| PDSI 092 | 9.2 | | | | ● | | | |
| PDSI 093 | 9.3 | | | | ● | | | |
| PDSI 094 | 9.4 | | | | ● | | | |
| PDSI 095 | 9.5 | | | | ● | | | |
| PDSI 096 | 9.6 | | | | ● | | | |
| PDSI 097 | 9.7 | | | | ● | | | |
| PDSI 098 | 9.8 | | | | ● | | | |
| PDSI 099 | 9.9 | | | | ● | | | |
| PDSI 100 | 10.0 | 51 | 95 | 11 | ● | | | |
| PDSI 101 | 10.1 | | | | ● | | | |
| PDSI 102 | 10.2 | | | | ● | | | |
| PDSI 103 | 10.3 | | | | ● | | | |
| PDSI 104 | 10.4 | | | | ● | | | |
| PDSI 105 | 10.5 | | | | ● | | | |
| PDSI 106 | 10.6 | | | | ● | | | |
| PDSI 107 | 10.7 | | | | ● | | | |
| PDSI 108 | 10.8 | | | | ● | | | |
| PDSI 109 | 10.9 | | | | ● | | | |
| PDSI 110 | 11.0 | ● | | | | | | |

ENDMILL

DRILL

POWER DRILL SERIES

PART.
B

ENDMILL
&
DRILL

| EDP. No. | Dia. | F.L | OAL | SH.Dia. | STOCK |
|----------|------|-----|-----|---------|-------|
| PDSI 111 | 11.1 | 54 | 102 | 12 | ● |
| PDSI 112 | 11.2 | | | | ● |
| PDSI 113 | 11.3 | | | | ● |
| PDSI 114 | 11.4 | | | | ● |
| PDSI 115 | 11.5 | | | | ● |
| PDSI 116 | 11.6 | | | | ● |
| PDSI 117 | 11.7 | | | | ● |
| PDSI 118 | 11.8 | | | | ● |
| PDSI 119 | 11.9 | | | | ● |
| PDSI 120 | 12.0 | | | | ● |
| PDSI 121 | 12.1 | 57 | 102 | 13 | ● |
| PDSI 122 | 12.2 | | | | ● |
| PDSI 123 | 12.3 | | | | ● |
| PDSI 124 | 12.4 | | | | ● |
| PDSI 125 | 12.5 | | | | ● |
| PDSI 126 | 12.6 | | | | ● |
| PDSI 127 | 12.7 | | | | ● |
| PDSI 128 | 12.8 | | | | ● |
| PDSI 129 | 12.9 | | | | ● |
| PDSI 130 | 13.0 | | | | ● |
| PDSI 131 | 13.1 | 60 | 107 | 14 | ● |
| PDSI 132 | 13.2 | | | | ● |
| PDSI 133 | 13.3 | | | | ● |
| PDSI 134 | 13.4 | | | | ● |
| PDSI 135 | 13.5 | | | | ● |
| PDSI 136 | 13.6 | | | | ● |
| PDSI 137 | 13.7 | | | | ● |
| PDSI 138 | 13.8 | | | | ● |
| PDSI 139 | 13.9 | | | | ● |
| PDSI 140 | 14.0 | | | | ● |
| PDSI 141 | 14.1 | 62 | 111 | 15 | ● |
| PDSI 142 | 14.2 | | | | ● |
| PDSI 143 | 14.3 | | | | ● |
| PDSI 144 | 14.4 | | | | ● |
| PDSI 145 | 14.5 | | | | ● |
| PDSI 146 | 14.6 | | | | ● |
| PDSI 147 | 14.7 | | | | ● |
| PDSI 148 | 14.8 | | | | ● |
| PDSI 149 | 14.9 | | | | ● |
| PDSI 150 | 15.0 | | | | ● |
| PDSI 151 | 15.1 | 64 | 115 | 16 | ● |
| PDSI 152 | 15.2 | | | | ● |
| PDSI 154 | 15.4 | | | | ● |
| PDSI 155 | 15.5 | | | | ● |
| PDSI 156 | 15.6 | | | | ● |
| PDSI 157 | 15.7 | | | | ● |
| PDSI 158 | 15.8 | | | | ● |
| PDSI 160 | 16.0 | | | | ● |

| EDP. No. | Dia. | F.L | OAL | SH.Dia. | STOCK |
|----------|------|-----|-----|---------|-------|
| PDSI 161 | 16.1 | 66 | 119 | 17 | ● |
| PDSI 163 | 16.3 | | | | ● |
| PDSI 165 | 16.5 | | | | ● |
| PDSI 170 | 17.0 | | | | ● |
| PDSI 171 | 17.1 | | | | ● |
| PDSI 172 | 17.2 | 66 | 123 | 18 | ● |
| PDSI 175 | 17.5 | | | | ● |
| PDSI 177 | 17.7 | | | | ● |
| PDSI 178 | 17.8 | | | | ● |
| PDSI 180 | 18.0 | | | | ● |
| PDSI 181 | 18.1 | 70 | 127 | 19 | ● |
| PDSI 182 | 18.2 | | | | ● |
| PDSI 185 | 18.5 | | | | ● |
| PDSI 190 | 19.0 | | | | ● |
| PDSI 191 | 19.1 | | | | 70 |
| PDSI 195 | 19.5 | ● | | | |
| PDSI 197 | 19.7 | ● | | | |
| PDSI 200 | 20.0 | ● | | | |

ENDMILL

DRILL

μm=1/1000mm

| Tolerance \ Dia. | from 1 to 3 | over 3 to 6 | over 6 to 10 | over 10 to 18 | over 18 to 30 |
|--------------------------|-------------|-------------|--------------|---------------|---------------|
| Cutting Edge (h8) | 0 -14 | 0 -18 | 0 -22 | 0 -27 | 0 -33 |
| Shank (h6) | 0 -6 | 0 -8 | 0 -9 | 0 -11 | 0 -13 |

POWER DRILL SERIES

ENDMILL
&
DRILL

PDMI



POWER DRILL - MEDIUM / INTERNAL COOLANT

| EDP. No. | Dia. | F.L. | OAL | SH.Dia. | STOCK | |
|----------|------|------|-----|---------|-------|---|
| PDMI 031 | 3.1 | 27 | 74 | 4 | ● | |
| PDMI 032 | 3.2 | | | | ● | |
| PDMI 033 | 3.3 | | | | ● | |
| PDMI 034 | 3.4 | 30 | | | ● | |
| PDMI 035 | 3.5 | | | | ● | |
| PDMI 036 | 3.6 | | | | ● | |
| PDMI 037 | 3.7 | 33 | ● | | | |
| PDMI 038 | 3.8 | | ● | | | |
| PDMI 039 | 3.9 | | ● | | | |
| PDMI 040 | 4.0 | 33 | 80 | 5 | ● | |
| PDMI 041 | 4.1 | | | | ● | |
| PDMI 042 | 4.2 | | | | ● | |
| PDMI 043 | 4.3 | | | | 36 | ● |
| PDMI 044 | 4.4 | | | | | ● |
| PDMI 045 | 4.5 | | | | | ● |
| PDMI 046 | 4.6 | 39 | ● | | | |
| PDMI 047 | 4.7 | | ● | | | |
| PDMI 048 | 4.8 | | ● | | | |
| PDMI 049 | 4.9 | 39 | 87 | 6 | ● | |
| PDMI 050 | 5.0 | | | | ● | |
| PDMI 051 | 5.1 | | | | 43 | ● |
| PDMI 052 | 5.2 | | | | | ● |
| PDMI 053 | 5.3 | | | | | ● |
| PDMI 054 | 5.4 | | | | 43 | ● |
| PDMI 055 | 5.5 | ● | | | | |
| PDMI 056 | 5.6 | ● | | | | |
| PDMI 057 | 5.7 | 43 | ● | | | |
| PDMI 058 | 5.8 | | ● | | | |
| PDMI 059 | 5.9 | | ● | | | |
| PDMI 060 | 6.0 | ● | | | | |

| EDP. No. | Dia. | F.L. | OAL | SH.Dia. | STOCK |
|----------|------|------|-----|---------|-------|
| PDMI 061 | 6.1 | 47 | 95 | 7 | ● |
| PDMI 062 | 6.2 | | | | ● |
| PDMI 063 | 6.3 | | | | ● |
| PDMI 064 | 6.4 | | | | ● |
| PDMI 065 | 6.5 | | | | ● |
| PDMI 066 | 6.6 | | | | ● |
| PDMI 067 | 6.7 | | | | ● |
| PDMI 068 | 6.8 | | | | ● |
| PDMI 069 | 6.9 | | | | ● |
| PDMI 070 | 7.0 | | | | ● |
| PDMI 071 | 7.1 | 52 | 103 | 8 | ● |
| PDMI 072 | 7.2 | | | | ● |
| PDMI 073 | 7.3 | | | | ● |
| PDMI 074 | 7.4 | | | | ● |
| PDMI 075 | 7.5 | | | | ● |
| PDMI 076 | 7.6 | | | | ● |
| PDMI 077 | 7.7 | | | | ● |
| PDMI 078 | 7.8 | | | | ● |
| PDMI 079 | 7.9 | | | | ● |
| PDMI 080 | 8.0 | | | | ● |
| PDMI 081 | 8.1 | 56 | 105 | 9 | ● |
| PDMI 082 | 8.2 | | | | ● |
| PDMI 083 | 8.3 | | | | ● |
| PDMI 084 | 8.4 | | | | ● |
| PDMI 085 | 8.5 | | | | ● |
| PDMI 086 | 8.6 | | | | ● |
| PDMI 087 | 8.7 | | | | ● |
| PDMI 088 | 8.8 | | | | ● |
| PDMI 089 | 8.9 | | | | ● |
| PDMI 090 | 9.0 | | | | ● |
| PDMI 091 | 9.1 | 62 | 108 | 10 | ● |
| PDMI 092 | 9.2 | | | | ● |
| PDMI 093 | 9.3 | | | | ● |
| PDMI 094 | 9.4 | | | | ● |
| PDMI 095 | 9.5 | | | | ● |
| PDMI 096 | 9.6 | | | | ● |
| PDMI 097 | 9.7 | | | | ● |
| PDMI 098 | 9.8 | | | | ● |
| PDMI 099 | 9.9 | | | | ● |
| PDMI 100 | 10.0 | | | | ● |
| PDMI 101 | 10.1 | 68 | 125 | 11 | ● |
| PDMI 102 | 10.2 | | | | ● |
| PDMI 103 | 10.3 | | | | ● |
| PDMI 104 | 10.4 | | | | ● |
| PDMI 105 | 10.5 | | | | ● |
| PDMI 106 | 10.6 | | | | ● |
| PDMI 107 | 10.7 | | | | ● |
| PDMI 108 | 10.8 | | | | ● |
| PDMI 109 | 10.9 | | | | ● |
| PDMI 110 | 11.0 | | | | ● |

ENDMILL

DRILL

POWER DRILL SERIES

PART.
B

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DRILL

| EDP. No. | Dia. | F.L | OAL | SH.Dia. | STOCK |
|----------|------|-----|-----|---------|-------|
| PDMI 111 | 11.1 | 71 | 133 | 12 | ● |
| PDMI 112 | 11.2 | | | | ● |
| PDMI 113 | 11.3 | | | | ● |
| PDMI 114 | 11.4 | | | | ● |
| PDMI 115 | 11.5 | | | | ● |
| PDMI 116 | 11.6 | | | | ● |
| PDMI 117 | 11.7 | | | | ● |
| PDMI 118 | 11.8 | | | | ● |
| PDMI 119 | 11.9 | | | | ● |
| PDMI 120 | 12.0 | | | | ● |
| PDMI 121 | 12.1 | 75 | 137 | 13 | ● |
| PDMI 122 | 12.2 | | | | ● |
| PDMI 123 | 12.3 | | | | ● |
| PDMI 124 | 12.4 | | | | ● |
| PDMI 125 | 12.5 | | | | ● |
| PDMI 126 | 12.6 | | | | ● |
| PDMI 127 | 12.7 | | | | ● |
| PDMI 128 | 12.8 | | | | ● |
| PDMI 129 | 12.9 | | | | ● |
| PDMI 130 | 13.0 | | | | ● |
| PDMI 131 | 13.1 | 80 | 142 | 14 | ● |
| PDMI 132 | 13.2 | | | | ● |
| PDMI 133 | 13.3 | | | | ● |
| PDMI 134 | 13.4 | | | | ● |
| PDMI 135 | 13.5 | | | | ● |
| PDMI 136 | 13.6 | | | | ● |
| PDMI 137 | 13.7 | | | | ● |
| PDMI 138 | 13.8 | | | | ● |
| PDMI 139 | 13.9 | | | | ● |
| PDMI 140 | 14.0 | | | | ● |
| PDMI 141 | 14.1 | 83 | 148 | 15 | ● |
| PDMI 142 | 14.2 | | | | ● |
| PDMI 143 | 14.3 | | | | ● |
| PDMI 144 | 14.4 | | | | ● |
| PDMI 145 | 14.5 | | | | ● |
| PDMI 146 | 14.6 | | | | ● |
| PDMI 147 | 14.7 | | | | ● |
| PDMI 148 | 14.8 | | | | ● |
| PDMI 149 | 14.9 | | | | ● |
| PDMI 150 | 15.0 | | | | ● |
| PDMI 151 | 15.1 | 90 | 152 | 16 | ● |
| PDMI 152 | 15.2 | | | | ● |
| PDMI 154 | 15.4 | | | | ● |
| PDMI 155 | 15.5 | | | | ● |
| PDMI 156 | 15.6 | | | | ● |
| PDMI 157 | 15.7 | | | | ● |
| PDMI 158 | 15.8 | | | | ● |
| PDMI 160 | 16.0 | | | | ● |

| EDP. No. | Dia. | F.L | OAL | SH.Dia. | STOCK |
|----------|------|-----|-----|---------|-------|
| PDMI 161 | 16.1 | 95 | 155 | 17 | ● |
| PDMI 163 | 16.3 | | | | ● |
| PDMI 165 | 16.5 | | | | ● |
| PDMI 170 | 17.0 | | | | ● |
| PDMI 171 | 17.1 | | | | ● |
| PDMI 172 | 17.2 | 100 | 157 | 18 | ● |
| PDMI 175 | 17.5 | | | | ● |
| PDMI 177 | 17.7 | | | | ● |
| PDMI 178 | 17.8 | | | | ● |
| PDMI 180 | 18.0 | | | | ● |
| PDMI 181 | 18.1 | | | | ● |
| PDMI 182 | 18.2 | 105 | 160 | 19 | ● |
| PDMI 185 | 18.5 | | | | ● |
| PDMI 190 | 19.0 | | | | ● |
| PDMI 191 | 19.1 | 110 | 163 | 20 | ● |
| PDMI 195 | 19.5 | | | | ● |
| PDMI 197 | 19.7 | | | | ● |
| PDMI 200 | 20.0 | | | | ● |

ENDMILL

DRILL

μm=1/1000mm

| Tolerance \ Dia. | from 1 to 3 | over 3 to 6 | over 6 to 10 | over 10 to 18 | over 18 to 30 |
|--------------------------|-------------|-------------|--------------|---------------|---------------|
| Cutting Edge (h8) | 0 -14 | 0 -18 | 0 -22 | 0 -27 | 0 -33 |
| Shank (h6) | 0 -6 | 0 -8 | 0 -9 | 0 -11 | 0 -13 |

SOLID SPIRAL DRILL SERIES

SSD



SOLID SPIRAL DRILL

| EDP. No. | Dia. | F.L | OAL | STOCK |
|----------|------|-----|-----|-------|
| SSD010 | 1.0 | 10 | 38 | ● |
| SSD011 | 1.1 | | | ● |
| SSD012 | 1.2 | | | ● |
| SSD013 | 1.3 | | | ● |
| SSD014 | 1.4 | | | ● |
| SSD015 | 1.5 | | | ● |
| SSD016 | 1.6 | 13 | 38 | ● |
| SSD017 | 1.7 | | | ● |
| SSD018 | 1.8 | | | ● |
| SSD019 | 1.9 | | | ● |
| SSD020 | 2.0 | 16 | 45 | ● |
| SSD021 | 2.1 | 16 | 45 | ● |
| SSD022 | 2.2 | | | ● |
| SSD023 | 2.3 | 18 | 50 | ● |
| SSD024 | 2.4 | | | ● |
| SSD025 | 2.5 | | | ● |
| SSD026 | 2.6 | 20 | 50 | ● |
| SSD027 | 2.7 | | | ● |
| SSD028 | 2.8 | 22 | 50 | ● |
| SSD029 | 2.9 | | | ● |
| SSD030 | 3.0 | | | ● |
| SSD031 | 3.1 | 25 | 50 | ● |
| SSD032 | 3.2 | | | ● |
| SSD033 | 3.3 | | | ● |
| SSD034 | 3.4 | | | ● |
| SSD035 | 3.5 | | | ● |
| SSD036 | 3.6 | 28 | 55 | ● |
| SSD037 | 3.7 | | | ● |
| SSD038 | 3.8 | | | ● |
| SSD039 | 3.9 | | | ● |
| SSD040 | 4.0 | 30 | 60 | ● |
| SSD041 | 4.1 | | | ● |
| SSD042 | 4.2 | | | ● |
| SSD043 | 4.3 | | | ● |
| SSD044 | 4.4 | | | ● |
| SSD045 | 4.5 | 33 | 65 | ● |
| SSD046 | 4.6 | | | ● |
| SSD047 | 4.7 | 35 | 65 | ● |
| SSD048 | 4.8 | | | ● |
| SSD049 | 4.9 | | | ● |
| SSD050 | 5.0 | | | ● |

ENDMILL

DRILL

SOLID SPIRAL DRILL SERIES

PART.
B

ENDMILL
&
DRILL

| EDP. No. | Dia. | F.L. | OAL | STOCK |
|----------|------|------|-----|-------|
| SSD051 | 5.1 | 35 | 65 | • |
| SSD052 | 5.2 | | | • |
| SSD053 | 5.3 | | | • |
| SSD054 | 5.4 | | | • |
| SSD055 | 5.5 | | | • |
| SSD056 | 5.6 | 38 | 70 | • |
| SSD057 | 5.7 | | | • |
| SSD058 | 5.8 | | | • |
| SSD059 | 5.9 | | | • |
| SSD060 | 6.0 | | | • |
| SSD061 | 6.1 | 38 | 75 | • |
| SSD062 | 6.2 | | | • |
| SSD063 | 6.3 | | | • |
| SSD064 | 6.4 | | | • |
| SSD065 | 6.5 | | | • |
| SSD066 | 6.6 | 45 | 80 | • |
| SSD067 | 6.7 | | | • |
| SSD068 | 6.8 | | | • |
| SSD069 | 6.9 | | | • |
| SSD070 | 7.0 | | | • |
| SSD071 | 7.1 | 45 | 80 | • |
| SSD072 | 7.2 | | | • |
| SSD073 | 7.3 | | | • |
| SSD074 | 7.4 | | | • |
| SSD075 | 7.5 | | | • |
| SSD076 | 7.6 | 18 | | • |
| SSD077 | 7.7 | | | • |
| SSD078 | 7.8 | | | • |
| SSD079 | 7.9 | | | • |
| SSD080 | 8.0 | | | • |
| SSD081 | 8.1 | 50 | 85 | • |
| SSD082 | 8.2 | | | • |
| SSD083 | 8.3 | | | • |
| SSD084 | 8.4 | | | • |
| SSD085 | 8.5 | | | • |
| SSD086 | 8.6 | 95 | | • |
| SSD087 | 8.7 | | | • |
| SSD088 | 8.8 | | | • |
| SSD089 | 8.9 | | | • |
| SSD090 | 9.0 | | | • |

| EDP. No. | Dia. | F.L. | OAL | STOCK |
|----------|------|------|-----|-------|
| SSD091 | 9.1 | 50 | 95 | • |
| SSD092 | 9.2 | | | • |
| SSD093 | 9.3 | | | • |
| SSD094 | 9.4 | | | • |
| SSD095 | 9.5 | | | • |
| SSD096 | 9.6 | 55 | 100 | • |
| SSD097 | 9.7 | | | • |
| SSD098 | 9.8 | | | • |
| SSD099 | 9.9 | | | • |
| SSD100 | 10.0 | | | • |
| SSD101 | 10.1 | 55 | 115 | • |
| SSD102 | 10.2 | | | • |
| SSD103 | 10.3 | | | • |
| SSD104 | 10.4 | | | • |
| SSD105 | 10.5 | | | • |
| SSD106 | 10.6 | 60 | | • |
| SSD107 | 10.7 | | | • |
| SSD108 | 10.8 | | | • |
| SSD109 | 10.9 | | | • |
| SSD110 | 11.0 | | | • |
| SSD115 | 11.5 | 65 | 120 | • |
| SSD120 | 12.0 | | | • |
| SSD125 | 12.5 | 70 | 125 | • |
| SSD130 | 13.0 | 75 | 130 | • |

ENDMILL

DRILL

µm=1/1000mm

| Tolerance \ Dia. | from 1 to 3 | over 3 to 6 | over 6 to 10 | over 10 to 18 |
|--------------------------|-------------|-------------|--------------|---------------|
| Cutting Edge (h8) | 0 -14 | 0 -18 | 0 -22 | 0 -27 |
| Shank (h7) | 0 -10 | 0 -12 | 0 -18 | 0 -10 |

SOLID SPIRAL DRILL SERIES

ENDMILL
&
DRILL

SSDL



SOLID SPIRAL DRILL - LONG

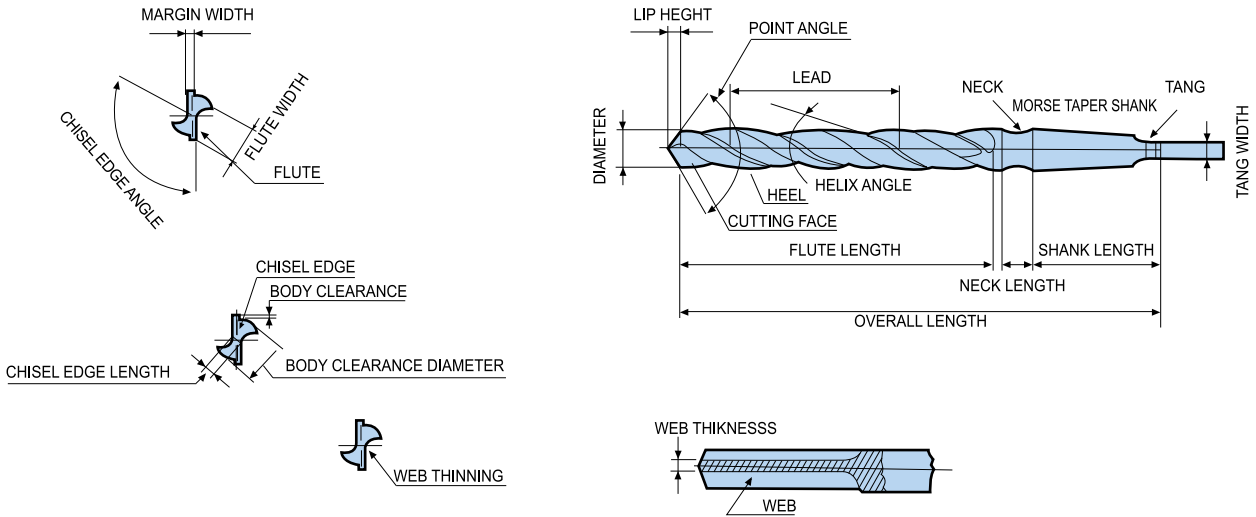
| EDP. No. | Dia. | F.L | OAL | STOCK |
|----------|------|-----|-----|-------|
| SSDL030 | 3.0 | 42 | 73 | ● |
| SSDL031 | 3.1 | | | ● |
| SSDL032 | 3.2 | | | ● |
| SSDL033 | 3.3 | | | ● |
| SSDL034 | 3.4 | | | ● |
| SSDL035 | 3.5 | 45 | 80 | ● |
| SSDL036 | 3.6 | | | ● |
| SSDL037 | 3.7 | | | ● |
| SSDL038 | 3.8 | | | ● |
| SSDL039 | 3.9 | | | ● |
| SSDL040 | 4.0 | 54 | 85 | ● |
| SSDL041 | 4.1 | 54 | 85 | ● |
| SSDL042 | 4.2 | | | ● |
| SSDL043 | 4.3 | | | ● |
| SSDL044 | 4.4 | | | ● |
| SSDL045 | 4.5 | | | ● |
| SSDL046 | 4.6 | 59 | 90 | ● |
| SSDL047 | 4.7 | | | ● |
| SSDL048 | 4.8 | | | ● |
| SSDL049 | 4.9 | | | ● |
| SSDL050 | 5.0 | | | ● |
| SSDL051 | 5.1 | 63 | 95 | ● |
| SSDL052 | 5.2 | | | ● |
| SSDL053 | 5.3 | | | ● |
| SSDL054 | 5.4 | | | ● |
| SSDL055 | 5.5 | | | ● |
| SSDL056 | 5.6 | 66 | 100 | ● |
| SSDL057 | 5.7 | | | ● |
| SSDL058 | 5.8 | | | ● |
| SSDL059 | 5.9 | | | ● |
| SSDL060 | 6.0 | | | ● |

| EDP. No. | Dia. | F.L | OAL | STOCK |
|----------|------|-----|-----|-------|
| SSDL061 | 6.1 | 70 | 105 | ● |
| SSDL062 | 6.2 | | | ● |
| SSDL063 | 6.3 | | | ● |
| SSDL064 | 6.4 | | | ● |
| SSDL065 | 6.5 | | | ● |
| SSDL066 | 6.6 | 73 | 110 | ● |
| SSDL067 | 6.7 | | | ● |
| SSDL068 | 6.8 | | | ● |
| SSDL069 | 6.9 | | | ● |
| SSDL070 | 7.0 | | | ● |
| SSDL071 | 7.1 | 76 | 110 | ● |
| SSDL072 | 7.2 | | | ● |
| SSDL073 | 7.3 | | | ● |
| SSDL074 | 7.4 | | | ● |
| SSDL075 | 7.5 | | | ● |
| SSDL076 | 7.6 | 80 | 115 | ● |
| SSDL077 | 7.7 | | | ● |
| SSDL078 | 7.8 | | | ● |
| SSDL079 | 7.9 | | | ● |
| SSDL080 | 8.0 | | | ● |
| SSDL081 | 8.1 | 85 | 125 | ● |
| SSDL082 | 8.2 | | | ● |
| SSDL083 | 8.3 | | | ● |
| SSDL084 | 8.4 | | | ● |
| SSDL085 | 8.5 | | | ● |
| SSDL086 | 8.6 | 88 | 130 | ● |
| SSDL087 | 8.7 | | | ● |
| SSDL088 | 8.8 | | | ● |
| SSDL089 | 8.9 | | | ● |
| SSDL090 | 9.0 | | | ● |
| SSDL091 | 9.1 | 90 | 130 | ● |
| SSDL092 | 9.2 | | | ● |
| SSDL093 | 9.3 | | | ● |
| SSDL094 | 9.4 | | | ● |
| SSDL095 | 9.5 | | | ● |
| SSDL096 | 9.6 | 90 | 130 | ● |
| SSDL097 | 9.7 | | | ● |
| SSDL098 | 9.8 | | | ● |
| SSDL099 | 9.9 | | | ● |
| SSDL100 | 10.0 | | | ● |

µm=1/1000mm

| Tolerance | Dia. | from 1 to 3 | over 3 to 6 | over 6 to 10 | over 10 to 18 |
|--------------------------|------|-------------|-------------|--------------|---------------|
| Cutting Edge (h8) | | 0 -14 | 0 -18 | 0 -22 | 0 -27 |
| Shank (h7) | | 0 -10 | 0 -12 | 0 -18 | 0 -18 |

NOMENCLATURE OF DRILL



WORKING OF MAIN ANGLE

| POINT ANGLE | HELIX ANGLE | LIP RELIEF ANGLE |
|--|---|--|
| 70° 118° 140° | 10° 38° 40° | 7° 10° 12° 15° |
| Large → Torque → Small Small → Thrust → Large | Bad → Cutting Capacity → Good Good → Chip Ejection → Bad Large → Rigidity of tool → Small | Small → Tool Wear → Large Small → Vibration → Large |

| | | |
|--|--|--|
| | <p>■ Cutting Speed</p> $V = \frac{\pi \times D \times N}{1000} \text{ (m/min)}$ <ul style="list-style-type: none"> • V : Cutting Speed (m/min) • D : Diameter of drill (mm) • N : revolution (rpm) • π : (3.14) | <p>■ Feed</p> $f = \frac{S}{N} \text{ (m/rev)}$ <ul style="list-style-type: none"> • f : feed (m/min) • S : depth of cut per min (mm) • N : revolution (rpm) |
| | <p>■ Cutting Speed</p> $\delta = \tan^{-1} \left(\frac{\pi D}{L} \right)$ <ul style="list-style-type: none"> • δ : helix angle (m/min) • D : Diameter of drill (mm) • L : lea (rpm) • π : (3.14) | |

TROUBLE SHOOTING FOR DRILLING

| Problems | Cause | Cutting Conditions | | | | | Tool shape | | | | | Grade | | The Others | | | | |
|--------------------------------|--|---|-----------|-----------|--------------|---------------|--------------|-------------|----------------|--------|---|----------|-----------|------------|--------------------------------|----------------|--------------|-----------------------------|
| | | Cutting Speed | Feed Rate | Step Feed | Initial Feed | Cutting Fluid | Relief Angle | Point Angle | Thinning Angle | Honing | Change the rate of flute and land width | Thinning | Toughness | Hardness | Machanical rigidity of machine | Drill Rigidity | Guide - Bush | Improvement of setting type |
| Chipping | • Improper cutting edge | | | | | | ▼ | | ▼ | ▲ | | ▲ | | | | | | |
| | • Improper cutting speed | ▼ | | | | ○ | | | | | | | | | | | | |
| | • Generation of built-up edge | | | | | ○ | ▼ | | ▼ | ▲ | | ▲ | | | | | | |
| | • Generation of chattering and vibration | ▼ | | | | | | | | | | | | ▲ | ▲ | | ○ | |
| Excessive wear on cutting dege | • Cutting speed too high in relation to insert grade | ▼ | | | | ○ | ▲ | ▲ | | | | | | ▲ | | | | |
| Breakage | In the beginning of operating | • Poor surface conditions of workpiece | | | ○ | ▼ | | | | | | | | | | | | ▼ |
| | | • Insufficient rigidity of tool and workpiece | | | | | | | | | | | | | ▲ | | | ○ |
| | Under the operating | • Deflection of hole | ▼ | ▼ | | | | | | | | | | | | | | |
| | | • Defult of chip ejection | | ▼ | ○ | | | | | | | | | ○ | | | | |

▲ : Increase ▼ : Decrease ○ : Application ⊙ : Proper application

PDS - POWER DRILL

V : m/min, f : mm/rev

| DRILL | | | MILD STEEL · ALLOY STEEL · CARBON STEEL | | ALLOY STEEL FORGED STEEL | | HIGH HARDENED STEEL | | STAINLESS STEEL | | DUCTILE CAST IRON | | CAST IRON | |
|------------|--------|------------|---|-----------|--------------------------|-----------|---------------------|-----------|-----------------|-----------|-------------------|-----------|-----------|-----------|
| | | | ≤ HRc 25 | | HRc 25 ~ HRc 35 | | HRc 35 ~ HRc 45 | | | | | | | |
| | Dia. | COD | V | F | V | F | V | F | V | F | V | F | V | F |
| SOLID TYPE | 03~5 | PDS030#050 | 40~70 | 0.15~0.25 | 35~55 | 0.10~0.20 | 15~25 | 0.05~0.15 | 15~25 | 0.05~0.15 | 35~70 | 0.15~0.25 | 45~75 | 0.15~0.30 |
| | 05~8 | PDS051~080 | 50~75 | 0.20~0.30 | 45~60 | 0.15~0.25 | 15~30 | 0.10~0.20 | 15~30 | 0.10~0.20 | 45~75 | 0.20~0.35 | 55~85 | 0.20~0.40 |
| | 08~10 | PDS081~100 | 50~75 | 0.25~0.35 | 45~60 | 0.15~0.30 | 20~35 | 0.10~0.20 | 15~30 | 0.10~0.20 | 45~75 | 0.25~0.40 | 55~85 | 0.20~0.40 |
| | 010~12 | PDS101~120 | 50~75 | 0.25~0.35 | 45~60 | 0.15~0.30 | 20~35 | 0.10~0.25 | 15~30 | 0.10~0.25 | 45~75 | 0.25~0.40 | 55~85 | 0.20~0.45 |
| | 012~14 | PDS121~140 | 55~80 | 0.25~0.40 | 50~70 | 0.20~0.35 | 20~35 | 0.10~0.25 | 15~30 | 0.10~0.25 | 50~80 | 0.25~0.45 | 60~90 | 0.25~0.50 |
| | 014~20 | PDS141~200 | 55~80 | 0.30~0.45 | 50~70 | 0.20~0.35 | 20~35 | 0.10~0.30 | 15~30 | 0.10~0.25 | 50~80 | 0.25~0.50 | 60~100 | 0.25~0.55 |

ENDMILL
&
DRILL

PDSI - OIL HOLE POWER DRILL

V : m/min, f : mm/rev

| | | MILD STEEL · ALLOY STEEL · CARBON STEEL | | ALLOY STEEL FORGED STEEL | | HIGH HARDENED STEEL | | STAINLESS STEEL | | DUCTILE CAST IRON | | CAST IRON | |
|--|-------|---|-----------|--------------------------|-----------|---------------------|-----------|-----------------|-----------|-------------------|-----------|-----------|-----------|
| | | ≤ HRc 25 | | HRc 25 ~ HRc 35 | | HRc 35 ~ HRc 45 | | | | | | | |
| | Dia. | V | F | V | F | V | F | V | F | V | F | V | F |
| | 7~8 | 80~110 | 0.15~0.25 | 70~100 | 0.15~0.25 | 50~80 | 0.10~0.20 | 30~60 | 0.10~0.20 | 50~80 | 0.15~0.25 | 80~120 | 0.15~0.30 |
| | 8~10 | 90~120 | 0.20~0.30 | 80~110 | 0.15~0.30 | 60~90 | 0.15~0.25 | 30~70 | 0.10~0.20 | 60~90 | 0.20~0.30 | 100~130 | 0.25~0.35 |
| | 10~12 | 100~130 | 0.25~0.35 | 90~120 | 0.20~0.30 | 70~100 | 0.20~0.30 | 30~70 | 0.10~0.20 | 70~100 | 0.25~0.35 | 110~140 | 0.25~0.35 |
| | 12~16 | 110~140 | 0.25~0.35 | 100~130 | 0.25~0.35 | 80~100 | 0.20~0.30 | 40~70 | 0.15~0.25 | 80~110 | 0.30~0.40 | 120~150 | 0.30~0.40 |
| | 16~20 | 120~150 | 0.25~0.40 | 110~140 | 0.25~0.35 | 90~110 | 0.20~0.30 | 40~70 | 0.15~0.30 | 90~120 | 0.30~0.40 | 130~160 | 0.30~0.40 |

ENDMILL

DRILL

TECHNICAL DATA

RECOMMENDATION OF CUTTING CONDITIONS

PF50, P50

| MATERIAL | CARBON STEEL (C < 0.3%) ALLOY STEEL / S440 SCM~710N/mm ² | | CARBON STEEL (C ≥ 0.3%) ALLOY STEEL / S50C SCM~1,060N/mm ² | | SUJ2 · SUS440 | | SKD61 34~43 HRC | | 43~48 HRC | | SKD11 48~53 HRC | | CAST IRON FC 250~350 | | DUCTILE FC 400~500 | |
|------------------|--|------------------|--|------------------|----------------------------|------------------|----------------------------|------------------|----------------------------|------------------|----------------------------|------------------|----------------------------|------------------|----------------------------|------------------|
| | V | 80~125m/min | | 80~125m/min | | 63~80m/min | | 40~63m/min | | 32~45m/min | | 25~36m/min | | 80~125m/min | | 63#90m/min |
| DIAMETER (mm) | RPM (mm ⁻¹) | FEED (mm/rev) | RPM (mm ⁻¹) | FEED (mm/rev) | RPM (mm ⁻¹) | FEED (mm/rev) | RPM (mm ⁻¹) | FEED (mm/rev) | RPM (mm ⁻¹) | FEED (mm/rev) | RPM (mm ⁻¹) | FEED (mm/rev) | RPM (mm ⁻¹) | FEED (mm/rev) | RPM (mm ⁻¹) | FEED (mm/rev) |
| 2 | 12,000 | 0.06~0.08 | 12,000 | 0.06~0.08 | 11,000 | 0.06~0.08 | 8,000 | 0.06~0.08 | 6,000 | 0.05~0.07 | 4,500 | 0.03~0.06 | 15,000 | 0.06~0.08 | 11,000 | 0.06~0.08 |
| 3 | 9,600 | 0.09~0.12 | 9,600 | 0.09~0.12 | 7,500 | 0.09~0.12 | 5,300 | 0.09~0.12 | 4,000 | 0.07~0.11 | 3,200 | 0.05~0.09 | 10,000 | 0.09~0.12 | 7,600 | 0.09~0.12 |
| 4 | 8,000 | 0.10~0.15 | 8,000 | 0.10~0.15 | 5,650 | 0.10~0.15 | 4,000 | 0.10~0.15 | 3,000 | 0.08~0.13 | 2,600 | 0.06~0.10 | 8,000 | 0.10~0.15 | 6,000 | 0.10~0.15 |
| 5 | 6,400 | 0.12~0.18 | 6,400 | 0.12~0.18 | 4,550 | 0.12~0.18 | 3,300 | 0.12~0.18 | 2,400 | 0.10~0.15 | 2,000 | 0.8~0.12 | 6,400 | 0.12~0.18 | 4,800 | 0.12~0.18 |
| 6 | 5,300 | 0.14~0.20 | 5,300 | 0.14~0.20 | 3,800 | 0.14~0.20 | 2,750 | 0.14~0.20 | 2,000 | 0.12~0.18 | 1,700 | 0.09~0.15 | 5,300 | 0.14~0.20 | 4,000 | 0.14~0.20 |
| 8 | 4,000 | 0.16~0.24 | 4,000 | 0.16~0.24 | 2,850 | 0.16~0.24 | 2,100 | 0.16~0.24 | 1,500 | 0.14~0.22 | 1,300 | 0.12~0.20 | 4,000 | 0.16~0.24 | 3,000 | 0.16~0.24 |
| 10 | 3,200 | 0.18~0.27 | 3,200 | 0.18~0.27 | 2,250 | 0.18~0.27 | 1,700 | 0.18~0.27 | 1,200 | 0.15~0.25 | 1,000 | 0.13~0.23 | 3,200 | 0.18~0.27 | 2,400 | 0.18~0.27 |
| 12 | 2,650 | 0.20~0.30 | 2,650 | 0.20~0.30 | 1,900 | 0.20~0.30 | 1,400 | 0.20~0.30 | 1,000 | 0.17~0.26 | 850 | 0.14~0.24 | 2,700 | 0.20~0.30 | 2,000 | 0.20~0.30 |
| 14 | 2,300 | 0.22~0.35 | 2,300 | 0.22~0.35 | 1,600 | 0.22~0.35 | 1,200 | 0.22~0.35 | 860 | 0.18~0.30 | 730 | 0.15~0.26 | 2,300 | 0.22~0.35 | 1,700 | 0.22~0.35 |
| 16 | 2,000 | 0.25~0.36 | 2,000 | 0.25~0.36 | 1,400 | 0.25~0.36 | 1,050 | 0.25~0.36 | 760 | 0.20~0.32 | 640 | 0.16~0.26 | 2,000 | 0.25~0.36 | 1,500 | 0.25~0.36 |
| 18 | 1,800 | 0.28~0.38 | 1,800 | 0.28~0.38 | 1,250 | 0.28~0.38 | 920 | 0.28~0.38 | 670 | 0.23~0.33 | 570 | 0.18~0.28 | 1,800 | 0.28~0.38 | 1,350 | 0.28~0.38 |
| 20 | 1,600 | 0.30~0.40 | 1,600 | 0.30~0.40 | 1,150 | 0.30~0.40 | 850 | 0.30~0.40 | 600 | 0.25~0.35 | 500 | 0.20~0.30 | 1,600 | 0.30~0.40 | 1,200 | 0.30~0.40 |

ENDMILL

SF50, PI50

| MATERIAL | CARBON STEEL (C < 0.3%) ALLOY STEEL / S440 SCM~710N/mm ² | | CARBON STEEL (C ≥ 0.3%) ALLOY STEEL / S50C SCM~1,060N/mm ² | | SUJ2 · SUS440 | | SKD61 34~43 HRC | | 43~48 HRC | | SKD11 48~53 HRC | | CAST IRON FC 250~350 | | DUCTILE FC 400~500 | |
|------------------|--|------------------|--|------------------|----------------------------|------------------|----------------------------|------------------|----------------------------|------------------|----------------------------|------------------|----------------------------|------------------|----------------------------|------------------|
| | V | 80~150m/min | | 80~150m/min | | 63~100m/min | | 40~70m/min | | 32~50m/min | | 25~40m/min | | 80~150m/min | | 63~100m/min |
| DIAMETER (mm) | RPM (mm ⁻¹) | FEED (mm/rev) | RPM (mm ⁻¹) | FEED (mm/rev) | RPM (mm ⁻¹) | FEED (mm/rev) | RPM (mm ⁻¹) | FEED (mm/rev) | RPM (mm ⁻¹) | FEED (mm/rev) | RPM (mm ⁻¹) | FEED (mm/rev) | RPM (mm ⁻¹) | FEED (mm/rev) | RPM (mm ⁻¹) | FEED (mm/rev) |
| 3 | 12,000 | 0.09~0.12 | 13,000 | 0.09~0.12 | 7,600 | 0.09~0.12 | 6,400 | 0.09~0.12 | 5,300 | 0.07~0.11 | 3,800 | 0.05~0.09 | 12,000 | 0.09~0.12 | 8,500 | 0.09~0.12 |
| 4 | 9,500 | 0.10~0.15 | 10,000 | 0.10~0.15 | 5,700 | 0.10~0.15 | 4,800 | 0.10~0.15 | 4,000 | 0.08~0.13 | 2,950 | 0.06~0.10 | 9,000 | 0.10~0.15 | 6,350 | 0.10~0.15 |
| 5 | 7,600 | 0.12~0.18 | 8,000 | 0.12~0.18 | 4,600 | 0.12~0.18 | 3,800 | 0.12~0.18 | 3,200 | 0.10~0.15 | 2,300 | 0.8~0.12 | 7,600 | 0.12~0.18 | 5,100 | 0.12~0.18 |
| 6 | 6,400 | 0.14~0.20 | 6,600 | 0.14~0.20 | 3,800 | 0.14~0.20 | 3,200 | 0.14~0.20 | 2,650 | 0.12~0.18 | 1,900 | 0.09~0.15 | 6,400 | 0.14~0.20 | 4,250 | 0.14~0.20 |
| 8 | 4,800 | 0.16~0.24 | 5,000 | 0.16~0.24 | 2,900 | 0.16~0.24 | 2,400 | 0.16~0.24 | 2,000 | 0.14~0.22 | 1,450 | 0.12~0.20 | 4,800 | 0.16~0.24 | 3,200 | 0.16~0.24 |
| 10 | 3,800 | 0.18~0.27 | 4,000 | 0.18~0.27 | 2,300 | 0.18~0.27 | 1,900 | 0.18~0.27 | 1,600 | 0.15~0.25 | 1,150 | 0.13~0.23 | 3,800 | 0.18~0.27 | 2,550 | 0.18~0.27 |
| 12 | 3,200 | 0.20~0.30 | 3,300 | 0.20~0.30 | 1,900 | 0.20~0.30 | 1,600 | 0.20~0.30 | 1,300 | 0.17~0.26 | 950 | 0.14~0.24 | 3,200 | 0.20~0.30 | 2,100 | 0.20~0.30 |
| 14 | 2,700 | 0.22~0.35 | 2,800 | 0.22~0.35 | 1,600 | 0.22~0.35 | 1,350 | 0.22~0.35 | 1,150 | 0.18~0.30 | 800 | 0.15~0.26 | 2,700 | 0.22~0.35 | 1,800 | 0.22~0.35 |
| 16 | 2,400 | 0.25~0.36 | 2,500 | 0.25~0.36 | 1,400 | 0.25~0.36 | 1,200 | 0.25~0.36 | 1,000 | 0.20~0.32 | 700 | 0.16~0.26 | 2,400 | 0.25~0.36 | 1,600 | 0.25~0.36 |
| 18 | 2,100 | 0.28~0.38 | 2,200 | 0.28~0.38 | 1,300 | 0.28~0.38 | 1,100 | 0.28~0.38 | 900 | 0.23~0.33 | 650 | 0.18~0.28 | 2,100 | 0.28~0.38 | 1,400 | 0.28~0.38 |
| 20 | 1,900 | 0.30~0.40 | 2,000 | 0.30~0.40 | 1,150 | 0.30~0.40 | 1,000 | 0.30~0.40 | 800 | 0.25~0.35 | 600 | 0.20~0.30 | 1,900 | 0.30~0.40 | 1,250 | 0.30~0.40 |

DRILL

MEMO

UNION MATERIALS

CUTTING TOOLS

C

CHUCK

Products Index C 2

Hydraulic Chuck Technical Information C 4

HYDRAULIC CHUCK - STANDARD C 8

- MAS 403 BT - Short & Heavy Design
- DIN 69871 SK - Short & Heavy Design
- MAS 403 BT
- DIN 69871 SK
- DIN 69893 HSK Type

Reduction Sleeve C 17

- Coolant waterproof type
- Standard

Shrink Fit Chuck - Slim Design (3.0° slop) C 19

- MAS 403 BT
- DIN 69893 HSK
- Extension Sleeve

MILLING CHUCK C 31

- MAS 403 BT
- DIN 69871 SK
- DIN 69893 HSK
- Milling Chuck Collet

ER COLLET CHUCK C 36

- MAS 403 BT
- DIN 69871 SK
- DIN 69893 HSK
- Straight Shank
- ER Collet
- ER Nut & Spanner

NC DRILL CHUCK C 45

- MAS 403 BT
- DIN 69893 HSK

End Mill Holder C 46

- MAS 403 BT
- DIN 69871 SK
- DIN 69893 HSK

Face Mill Arbor C 50

- MAS 403 BT
- DIN 69893 HSK

TAPPING CHUCK C 55

- MAS 403 BT
- Tap Adaptor



Shank Information C 57

APPLICATION INDEX

HYDRAULIC CHUCK

| Hydraulic Chuck - Short & Heavy Design | Hydraulic Chuck - Slim Design | Reduction Sleeve |
|---|--|--|
|  <p>Page 8</p> |  <p>Page 9~16</p> |  <p>Page 17~18</p> |

SHRINK FIT CHUCK

| Shrink Fit Chuck - Slim Design | Extension Sleeve - Slim Design |
|---|---|
|  <p>Page 20~28</p> |  <p>Page 29~30</p> |

MILLING CHUCK

| Milling Chuck & Collets | ER Collets Chuck | ER Collets & Accessories |
|---|---|--|
|  <p>Page 32~35</p> |  <p>Page 36~41</p> |  <p>Page 42~44</p> |

| NC Drill Chuck | End Mill Holder | Face Mill Arbor | Tapping Chuck |
|--|---|--|--|
|  <p>Page 45</p> |  <p>Page 46~49</p> |  <p>Page 50~54</p> |  <p>Page 55</p> |

Tap Adaptor



PRODUCTS INFORMATION

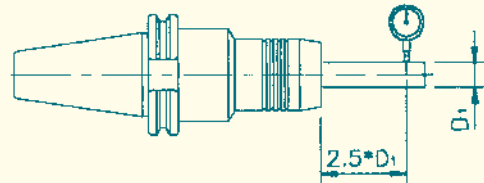


1. Apply Tools

Endmill, Drill, Reamer,
High accuracy tools, etc.

2. High roundness within 3 μ m.

Fine roundness assures longer tool life.



3. Over limit bore size, various size of collet can be applied.

4. Easy to clamp and unclamp with a T-wrench.

5. Good for high speed.

Even under high speed, it works very fast without vibration and makes sure of fine process and safety.

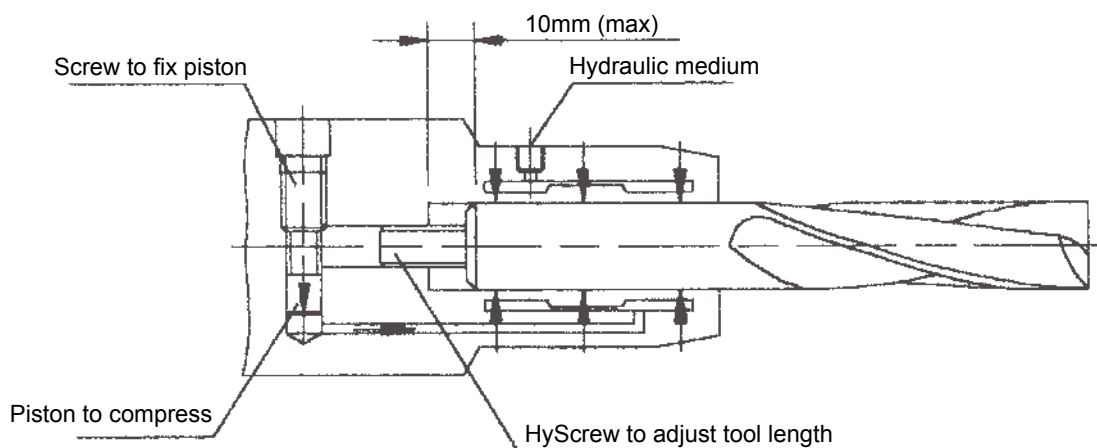
6. Coolant System.

Coolant can be supplied to the center through internal and external shank.

DIN69871 AD+B type.



BASIC PLAN OF HYDRAULIC EXPANSION CHUCK



Advantages of Hydraulic Expansion Chuck

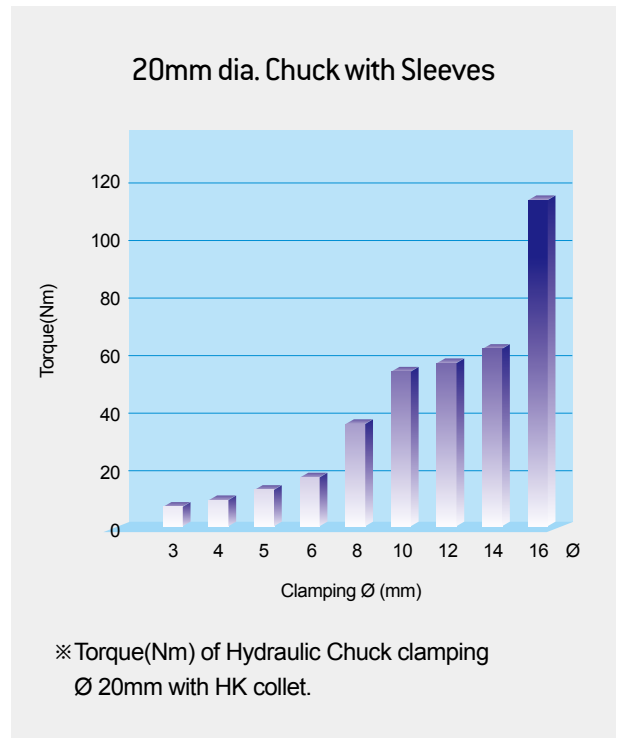
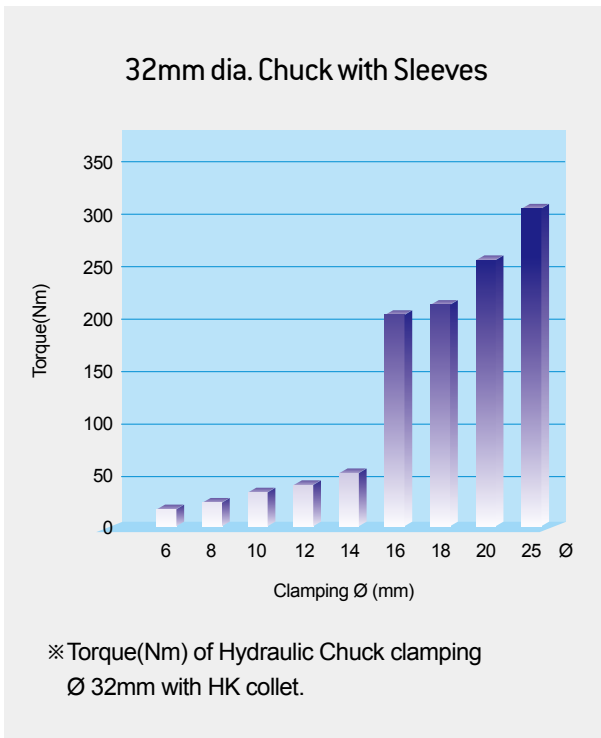
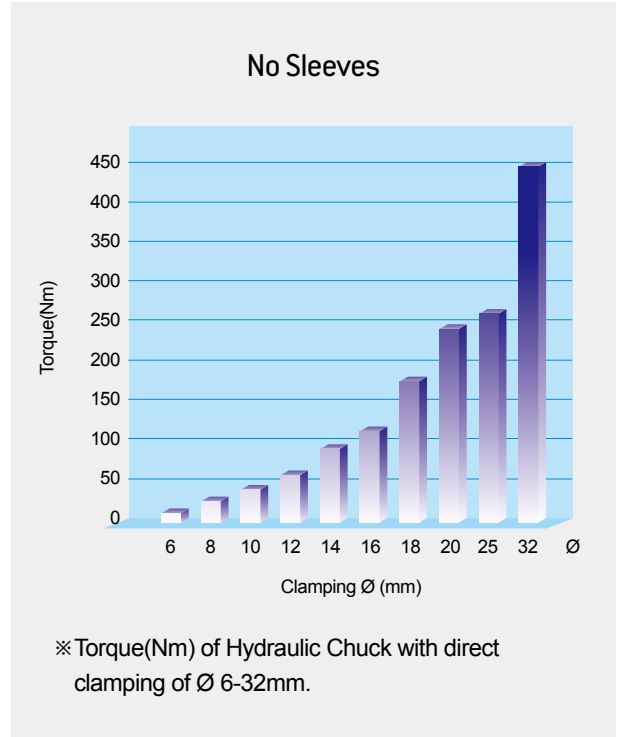
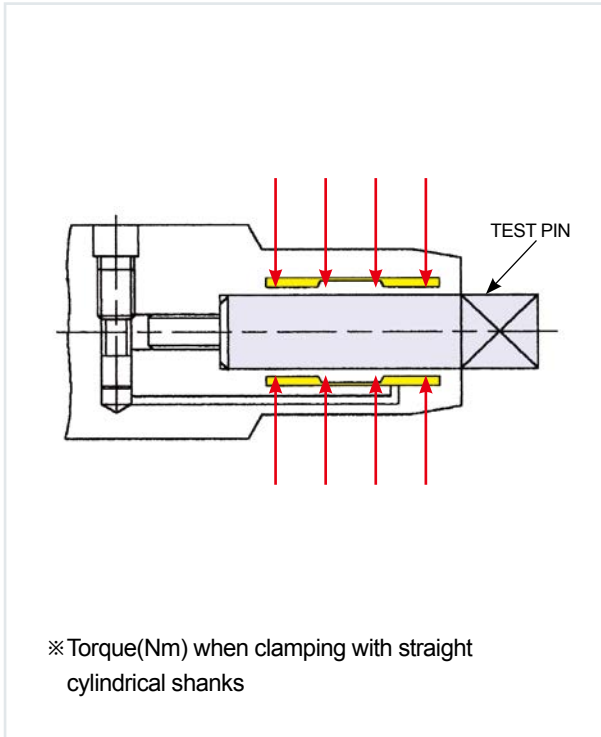
- High T.I.R. accuracy and repeatability of $\leq 3\mu\text{m}$ guarantee to have a precise interference between tool cutting edge and workpiece, rendering less tool wear.
- Balance (option)
Good balance of Hydraulic Chuck enables fine working under high speed and safety.
- The advanced system of Hydraulic Chuck completely prevents penetration of oil, grease, coolant or chips.
- Excellent output is expected when clamping with straight cylindrical shanks.

Advantages of Collet

- Collets can save costs by clamping with variety of shank diameter.
- Shanks with recesses may also be clamped by using a collet.

PRODUCTS INFORMATION

TORQUE (HYDRAULIC CHUCK)

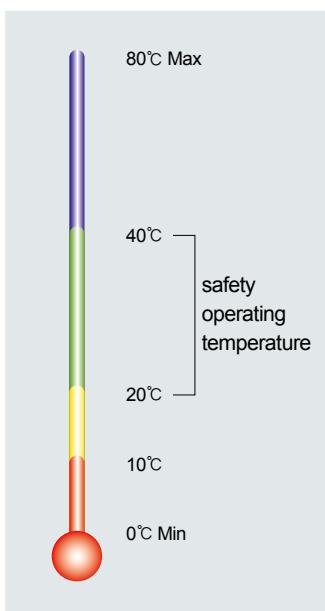


R·P·M / BALANCE

| | |
|---------------------|------------|
| Special Balanced | 25,000 rpm |
| Fine Balanced | 10,000 rpm |



TEMPERATURE



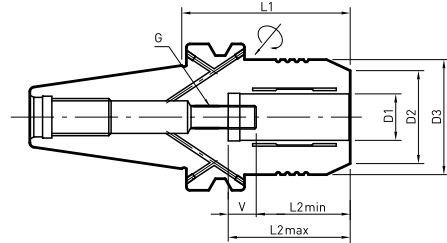
Operating Temperature

Generally, the normal operating temperature of Hydraulic Chuck is between 20°C ~ 40°C. When operating temperature isn't the normal range, pls ask technical information.



HYDRAULIC EXPANSION CHUCK

MAS 403 - BT SHORT & HEAVY DESIGN



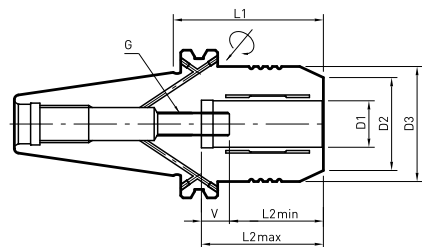
| | | | | | |
|---------------------|-------------------------------|----------------------------------|------------------------|---------------------|----|
| Taper AT3 | T.I.R ≥5μm 2.5×D | Bal./rpm G2.5 20000 | Coolant AD/B | HRc 48-50 | mm |
|---------------------|-------------------------------|----------------------------------|------------------------|---------------------|----|

| CODE NO | | | D ₁ | D ₂ | D ₃ | L ₁ | L _{2 max} | L _{2 min} | V | G |
|-----------|------|--------------|----------------|----------------|----------------|----------------|--------------------|--------------------|----|---------|
| 23.30.111 | BT30 | SHC 20P-85 | 20 | 40 | 44 | 85 | 52.5 | 42.5 | 10 | M8×1.0 |
| 24.40.211 | BT40 | SHC 20P-72.5 | | | 49.5 | 72.5 | | | | |
| 27.50.311 | BT50 | SHC 32P-90 | 32 | 60 | 72 | 90 | 65 | 55 | | M16×1.0 |

Note BT50 : Balancing grade G2.5 / 15000rpm

HYDRAULIC
CHUCK

DIN 69871 - SK SHORT & HEAVY DESIGN

SHRINK FIT
CHUCKMILLING
CHUCKER COLLET
CHUCKNC DRILL
CHUCKTAPPING
CHUCK

| | | | | | |
|---------------------|-------------------------------|----------------------------------|------------------------|---------------------|----|
| Taper AT3 | T.I.R ≥5μm 2.5×D | Bal./rpm G2.5 20000 | Coolant AD/B | HRc 48-50 | mm |
|---------------------|-------------------------------|----------------------------------|------------------------|---------------------|----|

| CODE NO | | | D ₁ | D ₂ | D ₃ | L ₁ | L _{2 max} | L _{2 min} | V | G |
|-----------|------|--------------|----------------|----------------|----------------|----------------|--------------------|--------------------|----|---------|
| 26.40.411 | SK40 | SHC 20P-64.5 | 20 | 40 | 49.5 | 64.5 | 52.5 | 42.5 | 10 | M8×1.0 |
| 27.50.511 | SK50 | SHC 32P-81 | 32 | 60 | 72 | 81 | 65 | 55 | | M16×1.0 |

Note SK50 : Balancing grade G2.5 / 15000rpm

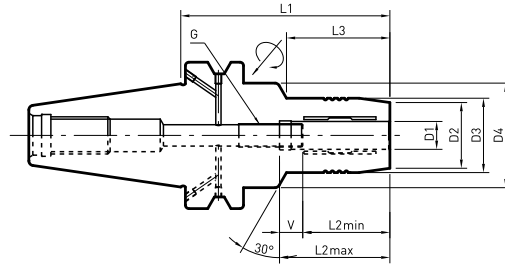
HYDRAULIC EXPANSION CHUCK

PART.

C

MAS 403 - BT30

CHUCK



| | | | | | |
|---------------------|-------------------------------|----------------------------------|------------------------|---------------------|----|
| Taper AT3 | T.I.R ≥5µm 2.5×D | Bal./rpm G2.5 20000 | Coolant AD/B | HRc 48-50 | mm |
|---------------------|-------------------------------|----------------------------------|------------------------|---------------------|----|

| CODE NO | | D ₁ | D ₂ | D ₃ | D ₄ | L ₁ | L _{2 max} | L _{2 min} | V | L ₃ | G |
|-----------|------|----------------|----------------|----------------|----------------|----------------|--------------------|--------------------|----|----------------|--------|
| 23.30.211 | BT30 | 6 | 25 | 28 | 45 | 70 | 37.5 | 27.5 | 10 | 28 | M5×0.8 |
| 23.30.212 | | 8 | 27 | 30 | | | | | | | M6×1.0 |
| 23.30.213 | | 10 | 29 | 32 | | | | | | | M8×1.0 |
| 23.30.214 | | 12 | 31 | 34 | | | | | | | |
| 23.30.215 | | 14 | 33 | 36 | | | | | | | |
| 23.30.216 | | 16 | 35 | 38 | | | | | | | |
| 23.30.217 | | 18 | 38 | 41 | | | | | | | |
| 23.30.218 | | 20 | 40 | 43 | | | | | | | - |

Note Reducing tool shank OD(chuck ID) through Reduction Sleeve

HYDRAULIC
CHUCK

SHRINK FIT
CHUCK

MILLING
CHUCK

ER COLLET
CHUCK

NC DRILL
CHUCK

TAPPING
CHUCK

MAS 403 - BT40

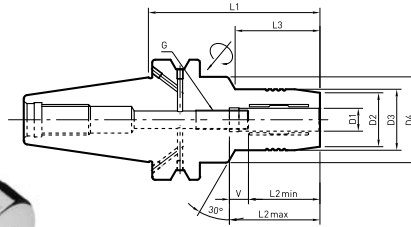


Fig1

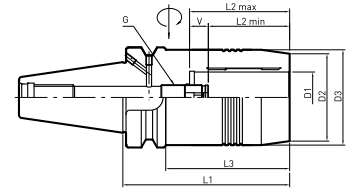


Fig2

| | | | | | |
|---------------------|-------------------------------|----------------------------------|------------------------|---------------------|----|
| Taper AT3 | T.I.R ≥5μm 2.5×D | Bal./rpm G2.5 20000 | Coolant AD/B | HRc 48-50 | mm |
|---------------------|-------------------------------|----------------------------------|------------------------|---------------------|----|

| CODE NO | | D ₁ | D ₂ | D ₃ | D ₄ | L ₁ | L _{2 max} | L _{2 min} | V | L ₃ | G | Type |
|-----------|------|----------------|----------------|----------------|----------------|----------------|--------------------|--------------------|------|----------------|--------|------|
| 24.40.225 | BT40 | 6 | 25 | 28 | 50 | 65 | 37.5 | 27.5 | 10 | 23 | M5×0.8 | Fig1 |
| 24.40.212 | | | | | | 90 | | | | 44 | | |
| 24.40.226 | | 8 | 27 | 30 | | 65 | 42.5 | 32.5 | | 23 | | |
| 24.40.213 | | | | | | 90 | | | | 44 | | |
| 24.40.227 | | 10 | 29 | 32 | | 65 | 47.5 | 37.5 | | 23 | | |
| 24.40.214 | | | | | | 90 | | | | 44 | | |
| 24.40.228 | | 12 | 31 | 34 | | 65 | 52.5 | 42.5 | | 23 | | |
| 24.40.215 | | | | | | 90 | | | | 44 | | |
| 24.40.233 | | 14 | 33 | 36 | | 65 | 75 | 42.5 | | 23 | | |
| 24.40.234 | | | | | | 90 | | | | 44 | | |
| 24.40.229 | | 16 | 35 | 38 | | 65 | 90 | 51 | | 23 | | |
| 24.40.216 | | | | | | 90 | | | | 48 | | |
| 24.40.235 | | 18 | 38 | 41 | | 75 | 100 | 55 | | 30 | | |
| 24.40.236 | | | | | | 90 | | | | 48 | | |
| 24.40.230 | | 20 | 40 | 43 | | 75 | 105 | 65 | | 30 | | |
| 24.40.217 | | | | | | 90 | | | | 48 | | |
| 24.40.231 | 25 | 53 | 57 | - | 61 | 51 | 73 | M16×1.0 | Fig2 | | | |
| 24.40.232 | | | | 105 | 65 | 55 | 78 | | | | | |

Note Reducing tool shank OD(chuck ID) through Reduction Sleeve

HYDRAULIC
CHUCKSHRINK FIT
CHUCKMILLING
CHUCKER COLLET
CHUCKNC DRILL
CHUCKTAPPING
CHUCK

HYDRAULIC EXPANSION CHUCK

PART.

C

MAS 403 - BT50

CHUCK

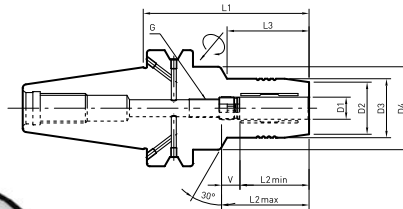


Fig1

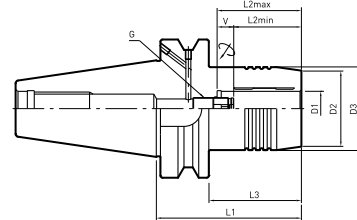


Fig2

| | | | | | |
|---------------------|-------------------------------|----------------------------------|------------------------|---------------------|----|
| Taper AT3 | T.I.R ≥5µm 2.5×D | Bal./rpm G2.5 20000 | Coolant AD/B | HRc 48-50 | mm |
|---------------------|-------------------------------|----------------------------------|------------------------|---------------------|----|

| CODE NO | | D ₁ | D ₂ | D ₃ | D ₄ | L ₁ | L _{2 max} | L _{2 min} | V | L ₃ | G | Type | | | | | | |
|-----------|------|----------------|----------------|----------------|----------------|----------------|--------------------|--------------------|----|----------------|--------|------|----|--------|------|------|---------|--------|
| 25.50.316 | BT50 | 6 | 25 | 28 | 50 | 90 | 37.5 | 27.5 | 10 | 32 | M5×0.8 | Fig1 | | | | | | |
| 25.50.411 | | | | | | 120 | | | | 38 | | | | | | | | |
| 20.50.317 | | | | | | 8 | | | | 27 | | | 30 | 90 | 32 | | | |
| 25.50.412 | | | | | | | | | | | | | | 120 | 40 | | | |
| 25.50.318 | | | | | | 10 | | | | 29 | | | 32 | 90 | 42.5 | 32.5 | 32 | M6×1.0 |
| 25.50.413 | | | | | | | | | | | | | | 120 | | | 42 | |
| 25.50.319 | | 12 | 31 | 34 | | 90 | 47.5 | 37.5 | | 32 | | | | | | | | |
| 25.50.414 | | | | | | 120 | | | | 44 | | | | | | | | |
| 25.50.324 | | 14 | 33 | 36 | | 90 | | | | 52.5 | 42.5 | | 32 | M8×1.0 | | | | |
| 25.50.415 | | | | | | 120 | | | | | | | 44 | | | | | |
| 25.50.320 | | 16 | 35 | 38 | | 90 | | | | | | | 61 | | 51 | 32 | M16×1.0 | |
| 25.50.416 | | | | | | 120 | | | | | | | | | | 46 | | |
| 25.50.325 | | 18 | 38 | 41 | | 90 | 65 | 55 | | | | | | | | 32 | | |
| 25.50.417 | | | | | | 120 | | | | | | | | | | 46 | | |
| 25.50.321 | | 20 | 40 | 43 | | 90 | | | | 77 | 77 | | | 32 | | | | |
| 25.50.418 | | | | | | 120 | | | | | | | | 48 | | | | |
| 25.50.322 | | 25 | 53 | 57 | | 105 | | | | | | | - | - | 67 | Fig2 | | |
| 25.50.323 | | | | | | 115 | | | | | | | | | 65 | | 55 | |

Note Reducing tool shank OD(chuck ID) through Reduction Sleeve

HYDRAULIC CHUCK

SHRINK FIT CHUCK

MILLING CHUCK

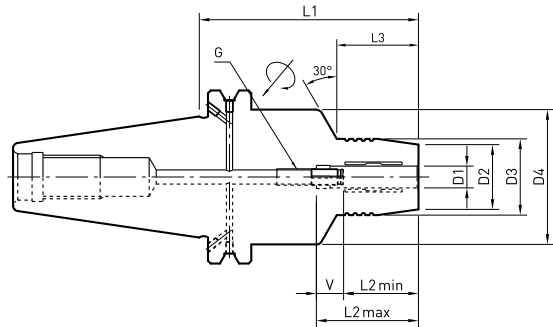
ER COLLET CHUCK

NC DRILL CHUCK

TAPPING CHUCK

HYDRAULIC EXPANSION CHUCK

DIN 69871 - SK40



| | | | | |
|---------------------|-------------------------------|----------------------------------|------------------------|---------------------|
| Taper AT3 | T.I.R ≥5µm 2.5×D | Bal./rpm G2.5 20000 | Coolant AD/B | HRc 48-50 |
|---------------------|-------------------------------|----------------------------------|------------------------|---------------------|

| CODE NO | | D ₁ | D ₂ | D ₃ | D ₄ | L ₁ | L _{2 max} | L _{2 min} | V | L ₃ | G |
|-----------|-------------|----------------|----------------|----------------|----------------|----------------|--------------------|--------------------|----|----------------|---------|
| 26.40.426 | SHC 6-65 | | | | | 65 | | | | 23 | M5×0.8 |
| 26.40.412 | SHC 6-80.5 | 6 | 25 | 28 | | 80.5 | | | | 44 | |
| 26.40.420 | SHC 6-110 | | | | | 110 | 37.5 | 27.5 | | 23 | |
| 26.40.427 | SHC 8-65 | | | | | 65 | | | | 44 | M6×1.0 |
| 26.40.413 | SHC 8-80.5 | 8 | 27 | 30 | | 80.5 | | | | 23 | |
| 26.40.421 | SHC 8-110 | | | | | 110 | | | | 44 | |
| 26.40.248 | SHC 10-65 | | | | | 65 | | | | 23 | M6×1.0 |
| 26.40.414 | SHC 10-80.5 | 10 | 29 | 32 | | 80.5 | 42.5 | 32.5 | | 44 | |
| 26.40.422 | SHC 10-110 | | | | | 110 | | | | 23 | |
| 26.40.429 | SHC 12-65 | | | | | 65 | | | | 44 | M8×1.0 |
| 26.40.415 | SHC 12-80.5 | 12 | 31 | 34 | 50 | 80.5 | | | | 23 | |
| 26.40.423 | SHC 12-110 | | | | | 110 | 47.5 | 37.5 | | 44 | |
| 26.40.431 | SHC 14-65 | | | | | 65 | | | 10 | 23 | M8×1.0 |
| 26.40.434 | SHC 14-80.5 | 14 | 33 | 36 | | 80.5 | | | | 44 | |
| 26.40.436 | SHC 14-110 | | | | | 110 | | | | 30 | |
| 26.40.430 | SHC 16-75 | | | | | 75 | | | | 48 | M10×1.0 |
| 26.40.416 | SHC 16-80.5 | 16 | 35 | 38 | | 80.5 | | | | 30 | |
| 26.40.424 | SHC 16-110 | | | | | 110 | | | | 48 | |
| 26.40.432 | SHC 18-75 | | | | | 75 | | | | 30 | M10×1.0 |
| 26.40.435 | SHC 18-80.5 | 18 | 38 | 41 | | 80.5 | 52.5 | 42.5 | | 48 | |
| 26.40.437 | SHC 18-110 | | | | | 135 | | | | 30 | |
| 26.40.433 | SHC 20-75 | | | | | 75 | | | | 48 | M16×1.0 |
| 26.40.417 | SHC 20-80.5 | 20 | 40 | 43 | | 80.5 | | | | 26 | |
| 26.40.425 | SHC 20-110 | | | | | 110 | | | | 48 | |
| 26.40.418 | SHC 25-80.5 | 25 | 53 | 57 | 66 | 80.5 | 61.0 | 51.0 | | 26 | M16×1.0 |
| 26.40.419 | SHC 32-80.5 | 32 | 60 | 63 | 80 | | 65.0 | 55.0 | | 48 | |

Note Reducing tool shank OD(chuck ID) through Reduction Sleeve

HYDRAULIC
CHUCKSHRINK FIT
CHUCKMILLING
CHUCKER COLLET
CHUCKNC DRILL
CHUCKTAPPING
CHUCK

HYDRAULIC EXPANSION CHUCK

PART.

C

DIN 69871 - SK50

CHUCK

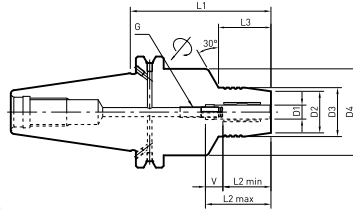


Fig1

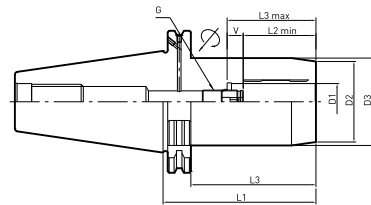


Fig2

| | | | | | |
|---------------------|-------------------------------|----------------------------------|------------------------|---------------------|----|
| Taper AT3 | T.I.R ≥5µm 2.5×D | Bal./rpm G2.5 20000 | Coolant AD/B | HRc 48-50 | mm |
|---------------------|-------------------------------|----------------------------------|------------------------|---------------------|----|

| CODE NO | | D ₁ | D ₂ | D ₃ | D ₄ | L ₁ | L _{2 max} | L _{2 min} | V | L ₃ | G | Type | | |
|-----------|------|----------------|----------------|----------------|----------------|----------------|--------------------|--------------------|------|----------------|------|---------|------|------|
| 27.50.514 | SK50 | SHC 6-90 | 6 | 25 | 28 | 50 | 90 | 37.5 | 27.5 | 10 | 44 | M5×0.8 | Fig1 | |
| 27.50.515 | | SHC 8-90 | 8 | 27 | 30 | | | | | | 44 | M6×1.0 | | |
| 27.50.516 | | SHC 10-90 | 10 | 29 | 32 | | | | | | 44 | M8×1.0 | | |
| 27.50.517 | | SHC 12-90 | 12 | 31 | 34 | | | | | | 44 | | | |
| 27.50.520 | | SHC 14-90 | 14 | 33 | 36 | | | | | | 44 | | | |
| 27.50.518 | | SHC 16-90 | 16 | 35 | 38 | | | | | | 48 | | | |
| 27.50.521 | | SHC 18-90 | 18 | 38 | 41 | | | | | | 48 | M16×1.0 | | Fig2 |
| 27.50.519 | | SHC 20-90 | 20 | 40 | 43 | | | | | | 48 | | | |
| 27.50.522 | | SHC 25-105 | 25 | 53 | 57 | | | | | | 85.9 | | | |
| 27.50.523 | | SHC 32-115 | 32 | 58 | 63 | | | | | | - | 105 | | 61.0 |
| | | | | | | 115 | 65.0 | 55.0 | | | | | | |

Note Reducing tool shank OD(chuck ID) through Reduction Sleeve

HYDRAULIC CHUCK

SHRINK FIT CHUCK

MILLING CHUCK

ER COLLET CHUCK

NC DRILL CHUCK

TAPPING CHUCK

HYDRAULIC EXPANSION CHUCK

DIN 69893 - HSK TYPE A

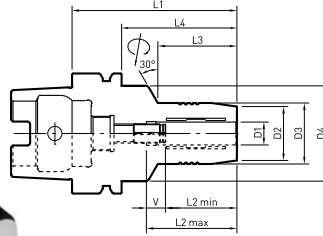


Fig1

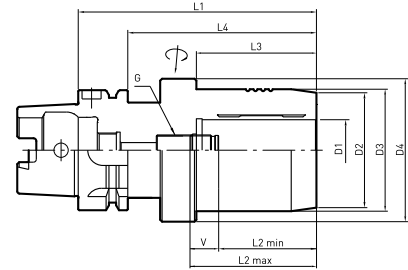


Fig2

| | | | | |
|---------------------|-------------------------------|----------------------------------|----------------------|---------------------|
| Taper AT3 | T.I.R ≥5µm 2.5×D | Bal./rpm G2.5 20000 | Coolant AD | HRc 48-50 |
|---------------------|-------------------------------|----------------------------------|----------------------|---------------------|

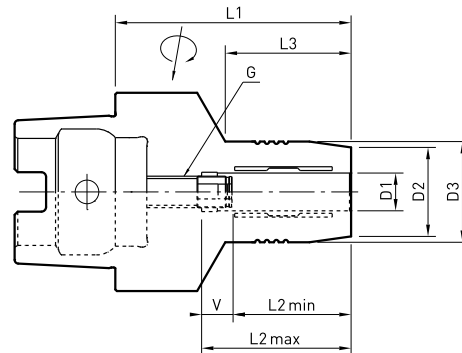
| CODE NO | | D ₁ | D ₂ | D ₃ | D ₄ | L ₁ | L _{2 max} | L _{2 min} | V | L ₃ | L ₄ | G | Type | | |
|------------------|---------|----------------|----------------|----------------|----------------|----------------|--------------------|--------------------|------|----------------|----------------|---------|--------|------|------|
| HYDRAULIC CHUCK | HSK40A | 28.40.611 | 6 | 25 | 28 | 34 | 70 | 37.5 | 27.5 | 10 | 28 | 50 | M5×0.8 | Fig1 | |
| | | 28.40.612 | 8 | 27 | 30 | | 75 | 42.5 | 32.5 | | 34 | 55 | M6×1.0 | | |
| | | 28.40.613 | 10 | 29 | 32 | | 85 | 47.5 | 37.5 | | 40 | 60 | M8×1.0 | | |
| | | 28.40.614 | 12 | 31 | 34 | | 90 | 52.5 | 42.5 | | 44 | 64 | | | |
| SHRINK FIT CHUCK | HSK50A | 29.50.711 | 6 | 25 | 28 | 40 | 70 | 37.5 | 27.5 | | 28 | 44 | M5×0.8 | | Fig1 |
| | | 29.50.712 | 8 | 27 | 30 | | 80 | 42.5 | 32.5 | | 34 | 49 | | | |
| | | 29.50.713 | 10 | 29 | 32 | | 85 | 47.5 | 37.5 | | 44 | 59 | | | |
| | | 29.50.714 | 12 | 31 | 34 | | 90 | 52.5 | 42.5 | | 30 | 64 | M8×1.0 | | |
| | | 29.50.715 | 14 | 33 | 36 | 60 | 90 | 52.5 | 42.5 | | 48 | 64 | | | |
| | | 29.50.716 | 16 | 35 | 38 | 62 | | | | | | | | | |
| | | 29.50.717 | 18 | 38 | 41 | 30 | | | | | | | | 64 | |
| | | 29.50.718 | 20 | 40 | 43 | 30 | | | | | | | 64 | | |
| MILLING CHUCK | HSK63A | 30.63.811 | 6 | 25 | 28 | 50 | 70 | 37.5 | 27.5 | 24 | 44 | M5×0.8 | Fig1 | | |
| | | 30.63.812 | 8 | 27 | 30 | | 80 | 42.5 | 32.5 | 35 | 54 | M6×1.0 | | | |
| | | 30.63.813 | 10 | 29 | 32 | | 85 | 47.5 | 37.5 | 40 | 59 | | | | |
| | | 30.63.814 | 12 | 31 | 34 | | 90 | 52.5 | 42.5 | 46 | 64 | | | | |
| | | 30.63.815 | 14 | 33 | 36 | 90 | 52.5 | 42.5 | 47 | 64 | | | | | |
| | | 30.63.816 | 16 | 35 | 38 | | | | 48 | | | | | | |
| | | 30.63.817 | 18 | 38 | 41 | 63 | 120 | 61 | 51 | 59 | 94 | M16×1.0 | | | |
| | | 30.63.818 | 20 | 40 | 43 | | | | | 63 | 94 | | | | |
| | | 30.63.819 | 25 | 53 | 57 | 75 | 125 | 65 | 55 | 63 | 99 | Fig2 | | | |
| | | 30.63.820 | 32 | 58 | 63 | | | | | | | | | | |
| ER COLLET CHUCK | HSK100A | 31.10.911 | 6 | 25 | 28 | 50 | 75 | 37.5 | 27.5 | 26 | 46 | M5×0.8 | Fig1 | | |
| | | 31.10.912 | 8 | 27 | 30 | | 90 | 42.5 | 32.5 | 42 | 61 | M6×1.0 | | | |
| | | 31.10.913 | 10 | 29 | 32 | | 95 | 47.5 | 37.5 | 47 | 66 | | | | |
| | | 31.10.914 | 12 | 31 | 34 | | 100 | 52.5 | 42.5 | 53 | 71 | | | | |
| | | 31.10.915 | 14 | 33 | 36 | 105 | 59 | | | 76 | | | | | |
| | | 31.10.916 | 16 | 35 | 38 | 63 | | 110 | 61 | | 51 | 62 | | 81 | |
| | | 31.10.917 | 18 | 38 | 41 | | 75 | | | 110 | | | | | 65 |
| | | 31.10.918 | 20 | 40 | 43 | | | | | | | | | | |
| | | 31.10.919 | 25 | 53 | 57 | | | | | | | | | | |
| | | 31.10.920 | 32 | 58 | 63 | | | | | | | | | | |

Note Reducing tool shank OD(chuck ID) through Reduction Sleeve

HYDRAULIC EXPANSION CHUCK

PART.
C

DIN 69893 - HSK TYPE C



CHUCK

| | | | | | |
|---------------------|-------------------------------|----------------------------------|----------------------|---------------------|----|
| Taper AT3 | T.I.R ≥5µm 2.5×D | Bal./rpm G2.5 20000 | Coolant AD | HRc 48-50 | mm |
|---------------------|-------------------------------|----------------------------------|----------------------|---------------------|----|

| CODE NO | | D ₁ | D ₂ | D ₃ | L ₁ | L _{2 max} | L _{2 min} | V | L ₃ | G | |
|-----------|--------|----------------|----------------|----------------|----------------|--------------------|--------------------|------|----------------|----|--------|
| 28.40.615 | HSK40C | SHC 6-60 | 6 | 25 | 28 | 60 | 37.5 | 27.5 | 10 | 35 | M5×0.8 |
| 28.40.616 | | SHC 8-60 | 8 | 27 | 30 | | | | | 36 | M6×1.0 |
| 28.40.617 | | SHC 10-65 | 10 | 29 | 32 | | | | | 41 | M8×1.0 |
| 28.40.618 | | SHC 12-70 | 12 | 31 | 34 | | | | | 47 | M8×1.0 |
| 29.50.719 | HSK50C | SHC 6-60 | 6 | 25 | 28 | 60 | 37.5 | 27.5 | 10 | 30 | M5×0.8 |
| 29.50.720 | | SHC 8-60 | 8 | 27 | 30 | | | | | 30 | M6×1.0 |
| 29.50.721 | | SHC 10-65 | 10 | 29 | 32 | | | | | 35 | |
| 29.50.722 | | SHC 12-75 | 12 | 31 | 34 | | | | | 44 | |
| 29.50.723 | | SHC 14-75 | 14 | 33 | 36 | 46 | M8×1.0 | | | | |
| 29.50.724 | | SHC 16-80 | 16 | 35 | 38 | 51 | | | | | |
| 29.50.725 | | SHC 18-80 | 18 | 38 | 41 | 80 | 51 | | | | |
| 29.50.726 | | SHC 20-80 | 20 | 40 | 43 | 80 | 52 | | | | |

Note Reducing tool shank OD(chuck ID) through Reduction Sleeve

HYDRAULIC
CHUCK

SHRINK FIT
CHUCK

MILLING
CHUCK

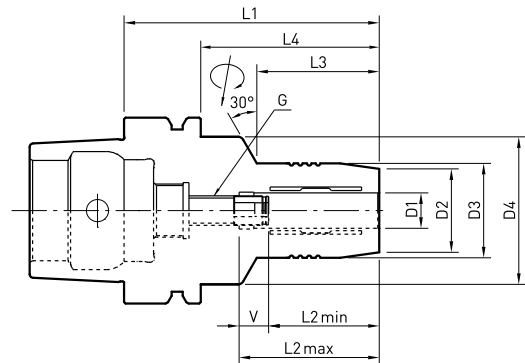
ER COLLET
CHUCK

NC DRILL
CHUCK

TAPPING
CHUCK

HYDRAULIC EXPANSION CHUCK

DIN 69893 - HSK TYPE E



| | | | | | |
|---------------------|-------------------------------|----------------------------------|----------------------|---------------------|----|
| Taper AT3 | T.I.R ≥5µm 2.5×D | Bal./rpm G2.5 20000 | Coolant AD | HRc 48-50 | mm |
|---------------------|-------------------------------|----------------------------------|----------------------|---------------------|----|

| CODE NO | | | D ₁ | D ₂ | D ₃ | L ₁ | L _{2 max} | L _{2 min} | V | L ₃ | G |
|-----------|--------|-----------|----------------|----------------|----------------|----------------|--------------------|--------------------|----|----------------|--------|
| 28.40.619 | HSK40E | SHC 6-75 | 6 | 25 | 28 | 75 | 37.5 | 27.5 | 10 | 28 | M5×0.8 |
| 28.40.620 | | SHC 8-70 | 8 | 27 | 30 | 70 | | | | 28 | |
| 28.40.621 | | SHC 10-75 | 10 | 29 | 32 | 75 | | | | 34 | M6×1.0 |
| 28.40.622 | | SHC 12-85 | 12 | 31 | 34 | 85 | | | | - | |
| 29.50.727 | HSK50E | SHC 6-70 | 6 | 25 | 28 | 70 | 37.5 | 27.5 | | 28 | M5×0.8 |
| 29.50.728 | | SHC 8-70 | 8 | 27 | 30 | 70 | | | | 34 | M6×1.0 |
| 29.50.729 | | SHC 10-80 | 10 | 29 | 32 | 80 | | | | 44 | M8×1.0 |
| 29.50.730 | | SHC 12-85 | 12 | 31 | 34 | 85 | 44 | | | | |
| 29.50.733 | | SHC 14-90 | 14 | 33 | 36 | 90 | 47.5 | 37.5 | | 44 | |
| 29.50.731 | | SHC 16-90 | 16 | 35 | 38 | | | | | 30 | |
| 29.50.734 | | SHC 18-90 | 18 | 38 | 41 | | | | 30 | | |
| 29.50.732 | | SHC 20-90 | 20 | 40 | 43 | 90 | 52.5 | 42.5 | 30 | | |

Note Reducing tool shank OD(chuck ID) through Reduction Sleeve

HYDRAULIC
CHUCK

SHRINK FIT
CHUCK

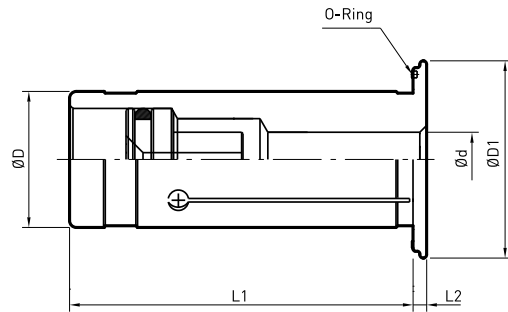
MILLING
CHUCK

ER COLLET
CHUCK

NC DRILL
CHUCK

TAPPING
CHUCK

OD



100% Coolant Waterproof

- Using for center through coolant system
- Reducing Tool Shank OD(=Chuck ID)

T.I.R
≥5µm
2.5×D mm

| CODE NO | d | D | D ₁ | L ₁ | L ₂ |
|---------|----|----|----------------|----------------|----------------|
| OHK12 | 3 | 12 | 12 | 45 | 2 |
| | 4 | | | | |
| | 5 | | | | |
| | 6 | | | | |
| | 8 | | | | |
| OHK20 | 3 | 20 | 29 | 50.5 | 2 |
| | 4 | | | | |
| | 5 | | | | |
| | 6 | | | | |
| | 8 | | | | |
| | 10 | | | | |
| | 12 | | | | |
| | 14 | | | | |
| OHK32 | 6 | 32 | 39 | 60.5 | 3 |
| | 8 | | | | |
| | 10 | | | | |
| | 12 | | | | |
| | 14 | | | | |
| | 16 | | | | |
| | 18 | | | | |
| | 20 | | | | |
| 25 | | | | | |

HYDRAULIC
CHUCK

SHRINK FIT
CHUCK

MILLING
CHUCK

ER COLLET
CHUCK

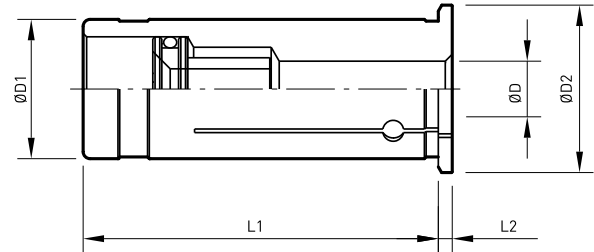
NC DRILL
CHUCK

TAPPING
CHUCK

HYDRAULIC EXPANSION CHUCK

REDUCTION SLEEVE - STANDARD

D



Reducing Tool Shank OD(=Chuck ID)

T.I.R
 $\geq 5\mu\text{m}$
 $2.5 \times D$ mm

| | CODE NO | | D | D ₁ | D ₂ | L ₁ | L ₂ |
|--|-----------|----|----|----------------|----------------|----------------|----------------|
| | 21.12.003 | 3 | 3 | | | | |
| | 21.12.004 | 4 | 4 | | | | |
| | 21.12.005 | 5 | 5 | 12 | 16 | 44.5 | 2 |
| | 21.12.006 | 6 | 6 | | | | |
| | 21.12.008 | 8 | 8 | | | | |
| | 22.20.003 | 3 | 3 | | | | |
| | 22.20.004 | 4 | 4 | | | | |
| | 22.20.005 | 5 | 5 | | | | |
| | 22.20.006 | 6 | 6 | | | | |
| | 22.20.008 | 8 | 8 | 20 | 24 | 50.5 | 2 |
| | 22.20.010 | 10 | 10 | | | | |
| | 22.20.012 | 12 | 12 | | | | |
| | 22.20.014 | 14 | 14 | | | | |
| | 22.20.016 | 16 | 16 | | | | |
| | 23.32.006 | 6 | 6 | | | | |
| | 23.32.008 | 8 | 8 | | | | |
| | 23.32.010 | 10 | 10 | | | | |
| | 23.32.012 | 12 | 12 | | | | |
| | 23.32.014 | 14 | 14 | 32 | 36 | 60.5 | 3 |
| | 23.32.016 | 16 | 16 | | | | |
| | 23.32.018 | 18 | 18 | | | | |
| | 23.32.020 | 20 | 20 | | | | |
| | 23.32.025 | 25 | 25 | | | | |

HYDRAULIC
CHUCKSHRINK FIT
CHUCKMILLING
CHUCKER COLLET
CHUCKNC DRILL
CHUCKTAPPING
CHUCK

SHRINK FIT CHUCK

PART.

C

CHUCK



HYDRAULIC
CHUCK

SHRINK FIT
CHUCK

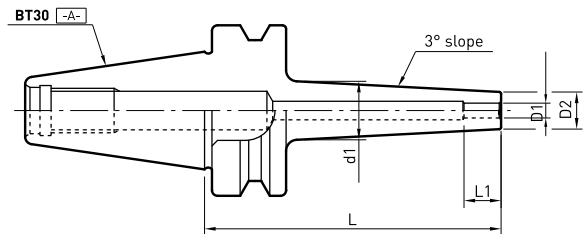
MILLING
CHUCK

ER COLLET
CHUCK

NC DRILL
CHUCK

TAPPING
CHUCK

MAS 403 - BT30



| | | | | | |
|---------------------|-------------------------------|----------------------------------|------------------------|---------------------|--------------------------------|
| Taper AT3 | T.I.R ≥3μm 2.5×D | Bal./rpm G2.5 25000 | Coolant AD/B | HRc 52~55 | For Solid Carbide |
|---------------------|-------------------------------|----------------------------------|------------------------|---------------------|--------------------------------|

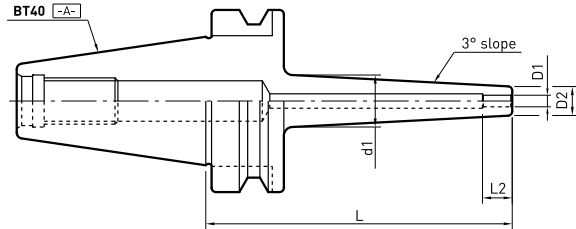
| CODE NO | ∅d ₁ | D ₁ | D ₂ | L ₁ | L | |
|-----------|-----------------|----------------|----------------|----------------|----|----|
| BT30 | SHR 3-80 | 14.8 | 3 | 9 | 9 | 80 |
| | SHR 4-80 | 15.8 | 4 | 10 | 12 | 80 |
| | SHR 5-80 | 16.8 | 5 | 11 | 15 | 80 |
| | SHR 6-80 | 17.8 | 6 | 12 | 25 | 80 |
| | SHR 8-80 | 19.8 | 8 | 14 | 25 | 80 |
| | SHR 10-80 | 21.8 | 10 | 16 | 32 | 80 |
| | SHR 12-80 | 23.8 | 12 | 18 | 38 | 80 |
| | SHR 14-80 | 25.8 | 14 | 20 | 40 | 80 |
| | SHR 16-90 | 27.8 | 16 | 22 | 40 | 90 |
| | SHR 18-90 | 29.8 | 18 | 24 | 42 | 90 |
| SHR 20-90 | 31.8 | 20 | 26 | 44 | 90 | |

HYDRAULIC
CHUCKSHRINK FIT
CHUCKMILLING
CHUCKER COLLET
CHUCKNC DRILL
CHUCKTAPPING
CHUCK

h6 Tolerance Data of Tool Shank OD

| TOOL SHANK OD (∅) | 3.0~6.0 | 6.1~10.0 | 10.1~14.0 | 14.1~18.0 | 18.1~24.0 | 24.1~30.0 | 30.1~40.0 |
|---------------------|---------|----------|-----------|-----------|-----------|-----------|-----------|
| h6 Tolerance | 0~8μm | 0~9μm | 0~11μm | 0~11μm | 0~13μm | 0~13μm | 0~16μm |

MAS 403 - BT40



| | | | | | | |
|---------------------|-------------------------------|----------------------------------|------------------------|---------------------|-----------------------------|----|
| Taper AT3 | T.I.R ≥3µm 2.5×D | Bal./rpm G2.5 25000 | Coolant AD/B | HRc 52~55 | For Solid Carbide | mm |
|---------------------|-------------------------------|----------------------------------|------------------------|---------------------|-----------------------------|----|

| CODE NO | $\emptyset d_1$ | D_1 | D_2 | L1 | L |
|------------|-----------------|-------|-------|-----|----|
| BT40 | SHR 3-90 | 17 | 3 | 9 | 90 |
| | SHR 4-90 | 18 | 4 | 10 | 90 |
| | SHR 5-90 | 19 | 5 | 11 | 90 |
| | SHR 6-90 | 20 | 6 | 12 | 90 |
| | SHR 8-90 | 22 | 8 | 14 | 90 |
| | SHR 10-90 | 24 | 10 | 16 | 90 |
| | SHR 12-90 | 26 | 12 | 18 | 90 |
| | SHR 14-90 | 28 | 14 | 20 | 90 |
| | SHR 16-90 | 30 | 16 | 22 | 90 |
| | SHR 18-95 | 32 | 18 | 24 | 95 |
| | SHR 20-95 | 34 | 20 | 26 | 95 |
| SHR 25-100 | 39 | 25 | 31 | 100 | |

HYDRAULIC CHUCK

SHRINK FIT CHUCK

MILLING CHUCK

ER COLLET CHUCK

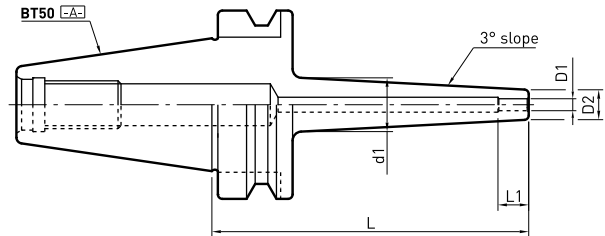
NC DRILL CHUCK

TAPPING CHUCK

h6 Tolerance Data of Tool Shank OD

| TOOL SHANK OD (Ø) | 3.0~6.0 | 6.1~10.0 | 10.1~14.0 | 14.1~18.0 | 18.1~24.0 | 24.1~30.0 | 30.1~40.0 |
|---------------------|---------|----------|-----------|-----------|-----------|-----------|-----------|
| h6 Tolerance | 0~8µm | 0~9µm | 0~11µm | 0~11µm | 0~13µm | 0~13µm | 0~16µm |

MAS 403 - BT50



| | | | | | |
|---------------------|-------------------------------|----------------------------------|------------------------|---------------------|--------------------------------|
| Taper AT3 | T.I.R ≥3μm 2.5×D | Bal./rpm G2.5 25000 | Coolant AD/B | HRc 52~55 | For Solid Carbide |
|---------------------|-------------------------------|----------------------------------|------------------------|---------------------|--------------------------------|

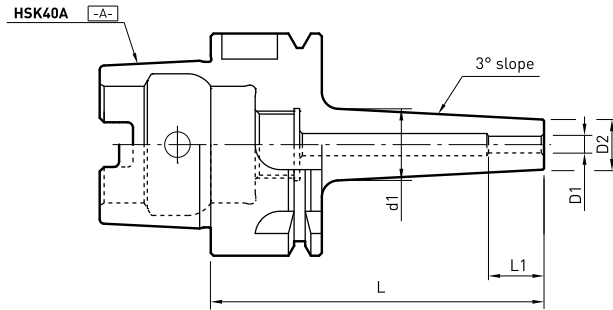
| CODE NO | | ∅d ₁ | D ₁ | D ₂ | L ₁ | L |
|------------|------------|-----------------|----------------|----------------|----------------|-----|
| BT50 | SHR 6-100 | 20.4 | 6 | 12 | 25 | 100 |
| | SHR 8-100 | 22.4 | 8 | 14 | 25 | |
| | SHR 10-100 | 24.4 | 10 | 16 | 32 | |
| | SHR 12-100 | 26.4 | 12 | 18 | 38 | |
| | SHR 14-100 | 28.4 | 14 | 20 | 40 | |
| | SHR 16-100 | 30.4 | 16 | 22 | 42 | |
| | SHR 18-100 | 32.4 | 18 | 24 | 44 | |
| | SHR 20-100 | 34.4 | 20 | 26 | 50 | |
| | SHR 25-100 | 39.4 | 25 | 31 | 50 | |
| SHR 32-100 | 46.4 | 32 | 38 | 50 | | |

HYDRAULIC
CHUCKSHRINK FIT
CHUCKMILLING
CHUCKER COLLET
CHUCKNC DRILL
CHUCKTAPPING
CHUCK

h6 Tolerance Data of Tool Shank OD

| TOOL SHANK OD (∅) | 3.0~6.0 | 6.1~10.0 | 10.1~14.0 | 14.1~18.0 | 18.1~24.0 | 24.1~30.0 | 30.1~40.0 |
|---------------------|---------|----------|-----------|-----------|-----------|-----------|-----------|
| h6 Tolerance | 0~8μm | 0~9μm | 0~11μm | 0~11μm | 0~13μm | 0~13μm | 0~16μm |

DIN 69893 HSK40 - FORM A



| | | Taper | T.I.R | Bal./rpm | Coolant | HRc | For | mm |
|------------|------------|-----------------|----------------|----------------|----------------|-------|---------------|----|
| | | AT3 | ≥3µm 2.5×D | G2.5 25000 | AD | 52~55 | Solid Carbide | |
| CODE NO | | Ød ₁ | D ₁ | D ₂ | L ₁ | L | | |
| HSK40A | SHR 3-60 | 19 | 3 | 9 | 9 | 60 | | |
| | SHR 3-120 | | | | | 120 | | |
| | SHR 4-60 | 20 | 4 | 10 | 12 | 60 | | |
| | SHR 4-120 | | | | | 120 | | |
| | SHR 5-60 | 21 | 5 | 11 | 15 | 60 | | |
| | SHR 5-120 | | | | | 120 | | |
| | SHR 6-80 | 22 | 6 | 12 | 25 | 80 | | |
| | SHR 6-120 | | | | | 120 | | |
| | SHR 8-80 | 24 | 8 | 14 | | 80 | | |
| | SHR 8-120 | | | | | 120 | | |
| | SHR 10-80 | 26 | 10 | 16 | 32 | 80 | | |
| | SHR 10-120 | | | | | 120 | | |
| SHR 12-90 | 28 | 12 | 18 | 38 | 90 | | | |
| SHR 12-120 | | | | | 120 | | | |

HYDRAULIC CHUCK

SHRINK FIT CHUCK

MILLING CHUCK

ER COLLET CHUCK

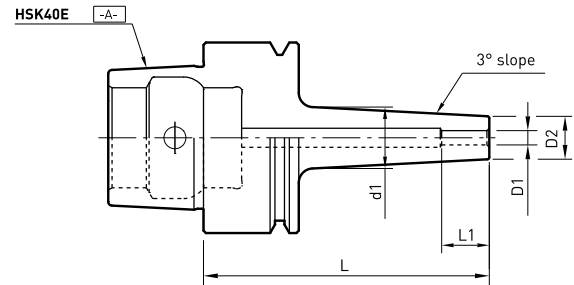
NC DRILL CHUCK

TAPPING CHUCK

h6 Tolerance Data of Tool Shank OD

| TOOL SHANK OD (Ø) | 3.0~6.0 | 6.1~10.0 | 10.1~14.0 | 14.1~18.0 | 18.1~24.0 | 24.1~30.0 | 30.1~40.0 |
|---------------------|---------|----------|-----------|-----------|-----------|-----------|-----------|
| h6 Tolerance | 0~8µm | 0~9µm | 0~11µm | 0~11µm | 0~13µm | 0~13µm | 0~16µm |

DIN 69893 HSK40 - FORM E



| | | | | | |
|---------------------|-------------------------------|----------------------------------|----------------------|---------------------|--------------------------------|
| Taper AT3 | T.I.R ≥3µm 2.5×D | Bal./rpm G2.5 25000 | Coolant AD | HRc 52~55 | For Solid Carbide |
|---------------------|-------------------------------|----------------------------------|----------------------|---------------------|--------------------------------|

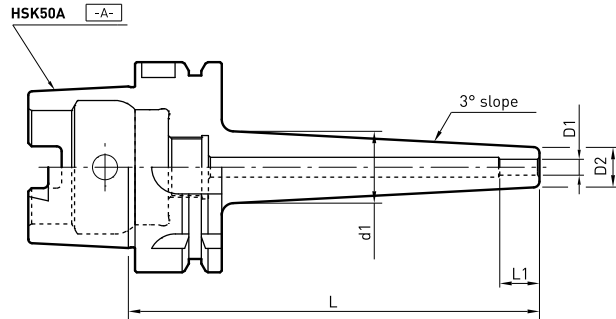
| CODE NO | | Ød ₁ | D ₁ | D ₂ | L ₁ | L | |
|------------|------------|-----------------|----------------|----------------|----------------|-----|-----|
| HSK40E | SHR 3-60 | 19 | 3 | 9 | 9 | 120 | |
| | SHR 3-120 | | | | | 60 | |
| | SHR 4-60 | 20 | 4 | 10 | 12 | 120 | |
| | SHR 4-120 | | | | | 60 | |
| | SHR 5-60 | 21 | 5 | 11 | 15 | 120 | |
| | SHR 5-120 | | | | | 80 | |
| | SHR 6-80 | 22 | 6 | 12 | 25 | 120 | |
| | SHR 6-120 | | | | | 80 | |
| | SHR 8-80 | 24 | 8 | 14 | | 32 | 120 |
| | SHR 8-120 | | | | | | 80 |
| | SHR 10-80 | 26 | 10 | 16 | | 38 | 120 |
| | SHR 10-120 | | | | | | 90 |
| | SHR 12-90 | 28 | 12 | 18 | | 120 | |
| SHR 12-120 | | | | | | | |

HYDRAULIC
CHUCKSHRINK FIT
CHUCKMILLING
CHUCKER COLLET
CHUCKNC DRILL
CHUCKTAPPING
CHUCK

h6 Tolerance Data of Tool Shank OD

| TOOL SHANK OD (Ø) | 3.0~6.0 | 6.1~10.0 | 10.1~14.0 | 14.1~18.0 | 18.1~24.0 | 24.1~30.0 | 30.1~40.0 |
|---------------------|---------|----------|-----------|-----------|-----------|-----------|-----------|
| h6 Tolerance | 0~8µm | 0~9µm | 0~11µm | 0~11µm | 0~13µm | 0~13µm | 0~16µm |

DIN 69893 HSK50 - FORM A



| | | | | | | |
|---------------------|-------------------------------|----------------------------------|----------------------|---------------------|-----------------------------|----|
| Taper AT3 | T.I.R ≥3µm 2.5×D | Bal./rpm G2.5 25000 | Coolant AD | HRc 52~55 | For Solid Carbide | mm |
|---------------------|-------------------------------|----------------------------------|----------------------|---------------------|-----------------------------|----|

| CODE NO | | Ød ₁ | D ₁ | D ₂ | L ₁ | L |
|------------|------------|-----------------|----------------|----------------|----------------|-----|
| HSK50A | SHR 4-60 | 18.6 | 4 | 9 | 12 | 60 |
| | SHR 5-60 | 19.6 | 5 | 10 | 15 | |
| | SHR 6-60 | | 6 | 11 | 25 | |
| | SHR 8-80 | 21.6 | 8 | 12 | | 32 |
| | SHR 8-120 | | | | 120 | |
| | SHR 10-80 | 23.6 | 10 | 14 | 38 | 80 |
| | SHR 10-120 | | | | | 120 |
| | SHR 12-85 | 25.6 | 12 | 16 | 44 | 85 |
| | SHR 12-120 | | | | | 120 |
| | SHR 14-90 | 27.6 | 14 | 18 | 44 | 90 |
| | SHR 14-120 | | | | | 120 |
| | SHR 16-90 | 29.6 | 16 | 20 | 44 | 90 |
| | SHR 16-120 | | | | | 120 |
| | SHR 18-95 | 31.6 | 18 | 22 | 44 | 95 |
| | SHR 18-120 | | | | | 120 |
| SHR 20-100 | 100 | | | | | |
| SHR 20-120 | | 20 | | 44 | 120 | |

HYDRAULIC
CHUCK

SHRINK FIT
CHUCK

MILLING
CHUCK

ER COLLET
CHUCK

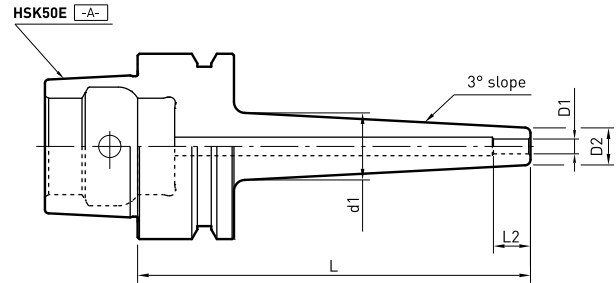
NC DRILL
CHUCK

TAPPING
CHUCK

h6 Tolerance Data of Tool Shank OD

| TOOL SHANK OD (Ø) | 3.0~6.0 | 6.1~10.0 | 10.1~14.0 | 14.1~18.0 | 18.1~24.0 | 24.1~30.0 | 30.1~40.0 |
|---------------------|---------|----------|-----------|-----------|-----------|-----------|-----------|
| h6 Tolerance | 0~8µm | 0~9µm | 0~11µm | 0~11µm | 0~13µm | 0~13µm | 0~16µm |

DIN 69893 HSK50 - FORM E



| | | | | | |
|---------------------|-------------------------------|----------------------------------|----------------------|---------------------|-----------------------------|
| Taper AT3 | T.I.R ≥3μm 2.5×D | Bal./rpm G2.5 25000 | Coolant AD | HRc 52~55 | For Solid Carbide |
|---------------------|-------------------------------|----------------------------------|----------------------|---------------------|-----------------------------|

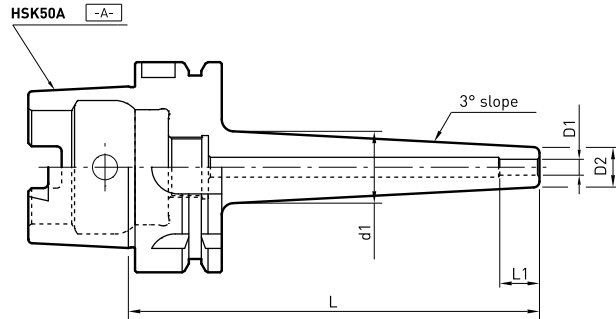
| CODE NO | ∅d ₁ | D ₁ | D ₂ | L ₁ | L | |
|------------|-----------------|----------------|----------------|----------------|----|-----|
| HSK50E | SHR 4-60 | 18.6 | 4 | 9 | 12 | 60 |
| | SHR 5-60 | 19.6 | 5 | 10 | 15 | |
| | SHR 6-60 | | 6 | 11 | 25 | 80 |
| | SHR 8-80 | 21.6 | 8 | 12 | | 120 |
| | SHR 8-120 | | 23.6 | 10 | | 14 |
| | SHR 10-80 | 120 | | | | |
| | SHR 10-120 | 25.6 | 12 | 16 | 38 | 85 |
| | SHR 12-85 | | | | | 120 |
| | SHR 12-120 | 27.6 | 14 | 18 | 40 | 90 |
| | SHR 14-90 | | | | | 120 |
| | SHR 14-120 | 29.6 | 16 | 20 | 42 | 90 |
| | SHR 16-90 | | | | | 120 |
| | SHR 16-120 | 31.6 | 18 | 22 | 44 | 95 |
| | SHR 18-95 | | | | | 120 |
| | SHR 18-120 | 20 | 20 | 22 | 44 | 100 |
| | SHR 20-100 | | | | | 120 |
| SHR 20-120 | | | | | | |

HYDRAULIC
CHUCKSHRINK FIT
CHUCKMILLING
CHUCKER COLLET
CHUCKNC DRILL
CHUCKTAPPING
CHUCK

h6 Tolerance Data of Tool Shank OD

| TOOL SHANK OD (∅) | 3.0~6.0 | 6.1~10.0 | 10.1~14.0 | 14.1~18.0 | 18.1~24.0 | 24.1~30.0 | 30.1~40.0 |
|---------------------|---------|----------|-----------|-----------|-----------|-----------|-----------|
| h6 Tolerance | 0~8μm | 0~9μm | 0~11μm | 0~11μm | 0~13μm | 0~13μm | 0~16μm |

DIN 69893 HSK63 - FORM A



| | | | | | | |
|---------------------|-------------------------------|----------------------------------|----------------------|---------------------|-----------------------------|----|
| Taper AT3 | T.I.R ≥3µm 2.5×D | Bal./rpm G2.5 25000 | Coolant AD | HRc 52~55 | For Solid Carbide | mm |
|---------------------|-------------------------------|----------------------------------|----------------------|---------------------|-----------------------------|----|

| CODE NO | ∅d ₁ | D ₁ | D ₂ | L ₁ | L | |
|------------|-----------------|----------------|----------------|----------------|----|-----|
| HSK63A | SHR 3-80 | 17.1 | 3 | 9 | 9 | 80 |
| | SHR 4-80 | 18.1 | 4 | 10 | 12 | 80 |
| | SHR 5-80 | 19.1 | 5 | 11 | 15 | 80 |
| | SHR 6-80 | 20.1 | 6 | 12 | 25 | 80 |
| | SHR 6-120 | | | | | 120 |
| | SHR 8-80 | 22.1 | 8 | 14 | | 80 |
| | SHR 8-120 | | | | | 120 |
| | SHR 10-85 | 24.1 | 10 | 16 | 32 | 85 |
| | SHR 10-120 | | | | | 120 |
| | SHR 12-90 | 26.1 | 12 | 18 | 38 | 90 |
| | SHR 12-120 | | | | | 120 |
| | SHR 14-90 | 28.1 | 14 | 20 | | 90 |
| | SHR 14-120 | | | | | 120 |
| | SHR 16-95 | 30.1 | 16 | 22 | 40 | 95 |
| | SHR 16-120 | | | | | 120 |
| | SHR 18-95 | 32.1 | 18 | 24 | 42 | 95 |
| | SHR 18-120 | | | | | 120 |
| | SHR 20-100 | 34.1 | 20 | 26 | 44 | 100 |
| | SHR 20-120 | | | | | 120 |
| | SHR 25-115 | 39.1 | 25 | 31 | 50 | 115 |
| SHR 25-130 | 130 | | | | | |
| SHR 32-120 | 46.1 | | | | | 32 |
| SHR 32-130 | | 130 | | | | |

HYDRAULIC CHUCK

SHRINK FIT CHUCK

MILLING CHUCK

ER COLLET CHUCK

NC DRILL CHUCK

TAPPING CHUCK

h6 Tolerance Data of Tool Shank OD

| TOOL SHANK OD (∅) | 3.0~6.0 | 6.1~10.0 | 10.1~14.0 | 14.1~18.0 | 18.1~24.0 | 24.1~30.0 | 30.1~40.0 |
|---------------------|---------|----------|-----------|-----------|-----------|-----------|-----------|
| h6 Tolerance | 0~8µm | 0~9µm | 0~11µm | 0~11µm | 0~13µm | 0~13µm | 0~16µm |

DIN 69893 HSK100 - FORM A

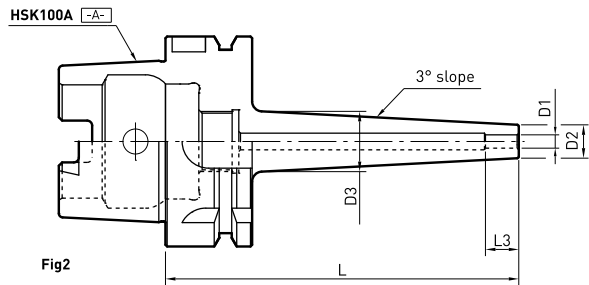
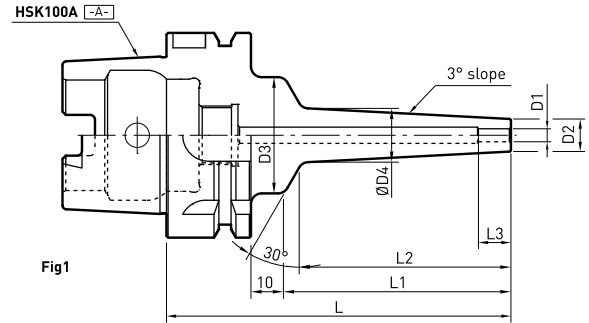


HSK100A Form.

- Heat resistant hot-working steel
- Hardened 54-2 HRC
- For HSS and solid carbide tools
- Shank tolerance h6

Certificate of Quality

- Chuck body fine balanced
- G2.5 25,000 RPM
- All functional surfaces machined
- More accurate than DIN



| | | | | | |
|---------------------|-------------------------------|----------------------------------|----------------------|---------------------|-----------------------------|
| Taper AT3 | T.I.R ≥3µm 2.5×D | Bal./rpm G2.5 25000 | Coolant AD | HRc 52~55 | For Solid Carbide |
|---------------------|-------------------------------|----------------------------------|----------------------|---------------------|-----------------------------|

mm

| CODE NO | | D ₁ | D ₂ | D ₃ | L ₁ | L _{2 max} | L _{2 min} | V | L ₃ | G |
|------------------|------------|----------------|----------------|----------------|----------------|--------------------|--------------------|-----|----------------|-------|
| HYDRAULIC CHUCK | SHR 6-85 | 6 | 12 | 50 | 24.8 | 91 | 83.84 | 25 | 80 | Fig 1 |
| | SHR 8-85 | 8 | 14 | | | | | | 85 | |
| | SHR 10-90 | 10 | 16 | | | | | | 90 | |
| | SHR 12-95 | 12 | 18 | | | | | | 95 | |
| | SHR 14-95 | 14 | 20 | | | | | | 100 | |
| SHRINK FIT CHUCK | SHR 16-100 | 16 | 22 | - | 39.2 | - | - | 42 | 100 | Fig 2 |
| | SHR 18-100 | 18 | 24 | | | | | | 105 | |
| | SHR 20-105 | 20 | 26 | | | | | | 115 | |
| | SHR 25-115 | 25 | 31 | | | | | | 120 | |
| MILLING CHUCK | SHR 32-120 | 32 | 38 | - | - | - | 50 | 120 | - | |

HYDRAULIC CHUCK

SHRINK FIT CHUCK

MILLING CHUCK

ER COLLET CHUCK

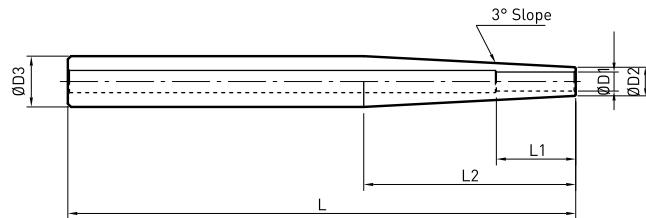
NC DRILL CHUCK

TAPPING CHUCK

h6 Tolerance Data of Tool Shank OD

| TOOL SHANK OD (Ø) | 3.0~6.0 | 6.1~10.0 | 10.1~14.0 | 14.1~18.0 | 18.1~24.0 | 24.1~30.0 | 30.1~40.0 |
|---------------------|---------|----------|-----------|-----------|-----------|-----------|-----------|
| h6 Tolerance | 0~8µm | 0~9µm | 0~11µm | 0~11µm | 0~13µm | 0~13µm | 0~16µm |

EXTENSION SLEEVE



| | | | | | |
|---------------------|-------------------------------|----------------------|---------------------|-----------------------------|----|
| Taper AT3 | T.I.R ≥3µm 2.5×D | Coolant AD | HRc 52~55 | For Solid Carbide | mm |
|---------------------|-------------------------------|----------------------|---------------------|-----------------------------|----|

| CODE NO | | D ₁ | D ₂ | D ₃ | L ₁ | L ₂ | L | Shank Tolerance |
|---------|------------|----------------|----------------|----------------|----------------|----------------|-----|-----------------|
| SR12 | SHR 3-160 | 3 | 6 | 12 | 9 | 28.6 | 160 | h4 |
| | SHR 4-160 | 4 | 7 | | 12 | | | |
| | SHR 5-160 | 5 | 8 | | 15 | | | |
| | SHR 6-160 | 6 | 9 | | 25 | | | |
| SR16 | SHR 3-160 | 3 | 6 | 16 | 9 | 66.8 | 160 | h6 |
| | SHR 4-160 | 4 | 7 | | 12 | | | |
| | SHR 5-160 | 5 | 8 | | 15 | | | |
| | SHR 6-160 | 6 | 9 | | 25 | | | |
| | SHR 8-160 | 8 | 11 | | 32 | | | |
| | SHR 10-160 | 10 | 13 | | 32 | | | |
| SR20 | SHR 6-160 | 6 | 9 | 20 | 25 | 105 | 160 | h6 |
| | SHR 8-160 | 8 | 11 | | 32 | | | |
| | SHR 10-160 | 10 | 13 | | 32 | | | |
| | SHR 12-160 | 12 | 15 | | 38 | | | |

HYDRAULIC CHUCK

SHRINK FIT CHUCK

MILLING CHUCK

ER COLLET CHUCK

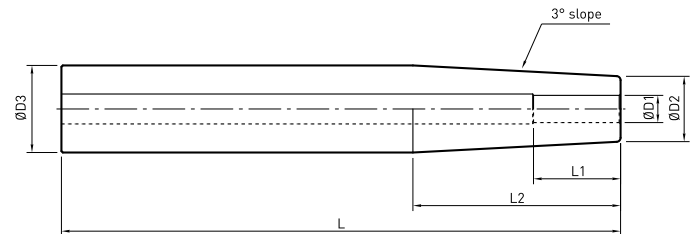
NC DRILL CHUCK

TAPPING CHUCK

h6 Tolerance Data of Tool Shank OD

| TOOL SHANK OD (Ø) | 3.0~6.0 | 6.1~10.0 | 10.1~14.0 | 14.1~18.0 | 18.1~24.0 | 24.1~30.0 | 30.1~40.0 |
|---------------------|---------|----------|-----------|-----------|-----------|-----------|-----------|
| h6 Tolerance | 0~8µm | 0~9µm | 0~11µm | 0~11µm | 0~13µm | 0~13µm | 0~16µm |

EXTENSION SLEEVE



| | | | | | |
|---------------------|-------------------------------|----------------------|---------------------|-----------------------------|----|
| Taper AT3 | T.I.R ≥3μm 2.5×D | Coolant AD | HRc 52~55 | For Solid Carbide | mm |
|---------------------|-------------------------------|----------------------|---------------------|-----------------------------|----|

| CODE NO | | D ₁ | D ₂ | D ₃ | L ₁ | L ₂ | L | Shank Tolerance |
|---------|------------|----------------|----------------|----------------|----------------|----------------|-----|-----------------|
| SR20 | SHR 6-300 | 6 | 12 | 20 | 25 | 76.3 | 300 | h6 |
| | SHR 8-300 | 8 | 14 | | | | | |
| SR16 | SHR 8-300 | 8 | 14 | 25 | 25 | 124 | | |
| | SHR 10-300 | 10 | 16 | | 32 | | | |
| | SHR 12-300 | 12 | 18 | | 38 | | | |
| | SHR 14-300 | 14 | 20 | | 40 | | | |
| | SHR 16-300 | 16 | 22 | | 40 | | | |
| SR20 | SHR 10-300 | 10 | 16 | 32 | 32 | 190.8 | | |
| | SHR 12-300 | 12 | 18 | | 38 | | | |
| | SHR 14-300 | 14 | 20 | | 40 | | | |
| | SHR 16-300 | 16 | 22 | | 40 | | | |
| | SHR 20-300 | 20 | 26 | | 42 | | | |

HYDRAULIC
CHUCKSHRINK FIT
CHUCKMILLING
CHUCKER COLLET
CHUCKNC DRILL
CHUCKTAPPING
CHUCK

h6 Tolerance Data of Tool Shank OD

| TOOL SHANK OD (Ø) | 3.0~6.0 | 6.1~10.0 | 10.1~14.0 | 14.1~18.0 | 18.1~24.0 | 24.1~30.0 | 30.1~40.0 |
|---------------------|---------|----------|-----------|-----------|-----------|-----------|-----------|
| h6 Tolerance | 0~8μm | 0~9μm | 0~11μm | 0~11μm | 0~13μm | 0~13μm | 0~16μm |

SINGLE MILLING CHUCK

PART.

C

CHUCK



Durability

- Milling chuck will guarantee long life through retainer that contains 300pcs of needle bearing with minimized friction on its rolling side.
- The retainer made of special steel is semi-permanent.

Needle Roller Bearing

- The Needle roller bearing high precision & high strength works softly without friction, noise, and hard load.

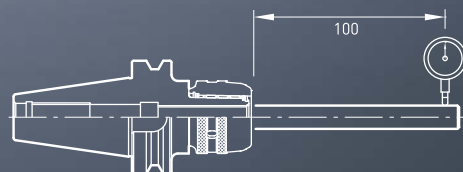
Slot

- 6 slot eliminate oil and dregs, and improve chucking ability by preventing slips.



T.I.R Accuracy

- Below 0.01mm at 2.5D



HYDRAULIC
CHUCK

SHRINK FIT
CHUCK

MILLING
CHUCK

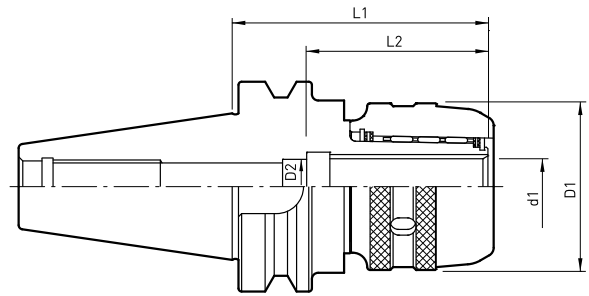
ER COLLET
CHUCK

NC DRILL
CHUCK

TAPPING
CHUCK

SINGLE MILLING CHUCK

MAS 403 - BT



COOLANT

- It is possible to use center through coolant.
Apply the ONK collet.

| | | | | |
|---------------------|--------------------------------|----------------------|---------------------|----|
| Taper AT3 | T.I.R ≥10µm 2.5×D | Coolant AD | HRc 58-60 | mm |
|---------------------|--------------------------------|----------------------|---------------------|----|

| CODE NO | | d ₁ | D ₂ | D ₁ | L ₁ | L ₂ | COLLET |
|-------------|---------|----------------|----------------|----------------|----------------|----------------|--------|
| BT30 | C20-75 | 20 | 19 | 59 | 75 | 65 | K20 |
| | C20-90 | | | | 90 | | |
| | C20-80 | | | | 80 | | |
| | C20-90 | | | | 90 | | |
| BT40 | C20-135 | 25 | 25 | 62 | 135 | 70 | K25 |
| | C25-90 | | | | 90 | | |
| | C25-135 | | | | 135 | | |
| | C32-90 | | | | 90 | | |
| | C32-105 | | | | 105 | | |
| BT50 | C32-135 | 32 | 25 | 75 | 135 | 75 | K32 |
| | C20-105 | | | | 105 | | |
| | C20-150 | | | | 150 | | |
| | C25-105 | | | | 105 | | |
| | C25-135 | | | | 135 | | |
| | C32-110 | | | | 110 | | |
| BT50 | C32-135 | 42 | 25 | 94 | 135 | 85 | K42 |
| | C32-165 | | | | 165 | | |
| | C42-110 | | | | 110 | | |
| | C42-135 | | | | 135 | | |
| | C42-165 | | | | 165 | | |

HYDRAULIC
CHUCKSHRINK FIT
CHUCKMILLING
CHUCKER COLLET
CHUCKNC DRILL
CHUCKTAPPING
CHUCK

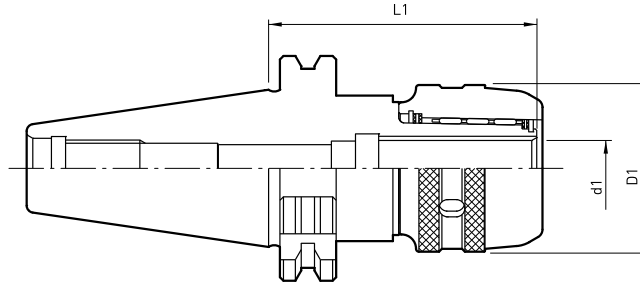
SINGLE MILLING CHUCK

PART.

C

DIN 69871 - SK

CHUCK



| | | | | |
|---------------------|--------------------------------|----------------------|---------------------|----|
| Taper AT3 | T.I.R ≥10µm 2.5×D | Coolant AD | HRc 58-60 | mm |
|---------------------|--------------------------------|----------------------|---------------------|----|

| CODE NO | | d ₁ | D ₁ | L ₁ | COLLET |
|---------|---------|----------------|----------------|----------------|--------|
| SK40 | C20-105 | 20 | 59 | 105 | K20 |
| | C25-105 | 25 | 62 | | K25 |
| | C32-105 | 32 | 75 | 135 | K32 |
| | C32-135 | | | | K32 |
| SK50 | C20-105 | 20 | 59 | 105 | K20 |
| | C25-105 | 25 | 62 | | K25 |
| | C32-105 | 32 | 75 | 135 | K32 |
| | C32-135 | | | | |
| | C32-165 | | | | |
| | C42-115 | 42 | 94 | 115 | K42 |
| | C42-135 | | | 135 | |
| | C42-165 | | | 165 | |
| C42-165 | 165 | | | | |

HYDRAULIC
CHUCK

SHRINK FIT
CHUCK

MILLING
CHUCK

ER COLLET
CHUCK

NC DRILL
CHUCK

TAPPING
CHUCK

SINGLE MILLING CHUCK

DIN 69893 - HSK

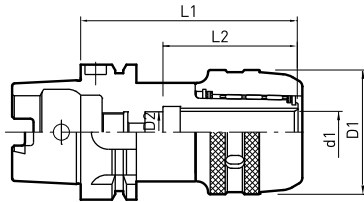


Fig.1

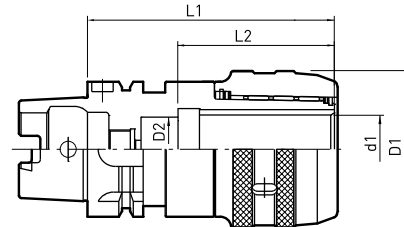


Fig.2

COOLANT

- It is possible to use center through coolant. Apply the ONK collet.

| | | | | |
|---------------------|--------------------------------|----------------------|---------------------|----|
| Taper AT3 | T.I.R ≥10µm 2.5×D | Coolant AD | HRc 58-60 | mm |
|---------------------|--------------------------------|----------------------|---------------------|----|

| CODE NO | | FIG | d ₁ | D ₂ | D ₁ | L ₁ | L ₂ |
|---------|---------|-----|----------------|----------------|----------------|----------------|----------------|
| HSK50A | C20-100 | 1 | 20 | 19 | 59 | 100 | 65 |
| | C20-105 | | | | | 105 | |
| HSK63A | C32-130 | 2 | 32 | 25 | 75 | 130 | 75 |
| | C20-110 | 1 | 20 | 19 | 59 | 110 | 65 |
| C32-135 | 32 | | 25 | | | 75 | |
| C42-135 | 42 | | | 94 | 135 | | 85 |

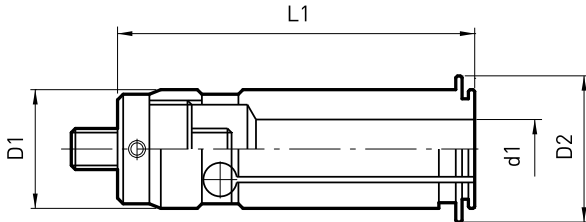
HYDRAULIC
CHUCKSHRINK FIT
CHUCKMILLING
CHUCKER COLLET
CHUCKNC DRILL
CHUCKTAPPING
CHUCK

MILLING CHUCK COLLET

PART.
C

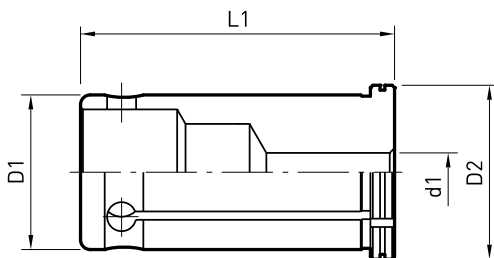
NK (LENGTH ADJUSTABLE)

CHUCK



| | | mm | | |
|------|------------------------------|----------------|----------------|----------------|
| | CODE NO (d ₁) | D ₁ | D ₂ | L ₁ |
| NK20 | 6, 8, 10, 12, 16 | 20 | 24 | 66 |
| NK32 | 6, 8, 10, 12, 16, 20, 25 | 32 | 37 | 80 |
| NK42 | 6, 8, 10, 12, 16, 20, 25, 32 | 42 | 48 | 87 |

K (STRAIGHT COLLET)



| | | mm | | |
|-----|------------------------------|----------------|----------------|----------------|
| | CODE NO (d ₁) | D ₁ | D ₂ | L ₁ |
| K20 | 6, 8, 10, 12, 16 | 20 | 24 | 50 |
| K32 | 6, 8, 10, 12, 16, 20, 25 | 32 | 36 | 65 |
| K42 | 6, 8, 10, 12, 16, 20, 25, 32 | 42 | 48 | 75 |

HYDRAULIC
CHUCK

SHRINK FIT
CHUCK

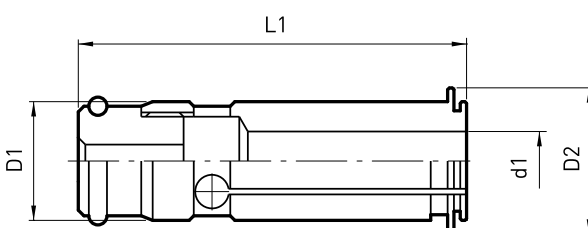
**MILLING
CHUCK**

ER COLLET
CHUCK

NC DRILL
CHUCK

TAPPING
CHUCK

ONK (FOR CENTER THROUGH COOLANT)



| | | mm | | |
|-------|------------------------------|----------------|----------------|----------------|
| | CODE NO (d ₁) | D ₁ | D ₂ | L ₁ |
| ONK20 | 6, 8, 10, 12, 16 | 20 | 24 | 77 |
| ONK32 | 6, 8, 10, 12, 16, 20, 25 | 32 | 37 | 90 |
| ONK42 | 6, 8, 10, 12, 16, 20, 25, 32 | 42 | 48 | 97 |

ER COLLET CHUCK

MAS 403 - BT30

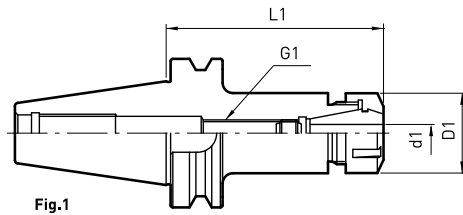


Fig.1

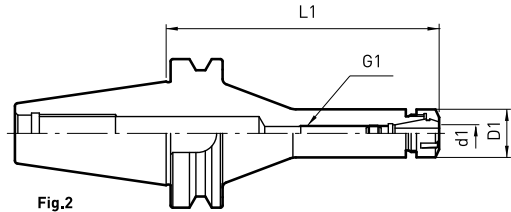


Fig.2

| | | | | |
|---------------------|-------------------------------|----------------------------------|----------------------|---------------------|
| Taper AT3 | T.I.R ≥5μm 2.5×D | Bal./rpm G6.3 12000 | Coolant AD | HRc 58-60 |
|---------------------|-------------------------------|----------------------------------|----------------------|---------------------|

mm

| CODE NO | FIG | d ₁ | D ₁ | L ₁ | G ₁ | WEIGHT(kg) | NUT | SPANNER |
|-------------|-----|----------------|----------------|----------------|----------------|------------|-------|---------|
| BT30 | 1 | 0.5~7 | 19 | 60 | M8×1.0 | 0.5 | ERN11 | ERS11 |
| | | | | 90 | | 0.6 | | |
| | | 1.0~1.0 | 28 | 60 | M11×1.0 | 0.5 | ERN16 | ERS16 |
| | | | | 90 | | 0.6 | | |
| | | 1.0~13 | 34 | 60 | M14×1.0 | 0.6 | ERN20 | ERS20 |
| | | | | 90 | | 0.7 | | |
| | | 1.0~16 | 42 | 75 | M18×1.5 | 1.0 | ERN25 | ERS25 |
| | | | | 105 | | 1.1 | | |
| | | 2.0~20 | 50 | 75 | M8×1.25 | 1.1 | ERN32 | ERS32 |
| | | | | 105 | | 1.2 | | |

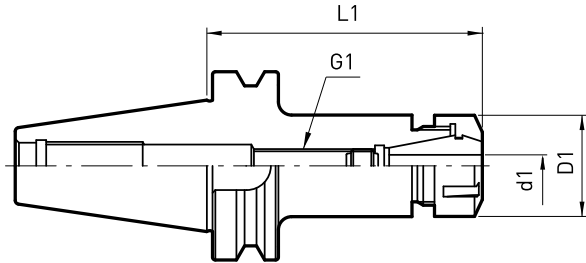
HYDRAULIC
CHUCKSHRINK FIT
CHUCKMILLING
CHUCKER COLLET
CHUCKNC DRILL
CHUCKTAPPING
CHUCK

ER COLLET CHUCK

PART.
C

MAS 403 - BT40

CHUCK



| | | | | | |
|---------------------|-------------------------------|----------------------------------|----------------------|---------------------|----|
| Taper AT3 | T.I.R ≥5μm 2.5×D | Bal./rpm G6.3 12000 | Coolant AD | HRc 58-60 | mm |
|---------------------|-------------------------------|----------------------------------|----------------------|---------------------|----|

| CODE NO | d ₁ | D ₁ | L ₁ | G ₁ | WEIGHT(kg) | NUT | SPANNER | |
|-----------------|-----------------|----------------|----------------|----------------|------------|-------|---------|-------|
| BT40 | ER11-60 | 0.5~7 | 19 | 60 | M8×1.0 | 1.0 | ERN11 | ERS11 |
| | ER16-60 | 1.0~10 | 28 | 60 | M11×1.0 | 1.1 | ERN16 | ERS16 |
| | ER16-90 | | | 90 | | 1.3 | | |
| | ER20-80 | 1.0~13 | 34 | 80 | M14×1.0 | 1.2 | ERN20 | ERS20 |
| | ER20-105 | | | 105 | | 1.4 | | |
| | ER25-80 | 1.0~16 | 42 | 80 | M18×1.5 | 1.3 | ERN25 | ERS25 |
| | ER25-105 | | | 105 | | 1.5 | | |
| | ER32-80 | 2.0~20 | 50 | 80 | M24×1.5 | 1.4 | ERN32 | ERS32 |
| | ER32-105 | | | 105 | | 1.7 | | |
| | ER40-80 | 3.0~26 | 63 | 80 | M12×1.75 | 1.6 | ERN40 | ERS40 |
| | ER40-105 | | | 105 | M28×1.5 | 2.2 | | |
| ER50-105 | 5.0~34 | 78 | 105 | M36×2.0 | 2.7 | ERN50 | ERS50 | |

HYDRAULIC
CHUCK

SHRINK FIT
CHUCK

MILLING
CHUCK

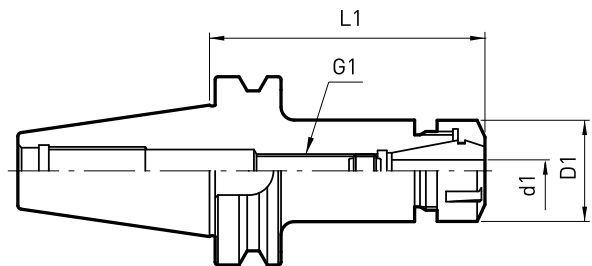
**ER COLLET
CHUCK**

NC DRILL
CHUCK

TAPPING
CHUCK

ER COLLET CHUCK

MAS 403 - BT50



| | | | | |
|---------------------|-------------------------------|----------------------------------|----------------------|---------------------|
| Taper AT3 | T.I.R ≥5μm 2.5×D | Bal./rpm G6.3 12000 | Coolant AD | HRc 58-60 |
|---------------------|-------------------------------|----------------------------------|----------------------|---------------------|

mm

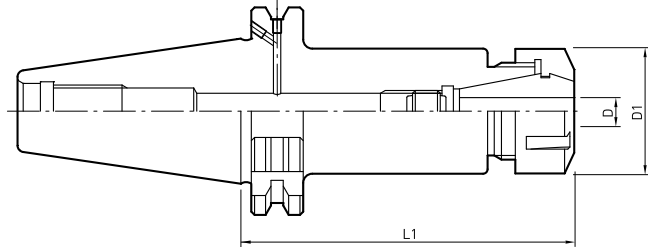
| | CODE NO | d ₁ | D ₁ | L ₁ | G ₁ | WEIGHT(kg) | NUT | SPANNER |
|------|----------|----------------|----------------|----------------|----------------|------------|-------|---------|
| BT50 | ER16-90 | 1.0~10 | 28 | 90 | M11×1.0 | 3.9 | ERN16 | ERS16 |
| | ER16-120 | | | 120 | | 4.1 | | |
| | ER20-90 | 1.0~13 | 34 | 90 | M14×1.0 | 4.0 | ERN20 | ERS20 |
| | ER20-120 | | | 120 | | 4.2 | | |
| | ER25-105 | 1.0~16 | 42 | 105 | M18×1.5 | 4.0 | ERN25 | ERS25 |
| | ER25-135 | | | 135 | | 4.3 | | |
| | ER32-105 | 2.0~20 | 50 | 105 | M24×1.5 | 4.1 | ERN32 | ERS32 |
| | ER32-135 | | | 135 | | 4.4 | | |
| | ER40-105 | 3.0~26 | 63 | 105 | M28×1.5 | 4.3 | ERN40 | ERS40 |
| | ER40-135 | | | 135 | | 4.7 | | |
| | ER50-105 | 5.0~34 | 78 | 105 | M36×2.0 | 4.8 | ERN50 | ERS50 |
| | ER50-135 | | | 135 | | 5.5 | | |

HYDRAULIC
CHUCKSHRINK FIT
CHUCKMILLING
CHUCKER COLLET
CHUCKNC DRILL
CHUCKTAPPING
CHUCK

SINGLE MILLING CHUCK

PART.
C

DIN 69871 - SK



CHUCK

| | | | | | |
|---------------------|-------------------------------|----------------------------------|----------------------|---------------------|----|
| Taper AT3 | T.I.R ≥5µm 2.5×D | Bal./rpm G6.3 12000 | Coolant AD | HRc 58~60 | mm |
|---------------------|-------------------------------|----------------------------------|----------------------|---------------------|----|

| CODE NO | FIG | d ₁ | D ₁ | L ₁ | NUT | SPANNER | |
|----------|----------|----------------|----------------|----------------|-------|---------|-------|
| SK40 | ER16-70 | 1.0~10 | 28 | 70 | ER16 | ERN16 | ERS16 |
| | ER16-100 | | 100 | | | | |
| | ER20-70 | 1.0~13 | 34 | 70 | ER20 | ERN20 | ERS20 |
| | ER20-100 | | 100 | | | | |
| | ER25-70 | 1.0~16 | 42 | 70 | ER25 | ERN25 | ERS25 |
| | ER25-100 | | 100 | | | | |
| | ER32-70 | 1.5~20 | 50 | 70 | ER32 | ERN32 | ERS32 |
| ER32-100 | 100 | | | | | | |
| SK50 | ER16-70 | 1.0~10 | 28 | 70 | ER16 | ERN16 | ERS16 |
| | ER16-100 | | 100 | | | | |
| | ER20-70 | 1.0~13 | 34 | 70 | ER20 | ERN20 | ERS20 |
| | ER20-100 | | 100 | | | | |
| | ER25-70 | 1.0~16 | 42 | 70 | ER25 | ERN25 | ERS25 |
| | ER25-100 | | 100 | | | | |
| | ER32-70 | 1.5~20 | 50 | 70 | ER32 | ERN32 | ERS32 |
| | ER32-100 | | 100 | | | | |
| ER40-70 | 2.5~26 | 63 | 70 | ER40 | ERN40 | ERS40 | |
| ER40-100 | | 100 | | | | | |

HYDRAULIC
CHUCK

SHRINK FIT
CHUCK

MILLING
CHUCK

ER COLLET
CHUCK

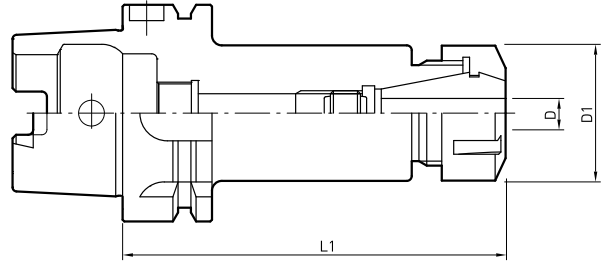
NC DRILL
CHUCK

TAPPING
CHUCK

Note SK30 shank ER collet chuck are available depend on buyer request

ER COLLET CHUCK

DIN 69893 - HSK



| | | | | | |
|---------------------|-------------------------------|----------------------------------|----------------------|---------------------|----|
| Taper AT3 | T.I.R ≥5μm 2.5×D | Bal./rpm G6.3 12000 | Coolant AD | HRc 58~60 | mm |
|---------------------|-------------------------------|----------------------------------|----------------------|---------------------|----|

| | CODE NO | CHUCKING [D] | D ₁ | L ₁ | COLLET | NUT | SPANNER |
|---------------------|-----------------------------------|------------------|----------------|----------------|--------------|----------------|----------------|
| HYDRAULIC CHUCK | ER11-60 | 0.5~7 | 19 | 60 | ER11 | ERN11 | ERS11 |
| | ER16-60 | 0.5~10 | 28 | 60 | ER16 | ERN16 | ERS16 |
| | ER16-100 | 0.5~10 | 28 | 100 | ER16 | ERN16 | ERS16 |
| | ER20-70 | 1.0~13 | 34 | 70 | ER20 | ERN20 | ERS20 |
| | ER20-100 | 1.0~13 | 34 | 100 | ER20 | ERN20 | ERS20 |
| | ER25-70 | 1.0~16 | 42 | 70 | ER25 | ERN25 | ERS25 |
| | ER25-100 | 1.0~16 | 42 | 100 | ER25 | ERN25 | ERS25 |
| | ER32-80 ER32-100 | 1.5~20 1.5~20 | 50 50 | 80 100 | ER32 ER32 | ERN32 ERN32 | ERS32 ERS32 |
| SHRINK FIT CHUCK | ER11-75 | 0.5~7 | 19 | 75 | ER11 | ERN11 | ERS11 |
| | ER11-100 | 0.5~7 | 19 | 100 | ER11 | ERN11 | ERS11 |
| | ER16-75 | 0.5~10 | 28 | 75 | ER16 | ERN16 | ERS16 |
| | ER16-100 | 0.5~10 | 28 | 100 | ER16 | ERN16 | ERS16 |
| | ER20-75 | 1.0~13 | 34 | 75 | ER20 | ERN20 | ERS20 |
| | ER20-100 | 1.0~13 | 34 | 100 | ER20 | ERN20 | ERS20 |
| | ER25-75 | 1.0~16 | 42 | 75 | ER25 | ERN25 | ERS25 |
| | ER25-100 | 1.0~16 | 42 | 100 | ER25 | ERN25 | ERS25 |
| | ER32-75 ER32-100 | 1.5~20 1.5~20 | 50 50 | 75 100 | ER32 ER32 | ERN32 ERN32 | ERS32 ERS32 |
| | ER40-75 ER40-120 | 1.5~20 1.5~20 | 63 63 | 75 120 | ER40 ER40 | ERN40 ERN40 | ERS40 ERS40 |
| MILLING CHUCK | ER16-100 | 0.5~10 | 28 | 100 | ER16 | ERN16 | ERS16 |
| | ER20-100 | 1.0~13 | 34 | 100 | ER20 | ERN20 | ERS20 |
| | ER25-100 | 1.0~16 | 42 | 100 | ER25 | ERN25 | ERS25 |
| | ER32-100 | 1.5~20 | 50 | 100 | ER32 | ERN32 | ERS32 |
| | ER40-120 | 1.5~20 | 63 | 120 | ER40 | ERN40 | ERS40 |
| ER COLLET CHUCK | ER16-100 | 0.5~10 | 28 | 100 | ER16 | ERN16 | ERS16 |
| | ER20-100 | 1.0~13 | 34 | 100 | ER20 | ERN20 | ERS20 |
| | ER25-100 | 1.0~16 | 42 | 100 | ER25 | ERN25 | ERS25 |
| | ER32-100 | 1.5~20 | 50 | 100 | ER32 | ERN32 | ERS32 |
| NC DRILL CHUCK | ER16-100 | 0.5~10 | 28 | 100 | ER16 | ERN16 | ERS16 |
| | ER20-100 | 1.0~13 | 34 | 100 | ER20 | ERN20 | ERS20 |
| | ER25-100 | 1.0~16 | 42 | 100 | ER25 | ERN25 | ERS25 |
| | ER32-100 | 1.5~20 | 50 | 100 | ER32 | ERN32 | ERS32 |
| TAPPING CHUCK | ER16-100 | 0.5~10 | 28 | 100 | ER16 | ERN16 | ERS16 |
| | ER20-100 | 1.0~13 | 34 | 100 | ER20 | ERN20 | ERS20 |
| | ER25-100 | 1.0~16 | 42 | 100 | ER25 | ERN25 | ERS25 |
| | ER32-100 | 1.5~20 | 50 | 100 | ER32 | ERN32 | ERS32 |

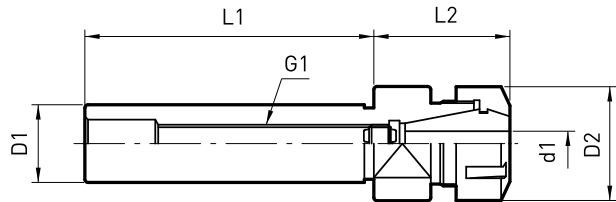
STRAIGHT SHANK ER COLLET CHUCK

PART.

C

STRAIGHT SHANK ER COLLET CHUCK (STANDARD DESIGN)

CHUCK



| | | | | | |
|---------------------|-------------------------------|----------------------------------|----------------------|---------------------|----|
| Taper AT3 | T.I.R ≥5μm 2.5×D | Bal./rpm G6.3 12000 | Coolant AD | HRC 58~60 | mm |
|---------------------|-------------------------------|----------------------------------|----------------------|---------------------|----|

| CODE NO | | d ₁ | D ₁ | D ₂ | L ₁ | L ₂ | G ₂ | SPANNER |
|---------|----------|----------------|----------------|----------------|----------------|----------------|----------------|---------|
| K16 | ER11-75 | 0.5~7 | 16 | 19 | 40 | 35 | M8×1.0 | ERS11 |
| | ER11-110 | | | | 70 | | | |
| K20 | ER11-100 | 1.0~10 | 20 | 28 | 60 | 40 | M11×1.0 | ERS16 |
| | ER11-130 | | | | 90 | | | |
| | ER16-105 | 1.0~13 | 34 | 70 | 45 | M14×1.0 | ERS20 | |
| | ER16-135 | | | | | | | 90 |
| | ER20-120 | | | | | | | 100 |
| K25 | ER20-150 | 1.0~10 | 25 | 28 | 80 | 50 | M11×1.0 | ERS16 |
| | ER16-130 | | | | 110 | | | |
| | ER16-160 | 1.0~13 | 34 | 80 | 110 | M14×1.0 | ERS20 | |
| | ER20-130 | | | | | | | 80 |
| K32 | ER20-160 | 1.0~16 | 32 | 42 | 80 | 55 | M18×1.5 | ERS25 |
| | ER25-135 | | | | 110 | | | |
| | ER20-130 | 1.0~13 | 34 | 80 | 110 | 50 | M14×1.0 | ERS20 |
| | ER25-165 | | | | | | | |
| K42 | ER25-135 | 1.0~16 | 32 | 42 | 110 | 55 | M18×1.5 | ERS25 |
| | ER25-165 | | | | 110 | | | |
| | ER32-170 | 2.0~20 | 42 | 50 | 110 | 60 | M24×1.5 | ERS32 |
| | ER32-210 | | | | 150 | | | |
| K42 | ER50-185 | 5.0~34 | 42 | 78 | 100 | 85 | M16×2.0 | ERS50 |
| | ER50-225 | | | | 140 | | | |

HYDRAULIC
CHUCK

SHRINK FIT
CHUCK

MILLING
CHUCK

ER COLLET
CHUCK

NC DRILL
CHUCK

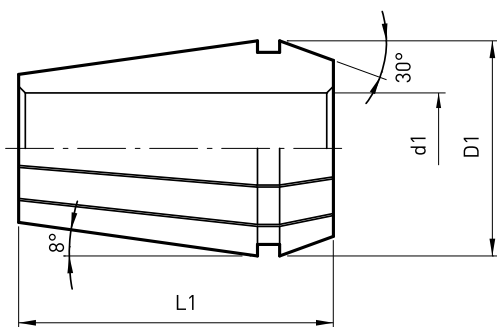
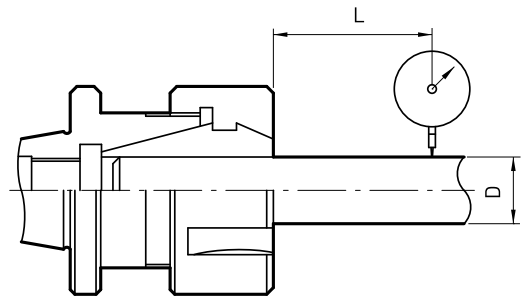
TAPPING
CHUCK

K - ER / M

| CODE NO | | d ₁ | D ₁ | D ₂ | L ₁ | L ₂ | G ₂ | SPANNER |
|---------|-----------|----------------|----------------|----------------|----------------|----------------|----------------|---------|
| K16 | ER11M-140 | 0.5~7 | 16 | 16 | 140 | 30 | M8×1.0 | ERS11M |
| K20 | ER16M-140 | 1.0~10 | 20 | 22 | 140 | 40 | M11×1.0 | ERS16M |

ER COLLET CHUCK

ER COLLET



| L | D | RUNOUT(T.I.R) |
|----|-----------|---------------|
| 6 | 1.0~1.4 | 0.015 |
| 10 | 1.5~2.9 | 0.015 |
| 16 | 3.0~5.9 | 0.015 |
| 25 | 6.0~9.9 | 0.015 |
| 40 | 10.0~17.9 | 0.02 |
| 50 | 18.0~26.9 | 0.02 |
| 60 | 27.0~34.0 | 0.02 |

HYDRAULIC
CHUCKSHRINK FIT
CHUCKMILLING
CHUCKER COLLET
CHUCKNC DRILL
CHUCKTAPPING
CHUCK

| CODE NO (d ₁) | d ₁ | D ₁ | L ₁ | CHUCK | NUT |
|---------------------------|----------------|----------------|----------------|-------|-------|
| ER11 | 0.5~7 | 11.5 | 18.0 | ER11 | ERN11 |
| ER16 | 1.0~10 | 17.0 | 27.5 | ER16 | ERN16 |
| ER20 | 1.0~13 | 21.0 | 31.5 | ER20 | ERN20 |
| ER25 | 1.0~16 | 26.0 | 34.0 | ER25 | ERN25 |
| ER32 | 2.0~20 | 33.0 | 40.0 | ER32 | ERN32 |
| ER40 | 3.0~26 | 41.0 | 46.0 | ER40 | ERN40 |
| ER50 | 5.0~34 | 52.0 | 60.0 | ER50 | ERN50 |

mm

| ER COLLET CODE NO (d ₁) | NUT |
|-------------------------------------|-------|
| ER11 | 13PCS |
| ER16 | 10PCS |
| ER20 | 12PCS |
| ER25 | 15PCS |
| ER32 | 18PCS |
| ER40 | 23PCS |
| ER50 | 17PCS |

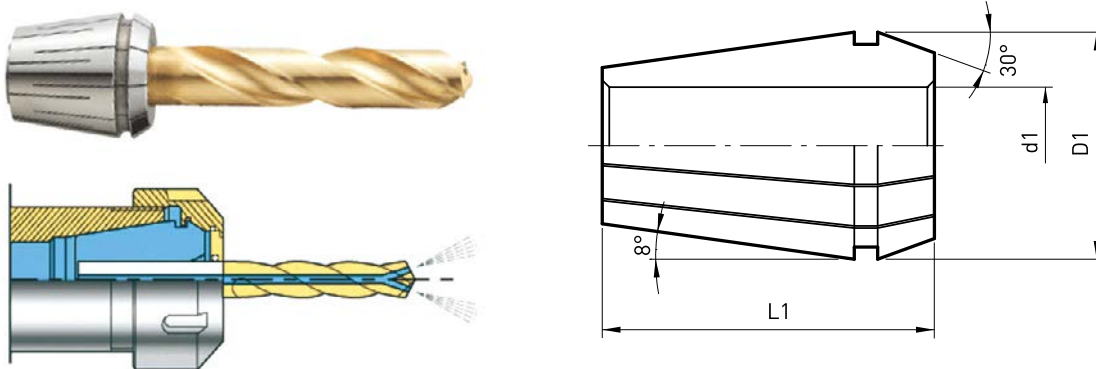
SINGLE MILLING CHUCK

PART.

C

CHUCK

ERC (FOR CENTER THROUGH COOLANT)



mm

| CODE NO (d ₁) | d ₁ | D ₁ | L ₁ | CHUCK | NUT |
|---------------------------|----------------|----------------|----------------|-------|-------|
| ERC16 | 1.0~10 | 17.0 | 27.5 | ER16 | ERN16 |
| ERC20 | 1.0~13 | 21.0 | 31.5 | ER20 | ERN20 |
| ERC25 | 1.0~16 | 26.0 | 34.0 | ER25 | ERN25 |
| ERC32 | 2.0~20 | 33.0 | 40.0 | ER32 | ERN32 |
| ERC40 | 3.0~26 | 41.0 | 46.0 | ER40 | ERN40 |

| ER COLLET CODE NO (d ₁) | | NUT |
|-------------------------------------|--|-------|
| ERC16 | 4, 5, 6, 7, 8, 9, 10 | 7PCS |
| ERC20 | 6, 7, 8, 9, 10, 11, 12, 13 | 8PCS |
| ERC25 | 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16 | 11PCS |
| ERC32 | 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20 | 13PCS |
| ERC40 | 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26 | 17PCS |

Note Collet set to be supplied with wooden tray

HYDRAULIC
CHUCK

SHRINK FIT
CHUCK

MILLING
CHUCK

ER COLLET
CHUCK

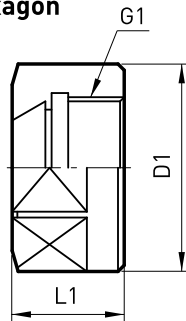
NC DRILL
CHUCK

TAPPING
CHUCK

ER NUT / ER SPANNER

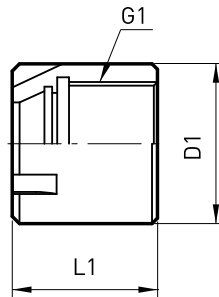
ERN

Hexagon



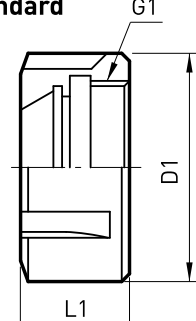
A Type

Mini



M Type

Standard



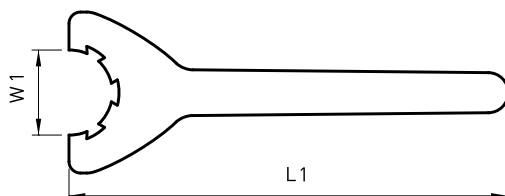
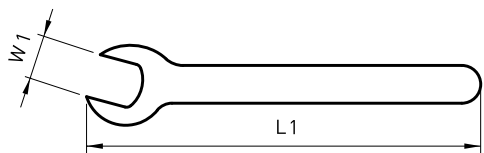
UM/RD Type

mm

| CODE NO [d ₁] | D ₁ | L ₁ | G ₁ | COLLET | CHUCK |
|---------------------------|----------------|----------------|----------------|--------|-------|
| ERN11-A | 19 | 11.3 | M28 1.5 | ER11 | ER11 |
| ERN16-A | 28 | 17.5 | M22 1.5 | ER16 | ER16 |
| ERN20-A | 34 | 19.0 | M25 1.5 | ER20 | ER20 |
| ERN11-M | 16 | 12.0 | M13 0.75 | ER11 | ER11 |
| ERN16-M | 22 | 18.0 | M19 1.0 | ER16 | ER16 |
| ERN20-M | 28 | 19.0 | M24 1.0 | ER20 | ER20 |
| ERN25-M | 35 | 20.0 | M30 1.0 | ER25 | ER25 |
| ERN25-UM/RD | 42 | 20.0 | M32 1.5 | ER25 | ER25 |
| ERN32-UM/RD | 50 | 22.5 | M40 1.5 | ER32 | ER32 |
| ERN40-UM/RD | 63 | 22.5 | M50 1.5 | ER40 | ER40 |
| ERN50-UM/RD | 78 | 35.5 | M64 2.0 | ER50 | ER50 |

HYDRAULIC
CHUCKSHRINK FIT
CHUCKMILLING
CHUCKER COLLET
CHUCKNC DRILL
CHUCKTAPPING
CHUCK

ERN



mm

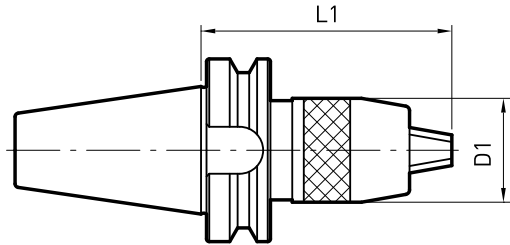
| CODE NO [d ₁] | W ₁ | L ₁ |
|---------------------------|----------------|----------------|
| ERS11-A | 17.0 | 155 |
| ERS16-A | 25.0 | 210 |
| ERS20-A | 30.0 | 250 |
| ERS25-UM.KM/RD | 37.0 | 206 |
| ERS32-UM.KM/RD | 46.5 | 253 |
| ERS40-UM.KM/RD | 58.0 | 289 |
| ERS50-UM.KM/RD | 74.0 | 351 |
| ERS11-M | 11.5 | 95 |
| ERS16-M | 15.0 | 117 |
| ERS20-M | 19.5 | 129 |
| ERS25-M | 25.0 | 142 |

NC DRILL CHUCK

PART.
C

CHUCK

MAS 403 - BT

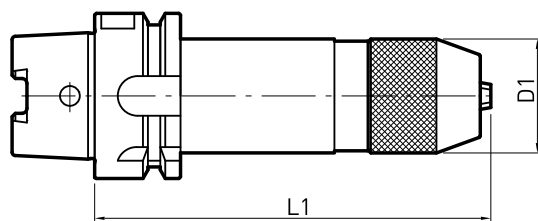


| | | |
|---------------------|--------------------------------|---------------------|
| Taper AT3 | T.I.R ≥30μm 2.5×D | HRc 58-60 |
|---------------------|--------------------------------|---------------------|

mm

| CODE NO | CHUCKING | D ₁ | L ₁ | | |
|---------|-----------|----------------|----------------|-----|-----|
| | | | MIN | MAX | |
| BT30 | NPU8-70 | 1.0~8 | 38 | 72 | 78 |
| | NPU13-105 | 1.0~13 | 50.5 | 97 | 108 |
| BT40 | NPU8-70 | 1.0~8 | 38 | 72 | 78 |
| | NPU8-110 | 1.0~8 | 38 | 111 | 117 |
| | NPU13-100 | 1.0~13 | 50.5 | 100 | 111 |
| BT50 | NPU13-130 | 1.0~13 | 50.5 | 132 | 143 |
| | NPU8-85 | 1.0~8 | 38 | 83 | 89 |
| | NPU8-110 | 1.0~8 | 38 | 111 | 117 |
| | NPU13-100 | 1.0~13 | 50.5 | 100 | 111 |
| | NPU13-130 | 1.0~13 | 50.5 | 132 | 143 |

DIN 69893 - HSK



| | | |
|---------------------|--------------------------------|---------------------|
| Taper AT3 | T.I.R ≥30μm 2.5×D | HRc 58-60 |
|---------------------|--------------------------------|---------------------|

mm

| CODE NO | CHUCKING | D ₁ | L ₁ | | |
|---------|-----------|----------------|----------------|-----|-----|
| | | | MIN | MAX | |
| HSK50A | NPU8-140 | 1.0~8 | 34.5 | 141 | 147 |
| HSK63A | NPU8-140 | 1.0~8 | 34.5 | 142 | 153 |
| | NPU13-140 | 1.0~13 | 46.0 | 151 | 157 |
| HSK100A | NPU8-150 | 1.0~8 | 34.5 | 172 | 183 |
| | NPU13-170 | 1.0~13 | 46.0 | | |

HYDRAULIC
CHUCK

SHRINK FIT
CHUCK

MILLING
CHUCK

ER COLLET
CHUCK

NC DRILL
CHUCK

TAPPING
CHUCK

MAS 403 - BT

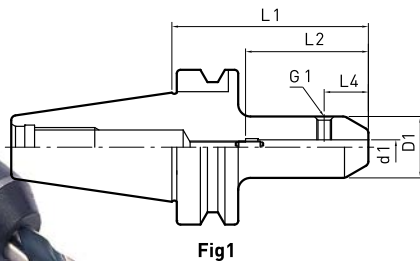
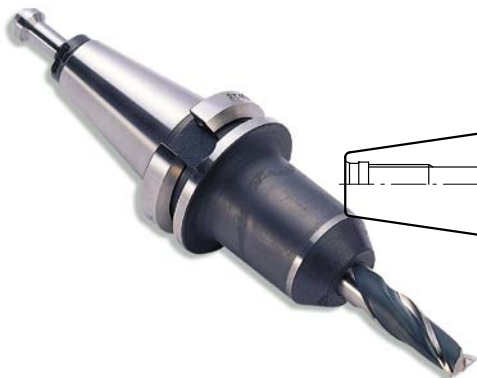


Fig1

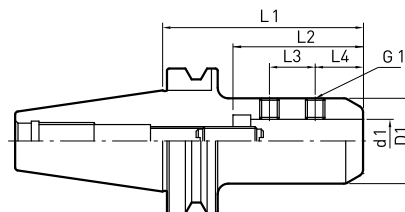


Fig2

| | | | | | |
|---------------------|-------------------------------|----------------------------------|----------------------|---------------------|----|
| Taper AT3 | T.I.R ≥5μm 2.5×D | Bal./rpm G6.3 12000 | Coolant AD | HRc 58-60 | mm |
|---------------------|-------------------------------|----------------------------------|----------------------|---------------------|----|

| CODE NO | | d ₁ | D ₁ | L ₁ | L ₂ | L ₃ | L ₄ | G ₁ | FIG |
|-----------|-----------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|-----|
| BT30 | EMH6-60 | 6 | 25 | 60 | 50 | - | 18 | M6×0.75 | 1 |
| | EMH8-60 | 8 | 28 | | | | M8×1.0 | | |
| | EMH10-60 | 10 | 35 | | | | 20 | M10×1.25 | |
| | EMH12-60 | 12 | 37 | 60 | 59 | 22.5 | | | |
| | EMH16-75 | 16 | 40 | 75 | 62 | 20 | 24 | | |
| | EMH20-75 | 20 | 43 | 75 | 64 | | | | |
| | EMH25-75 | 25 | 48 | 75 | 69 | 20 | 20 | 2 | |
| BT40 | EMH6-80 | 6 | 25 | 80 | 50 | - | 18 | M6×0.75 | 1 |
| | EMH8-80 | 8 | 28 | | | | M8×1.0 | | |
| | EMH10-80 | 10 | 35 | | | | 20 | M10×1.25 | |
| | EMH12-80 | 12 | 42 | 80 | 59 | 22.5 | | | |
| | EMH16-80 | 16 | 48 | 90 | 62 | 20 | 24 | M12×1.5 | |
| | EMH20-90 | 20 | 52 | | | | | | |
| | EMH25-90 | 25 | 55 | 90 | 74 | 25 | M16×1.5 | 2 | |
| | EMH32-105 | 32 | 60 | 105 | 78 | 28 | | | |
| BT50 | EMH6-90 | 6 | 25 | 90 | 50 | - | 18 | M6×0.75 | 1 |
| | EMH8-90 | 8 | 28 | | | | M8×1.0 | | |
| | EMH10-90 | 10 | 35 | | | | 20 | M10×1.25 | |
| | EMH12-90 | 12 | 42 | 90 | 59 | 22.5 | | | |
| | EMH16-105 | 16 | 48 | 105 | 62 | 20 | 24 | M12×1.5 | |
| | EMH20-105 | 20 | 52 | | | | | | |
| | EMH25-105 | 25 | 62 | 105 | 74 | 25 | M16×1.5 | | |
| | EMH32-105 | 32 | 75 | 78 | 28 | | | | |
| | EMH40-120 | 40 | 80 | 120 | 88 | 32 | 30 | M20×1.5 | |
| | EMH42-120 | 42 | 80 | | | | | | |
| EMH50-120 | 50 | 100 | 98 | | | | | | 35 |

HYDRAULIC
CHUCKSHRINK FIT
CHUCKMILLING
CHUCKER COLLET
CHUCKNC DRILL
CHUCKTAPPING
CHUCK

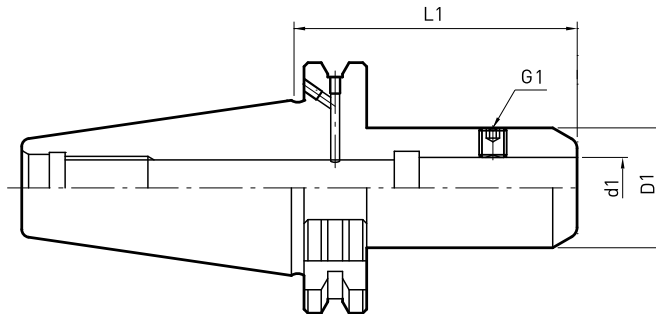
END MILL HOLDER

PART.

C

DIN 69871 - SK40

CHUCK



| | | | | | |
|---------------------|-------------------------------|----------------------------------|----------------------|---------------------|----|
| Taper AT3 | T.I.R ≥5µm 2.5×D | Bal./rpm G6.3 12000 | Coolant AD | HRc 58-60 | mm |
|---------------------|-------------------------------|----------------------------------|----------------------|---------------------|----|

| CODE NO | d ₁ | D ₁ | L ₁ | G ₁ | |
|-----------|----------------|----------------|----------------|----------------|-----|
| SK40 | EMH6-50 | 6 | 25 | 50 | M6 |
| | EMH6-100 | | | | |
| | EMH8-50 | 8 | 28 | 50 | M8 |
| | EMH8-100 | | | | |
| | EMH10-50 | 10 | 35 | 50 | M10 |
| | EMH10-100 | | | | |
| | EMH12-50 | 12 | 42 | 50 | M12 |
| | EMH12-100 | | | | |
| | EMH14-50 | 14 | 44 | 50 | M12 |
| | EMH14-100 | | | | |
| | EMH16-63 | 16 | 48 | 63 | M14 |
| | EMH16-100 | | | 100 | |
| | EMH18-63 | 18 | | 63 | |
| | EMH18-100 | | | 100 | |
| | EMH20-63 | 20 | 52 | 63 | M16 |
| | EMH20-100 | | | 100 | |
| EMH25-100 | 25 | 55 | 100 | M18 | |
| EMH32-100 | 32 | 60 | 100 | M20 | |

HYDRAULIC
CHUCK

SHRINK FIT
CHUCK

MILLING
CHUCK

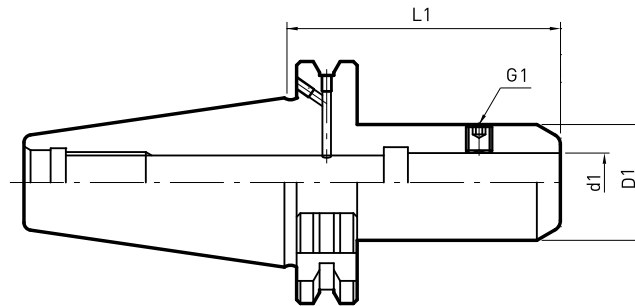
ER COLLET
CHUCK

NC DRILL
CHUCK

TAPPING
CHUCK

END MILL HOLDER

DIN 69871 - SK50



| | | | | | |
|---------------------|-------------------------------|----------------------------------|----------------------|---------------------|----|
| Taper AT3 | T.I.R ≥5μm 2.5×D | Bal./rpm G6.3 12000 | Coolant AD | HRc 58-60 | mm |
|---------------------|-------------------------------|----------------------------------|----------------------|---------------------|----|

| CODE NO | | d ₁ | D ₁ | L ₁ | G ₁ | |
|-----------|-----------|----------------|----------------|----------------|----------------|-----|
| SK50 | EMH6-63 | 6 | 25 | 63 | M6 | |
| | EMH6-100 | | | 100 | | |
| | EMH8-63 | 8 | 28 | 63 | M8 | |
| | EMH8-100 | | | 100 | | |
| | EMH10-63 | 10 | 35 | 63 | M10 | |
| | EMH10-100 | | | 100 | | |
| | EMH12-63 | 12 | 42 | 63 | M12 | |
| | EMH12-100 | | | 100 | | |
| | EMH14-63 | 14 | 44 | 63 | | |
| | EMH14-100 | | | 100 | | |
| | EMH16-63 | 16 | 48 | 63 | M14 | |
| | EMH16-100 | | | 100 | | |
| | EMH18-63 | 18 | | 52 | | 63 |
| | EMH18-100 | | | | | 100 |
| | EMH20-63 | 20 | 52 | 63 | M16 | |
| | EMH20-100 | | | 100 | | |
| EMH25-80 | 25 | 62 | 80 | | | |
| EMH25-100 | | | 100 | | | |
| EMH32-100 | 32 | 75 | 100 | M20 | | |
| EMH40-100 | 40 | 80 | | | | |

HYDRAULIC
CHUCKSHRINK FIT
CHUCKMILLING
CHUCKER COLLET
CHUCKNC DRILL
CHUCKTAPPING
CHUCK

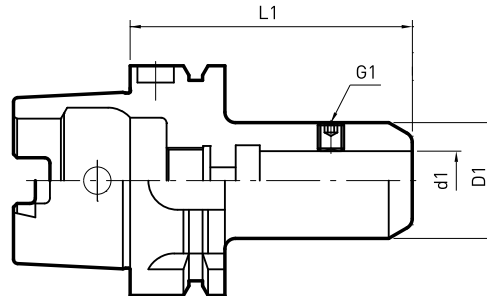
END MILL HOLDER

PART.

C

DIN 69893 - HSK

CHUCK



| | | | | | |
|---------------------|-------------------------------|----------------------------------|----------------------|---------------------|----|
| Taper AT3 | T.I.R ≥5µm 2.5×D | Bal./rpm G6.3 12000 | Coolant AD | HRc 58-60 | mm |
|---------------------|-------------------------------|----------------------------------|----------------------|---------------------|----|

| CODE NO | | d ₁ | D ₁ | L ₁ | G ₁ |
|-----------|-----------|----------------|----------------|----------------|----------------|
| HSK50A | EMH6-65 | 6 | 25 | 65 | M6 |
| | EMH8-65 | 8 | 28 | 65 | M8 |
| | EMH10-65 | 10 | 35 | 65 | M10 |
| | EMH12-80 | 12 | 42 | 80 | M12 |
| | EMH16-80 | 16 | 48 | 80 | M14 |
| | EMH20-80 | 20 | 52 | 80 | M16 |
| HSK63A | EMH6-65 | 6 | 25 | 65 | M6 |
| | EMH8-65 | 8 | 28 | 65 | M8 |
| | EMH10-65 | 10 | 35 | 65 | M10 |
| | EMH12-80 | 12 | 42 | 80 | M12 |
| | EMH14-80 | 14 | 44 | 80 | M12 |
| | EMH16-80 | 16 | 48 | 80 | M14 |
| | EMH18-80 | 18 | 50 | 80 | M14 |
| | EMH20-80 | 20 | 52 | 80 | M16 |
| | EMH25-110 | 25 | 62 | 110 | M16 |
| EMH32-110 | 32 | 75 | 110 | M20 | |
| HSK100A | EMH6-80 | 6 | 25 | 80 | M6 |
| | EMH8-80 | 8 | 28 | 80 | M8 |
| | EMH10-80 | 10 | 35 | 80 | M10 |
| | EMH12-80 | 12 | 42 | 80 | M12 |
| | EMH14-80 | 14 | 44 | 80 | M12 |
| | EMH16-100 | 16 | 48 | 100 | M14 |
| | EMH18-100 | 18 | 50 | 100 | M14 |
| | EMH20-100 | 20 | 52 | 100 | M16 |
| | EMH25-100 | 25 | 62 | 100 | M18 |
| EMH32-100 | 32 | 75 | 100 | M20 | |

HYDRAULIC
CHUCK

SHRINK FIT
CHUCK

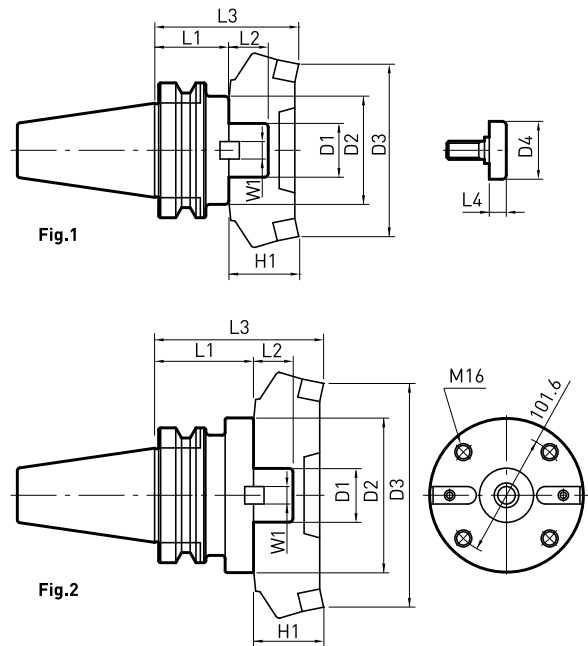
MILLING
CHUCK

ER COLLET
CHUCK

NC DRILL
CHUCK

TAPPING
CHUCK

FMA



Taper AT3 HRC 58-60 mm

| TAPER | CODE NO | | FIG | L ₂ | D ₂ | W ₁ | D ₄ | L ₄ | WEIGHT (kg) | After assembling cutter | | | |
|-----------|----------------|----------------|-----|----------------|----------------|----------------|----------------|----------------|-------------|-------------------------|----------------|----------------|----|
| | D ₁ | L ₁ | | | | | | | | L ₃ | D ₃ | H ₁ | |
| BT30 | FMA25.4 | 45 | 1 | 22 | 50 | 9.5 | 33 | 10 | 1.3 | 95 | 80 | 50 | |
| | | 60 | | 30 | 60 | 12.7 | 40 | 14 | 1.5 | 105 | 100 | 60 | |
| BT40 | FMA31.75 | 45 | | 34 | 80 | 15.9 | 50 | 14 | 2.9 | 120 | 125 | | 60 |
| | | 75 | | 22 | 50 | 9.5 | 33 | 10 | 3.7 | 95 | 80 | 50 | |
| BT50 | FMA25.4 | 45 | | 1 | 30 | 60 | 12.7 | 40 | 10 | 4.6 | 140 | 100 | 60 |
| | | 90 | | | | | | | | 4.5 | 105 | 100 | |
| | FMA31.75 | 45 | | | 34 | 80 | 15.9 | 50 | 14 | 5.3 | 135 | 125 | |
| | | 75 | | | | | | | | 4.3 | 105 | 125 | |
| | FMA38.1 | 45 | | | 36 | 98 | 19 | 65 | 14 | 5.6 | 135 | 160 | |
| | | 75 | | | | | | | | 4.9 | 105 | 160 | |
| FMA50.8 | 45 | 2 | | | 38 | 128.57 | 25.4 | - | - | 6.8 | 135 | 200 | |
| FMA47.625 | 75 | | | | | | | | | 7.7 | 200 | | |

HYDRAULIC CHUCK

SHRINK FIT CHUCK

MILLING CHUCK

ER COLLET CHUCK

NC DRILL CHUCK

TAPPING CHUCK

FACE MILL ARBOR - FMA

DIN 69893 - HSK

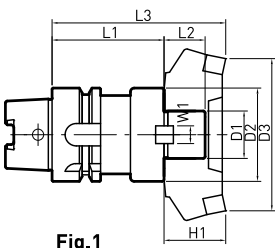


Fig.1

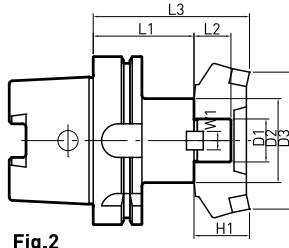


Fig.2

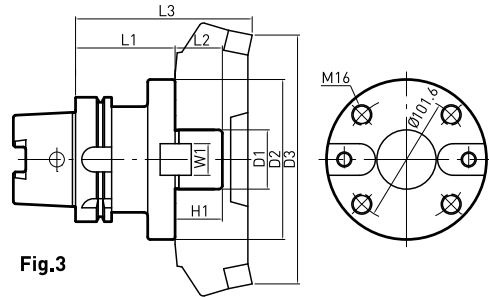


Fig.3

| | |
|--------------|------------|
| Taper | HRc |
| AT3 | 58-60 |

mm

| CODE NO | | | FIG | L ₂ | D ₂ | W ₁ | D ₄ | L ₄ | After assembling cutter | | |
|---------|----------------|----------------|-----|----------------|----------------|----------------|----------------|----------------|-------------------------|----------------|----------------|
| TAPER | D ₁ | L ₁ | | | | | | | L ₃ | D ₃ | H ₁ |
| HSK50A | FMA25.4 | 60 | 1 | 22 | 50 | 9.5 | 33 | 10 | 110 | 80 | 50 |
| | HSK63A | FMA31.75 | | 65 | 30 | 60 | 12.7 | 40 | 14 | 125 | 100 |
| FMA38.1 | | 34 | 80 | | 15.9 | 50 | | | | | |
| HSK100A | FMA25.4 | 60 | 2 | 22 | 50 | 9.5 | 33 | 10 | 110 | 80 | 50 |
| | FMA31.75 | 65 | | 30 | 60 | 12.7 | 40 | 14 | 125 | 100 | 60 |
| | FMA38.1 | | | 34 | 80 | 15.9 | 50 | | | | |
| | FMA50.8 | 75 | 3 | 36 | 98 | 19 | 65 | - | 140 | 160 | |
| | FMA47.625 | 80 | | 38 | 128.57 | 25.4 | - | | | 200 | |

HYDRAULIC CHUCK

SHRINK FIT CHUCK

MILLING CHUCK

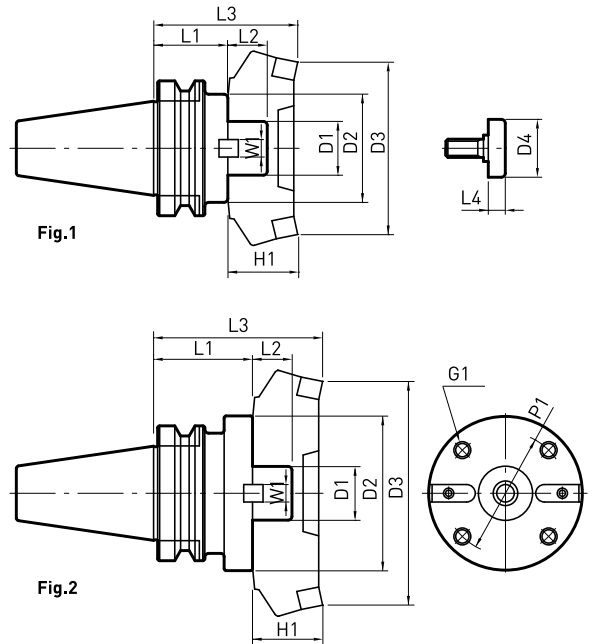
ER COLLET CHUCK

NC DRILL CHUCK

TAPPING CHUCK

FACE MILL ARBOR - FMB

FMB



Taper
AT3

HRc
58-60

mm

| INCH TYPE | | | | | | | | | | | | | METRIC TYPE | | | | | | | | | | | | | | | | | | | | | | |
|-----------|----------------|----------------|-----|----------------|----------------|----------------|--------|----------------|----------------|----------------|----------------|-------------|----------------|----------------|----------------|---------|----------------|----------------|----|------|-----|-----|-----|-----|----|--------|-------|----|------|-------|-----|-----|----|-------|----|
| CODE NO | | | FIG | L ₂ | D ₂ | W ₁ | | G ₁ | P ₁ | D ₄ | L ₄ | WEIGHT (kg) | L ₃ | D ₃ | H ₁ | CODE NO | | | | | | | | | | | | | | | | | | | |
| TAPER | D ₁ | L ₁ | | | | INCH | METRIC | | | | | | | | | TAPER | D ₁ | L ₁ | | | | | | | | | | | | | | | | | |
| BT30 | FMB25.4 | 45 | 1 | 26 | 80 | 9.5 | 12 | - | - | 33 | 10 | 1.7 | 95 | 80 | 50 | BT30 | FMB27 | 45 | | | | | | | | | | | | | | | | | |
| | | 60 | | | | | | | | | | | | | | | | 60 | | | | | | | | | | | | | | | | | |
| | BT40 | FMB38.1 | | | | 90 | 85 | | | | | 15.9 | 16 | | | | - | - | 50 | 14 | 4.7 | 140 | 123 | 125 | 63 | BT40 | FMB40 | 60 | | | | | | | |
| | | | | | | 60 | | | | | | | | | | | | | | | | | | | | | | 60 | | | | | | | |
| BT50 | FMB25.4 | 45 | | | 80 | 9.5 | | | | 12 | - | - | 33 | | | 10 | | | | | 40 | 95 | | | | | 80 | 50 | BT50 | FMB27 | 45 | | | | |
| | | 90 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 90 | | | | |
| | | FMB38.1 | | | | | 45 | | | | | | | | | | | | 85 | 15.9 | 16 | - | - | 50 | 14 | 4.7 | | | | | 108 | 125 | 63 | FMB40 | 45 |
| | | | | | | | 75 | | | | | | | | | | | | | | | | | | | | | | | | | | | | 75 |
| | 105 | | 105 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | - | | - | 2 | 25 | 140 | 25.4 | M16 | 101.6 | - | | | - | 7.9 | 138 | 200 | | | | | | | | | | FMB40F | 75 | | | | | | | | |
| | - | - | - | - | - | - | - | - | - | - | | | - | - | - | - | - | - | - | - | - | | | | | | | | | | | | | | |

HYDRAULIC CHUCK

SHRINK FIT CHUCK

MILLING CHUCK

ER COLLET CHUCK

NC DRILL CHUCK

TAPPING CHUCK

SINGLE MILLING CHUCK

PART.
C

CHUCK

FMC

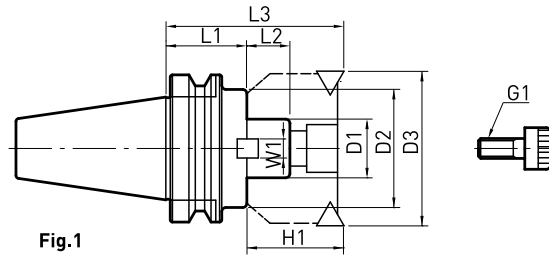


Fig.1

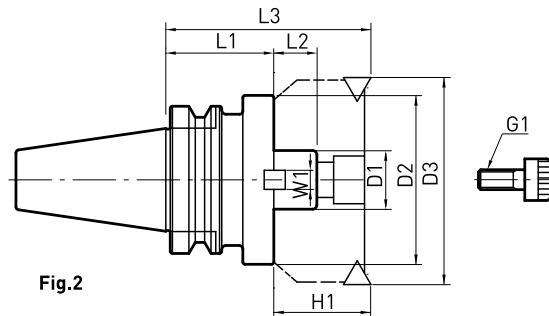


Fig.2

| | |
|--------------|------------|
| Taper | HRc |
| AT3 | 58-60 |

mm

| INCH TYPE | | | | | | | | METRIC TYPE | | | | | | | | | | | | | | | |
|-------------|----------------|------------|-----|-----------|----|------|--------|-------------|----------------|------------|-----|----|--------------|--------------|-------------|--------------|----|--------|-----------|-----|-----|----|-----------|
| CODE NO | | | Fig | L2 | D2 | W1 | | G1 | WEIGHT (kg) | L3 | D3 | H1 | CODE NO | | | | | | | | | | |
| TAPER | D1 | L1 | | | | INCH | METRIC | | | | | | TAPER | D1 | L1 | | | | | | | | |
| BT30 | - | - | 1 | 18 | 45 | - | 10 | M10×30 | 1.4 | 80 | 50 | 40 | BT30 | 40 | | | | | | | | | |
| BT40 | FMC25.4 | 60 | 2 | 20 | 70 | 9.5 | 12 | M12×35 | 1.3 | 85 | | | 80 | 50 | BT40 | FMC22 | | | | | | | |
| | | 90 | | | | | | | 45 | | | | | | | | | | | | | | |
| | | 2.0 | | | | | | | 130 | 90 | | | | | | | | | | | | | |
| | FMC38.1 | 60 | | 22 | 85 | 15.9 | 14 | M16×35 | 1.5 | 110 | 100 | 50 | FMC27 | | | | | | | | | | |
| | | 75 | | | | | | | 60 | | | | | | | | | | | | | | |
| | | 2.3 | | | | | | | 110 | 75 | | | | | | | | | | | | | |
| BT50 | - | - | 1 | 18 | 45 | - | 10 | M10×30 | 2.2 | 140 | 80 | 50 | BT50 | FMC32 | | | | | | | | | |
| | | | | | | | | | FMC25.4 | 45 | | | | 20 | 70 | 9.5 | 12 | M12×35 | 2.6 | 125 | 100 | 50 | 60 |
| | | | | | | | | | | 90 | | | | | | | | | 60 | | | | |
| | 4.2 | 100 | | 75 | | | | | | | | | | | | | | | | | | | |
| | FMC38.1 | 45 | | 22 | 85 | 15.9 | 14 | M16×35 | 4.7 | 145 | 100 | 50 | | 105 | | | | | | | | | |
| | | 75 | | | | | | | 105 | | | | | | | | | | | | | | |
| | | 5.3 | | | | | | | 190 | 150 | | | | | | | | | | | | | |
| | | 4.1 | | | | | | | 95 | 45 | | | | | | | | | | | | | |
| | | 5.5 | | | | | | | 140 | 90 | | | | | | | | | | | | | |
| | | 4.2 | | | | | | | 95 | 150 | | | | | | | | | | | | | |
| | 7.0 | 155 | | 45 | | | | | | | | | | | | | | | | | | | |
| | 5.5 | 125 | | 75 | | | | | | | | | | | | | | | | | | | |
| 7.0 | 155 | 105 | | | | | | | | | | | | | | | | | | | | | |

HYDRAULIC CHUCK

SHRINK FIT CHUCK

MILLING CHUCK

ER COLLET CHUCK

NC DRILL CHUCK

TAPPING CHUCK

FACE MILL ARBOR - FMC

DIN 69893 - HSK

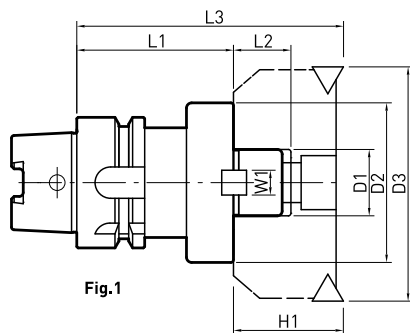


Fig.1

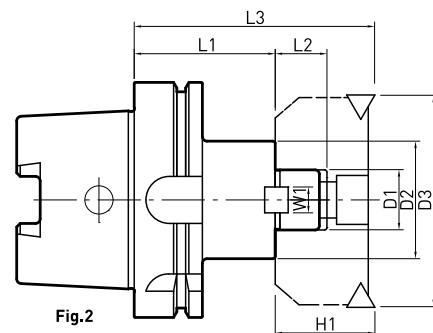
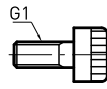


Fig.2

| | |
|--------------|------------|
| Taper | HRc |
| AT3 | 58-60 |

 mm

| METRIC TYPE | | CODE NO | | FIG | L ₂ | D ₂ | W ₁ | G ₁ | After assembling cutter | | |
|-------------|----------------|----------------|----------------|-----|----------------|----------------|----------------|----------------|-------------------------|----------------|---------|
| TAPER | D ₁ | L ₁ | L ₃ | | | | | | D ₃ | H ₁ | |
| HSK40A | FMC16 | 45 | 1 | 17 | 38 | 8 | M8×3.0 | 85 | 40 | 40 | |
| | FMC22 | 45 | | 18 | 45 | 10 | | | | | M10×3.0 |
| HSK50A | FMC16 | 45 | 2 | 17 | 38 | 8 | M8×3.0 | 90 | 40 | 40 | |
| | FMC22 | 50 | | 18 | 45 | 10 | | | | | M10×3.0 |
| | FMC27 | 50 | 1 | 20 | 70 | 12 | M12×3.5 | 100 | 80 | 50 | |
| | FMC32 | 50 | | 22 | 85 | 14 | | | | | M16×3.5 |
| HSK63A | FMC16 | 60 | 2 | 17 | 38 | 8 | M8×3.0 | 110 | 40 | 40 | |
| | FMC22 | 60 | | 18 | 45 | 10 | | | | | M10×3.0 |
| | FMC27 | 60 | 1 | 20 | 70 | 12 | M12×3.5 | 100 | 80 | 50 | |
| | FMC32 | 60 | | 22 | 85 | 14 | | | | | M16×3.5 |
| HSK100A | FMC16 | 75 | 2 | 17 | 38 | 8 | M8×3.0 | 115 | 40 | 40 | |
| | FMC22 | 75 | | 18 | 45 | 10 | | | | | M10×3.0 |
| | FMC27 | 75 | 1 | 20 | 70 | 12 | M12×3.5 | 125 | 80 | 50 | |
| | FMC32 | 75 | | 22 | 85 | 14 | | | | | M16×3.5 |

HYDRAULIC
CHUCKSHRINK FIT
CHUCKMILLING
CHUCKER COLLET
CHUCKNC DRILL
CHUCKTAPPING
CHUCK

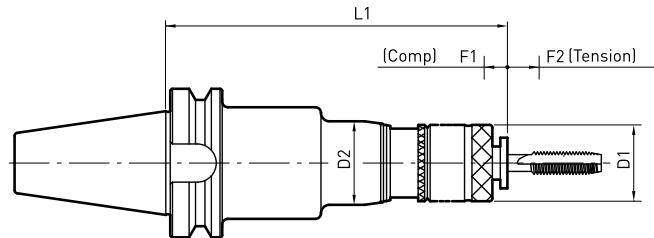
TAPPING CHUCK

PART.

C

MAS 403 - BT

CHUCK



Taper AT3 HRC 58-60 mm

| CODE NO | | Tapping Range | | | D ₁ | D ₂ | L ₁ | F ₁ | F ₂ | WEIGHT (kg) | Collet |
|---------|------------|---------------|-----------|-----------|----------------|----------------|----------------|----------------|----------------|-------------|--------|
| | | M | U | P | | | | | | | |
| BT30 | TC0312-130 | 3~12 | 1/4~1/2 | 1/8 | 32 | 45 | 130 | 635 | 12 | 1.5 | SES1 |
| | 135 | | | | | | 1.8 | | | | |
| BT40 | TC0312-135 | 8~25 | 5/16~7/8 | 1/8~1/2 | 50 | 62 | 160 | 14.5 | 13 | 2.6 | SES2 |
| | TC0822-160 | | | | | | | | | | |
| BT50 | TC0312-150 | 3~12 | 1/4~1/2 | 1/8 | 32 | 45 | 150 | 6.5 | 12 | 4.2 | SES1 |
| | TC0822-175 | | | | | | | | | | |
| | TC1638-240 | 16~38 | 5/8~1 3/8 | 1/4~1 3/8 | 72 | 88 | 240 | 20 | 20 | 7.8 | SES3 |

HYDRAULIC CHUCK

SHRINK FIT CHUCK

MILLING CHUCK

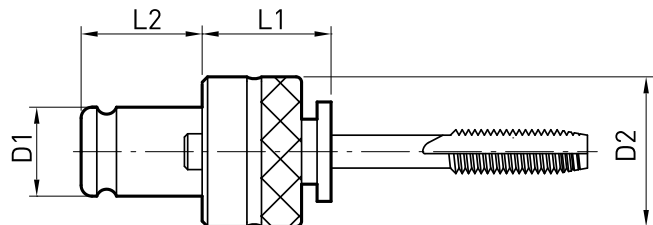
ER COLLET CHUCK

NC DRILL CHUCK

TAPPING CHUCK

TAPPING CHUCK

SES



58-60

mm

| CODE NO | Tapping Range | | | D ₁ | D ₂ | L ₁ | L ₂ | CHUCK CODE |
|---------|---------------|-----------|-----------|----------------|----------------|----------------|----------------|------------|
| | M | U | P | | | | | |
| SES-1 | 3~12 | 1/4~1/2 | 1/8 | 19 | 32 | 25 | 21.5 | TC0312 |
| SES-2 | 8~25 | 5/16~7/8 | 1/8~1/2 | 31 | 50 | 33 | 35.5 | TC0822 |
| SES-3 | 16~38 | 5/8~1 3/8 | 1/4~1 1/8 | 48 | 72 | 45 | 55.5 | TC1638 |

| Tap collet size | Tap size | | | | | |
|-----------------|----------|------|---------|--------|------|------|
| | METRIC | | UNC | SHANK | | |
| | | | | ∅ | ⊠ | |
| SES-1 | M3 | | N0 5, 6 | 4.0 | 3.2 | |
| | M4 | M4.5 | | 5.0 | 4.0 | |
| | M5 | M5.5 | | 5.5 | 4.5 | |
| | M6 | | U1/4 | 6.0 | | |
| | | | U5/16 | 6.1 | 5.0 | |
| | M8 | M7 | | 6.2 | | |
| | M10 | M9 | U3/8 | 7.0 | 5.5 | |
| | | M11 | U7/16 | 8.0 | 6.0 | |
| | | M12 | | 8.5 | 6.5 | |
| | | | U1/2 | 9.0 | 7.0 | |
| | SES-2 | M14 | M15 | U9/16 | 10.5 | 8.0 |
| | | | | U5/8 | 12.0 | 9.0 |
| M16 | | | | 12.5 | 10.0 | |
| | | M17 | | 13.0 | | |
| | | M18 | U3/4 | 14.0 | 11.0 | |
| M20 | | | | 15.0 | 12.0 | |
| | | M22 | U7/8 | 17.0 | 13.0 | |
| M24 | | M25 | | 19.0 | 15.0 | |
| | | M27 | M26 | U1 | | 20.0 |
| | | M28 | | 21.0 | 17.0 | |
| | | | U1 1/8 | 22.0 | | |
| | | M30 | | 23.0 | 17.0 | |
| SES-3 | | M32 | U1 1/4 | 24.0 | 19.0 | |
| | | M33 | | 25.0 | | |
| | | M35 | M34 | U1 3/8 | 26.0 | 21.0 |
| | | M36 | M38 | | 28.0 | |

| Tap collet size | Tap size | | | | |
|-----------------|----------|-------|-------|----|--|
| | PT | PF | SHANK | | |
| | | | ∅ | ⊠ | |
| SES-1 | 1/8 | 1/8 | 8 | 6 | |
| | 1/4 | 1/4 | 11 | 9 | |
| SES-2 | 3/8 | 3/8 | 14 | 11 | |
| | 1/2 | 1/2 | 18 | 14 | |
| | | 5/8 | 19 | 15 | |
| | 3/4 | 3/4 | 23 | 17 | |
| SES-3 | | 7/8 | 24 | 19 | |
| | 1 | 1 | 26 | 21 | |
| | | 1 1/8 | 28 | | |

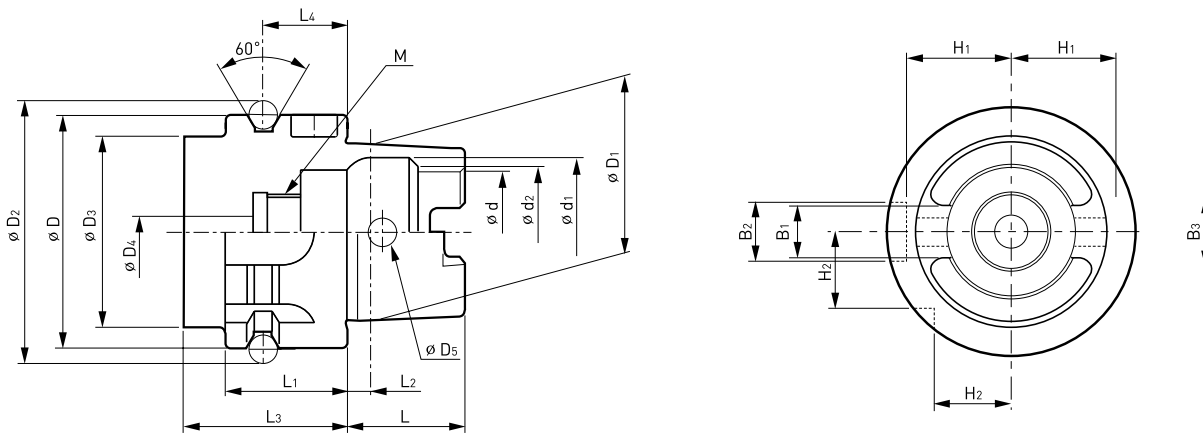
Note M : Metric threads
 UNC : Unified coarse threads
 PT : Pipe taper threads
 PF : Pipe straight threads

SHANK INFORMATION

PART.
C

HSK SHANK DIN 69893-1, ISO 12164-1 : 2001

CHUCK



| TAPER | D | D ₁ | D ₂ | D ₃ | D ₄ | D ₅ | L | L ₁ | L ₁ | L ₃ | L ₄ |
|---------|-----|----------------|----------------|----------------|----------------|----------------|----|----------------|----------------|----------------|----------------|
| HSK40A | 40 | 30 | 45.00 | 34 | 5.0 | 4.6 | 20 | 20 | 4.0 | 35 | 16 |
| HSK50A | 50 | 38 | 59.30 | 42 | 6.8 | 6.0 | 25 | 26 | 5.0 | 42 | 18 |
| HSK63A | 63 | 48 | 72.30 | 53 | 8.4 | 7.5 | 32 | 26 | 6.3 | 42 | 18 |
| HSK100A | 100 | 75 | 109.75 | 82 | 12.0 | 12.0 | 50 | 29 | 10.0 | 45 | 20 |

| TAPER | D | D ₁ | D ₂ | B ₁ | B ₂ | B ₃ | H ₁ | H ₂ | M |
|---------|----|----------------|----------------|----------------|----------------|----------------|----------------|----------------|---------|
| HSK40A | 21 | 25.5 | 23 | 8.05 | 11 | 9 | 17.0 | 12.0 | M12×1.0 |
| HSK50A | 26 | 32.0 | 29 | 10.54 | 14 | 12 | 21.0 | 15.5 | M16×1.0 |
| HSK63A | 34 | 40.0 | 37 | 12.54 | 18 | 16 | 26.5 | 20.0 | M18×1.0 |
| HSK100A | 53 | 63.0 | 58 | 20.02 | 22 | 20 | 44.0 | 31.5 | M24×15 |

HYDRAULIC
CHUCK

SHRINK FIT
CHUCK

MILLING
CHUCK

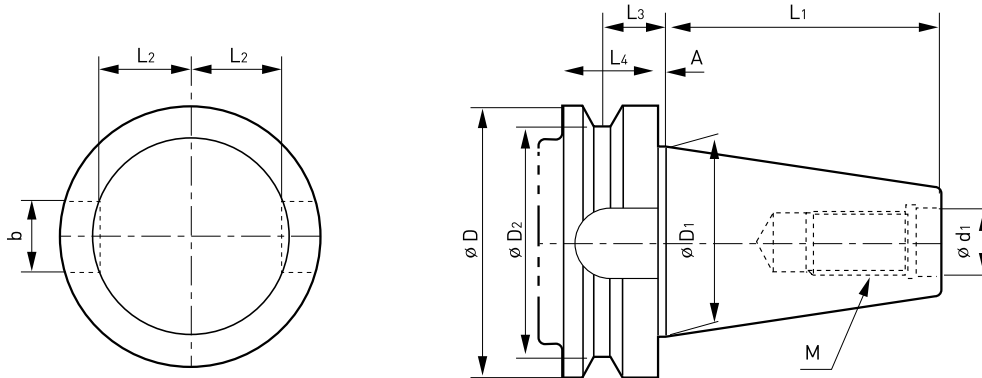
ER COLLET
CHUCK

NC DRILL
CHUCK

TAPPING
CHUCK

SHANK INFORMATION

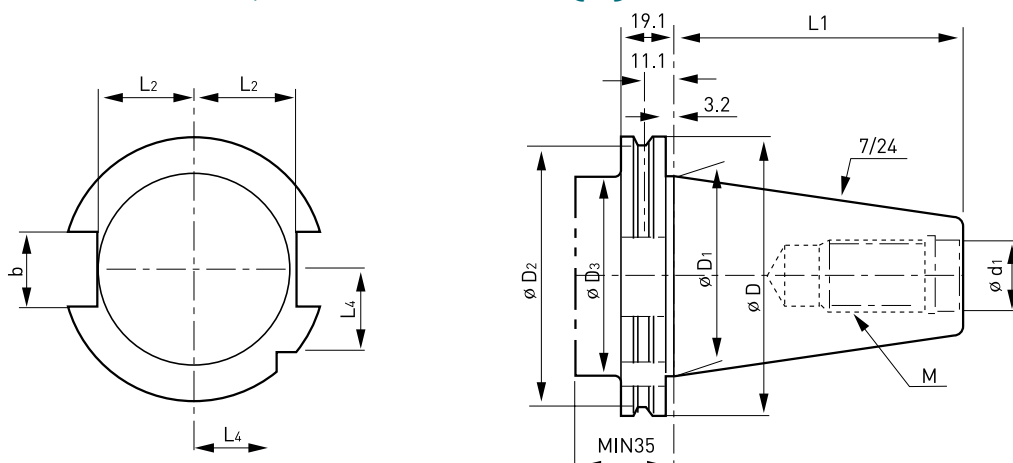
BOTTLE GRIP TAPER MAS 403 - BT



| TAPER | D | D ₁ | D ₂ | d ₁ | L ₁ | L ₂ | L ₃ | L ₄ | A | B | M |
|-------|-----|----------------|----------------|----------------|----------------|----------------|----------------|----------------|---|------|----------|
| BT30 | 46 | 31.75 | 38 | 12.5 | 48.4 | 16.3 | 13.6 | 20 | 2 | 16.1 | M12×1.75 |
| BT40 | 63 | 44.45 | 53 | 17.0 | 65.4 | 22.6 | 16.6 | 25 | 2 | 16.1 | M16×2.0 |
| BT50 | 100 | 69.85 | 85 | 25.0 | 101.8 | 35.4 | 23.2 | 35 | 3 | 25.7 | M24×3.0 |
| BT60 | 155 | 107.95 | 135 | 31.0 | 161.8 | 60.1 | 28.2 | 45 | 3 | 25.7 | M30×3.5 |

HYDRAULIC
CHUCKSHRINK FIT
CHUCKMILLING
CHUCKER COLLET
CHUCKNC DRILL
CHUCKTAPPING
CHUCK

DIN 69871-1 A/B, 7388/1 : 1983(E)



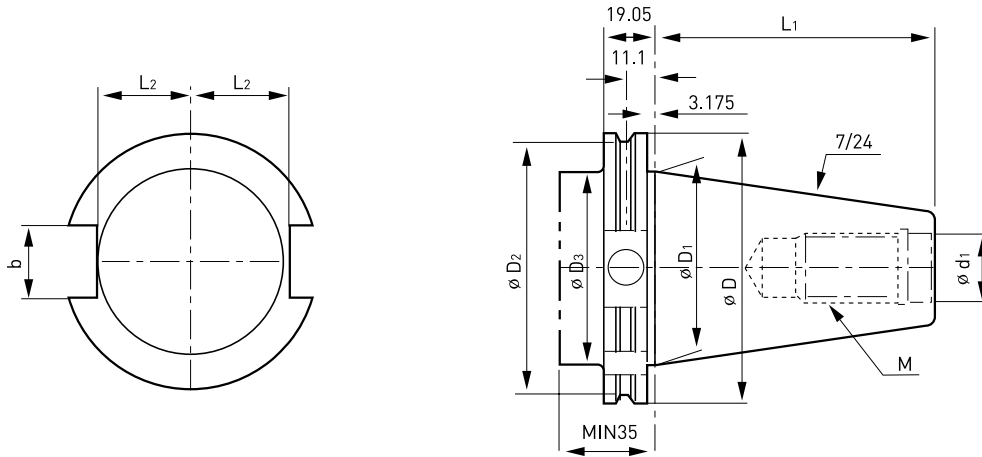
| TAPER | D | D ₁ | D ₂ | d ₁ | L ₁ | L ₂ | L ₃ | L ₄ | A | B | M |
|-------|-------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|------|------|----------|
| SK30 | 50.00 | 31.75 | 44.30 | 45 | 13 | 47.8 | 16.4 | 19.0 | 15.0 | 16.1 | M12×1.75 |
| SK40 | 63.55 | 44.45 | 56.25 | 50 | 17 | 68.4 | 22.8 | 25.0 | 18.5 | 16.1 | M16×2.0 |
| SK50 | 97.50 | 69.85 | 91.25 | 80 | 25 | 101.75 | 35.5 | 37.7 | 30.0 | 25.7 | M24×3.0 |

SHANK INFORMATION

PART.
C

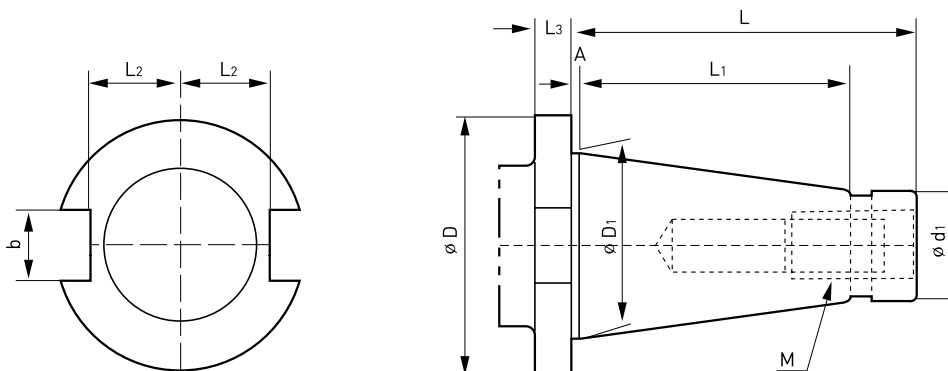
CAT SHANK (ANSI/ASME B5.50 - 1985)

CHUCK



| TAPER | D | D ₁ | D ₂ | D ₃ | d ₁ | L ₁ | L ₂ | L ₃ | B | M |
|-------|-------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|------|---------------|
| CAT30 | 50.00 | 31.75 | 44.30 | 31.75 | 13.0 | 47.625 | 16.25 | 18.67 | 16.1 | UNC 1/2~13 |
| CAT40 | 63.55 | 44.45 | 56.25 | 44.45 | 17.0 | 68.250 | 22.60 | 25.00 | 16.1 | UNC 5/8~11 |
| CAT50 | 97.50 | 69.85 | 91.25 | 70.10 | 25.0 | 101.600 | 35.30 | 37.70 | 25.7 | UNC 1~18 |
| CAT60 | 15.50 | 107.95 | 135.26 | 32.00 | 161.8 | 161.930 | 54.00 | 59.30 | 25.7 | UNC C1, 1/4~7 |

DIN 2080, JIS B 6101, ISO 297 : 1988(E)



| TAPER | D | D ₁ | d ₁ | L | L ₁ | L ₂ | L ₃ | A | B | M |
|-------|-----|----------------|----------------|-------|----------------|----------------|----------------|-----|------|---------------|
| NT30 | 46 | 31.75 | 17.4 | 68.4 | 48.4 | 16.2 | 10 | 1.6 | 16.1 | UNC 1/2~13 |
| NT40 | 63 | 44.45 | 25.3 | 93.4 | 65.4 | 22.5 | 10 | 1.6 | 16.1 | UNC 5/8~11 |
| NT50 | 100 | 69.85 | 39.6 | 126.8 | 101.8 | 35.3 | 12 | 3.2 | 25.7 | UNC 1~18 |
| NT60 | 155 | 107.95 | 60.2 | 206.8 | 161.8 | 60.0 | 15 | 3.2 | 25.7 | UNC C1, 1/4~7 |

HYDRAULIC
CHUCK

SHRINK FIT
CHUCK

MILLING
CHUCK

ER COLLET
CHUCK

NC DRILL
CHUCK

TAPPING
CHUCK

UNION MATERIALS

CUTTING TOOLS

D

REAMER

REAMER

| | |
|----------------|------|
| HSS Reamer | D 2 |
| Carbide Reamer | D 12 |
| Counter | D 18 |
| Endmill | D 22 |
| Drill | D 24 |

HAND REAMER



- SKH51(M2), JIS
- Straight Flutes & ST Shank
- Suitable for through Holes
- Easy Resharpener

HSS

M2

JIS

SF

ST

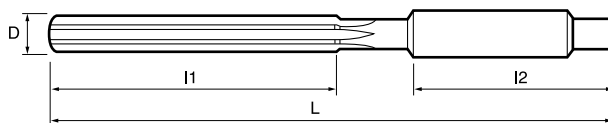
| CODE NO | D | L | I1 | I2 | Flutes |
|----------------|-------------|-----|-----|-----|--------|
| GEM 100010~14 | 1.0M~1.4M | 65 | 15 | 23 | 4 |
| GEM 100015~19 | 1.5M~1.9M | 65 | 23 | 23 | 4 |
| GEM 100020~29 | 2.0M~2.9M | 65 | 30 | 23 | 4 |
| GEM 100030~39 | 3.0M~3.9M | 72 | 40 | 23 | 4 |
| GEM 100040~49 | 4.0M~4.9M | 80 | 40 | 30 | 6 |
| GEM 100050~59 | 5.0M~5.9M | 90 | 45 | 35 | 6 |
| GEM 100060~69 | 6.0M~6.9M | 100 | 50 | 38 | 6 |
| GEM 100070~79 | 7.0M~7.9M | 105 | 55 | 38 | 6 |
| GEM 100080~89 | 8.0M~8.9M | 115 | 60 | 42 | 6 |
| GEM 100090~99 | 9.0M~9.9M | 125 | 65 | 45 | 6 |
| GEM 100100~109 | 10.0M~10.9M | 130 | 70 | 45 | 6 |
| GEM 100110~119 | 11.0M~11.9M | 140 | 75 | 50 | 6 |
| GEM 100120~129 | 12.0M~12.9M | 150 | 75 | 58 | 6 |
| GEM 100130~139 | 13.0M~13.9M | 160 | 80 | 62 | 6 |
| GEM 100140 | 14.0M | 165 | 85 | 62 | 8 |
| GEM 100150 | 15.0M | 175 | 90 | 66 | 8 |
| GEM 100160 | 16.0M | 185 | 95 | 70 | 8 |
| GEM 100170 | 17.0M | 190 | 100 | 70 | 8 |
| GEM 100180 | 18.0M | 200 | 105 | 75 | 8 |
| GEM 100190 | 19.0M | 210 | 105 | 85 | 8 |
| GEM 100200 | 20.0M | 220 | 110 | 88 | 8 |
| GEM 100210 | 21.0M | 230 | 120 | 88 | 8 |
| GEM 100220 | 22.0M | 235 | 120 | 90 | 8 |
| GEM 100230 | 23.0M | 250 | 130 | 95 | 8 |
| GEM 100240 | 24.0M | 255 | 130 | 100 | 8 |
| GEM 100250 | 25.0M | 260 | 130 | 102 | 8 |
| GEM 100260 | 26.0M | 270 | 130 | 102 | 8 |
| GEM 100270 | 27.0M | 270 | 140 | 102 | 10 |
| GEM 100280 | 28.0M | 290 | 140 | 120 | 10 |
| GEM 100290 | 29.0M | 290 | 140 | 120 | 10 |
| GEM 100300 | 30.0M | 305 | 140 | 120 | 10 |

HSS
REAMERCARBIDE
REAMER

COUNTER

ENDMILL

DRILL



| CODE NO | D | L | l1 | l2 | Flutes |
|------------|-------|-----|-----|-----|--------|
| GEM 100300 | 30.0M | 305 | 140 | 120 | 10 |
| GEM 100310 | 31.0M | 305 | 150 | 120 | 10 |
| GEM 100320 | 32.0M | 315 | 150 | 120 | 10 |
| GEM 100330 | 33.0M | 315 | 160 | 120 | 10 |
| GEM 100340 | 34.0M | 315 | 160 | 120 | 10 |
| GEM 100350 | 35.0M | 315 | 160 | 120 | 10 |
| GEM 100360 | 36.0M | 320 | 160 | 120 | 10 |
| GEM 100370 | 37.0M | 320 | 165 | 120 | 10 |
| GEM 100380 | 38.0M | 325 | 165 | 125 | 10 |
| GEM 100390 | 39.0M | 325 | 165 | 125 | 10 |
| GEM 100400 | 40.0M | 330 | 165 | 125 | 12 |
| GEM 100410 | 41.0M | 330 | 170 | 125 | 12 |
| GEM 100420 | 42.0M | 335 | 170 | 125 | 12 |
| GEM 100430 | 43.0M | 335 | 170 | 125 | 12 |
| GEM 100440 | 44.0M | 340 | 170 | 125 | 12 |
| GEM 100450 | 45.0M | 340 | 170 | 125 | 12 |
| GEM 100460 | 46.0M | 345 | 170 | 125 | 12 |
| GEM 100470 | 47.0M | 345 | 175 | 125 | 12 |
| GEM 100480 | 48.0M | 350 | 180 | 125 | 12 |
| GEM 100490 | 49.0M | 350 | 180 | 125 | 12 |
| GEM 100500 | 50.0M | 355 | 180 | 125 | 12 |
| GEM 100510 | 51.0M | 355 | 180 | 125 | 12 |
| GEM 100520 | 52.0M | 355 | 180 | 125 | 12 |
| GEM 100530 | 53.0M | 360 | 195 | 125 | 14 |
| GEM 100540 | 54.0M | 360 | 195 | 125 | 14 |
| GEM 100550 | 55.0M | 360 | 195 | 125 | 14 |
| GEM 100560 | 56.0M | 360 | 195 | 125 | 14 |
| GEM 100570 | 57.0M | 370 | 200 | 130 | 14 |
| GEM 100580 | 58.0M | 370 | 200 | 130 | 14 |
| GEM 100590 | 59.0M | 370 | 200 | 130 | 14 |
| GEM 100600 | 60.0M | 370 | 200 | 130 | 14 |

HSS
REAMERCARBIDE
REAMER

COUNTER

ENDMILL

DRILL

SPIRAL CHUCKING REAMER-7° ST



- SKH55(M35), DIN, H7 Tolerance
- LH Helical 7° & ST Shank
- Suitable for through Holes
- For Mold Hole



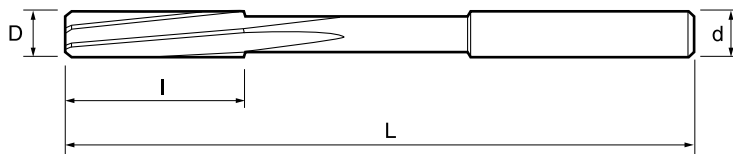
| CODE NO | D | L | I1 | I2 | Flutes |
|---------------|-----------|-----|----|-----|--------|
| GEM E407020 | 2.0M | 55 | 16 | D | 4 |
| GEM E407021~4 | 2.1M~2.4M | 55 | 16 | D | 4 |
| GEM E407025 | 2.5M | 55 | 16 | D | 4 |
| GEM E407026~9 | 2.6M~2.9M | 55 | 16 | D | 4 |
| GEM E407030 | 3.0M | 61 | 15 | D | 6 |
| GEM E407031~4 | 3.1M~3.4M | 61 | 15 | D | 6 |
| GEM E407035 | 3.5M | 61 | 15 | D | 6 |
| GEM E407036~9 | 3.6M~3.9M | 61 | 15 | D | 6 |
| GEM E407040 | 4.0M | 75 | 19 | 4 | 6 |
| GEM E407041~4 | 4.1M~4.4M | 75 | 19 | 4 | 6 |
| GEM E407045 | 4.5M | 75 | 19 | 4.5 | 6 |
| GEM E407046~9 | 4.6M~4.9M | 75 | 19 | 4.5 | 6 |
| GEM E407050 | 5.0M | 86 | 23 | 5 | 6 |
| GEM E407051~4 | 5.1M~5.4M | 86 | 23 | 5 | 6 |
| GEM E407055 | 5.5M | 86 | 23 | 5.5 | 6 |
| GEM E407056~9 | 5.6M~5.9M | 86 | 23 | 5.5 | 6 |
| GEM E407060 | 6.0M | 93 | 26 | 6 | 6 |
| GEM E407061~4 | 6.1M~6.4M | 93 | 26 | 6 | 6 |
| GEM E407065 | 6.5M | 93 | 26 | 6 | 6 |
| GEM E407066~9 | 6.6M~6.9M | 93 | 26 | 6 | 6 |
| GEM E407070 | 7.0M | 109 | 31 | 7 | 6 |
| GEM E407071~4 | 7.1M~7.4M | 109 | 31 | 7 | 6 |
| GEM E407075 | 7.5M | 109 | 31 | 7 | 6 |
| GEM E407076~9 | 7.6M~7.9M | 109 | 31 | 7 | 6 |
| GEM E407080 | 8.0M | 117 | 33 | 8 | 6 |
| GEM E407081~4 | 8.1M~8.4M | 117 | 33 | 8 | 6 |
| GEM E407085 | 8.5M | 117 | 33 | 8 | 6 |
| GEM E407086~9 | 8.6M~8.9M | 117 | 33 | 8 | 6 |
| GEM E407090 | 9.0M | 125 | 36 | 9 | 6 |
| GEM E407091~4 | 9.1M~9.4M | 125 | 36 | 9 | 6 |
| GEM E407095 | 9.5M | 125 | 36 | 9 | 6 |

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REAMERCARBIDE
REAMER

COUNTER

ENDMILL

DRILL



| CODE NO | D | L | l1 | l2 | Flutes |
|---------------|-------------|-----|----|----|--------|
| GEM E407096~9 | 9.6M~9.9M | 125 | 36 | 9 | 6 |
| GEM E407100 | 10.0M | 133 | 38 | 10 | 6 |
| GEM E407101~4 | 10.1M~10.4M | 133 | 38 | 10 | 6 |
| GEM E407105 | 10.5M | 133 | 38 | 10 | 6 |
| GEM E407106~9 | 10.5M~10.8M | 133 | 38 | 10 | 6 |
| GEM E407110 | 11.0M | 142 | 41 | 10 | 6 |
| GEM E407111~4 | 11.1M~11.4M | 142 | 41 | 10 | 6 |
| GEM E407115 | 11.5M | 142 | 41 | 10 | 6 |
| GEM E407116~9 | 11.6M~11.9M | 142 | 41 | 10 | 6 |
| GEM E407120 | 12.0M | 151 | 44 | 10 | 6 |
| GEM E407121~4 | 12.1M~12.4M | 151 | 44 | 10 | 6 |
| GEM E407125 | 12.5M | 151 | 44 | 10 | 6 |
| GEM E407126~9 | 12.6M~12.9M | 151 | 44 | 10 | 6 |
| GEM E407130 | 13.0M | 151 | 44 | 10 | 6 |
| GEM E407135 | 13.5M | 151 | 44 | 12 | 6 |
| GEM E407140 | 14.0M | 160 | 47 | 12 | 8 |
| GEM E407145 | 14.5M | 160 | 47 | 12 | 8 |
| GEM E407150 | 15.0M | 162 | 50 | 12 | 8 |
| GEM E407155 | 15.5M | 162 | 50 | 12 | 8 |
| GEM E407160 | 16.0M | 170 | 52 | 16 | 8 |
| GEM E407165 | 16.5M | 170 | 52 | 16 | 8 |
| GEM E407170 | 17.0M | 175 | 54 | 16 | 8 |
| GEM E407175 | 17.5M | 175 | 54 | 16 | 8 |
| GEM E407180 | 18.0M | 182 | 56 | 16 | 8 |
| GEM E407185 | 18.5M | 182 | 56 | 16 | 8 |
| GEM E407190 | 19.0M | 189 | 58 | 16 | 8 |
| GEM E407195 | 19.5M | 189 | 58 | 16 | 8 |
| GEM E407200 | 20.0M | 195 | 60 | 20 | 8 |
| GEM E407210 | 21.0M | 205 | 60 | 20 | 8 |
| GEM E407220 | 22.0M | 205 | 60 | 20 | 8 |

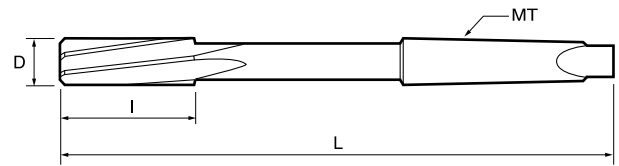
HSS
REAMERCARBIDE
REAMER

COUNTER

ENDMILL

DRILL

SPIRAL CHUCKING REAMER-7° MT



- SKH55(M35), DIN, H7 Tolerance
- LH Helical 7° & ST Shank
- Suitable for through Holes
- For Mold Hole



| CODE NO | D | L | l1 | MT | Flutes |
|--------------|----|-----|----|-----|--------|
| GEM E407060M | 6 | 130 | 35 | MT1 | 6 |
| GEM E407080M | 8 | 150 | 40 | | 6 |
| GEM E407100M | 10 | 160 | 40 | | 6 |
| GEM E407120M | 12 | 170 | 45 | | 6 |
| GEM E407130M | 13 | 180 | 45 | | 6 |
| GEM E407140M | 14 | 190 | 50 | | 8 |
| GEM E407150M | 15 | 205 | 50 | MT2 | 8 |
| GEM E407160M | 16 | 205 | 50 | | 8 |
| GEM E407170M | 17 | 210 | 55 | | 8 |
| GEM E407180M | 18 | 220 | 55 | | 8 |
| GEM E407190M | 19 | 220 | 55 | | 8 |
| GEM E407200M | 20 | 230 | 60 | | 8 |
| GEM E407210M | 21 | 240 | 60 | MT3 | 8 |
| GEM E407220M | 22 | 240 | 60 | | 8 |
| GEM E407230M | 23 | 250 | 65 | | 8 |
| GEM E407240M | 24 | 265 | 65 | | 8 |
| GEM E407250M | 25 | 270 | 65 | | 8 |
| GEM E407260M | 26 | 270 | 70 | | 8 |
| GEM E407270M | 27 | 270 | 70 | MT4 | 10 |
| GEM E407280M | 28 | 270 | 70 | | 10 |
| GEM E407290M | 29 | 280 | 75 | | 10 |
| GEM E407300M | 30 | 280 | 75 | | 10 |
| GEM E407320M | 32 | 300 | 80 | MT4 | 10 |
| GEM E407340M | 34 | 325 | 80 | | 10 |
| GEM E407350M | 35 | 325 | 80 | | 10 |
| GEM E407360M | 36 | 330 | 85 | | 10 |
| GEM E407380M | 38 | 330 | 85 | MT4 | 12 |
| GEM E407400M | 40 | 330 | 85 | | 12 |

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REAMER
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CARBIDE
REAMER

COUNTER

ENDMILL

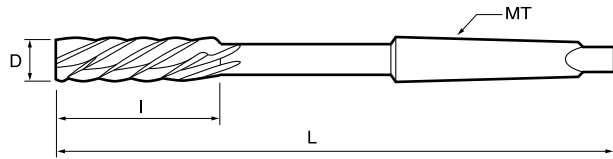
DRILL

HI HELICAL REAMER-45° MT

PART.

D

REAMER



- SKH55(M35), DIN, H7 Tolerance
- LH Helical 45° & MT Shank
- Suitable for through Holes
- Much Higher Feed Rate
- Excellent Finish Surface



| CODE NO | D | L | l1 | MT | Flutes |
|--------------|----|-----|----|-----|--------|
| GEM E445060M | 6 | 130 | 35 | MT1 | 3 |
| GEM E445080M | 8 | 150 | 40 | | 3 |
| GEM E445090M | 9 | 150 | 40 | | 3 |
| GEM E445100M | 10 | 160 | 40 | | 3 |
| GEM E445110M | 11 | 160 | 40 | | 3 |
| GEM E445120M | 12 | 170 | 45 | | 3 |
| GEM E445130M | 13 | 180 | 45 | | 3 |
| GEM E445140M | 14 | 190 | 50 | MT2 | 4 |
| GEM E445150M | 15 | 205 | 50 | | 4 |
| GEM E445160M | 16 | 205 | 50 | | 4 |
| GEM E445170M | 17 | 210 | 55 | | 4 |
| GEM E445180M | 18 | 220 | 55 | | 4 |
| GEM E445190M | 19 | 220 | 55 | | 4 |
| GEM E445200M | 20 | 230 | 60 | | 4 |
| GEM E445210M | 21 | 240 | 60 | 4 | |
| GEM E445220M | 22 | 240 | 60 | 4 | |
| GEM E445230M | 23 | 250 | 65 | 4 | |
| GEM E445240M | 24 | 265 | 65 | MT3 | 4 |
| GEM E445250M | 25 | 270 | 65 | | 4 |
| GEM E445260M | 26 | 270 | 70 | | 6 |
| GEM E445270M | 27 | 270 | 70 | | 6 |
| GEM E445280M | 28 | 270 | 70 | | 6 |
| GEM E445290M | 29 | 280 | 75 | | 6 |
| GEM E445300M | 30 | 280 | 75 | | 6 |
| GEM E445310M | 32 | 300 | 80 | 6 | |
| GEM E445340M | 34 | 325 | 80 | MT4 | 8 |
| GEM E445350M | 35 | 325 | 80 | | 8 |
| GEM E445360M | 36 | 330 | 85 | | 8 |
| GEM E445380M | 38 | 330 | 85 | | 8 |
| GEM E445400M | 40 | 330 | 85 | | 8 |

HSS
REAMER
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ECONOMICAL

CARBIDE
REAMER

COUNTER

ENDMILL

DRILL

HI HELICAL REAMER-45° ST



- SKH55(M35), DIN, H7 Tolerance
- LH Helical 45° & ST Shank
- Suitable for through Holes
- Much Higher Feed Rate
- Excellent Finish Surface



| CODE NO | D | L | I1 | I2 | Flutes |
|---------------|-----------|-----|----|-----|--------|
| GEM E445020 | 2.0M | 55 | 16 | D | 3 |
| GEM E445021~4 | 2.1M~2.4M | 55 | 16 | D | 3 |
| GEM E445025 | 2.5M | 55 | 16 | D | 3 |
| GEM E445026~9 | 2.6M~2.9M | 55 | 16 | D | 3 |
| GEM E445030 | 3.0M | 61 | 15 | D | 3 |
| GEM E445031~4 | 3.1M~3.4M | 61 | 15 | D | 3 |
| GEM E445035 | 3.5M | 61 | 15 | D | 3 |
| GEM E445036~9 | 3.6M~3.9M | 61 | 15 | D | 3 |
| GEM E445040 | 4.0M | 75 | 19 | 4 | 3 |
| GEM E445041~4 | 4.1M~4.4M | 75 | 19 | 4 | 3 |
| GEM E445045 | 4.5M | 75 | 19 | 4.5 | 3 |
| GEM E445046~9 | 4.6M~4.9M | 75 | 19 | 4.5 | 3 |
| GEM E445050 | 5.0M | 86 | 23 | 5 | 3 |
| GEM E445051~4 | 5.1M~5.4M | 86 | 23 | 5 | 3 |
| GEM E445055 | 5.5M | 86 | 23 | 5.5 | 3 |
| GEM E445056~9 | 5.6M~5.9M | 86 | 23 | 5.5 | 3 |
| GEM E445060 | 6.0M | 93 | 26 | 6 | 3 |
| GEM E445061~4 | 6.1M~6.4M | 93 | 26 | 6 | 3 |
| GEM E445065 | 6.5M | 93 | 26 | 6 | 3 |
| GEM E445066~9 | 6.6M~6.9M | 93 | 26 | 6 | 3 |
| GEM E445070 | 7.0M | 109 | 31 | 7 | 3 |
| GEM E445071~4 | 7.1M~7.4M | 109 | 31 | 7 | 3 |
| GEM E445075 | 7.5M | 109 | 31 | 7 | 3 |
| GEM E445076~9 | 7.6M~7.9M | 109 | 31 | 7 | 3 |
| GEM E445080 | 8.0M | 117 | 33 | 8 | 3 |
| GEM E445071~4 | 8.1M~8.4M | 117 | 33 | 8 | 3 |
| GEM E445085 | 8.5M | 117 | 33 | 8 | 3 |
| GEM E445086~9 | 8.6M~8.9M | 117 | 33 | 8 | 3 |
| GEM E445090 | 9.0M | 125 | 36 | 9 | 3 |

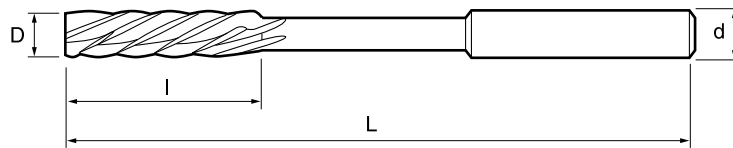
HSS
REAMER
ECONOMICAL

CARBIDE
REAMER

COUNTER

ENDMILL

DRILL



| CODE NO | D | L | l1 | l2 | Flutes |
|---------------|-------------|-----|----|----|--------|
| GEM E445091~4 | 9.1M~9.4M | 125 | 36 | 9 | 3 |
| GEM E445095 | 9.5M | 125 | 36 | 9 | 3 |
| GEM E445096~9 | 9.6M~9.9M | 125 | 36 | 9 | 3 |
| GEM E445100 | 10.0M | 133 | 38 | 10 | 3 |
| GEM E445101~4 | 10.1M~10.4M | 133 | 38 | 10 | 3 |
| GEM E445105 | 10.5M | 133 | 38 | 10 | 3 |
| GEM E445106~9 | 10.6M~10.9M | 133 | 38 | 10 | 3 |
| GEM E445110 | 11.0M | 142 | 41 | 10 | 3 |
| GEM E445111~4 | 11.1M~11.4M | 142 | 41 | 10 | 3 |
| GEM E445115 | 11.5M | 142 | 41 | 10 | 3 |
| GEM E445116~9 | 11.6M~11.9M | 142 | 41 | 10 | 3 |
| GEM E445120 | 12.0M | 151 | 44 | 10 | 3 |
| GEM E445121~4 | 12.1M~12.4M | 151 | 44 | 10 | 3 |
| GEM E445125 | 12.5M | 151 | 44 | 10 | 3 |
| GEM E445126~9 | 12.6M~12.9M | 151 | 44 | 10 | 3 |
| GEM E445130 | 13.0M | 151 | 44 | 10 | 3 |
| GEM E445135 | 13.5M | 151 | 44 | 12 | 3 |
| GEM E445140 | 14.0M | 160 | 47 | 12 | 4 |
| GEM E445145 | 14.5M | 160 | 47 | 12 | 4 |
| GEM E445150 | 15.0M | 162 | 50 | 12 | 4 |
| GEM E445155 | 15.5M | 162 | 50 | 12 | 4 |
| GEM E445160 | 16.0M | 170 | 52 | 16 | 4 |
| GEM E445165 | 16.5M | 170 | 52 | 16 | 4 |
| GEM E445170 | 17.0M | 175 | 54 | 16 | 4 |
| GEM E445175 | 17.5M | 175 | 54 | 16 | 4 |
| GEM E445180 | 18.0M | 182 | 56 | 16 | 4 |
| GEM E445185 | 18.5M | 182 | 56 | 16 | 4 |
| GEM E445190 | 19.0M | 189 | 58 | 16 | 4 |
| GEM E445195 | 19.5M | 189 | 58 | 16 | 4 |
| GEM E445200 | 20.0M | 195 | 60 | 20 | 4 |
| GEM E445210 | 21.0M | 205 | 60 | 20 | 4 |
| GEM E445220 | 22.0M | 205 | 60 | 20 | 4 |

HSS
REAMER
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ECONOMICAL

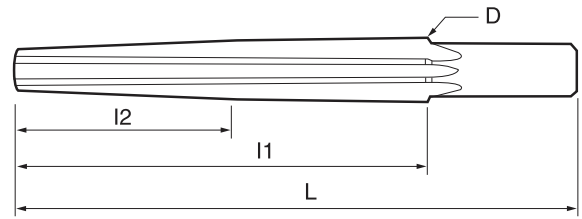
CARBIDE
REAMER

COUNTER

ENDMILL

DRILL

BRIDGE REAMER (ST SHANK)



- SKH51(M2), JIS
- Straight Flutes & ST Shank
- Correct holes displacement of sandwiched sheet
- 1/20 taper

HSS

M2

JIS

SF

ST

| CODE NO | D | L | l | Flutes |
|------------|--------|-----|-----|--------|
| GEM 501200 | 20.0 M | 190 | 140 | 6 |
| GEM 501205 | 20.5 | 190 | 140 | 6 |
| GEM 501210 | 21.0 | 190 | 140 | 6 |
| GEM 501215 | 21.5 | 190 | 140 | 8 |
| GEM 501220 | 22.0 | 190 | 140 | 8 |
| GEM 501225 | 22.5 | 190 | 140 | 8 |
| GEM 501230 | 23.0 | 190 | 140 | 8 |
| GEM 501235 | 23.5 | 190 | 140 | 8 |
| GEM 501240 | 24.0 | 190 | 140 | 8 |
| GEM 501245 | 24.5 | 190 | 140 | 8 |
| GEM 501250 | 25.0 | 190 | 140 | 8 |
| GEM 501255 | 25.5 | 190 | 140 | 8 |
| GEM 501260 | 26.0 | 190 | 140 | 8 |

HSS
REAMERCARBIDE
REAMER

COUNTER

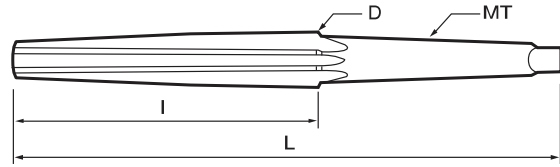
ENDMILL

DRILL

MACHINE BRIDGE REAMER (MT SHANK)

PART.
D

REAMER



- SKH51(M2), JIS
- Straight Flutes & MT Shank
- Correct holes displacement of sandwiched sheet
- 1/20 taper

HSS
M2
JIS
SF
ST

| CODE NO | D | L | L | I | Flutes |
|------------|------|-----|-----|-----|--------|
| GEM 500160 | 16.0 | 210 | 115 | MT2 | 6 |
| GEM 500180 | 18.0 | 210 | 115 | | 6 |
| GEM 500200 | 20.0 | 215 | 120 | | 6 |
| GEM 500210 | 21.0 | 215 | 120 | | 6 |
| GEM 500220 | 22.0 | 215 | 120 | | 8 |
| GEM 500230 | 23.0 | 215 | 120 | | 8 |
| GEM 500240 | 24.0 | 250 | 135 | MT3 | 8 |
| GEM 500250 | 25.0 | 250 | 135 | | 8 |
| GEM 500260 | 26.0 | 250 | 135 | | 8 |
| GEM 500270 | 27.0 | 260 | 145 | | 8 |
| GEM 500280 | 28.0 | 260 | 145 | | 8 |
| GEM 500290 | 29.0 | 280 | 165 | | 8 |
| GEM 500300 | 30.0 | 280 | 165 | | 8 |
| GEM 500310 | 31.0 | 280 | 165 | | 8 |
| GEM 500320 | 32.0 | 280 | 165 | | 8 |
| GEM 500330 | 33.0 | 280 | 165 | | 8 |
| GEM 500340 | 34.0 | 280 | 165 | 8 | |

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REAMER

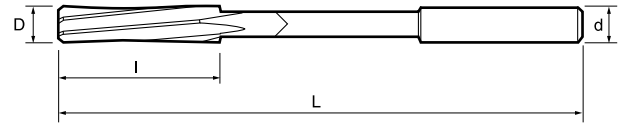
CARBIDE
REAMER

COUNTER

ENDMILL

DRILL

CARBIDE SPIRAL CHUCKING REAMER-7° ST



- Carbide, DIN, H7 Tolerance
- Unequal Flutes, ~HRc 50
- LH Helical 7° & ST Shank
- All and Top Solid
- Suitable for through Holes
- For Mold Hole



| CODE NO | D | d | L | I |
|-------------|-----------|----|-----|----|
| GEM C407020 | 2.0M | 3 | 62 | 15 |
| GEM C407030 | 3.0M | 3 | 62 | 15 |
| GEM C407040 | 4.0M | 4 | 62 | 19 |
| GEM C407050 | 5.0M | 5 | 79 | 23 |
| GEM C407060 | 6.0M | 6 | 79 | 25 |
| GEM C407070 | 7.0M (B) | 7 | 109 | 27 |
| GEM C407080 | 8.0M (B) | 8 | 117 | 28 |
| GEM C407090 | 9.0M (B) | 9 | 125 | 29 |
| GEM C407100 | 10.0M (B) | 10 | 133 | 32 |
| GEM C407110 | 11.0M (B) | 10 | 142 | 32 |
| GEM C407120 | 12.0M (B) | 10 | 151 | 35 |
| GEM C407130 | 13.0M (B) | 10 | 151 | 35 |
| GEM C407140 | 14.0M (B) | 16 | 200 | 36 |
| GEM C407150 | 15.0M (B) | 16 | 200 | 36 |
| GEM C407160 | 16.0M (B) | 16 | 200 | 38 |
| GEM C407170 | 17.0M (B) | 16 | 200 | 38 |
| GEM C407180 | 18.0M (B) | 20 | 200 | 38 |
| GEM C407190 | 19.0M (B) | 20 | 200 | 38 |
| GEM C407200 | 20.0M (B) | 20 | 200 | 38 |
| GEM C407220 | 22.0M (B) | 20 | 235 | 42 |
| GEM C407250 | 25.0M (B) | 25 | 260 | 45 |

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REAMER

COUNTER

ENDMILL

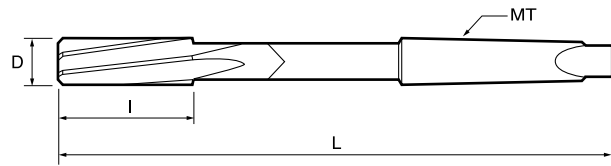
DRILL

CARBIDE SPIRAL CHUCKING REAMER-7° MT

PART.

D

REAMER



- Carbide, DIN, H7 Tolerance
- Unequal Flutes, ~HRc 50
- LH Helical 7° & MT Shank
- All and Top Solid
- Suitable for through Holes
- For Mold Hole



| CODE NO | D | d | L | MT |
|--------------|---------|-----|----|-----|
| GEM C407060M | 6M (B) | 130 | 26 | MT1 |
| GEM C407080M | 8M (B) | 150 | 28 | |
| GEM C407100M | 10M (B) | 160 | 32 | |
| GEM C407120M | 12M (B) | 180 | 35 | |
| GEM C407130M | 13M (B) | 190 | 35 | |
| GEM C407140M | 14M (B) | 190 | 36 | |
| GEM C407150M | 15M (B) | 205 | 36 | MT2 |
| GEM C407160M | 16M (B) | 205 | 38 | |
| GEM C407170M | 17M (B) | 210 | 38 | |
| GEM C407180M | 18M (B) | 220 | 38 | |
| GEM C407190M | 19M (B) | 220 | 38 | |
| GEM C407200M | 20M (B) | 230 | 38 | |
| GEM C407220M | 22M (B) | 240 | 42 | MT3 |
| GEM C407250M | 25M (B) | 270 | 45 | |
| GEM C407300M | 30M (B) | 280 | 48 | |
| GEM C407320M | 32M (B) | 300 | 48 | |

HSS
REAMER

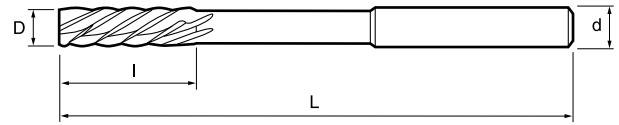
CARBIDE
REAMER

COUNTER

ENDMILL

DRILL

CARBIDE HI HELICAL REAMER-45° ST



- Carbide, DIN, H7 Tolerance
- All and Top Solid, ~HRC 50
- LH Helical 45° & ST Shank
- Suitable for through Holes
- Much Higher Feed Rate
- Excellent Finish Surface



| CODE NO | D | d | L | l |
|-------------|---------|----|-----|----|
| GEM C445020 | 2M | 3 | 62 | 12 |
| GEM C445030 | 3M | 4 | 62 | 12 |
| GEM C445040 | 4M | 4 | 62 | 12 |
| GEM C445050 | 5M | 6 | 79 | 16 |
| GEM C445060 | 6M | 6 | 79 | 16 |
| GEM C445070 | 7M (B) | 8 | 109 | 20 |
| GEM C445080 | 8M (B) | 8 | 117 | 20 |
| GEM C445090 | 9M (B) | 10 | 125 | 26 |
| GEM C445100 | 10M (B) | 10 | 133 | 26 |
| GEM C445110 | 11M (B) | 12 | 142 | 28 |
| GEM C445120 | 12M (B) | 12 | 151 | 28 |
| GEM C445130 | 13M (B) | 12 | 151 | 30 |
| GEM C445140 | 14M (B) | 16 | 200 | 35 |
| GEM C445150 | 15M (B) | 16 | 200 | 35 |
| GEM C445160 | 16M (B) | 16 | 200 | 36 |
| GEM C445170 | 17M (B) | 16 | 200 | 38 |
| GEM C445180 | 18M (B) | 20 | 200 | 38 |
| GEM C445190 | 19M (B) | 20 | 200 | 38 |
| GEM C445200 | 20M (B) | 20 | 200 | 38 |
| GEM C445220 | 22M (B) | 20 | 235 | 42 |
| GEM C445250 | 25M (B) | 20 | 260 | 45 |

HSS
REAMERCARBIDE
REAMER

COUNTER

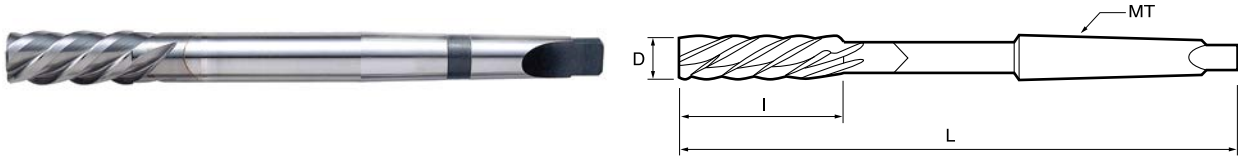
ENDMILL

DRILL

CARBIDE HI HELICAL REAMER-45° MT

PART.
D

REAMER



- Carbide, DIN, H7 Tolerance
- All and Top Solid, ~HRc 50
- LH Helical 45° & MT Shank
- Suitable for through Holes
- Much Higher Feed Rate
- Excellent Finish Surface

WC DIN H7 LH 45° ~HRc 50 MT

| CODE NO | D | d | L | MT |
|--------------|--------|-----|----|-----|
| GEM C445060M | 6 (B) | 130 | 26 | MT1 |
| GEM C445080M | 8 (B) | 150 | 28 | |
| GEM C445100M | 10 (B) | 160 | 32 | |
| GEM C445120M | 12 (B) | 180 | 35 | |
| GEM C445130M | 13 (B) | 190 | 35 | |
| GEM C445140M | 14 (B) | 190 | 36 | |
| GEM C445150M | 15 (B) | 205 | 36 | MT2 |
| GEM C445160M | 16 (B) | 205 | 38 | |
| GEM C445170M | 17 (B) | 210 | 38 | |
| GEM C457180M | 18 (B) | 220 | 38 | |
| GEM C445190M | 19 (B) | 220 | 38 | |
| GEM C445200M | 20 (B) | 230 | 38 | |
| GEM C445220M | 22 (B) | 240 | 42 | MT3 |
| GEM C445250M | 25 (B) | 270 | 45 | |
| GEM C445300M | 30 (B) | 280 | 48 | |
| GEM C445320M | 32 (B) | 300 | 48 | |

HSS
REAMER

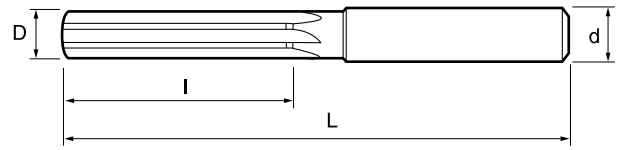
CARBIDE
REAMER

COUNTER

ENDMILL

DRILL

CARBIDE HAND REAMER



- Carbide, H7 Tolerance
- Straight Flutes & ST Shank
- Suitable for through & Blind Holes
- All Solid, ~HRc 50



| CODE NO | D | d | L | I |
|-------------|----|----|-----|----|
| GEM C100020 | 2 | 3 | 62 | 15 |
| GEM C100030 | 3 | 4 | 62 | 25 |
| GEM C100040 | 4 | 4 | 62 | 28 |
| GEM C100050 | 5 | 6 | 79 | 31 |
| GEM C100060 | 6 | 6 | 79 | 31 |
| GEM C100070 | 7 | 8 | 79 | 35 |
| GEM C100080 | 8 | 8 | 79 | 35 |
| GEM C100090 | 9 | 10 | 106 | 50 |
| GEM C100100 | 10 | 10 | 106 | 50 |
| GEM C100110 | 11 | 12 | 106 | 50 |
| GEM C100120 | 12 | 12 | 106 | 50 |
| GEM C100130 | 13 | 12 | 106 | 50 |
| GEM C100140 | 14 | 12 | 106 | 50 |
| GEM C100150 | 15 | 16 | 106 | 50 |
| GEM C100160 | 16 | 16 | 106 | 50 |
| GEM C100200 | 20 | 20 | 106 | 50 |

HSS
REAMERCARBIDE
REAMER

COUNTER

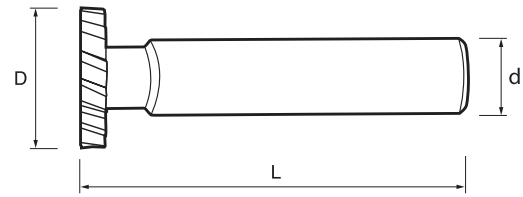
ENDMILL

DRILL

CARBIDE HELICAL T-CUTTER (HSS SHANK)

PART.
D

REAMER



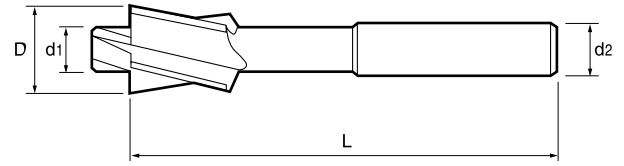
- Carbide, HSS shank, ~Hrc 50
- Helix 25°, Unequal flutes
- Reducing Vibration due to HSS body
- Much Higher Feed Rate
- Excellent Finish Surface

WC RH 25° ST ~HRC 50

| CODE NO | D | L | d | F |
|-----------------|----|-----|----|----|
| GEM CTHCT100050 | 10 | 64 | 10 | 8 |
| GEM CTHCT150050 | 15 | 80 | 12 | 8 |
| GEM CTHCT200050 | 20 | 80 | 12 | 8 |
| GEM CTHCT250050 | 25 | 80 | 12 | 10 |
| GEM CTHCT300050 | 30 | 100 | 16 | 12 |
| GEM CTHCT350050 | 35 | 100 | 20 | 12 |
| GEM CTHCT400050 | 40 | 120 | 20 | 12 |
| GEM CTHCT450050 | 45 | 120 | 20 | 14 |
| GEM CTHCT500050 | 50 | 120 | 20 | 14 |

| | |
|-------------------|--|
| HSS REAMER | |
| CARBIDE REAMER | |
| COUNTER | |
| ENDMILL | |
| DRILL | |

COUNTER BORE-KOR



- SKH51(M2), DIN, 4 Flutes
- RH Helix 25°, ST Shank
- Suitable for Hole of Mold Bolt

HSS

M2

RH

25°

ST

| CODE NO | Pr No | d1 | D | l | d2 |
|------------|-------|------|------|-----|----|
| GEM 625030 | 3M | 3.2 | 6.5 | 60 | 6 |
| GEM 625040 | 4M | 4.3 | 8.0 | 70 | 8 |
| GEM 625050 | 5M | 5.3 | 9.4 | 80 | 8 |
| GEM 625060 | 6M | 6.4 | 11.0 | 90 | 10 |
| GEM 625070 | 7M | 7.4 | 12.5 | 95 | 10 |
| GEM 625080 | 8M | 8.4 | 14.0 | 100 | 12 |
| GEM 625090 | 9M | 9.4 | 16.0 | 105 | 12 |
| GEM 625100 | 10M | 10.5 | 17.5 | 110 | 12 |
| GEM 625110 | 11M | 11.5 | 18.5 | 115 | 12 |
| GEM 625120 | 12M | 13.0 | 20.0 | 125 | 12 |
| GEM 625130 | 13M | 14.0 | 22.0 | 130 | 12 |
| GEM 625140 | 14M | 15.0 | 24.0 | 130 | 12 |
| GEM 625150 | 15M | 16.0 | 25.5 | 140 | 12 |
| GEM 625160 | 16M | 17.0 | 27.0 | 145 | 12 |
| GEM 625170 | 17M | 18.0 | 28.0 | 150 | 12 |
| GEM 625180 | 18M | 19.0 | 29.0 | 150 | 12 |
| GEM 625190 | 19M | 20.0 | 30.0 | 155 | 16 |
| GEM 625200 | 20M | 21.0 | 31.0 | 155 | 16 |
| GEM 625210 | 21M | 22.0 | 32.0 | 160 | 16 |
| GEM 625220 | 22M | 23.0 | 33.0 | 160 | 16 |
| GEM 625230 | 23M | 24.0 | 34.5 | 160 | 16 |
| GEM 625240 | 24M | 25.0 | 36.0 | 175 | 16 |
| GEM 625250 | 25M | 26.0 | 40.0 | 175 | 16 |
| GEM 625260 | 26M | 27.0 | 41.0 | 180 | 20 |
| GEM 625270 | 27M | 28.0 | 42.0 | 180 | 20 |
| GEM 625280 | 28M | 29.0 | 43.5 | 180 | 20 |
| GEM 625290 | 29M | 30.0 | 45.0 | 180 | 20 |
| GEM 625300 | 30M | 31.0 | 46.0 | 180 | 20 |

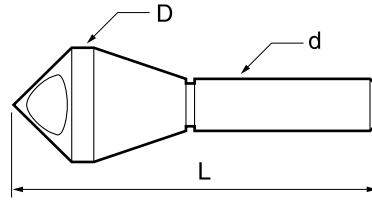
HSS
REAMERCARBIDE
REAMER

COUNTER

ENDMILL

DRILL

COUNTER SINK-90° HOLE



- Bur away
- TiN, TiCN, TiAlN
- Excellent Finish Surface
- ST & MT Shank available
- For Plastics and Soft Steel



SKH55(CO 5%), M35

| CODE NO | D | L | d |
|------------|-------|-----|----|
| GEM 850100 | 10.0M | 50 | 6 |
| GEM 850150 | 15.0M | 55 | 8 |
| GEM 850200 | 20.0M | 65 | 10 |
| GEM 850250 | 25.0M | 75 | 12 |
| GEM 850300 | 30.0M | 82 | 12 |
| GEM 850350 | 35.0M | 90 | 12 |
| GEM 850400 | 40.0M | 95 | 12 |
| GEM 850450 | 45.0M | 115 | 12 |
| GEM 850500 | 50.0M | 120 | 12 |

SKH59(CO 8%), M42

| CODE NO | D | L | d |
|------------|-------|-----|----|
| GEM 890100 | 10.0M | 50 | 6 |
| GEM 890150 | 15.0M | 55 | 8 |
| GEM 890200 | 20.0M | 65 | 10 |
| GEM 890250 | 25.0M | 75 | 12 |
| GEM 890300 | 30.0M | 82 | 12 |
| GEM 890350 | 35.0M | 90 | 12 |
| GEM 890400 | 40.0M | 95 | 12 |
| GEM 890450 | 45.0M | 115 | 12 |
| GEM 890500 | 50.0M | 120 | 12 |

PART.
D

REAMER

HSS
REAMER

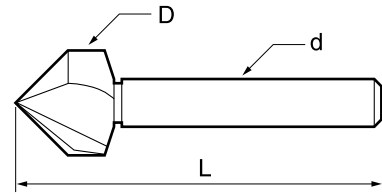
CARBIDE
REAMER

COUNTER

ENDMILL

DRILL

COUNTER SINK-90°, 1F



- Bur away
- TiN, TiCN, TiAlN
- Good Finish Surface
- ST & MT Shank available



SKH55(CO 5%), M35

| CODE NO | D | L | d |
|------------|-------|----|----|
| GEM 851100 | 10.0M | 50 | 6 |
| GEM 851150 | 15.0M | 55 | 8 |
| GEM 851200 | 20.0M | 60 | 10 |
| GEM 851250 | 25.0M | 65 | 12 |
| GEM 851300 | 30.0M | 70 | 12 |
| GEM 851350 | 35.0M | 75 | 12 |
| GEM 851400 | 40.0M | 80 | 12 |
| GEM 851450 | 45.0M | 85 | 12 |
| GEM 851500 | 50.0M | 90 | 12 |

HSS
REAMER

CARBIDE
REAMER

COUNTER

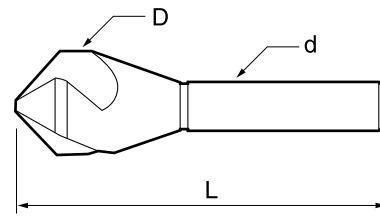
ENDMILL

DRILL

SKH59(CO 8%), M42

| CODE NO | D | L | d |
|------------|-------|----|----|
| GEM 891100 | 10.0M | 50 | 6 |
| GEM 891150 | 15.0M | 55 | 8 |
| GEM 891200 | 20.0M | 60 | 10 |
| GEM 891250 | 25.0M | 65 | 12 |
| GEM 891300 | 30.0M | 70 | 12 |
| GEM 891350 | 35.0M | 75 | 12 |
| GEM 891400 | 40.0M | 80 | 12 |
| GEM 891450 | 45.0M | 85 | 12 |
| GEM 891500 | 50.0M | 90 | 12 |

COUNTER SINK-90°, 3F



PART.
D

REAMER

- Bur away
- TiN, TiCN, TiAlN
- Good Finish Surface
- ST & MT Shank available



SKH55(CO 5%), M35

| CODE NO | D | L | d |
|------------|-------|----|----|
| GEM 853100 | 10.0M | 50 | 6 |
| GEM 853150 | 15.0M | 55 | 8 |
| GEM 853200 | 20.0M | 60 | 10 |
| GEM 853250 | 25.0M | 65 | 12 |
| GEM 853300 | 30.0M | 70 | 12 |
| GEM 853350 | 35.0M | 75 | 12 |
| GEM 853400 | 40.0M | 80 | 12 |
| GEM 853450 | 45.0M | 85 | 12 |
| GEM 853500 | 50.0M | 90 | 12 |

SKH59(CO 8%), M42

| CODE NO | D | L | d |
|------------|-------|----|----|
| GEM 893100 | 10.0M | 50 | 6 |
| GEM 893150 | 15.0M | 55 | 8 |
| GEM 893200 | 20.0M | 60 | 10 |
| GEM 893250 | 25.0M | 65 | 12 |
| GEM 893300 | 30.0M | 70 | 12 |
| GEM 893350 | 35.0M | 75 | 12 |
| GEM 893400 | 40.0M | 80 | 12 |
| GEM 893450 | 45.0M | 85 | 12 |
| GEM 893500 | 50.0M | 90 | 12 |

HSS
REAMER

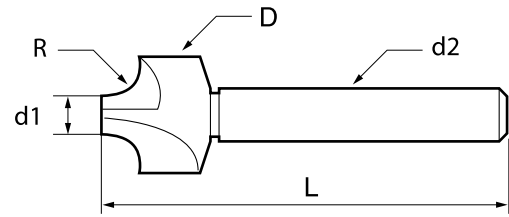
CARBIDE
REAMER

COUNTER

ENDMILL

DRILL

CORNER ROUNDING END MILL



- SKH59(Co 8%), DIN
- For R Forming, ST Shank
- 4 Flutes

SKH
59

M42

ST

| CODE NO | D | L | l1 | l2 | Flutes |
|-------------|-------|----|----|-----|--------|
| GEM R810010 | 1.0R | 6 | 8 | 60 | 10 |
| GEM R810015 | 1.5R | 6 | 9 | 60 | 10 |
| GEM R810020 | 2.0R | 6 | 10 | 60 | 10 |
| GEM R810025 | 2.5R | 6 | 11 | 60 | 10 |
| GEM R810030 | 3.0R | 6 | 12 | 60 | 12 |
| GEM R810035 | 3.5R | 6 | 13 | 60 | 12 |
| GEM R810040 | 4.0R | 6 | 14 | 60 | 12 |
| GEM R810045 | 4.5R | 6 | 15 | 60 | 12 |
| GEM R810050 | 5.0R | 6 | 16 | 60 | 12 |
| GEM R810060 | 6.0R | 8 | 20 | 67 | 16 |
| GEM R810070 | 7.0R | 8 | 22 | 71 | 16 |
| GEM R810080 | 8.0R | 8 | 24 | 71 | 16 |
| GEM R810090 | 9.0R | 8 | 26 | 85 | 25 |
| GEM R810100 | 10.0R | 8 | 28 | 85 | 25 |
| GEM R810110 | 11.0R | 10 | 32 | 90 | 25 |
| GEM R810120 | 12.0R | 10 | 34 | 90 | 25 |
| GEM R810130 | 13.0R | 16 | 42 | 100 | 25 |
| GEM R810140 | 14.0R | 16 | 44 | 100 | 25 |
| GEM R810150 | 15.0R | 16 | 46 | 100 | 25 |
| GEM R810160 | 16.0R | 16 | 48 | 100 | 25 |
| GEM R810180 | 18.0R | 16 | 52 | 112 | 32 |
| GEM R810200 | 20.0R | 16 | 56 | 112 | 32 |

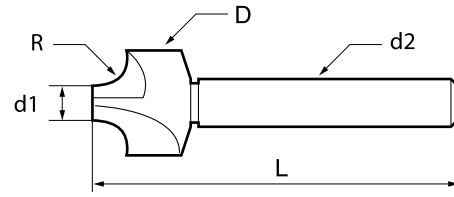
HSS
REAMERCARBIDE
REAMER

COUNTER

ENDMILL

DRILL

CARBIDE CORNER ROUNDING END MILL



- Carbide, DIN
- For R Forming, ST Shank
- All Solid, Tip Blazed
- 2~4 Flutes, ~HRc 50



| CODE NO | D | L | l1 | l2 | Flutes |
|--------------|-----------|-----|------|-----|--------|
| GEM CR810005 | 0.5R | 1.0 | 2.1 | 45 | 4 |
| GEM CR810010 | 1.0R | 3.9 | 6.0 | 52 | 6 |
| GEM CR810015 | 1.5R | 2.9 | 6.0 | 52 | 6 |
| GEM CR810020 | 2.0R | 1.9 | 6.0 | 52 | 6 |
| GEM CR810025 | 2.5R | 3.0 | 8.0 | 52 | 8 |
| GEM CR810030 | 3.0R | 1.9 | 8.0 | 52 | 8 |
| GEM CR810035 | 3.5R | 2.9 | 10.0 | 52 | 10 |
| GEM CR810040 | 4.0R | 1.9 | 10.0 | 52 | 10 |
| GEM CR810045 | 4.5R | 2.9 | 12.0 | 63 | 12 |
| GEM CR810050 | 5.0R | 1.9 | 12.0 | 63 | 12 |
| GEM CR810060 | 6.0R (B) | 7.9 | 20.0 | 110 | 16 |
| GEM CR810080 | 8.0R (B) | 8.9 | 25.0 | 110 | 20 |
| GEM CR810100 | 10.0R (B) | 8.9 | 29.0 | 110 | 20 |
| GEM CR810120 | 12.0R (B) | 8.9 | 33.0 | 120 | 25 |

PART.

D

REAMER

HSS
REAMER

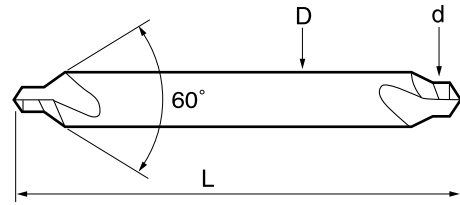
CARBIDE
REAMER

COUNTER

ENDMILL

DRILL

CARBIDE CENTER DRILL A TYPE(60°)



- Carbide
- For Centering & Chamfering
- Form A, ~HRc 50

HSS

M2

JIS

ST

| CODE NO | d | L | D |
|-------------|------|----|----|
| GEM C700010 | 1.0M | 44 | 4 |
| GEM C700015 | 1.5M | 44 | 4 |
| GEM C700020 | 2.0M | 52 | 6 |
| GEM C700025 | 2.5M | 52 | 6 |
| GEM C700030 | 3.0M | 52 | 6 |
| GEM C700040 | 4.0M | 63 | 8 |
| GEM C700050 | 5.0M | 63 | 10 |
| GEM C700060 | 6.0M | 79 | 12 |
| GEM C700080 | 8.0M | 79 | 16 |

HSS
REAMERCARBIDE
REAMER

COUNTER

ENDMILL

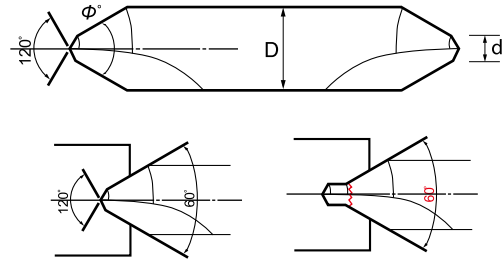
DRILL

HSS NC DOUBLE POINT DRILL-JIS

PART.

D

REAMER



- HSS, TiALN, JIS
- For Centering
- Preventing Broken Pilot



| CODE NO | d | D | L | ANGLE |
|----------------|------|----|-----|----------|
| GEM SPC700010J | 1.0M | 4 | 56 | 120°×60° |
| GEM SPC700015J | 1.5M | 4 | 56 | 120°×60° |
| GEM SPC700020J | 2.0M | 6 | 56 | 120°×60° |
| GEM SPC700025J | 2.5M | 8 | 65 | 120°×60° |
| GEM SPC700030J | 3.0M | 10 | 70 | 120°×60° |
| GEM SPC700040J | 4.0M | 12 | 80 | 120°×60° |
| GEM SPC700050J | 5.0M | 16 | 100 | 120°×60° |
| GEM SPC700060J | 6.0M | 20 | 120 | 120°×60° |

| CODE NO | d | D | L | ANGLE |
|----------------|------|----|-----|----------|
| GEM SPC750010J | 1.0M | 4 | 56 | 120°×90° |
| GEM SPC750015J | 1.5M | 4 | 56 | 120°×90° |
| GEM SPC750020J | 2.0M | 6 | 56 | 120°×90° |
| GEM SPC750025J | 2.5M | 8 | 65 | 120°×90° |
| GEM SPC750030J | 3.0M | 10 | 70 | 120°×90° |
| GEM SPC750040J | 4.0M | 12 | 80 | 120°×90° |
| GEM SPC750050J | 5.0M | 16 | 100 | 120°×90° |
| GEM SPC750060J | 6.0M | 20 | 120 | 120°×90° |

HSS
REAMER

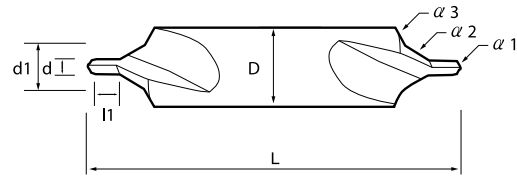
CARBIDE
REAMER

COUNTER

ENDMILL

DRILL

HSS CENTER DRILL B TYPE



- HSS, JIS
- For Centering & Chamfering
- Form B

HSS

M2

JIS

ST

| CODE NO | d | d1 | d1 | D | L |
|--------------|-----|------|----|------|----|
| GEM B700020E | 2 | 4.25 | 8 | 2.60 | 50 |
| GEM B7000200 | 2 | 4.5 | 8 | 2.60 | 53 |
| GEM B7000250 | 2.5 | 5.3 | 9 | 3.20 | 57 |
| GEM B700025E | 2.5 | 5.3 | 10 | 3.20 | 57 |
| GEM B7000300 | 3 | 6 | 10 | 3.90 | 63 |
| GEM B7000400 | 4 | 8 | 13 | 5.20 | 73 |
| GEM B700040E | 4 | 8.5 | 14 | 5.20 | 67 |
| GEM B7000500 | 5 | 10 | 16 | 6.60 | 84 |
| GEM B700050E | 5 | 10.6 | 18 | 6.40 | 75 |
| GEM B7000600 | 6 | 12 | 18 | 7.80 | 95 |

HSS
REAMERCARBIDE
REAMER

COUNTER

ENDMILL

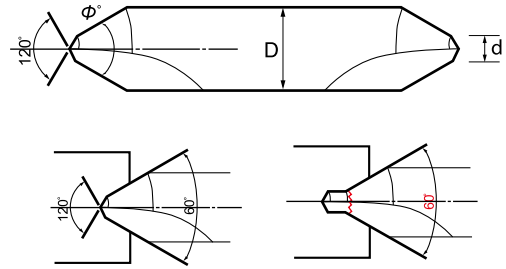
DRILL

HSS NC DOUBLE POINT DRILL-KOR

PART.

D

REAMER



- HSS, TiAlN, KOR
- For Centering
- Preventing Broken Pilot



| CODE NO | d | D | L | ANGLE |
|----------------|------|----|----|----------|
| GEM SPC700010K | 1.0M | 4 | 50 | 120°×60° |
| GEM SPC700015K | 1.5M | 4 | 50 | 120°×60° |
| GEM SPC700020K | 2.0M | 6 | 50 | 120°×60° |
| GEM SPC700025K | 2.5M | 8 | 50 | 120°×60° |
| GEM SPC700030K | 3.0M | 8 | 55 | 120°×60° |
| GEM SPC700040K | 4.0M | 8 | 55 | 120°×60° |
| GEM SPC700050K | 5.0M | 10 | 65 | 120°×60° |
| GEM SPC700060K | 6.0M | 12 | 70 | 120°×60° |
| GEM SPC700080K | 8.0M | 16 | 80 | 120°×60° |

| CODE NO | d | D | L | ANGLE |
|----------------|------|----|----|----------|
| GEM SPC750010K | 1.0M | 4 | 50 | 120°×90° |
| GEM SPC750015K | 1.5M | 4 | 50 | 120°×90° |
| GEM SPC750020K | 2.0M | 6 | 50 | 120°×90° |
| GEM SPC750025K | 2.5M | 8 | 50 | 120°×90° |
| GEM SPC750030K | 3.0M | 8 | 55 | 120°×90° |
| GEM SPC750040K | 4.0M | 8 | 55 | 120°×90° |
| GEM SPC750050K | 5.0M | 10 | 65 | 120°×90° |
| GEM SPC750060K | 6.0M | 12 | 70 | 120°×90° |
| GEM SPC750080K | 8.0M | 16 | 80 | 120°×90° |

HSS
REAMER

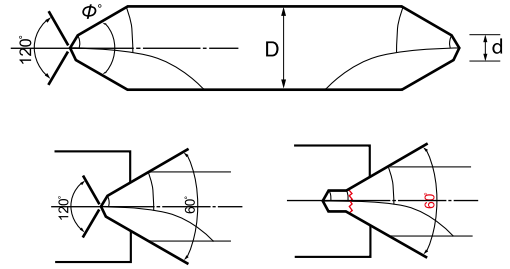
CARBIDE
REAMER

COUNTER

ENDMILL

DRILL

CARBIDE NC DOUBLE POINT DRILL-KOR



- HSS, TiAlN, KOR
- For Centering
- Preventing Broken Pilot



| CODE NO | d | D | L | ANGLE |
|----------------|------|----|----|----------|
| GEM SPC700010K | 1.0M | 4 | 44 | 120°×60° |
| GEM SPC700015K | 1.5M | 4 | 44 | 120°×60° |
| GEM SPC700020K | 2.0M | 6 | 52 | 120°×60° |
| GEM SPC700025K | 2.5M | 8 | 52 | 120°×60° |
| GEM SPC700030K | 3.0M | 8 | 52 | 120°×60° |
| GEM SPC700040K | 4.0M | 8 | 63 | 120°×60° |
| GEM SPC700050K | 5.0M | 10 | 63 | 120°×60° |
| GEM SPC700060K | 6.0M | 12 | 79 | 120°×60° |
| GEM SPC700080K | 8.0M | 16 | 79 | 120°×60° |

| CODE NO | d | D | L | ANGLE |
|----------------|------|----|----|----------|
| GEM SPC750010K | 1.0M | 4 | 44 | 120°×90° |
| GEM SPC750015K | 1.5M | 4 | 44 | 120°×90° |
| GEM SPC750020K | 2.0M | 6 | 52 | 120°×90° |
| GEM SPC750025K | 2.5M | 8 | 52 | 120°×90° |
| GEM SPC750030K | 3.0M | 8 | 52 | 120°×90° |
| GEM SPC750040K | 4.0M | 8 | 63 | 120°×90° |
| GEM SPC750050K | 5.0M | 10 | 63 | 120°×90° |
| GEM SPC750060K | 6.0M | 12 | 79 | 120°×90° |
| GEM SPC750080K | 8.0M | 16 | 79 | 120°×90° |

HSS
REAMERCARBIDE
REAMER

COUNTER

ENDMILL

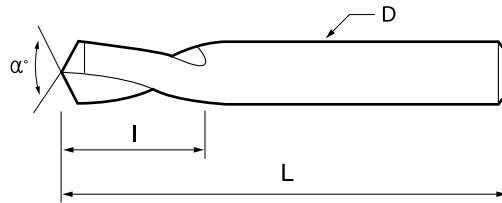
DRILL

HSS CO NC SPOTTING DRILL

PART.

D

REAMER



- SKH55(Co 5%), M35
- Helix 16°, ST Shank
- For Centering & Chamfering of tapping holes on one operation
- Only suitable for shallow drilling depth

SKH 55
M35
RH 16°
ST

| CODE NO | D | L | l | d |
|------------|----|-----|----|----|
| GEM 900030 | 3 | 48 | 12 | 3 |
| GEM 900040 | 4 | 53 | 13 | 4 |
| GEM 900050 | 5 | 56 | 16 | 5 |
| GEM 900060 | 6 | 62 | 20 | 6 |
| GEM 900080 | 8 | 75 | 25 | 8 |
| GEM 900100 | 10 | 85 | 25 | 10 |
| GEM 900120 | 12 | 95 | 30 | 12 |
| GEM 900140 | 14 | 105 | 34 | 14 |
| GEM 900160 | 16 | 110 | 34 | 16 |
| GEM 900200 | 20 | 125 | 38 | 20 |

HSS
REAMER

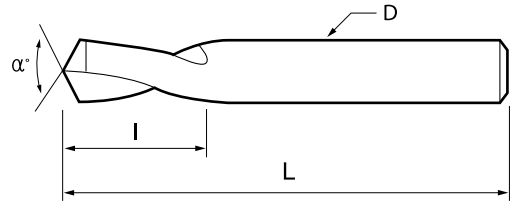
CARBIDE
REAMER

COUNTER

ENDMILL

DRILL

LONG HSS NC SPOTTING DRILL



- SKH55(Co 5%), M35
- Helix 16°, ST Shank
- For Centering & Chamfering of tapping holes on one operation
- Only suitable for shallow drilling depth

SKH
55

M35

RH
16°

ST

SKH55-M35

| CODE NO | D | L | l | d |
|------------|----|-----|----|----|
| GEM 910030 | 3 | 80 | 12 | 3 |
| GEM 910040 | 4 | 100 | 15 | 4 |
| GEM 910050 | 5 | 120 | 16 | 5 |
| GEM 910060 | 6 | 140 | 20 | 6 |
| GEM 910080 | 8 | 140 | 22 | 8 |
| GEM 910100 | 10 | 170 | 36 | 10 |
| GEM 910120 | 12 | 170 | 32 | 12 |
| GEM 910160 | 16 | 200 | 36 | 16 |
| GEM 910200 | 20 | 200 | 42 | 20 |

HSS
REAMERCARBIDE
REAMER

COUNTER

ENDMILL

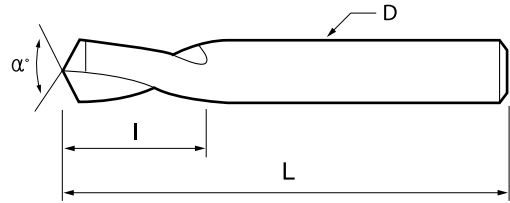
DRILL

CARBIDE NC LEADING DRILL-TIALN

PART.

D

REAMER



- Carbide, TiAlN
- For Centering & Chamfering
- All Solid
- Form 90°



SKH55-M35

| CODE NO | D | L | l | d |
|------------|----|----|----|----|
| TLDS900030 | 3 | 44 | 12 | 3 |
| TLDS900040 | 4 | 44 | 14 | 4 |
| TLDS900050 | 5 | 52 | 16 | 5 |
| TLDS900060 | 6 | 52 | 18 | 6 |
| TLDS900080 | 8 | 63 | 24 | 8 |
| TLDS900010 | 10 | 79 | 26 | 10 |
| TLDS900012 | 12 | 79 | 26 | 12 |

HSS
REAMER

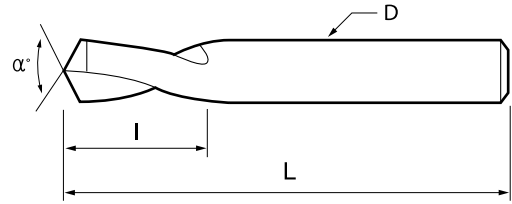
CARBIDE
REAMER

COUNTER

ENDMILL

DRILL

CARBIDE V-MILL DRILL-FLAT TYPE



- Carbide
- For Centering & Chamfering
- For AL & V-Cutting
- Form 90°, ~HRc 50



SKH55-M35

| CODE NO | D | L | l | d |
|---------|----|-----|----|----|
| C900020 | 2 | 40 | 10 | 2 |
| C900030 | 3 | 45 | 12 | 3 |
| C900040 | 4 | 45 | 14 | 4 |
| C900050 | 5 | 54 | 16 | 5 |
| C900060 | 6 | 54 | 18 | 6 |
| C900080 | 8 | 65 | 24 | 8 |
| C900100 | 10 | 80 | 26 | 10 |
| C900120 | 12 | 80 | 26 | 12 |
| C900140 | 16 | 100 | 28 | 16 |
| C900160 | 16 | 100 | 28 | 16 |
| C900200 | 20 | 120 | 35 | 20 |
| C900250 | 25 | 150 | 40 | 25 |

HSS
REAMER

CARBIDE
REAMER

COUNTER

ENDMILL

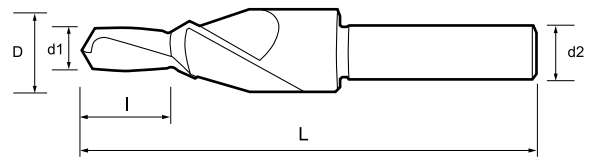
DRILL

HSS CO STEP DRILL-90° & 180°

PART.

D

REAMER



SKH 55 M35 ST

• Drilling with Counter Sinking or Counter Boring

180°

| CODE NO | PR NO | d1 | D | d2 | l | L |
|----------------|-------|------|------|------|----|-----|
| GEM STD1025050 | M2.5 | 2.9 | 5.0 | 5.0 | 7 | 45 |
| GEM STD1030060 | M3.0 | 3.4 | 6.0 | 6.0 | 9 | 45 |
| GEM STD1040080 | M4.0 | 4.5 | 8.0 | 8.0 | 11 | 50 |
| GEM STD1050100 | M5.0 | 5.5 | 10.0 | 10.0 | 13 | 55 |
| GEM STD1060110 | M6.0 | 6.6 | 11.0 | 11.0 | 15 | 63 |
| GEM STD1080150 | M8.0 | 9.0 | 15.0 | 12.0 | 19 | 100 |
| GEM STD1100180 | M10.0 | 11.0 | 18.0 | 12.0 | 23 | 110 |
| GEM STD1120200 | M12.0 | 14.0 | 20.0 | 12.0 | 28 | 110 |
| GEM STD1140240 | M14.0 | 16.0 | 24.0 | 12.0 | 34 | 120 |

90°

| CODE NO | PR NO | d1 | D | d2 | l | L |
|---------------|-------|------|------|------|----|-----|
| GEM STD030065 | M3.0 | 3.2 | 6.5 | 6.0 | 9 | 45 |
| GEM STD035076 | M3.5 | 3.7 | 7.6 | 7.0 | 10 | 50 |
| GEM STD040086 | M4.0 | 4.3 | 8.6 | 8.0 | 11 | 50 |
| GEM STD050104 | M5.0 | 5.3 | 10.4 | 10.0 | 13 | 55 |
| GEM STD060124 | M6.0 | 6.4 | 12.4 | 12.0 | 15 | 63 |
| GEM STD080164 | M8.0 | 8.4 | 16.4 | 12.0 | 19 | 100 |
| GEM STD100204 | M10.0 | 10.5 | 20.4 | 12.0 | 23 | 110 |
| GEM STD120250 | M12.0 | 13.0 | 25.0 | 12.0 | 28 | 120 |

HSS
REAMER

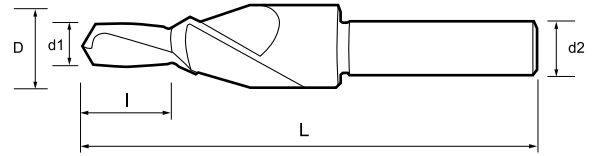
CARBIDE
REAMER

COUNTER

ENDMILL

DRILL

HSS CO STEP DRILL FOR TAP



• For Tap Predrilling with Counter Sinking

SKH
55

M35

ST

90°

| CODE NO | PR NO | d1 | D | d2 | l | L |
|----------------|-------|------|------|------|----|-----|
| GEM STD030040T | M3 | 2.5 | 4.0 | 4.0 | 8 | 52 |
| GEM STD040050T | M4 | 3.3 | 5.0 | 5.0 | 11 | 58 |
| GEM STD050060T | M5 | 4.2 | 6.0 | 6.0 | 13 | 66 |
| GEM STD060066T | M6 | 5.0 | 6.6 | 6.0 | 16 | 70 |
| GEM STD080090T | M8 | 6.8 | 9.0 | 9.0 | 20 | 84 |
| GEM STD100110T | M10 | 8.5 | 11.0 | 10.0 | 24 | 95 |
| GEM STD120140T | M12 | 10.2 | 14.0 | 12.0 | 29 | 107 |
| GEM STD140160T | M14 | 12.0 | 16.0 | 12.0 | 32 | 115 |
| GEM STD160180T | M16 | 14.0 | 18.0 | 12.0 | 34 | 135 |

HSS
REAMER

CARBIDE
REAMER

COUNTER

ENDMILL

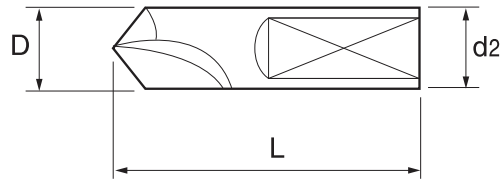
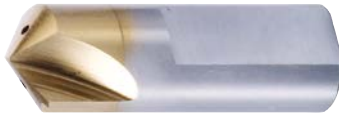
DRILL

PILOT DRILL

PART.

D

REAMER



- SKH59(CO 8%) M42
- For Centering
- Oil Coolant



| CODE NO | Pr No. | L | D |
|-------------|--------|----|----|
| GEM TPD0060 | 6 M | 30 | 6 |
| GEM TPD0080 | 8 M | 35 | 8 |
| GEM TPD0100 | 10 M | 35 | 10 |
| GEM TPD0120 | 12 M | 38 | 12 |
| GEM TPD0160 | 16 M | 45 | 16 |
| GEM TPD0200 | 20 M | 45 | 20 |
| GEM TPD0250 | 25 M | 56 | 25 |
| GEM TPD0300 | 30 M | 68 | 30 |

HSS
REAMER

CARBIDE
REAMER

COUNTER

ENDMILL

DRILL

UNION MATERIALS

CUTTING TOOLS

E

INDUSTRIAL

INDUSTRIAL CERAMICS

Industrial Ceramics E 2

Properties of Fine Ceramics E 4

CERAMICS

NEW TECHNOLOGY PRODUCTS WHICH WILL CONTRIBUTE TO THE PRODUCTIVITY OF ALL KINDS OF INDUSTRIES.



Union Materials Corporation has utilized its technologies with expertise accumulated since 1962 manufacturing experiences of various materials like advanced inorganic materials and cement.

Fine ceramics of Union have enjoyed a world-wide fame in fields of industries from electro-electric industry to automobile and chemical industries.



CERAMICS FOR FAUCET

With state-of-the-art facilities and technologies, Union has been supplying various types of ceramics all over the world. Enjoy the world best technologies for surface grinding, geometrical accuracy and chemico-physical stability.



CERAMICS FOR FIBER OPTIC FERRULE

Fiber optic ferrule with ultra high precision satisfies customers' requirement of concentricity, straightness and roundness that are essential to the quality.

The unique technologies of powder-compounding and near-net shape of mould guarantee customers' easy processing and short production lead time.



CERAMICS FOR METALIZED PARTS

As the world biggest supplier of metalizing ceramics, Union has the strong point in metalizing and plating technologies for insulating parts such as ceramics for microwave oven and various interruptors.



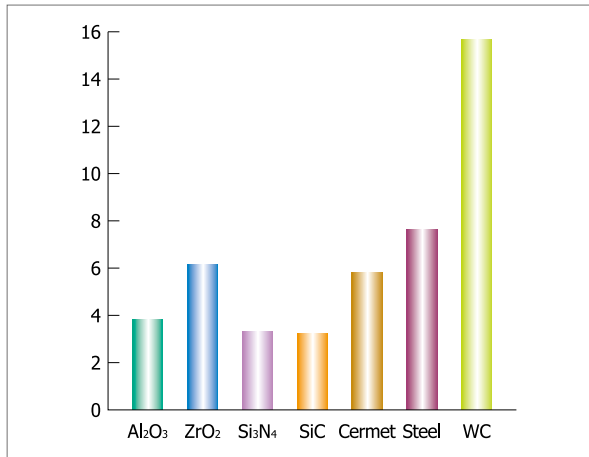
BIO-CERMAICS AND OTHERS

Following the various needs from the industries overall, Union has been developing the best of the best technology maximizing unique characteristics of ceramics; wear-resistance, anti-corrosiveness, thermal shock-resistance and electric insulation.

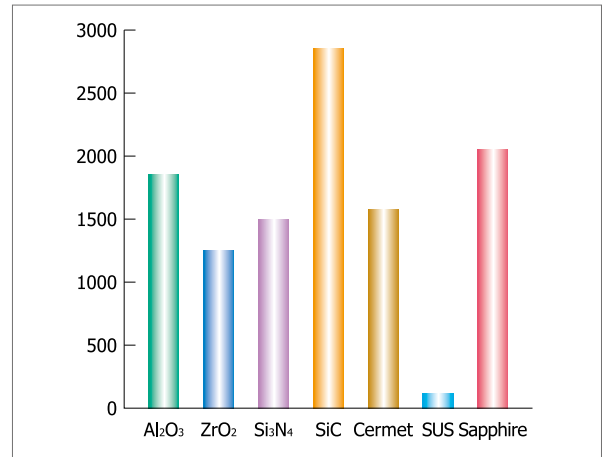
Now our products are; dental implant, extruding dies, fixtures, guides, oxygen sensors, shafts, seals, balls, nozzles, cutters, various jigs for electro-electric areas, automobile industry and etc.

PROPERTIES OF FINE CERAMICS

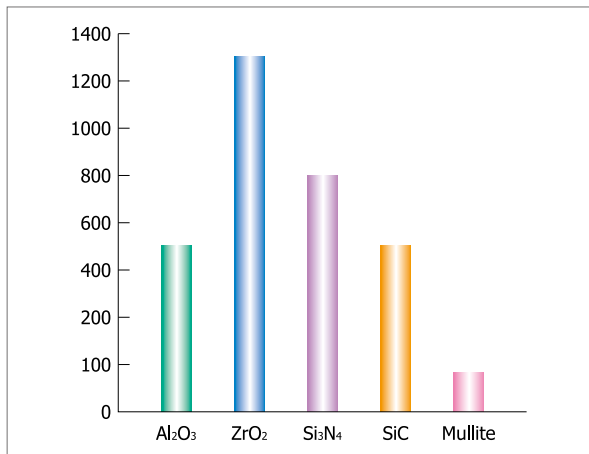
DENSITY(g/cm³)



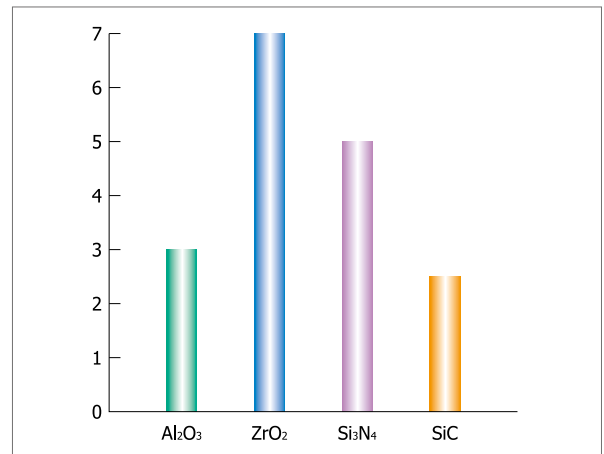
HARDNESS(Kg/mm²)



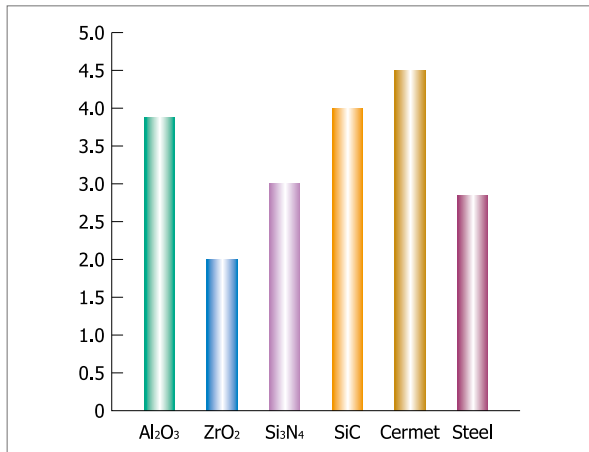
BENDING STRENGTH(MPa)



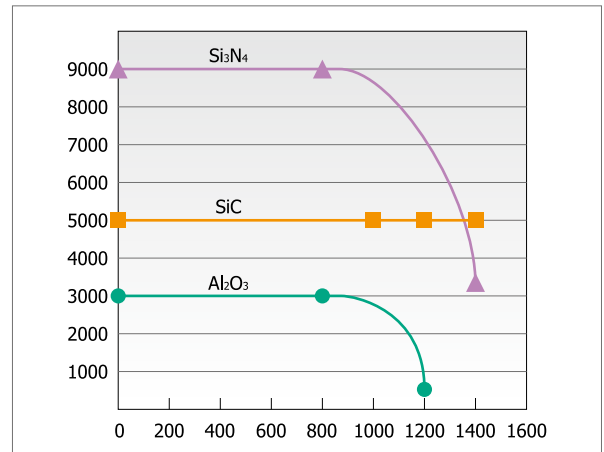
TOUGHNESS(MPa · √m)



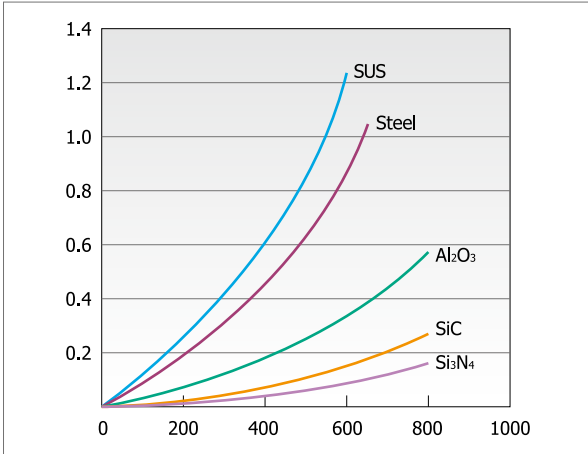
YOUNG'S MODULS(10⁴kg/cm²)



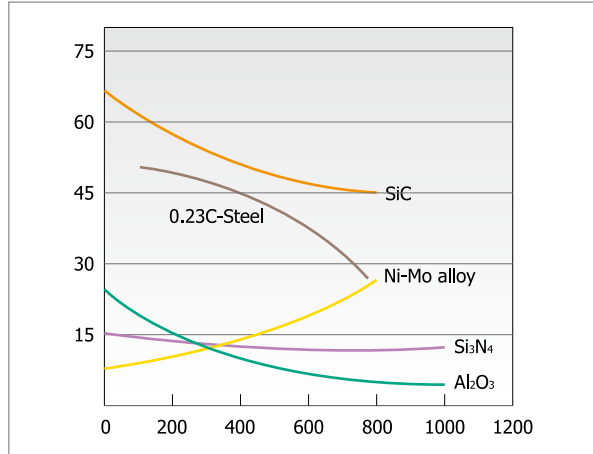
HIGH TEMPERATURE STRENGTH(kg/cm²)



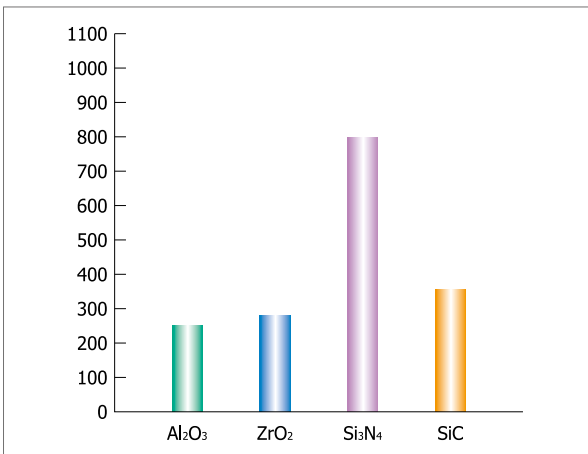
THERMAL EXPANSION(%)



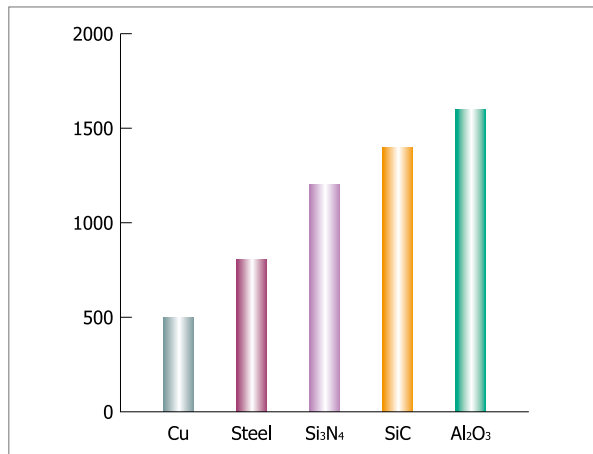
THERMAL CONDUCTIVITY(ω /mK)



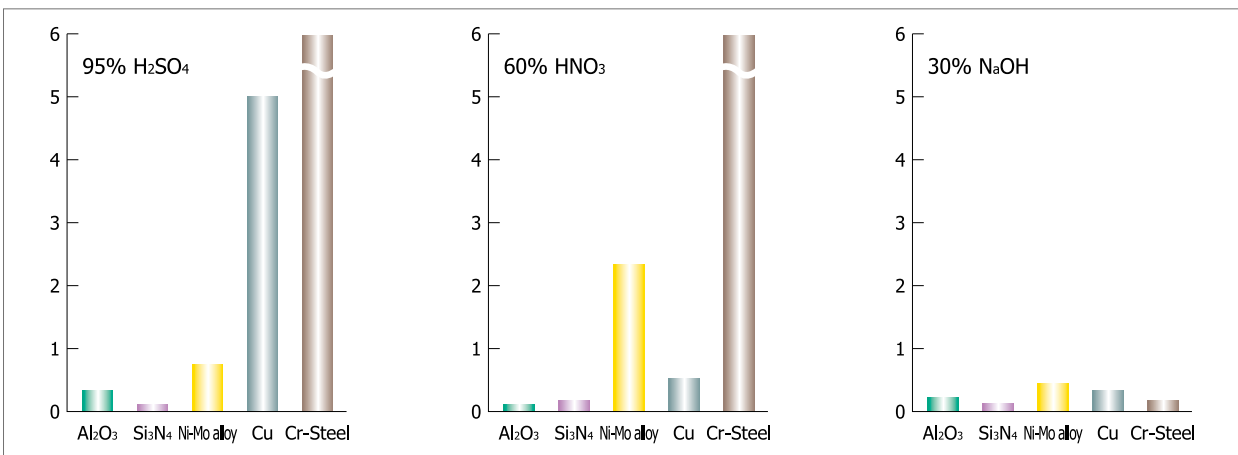
THERMAL SHOCK(ΔT , °C)



WORKING TEMP.(°C, in air)



CORROSION RESISTANCE(mg/cm³, boiling, 30min.)



PROPERTIES OF FINE CERAMICS

| Materials | | Al2O3 | | ZrO2 | |
|---|--------|--|---|---|---|
| Properties | Grade | SYAL 995 | SYAL 950 | SYZR-1 | SYZR-2 |
| Density(g/cm ³) | | 3.94 | 3.77 | 6.10 | 5.45 |
| Hardness(kg/mm ²) | | 1,800 | 1,400 | 1,250 | 1,500 |
| Toughness(MPa · √m) | | 3.0 | 2.0 | 7.0 | 5.5 |
| Bending Strength(MPa) | | 500 | 380 | 1,300 | 2,000 |
| Young's Modulus(106kg/cm ²) | | 3.8 | 3.3 | 2.0 | 2.5 |
| Specific Heat(cal/g · °C) | | 0.19 | 0.19 | - | - |
| Thermal Expansion Coeff.(×10-6/°C) | | 7.5 | 8.0 | 9.5 | 8.7 |
| Thermal Shock(ΔT, °C) | | 250 | 200 | 280 | 400 |
| Thermal Conductivity(ω/mK) | | 23 | 23 | 3.0 | 7.0 |
| Working Temperature(°C) | | 1,600 | 1,500 | 800 | 1,000 |
| Corrosion Resistance | Acid | Excellent | Good | Good | Good |
| | Alkali | Excellent | Good | Good | Good |
| Merit | | Wear resistance Anti-corrosion High temp. application High purity | Wear resistance Anti-corrosion High temp. application | High strength Wear resistance High toughness Insulation for heat | High strength Wear resistance High toughness Insulation for heat |

| Materials | | Si3N4 | | | SiC |
|---|--------|---|--|---|--|
| Properties | Grade | SYSN-1 | SYSN-2 | SYSN-3 | SYSC-1 |
| Density(g/cm ³) | | 3.24 | 3.26 | 3.32 | 3.20 |
| Hardness(kg/mm ²) | | 1,500 | 1,600 | 1,500 | 2,800 |
| Toughness(MPa · √m) | | 5.0 | 6.0 | 4.9 | 2.5 |
| Bending Strength(MPa) | | 800 | 1,000 | 900 | 500 |
| Young's Modulus(106kg/cm ²) | | 3.0 | 3.2 | 3.0 | 4.0 |
| Specific Heat(cal/g · °C) | | 0.19 | 0.19 | 0.19 | 0.16 |
| Thermal Expansion Coeff.(×10-6/°C) | | 2.8 | 3.0 | 2.8 | 4.2 |
| Thermal Shock(ΔT, °C) | | 800 | 800 | 800 | 350 |
| Thermal Conductivity(ω/mK) | | 29 | 29 | 40 | 120 |
| Working Temperature(°C) | | 1,200 | 1,200 | 1,200 | 1,400 |
| Corrosion Resistance | Acid | Good | Good | Good | Excellent |
| | Alkali | Good | Good | Good | Excellent |
| Merit | | High temp. strength High thermal shock resistance Wear resistance Anti-corrosion | High temp. strength Wear resistance Anti-corrosion | High temp. strength High thermal shock resistance Wear resistance Anti-corrosion | High temp. strength Wear resistance Anti-corrosion Excellent hardness |

MEMO

TURNING & MILLING

A

| | | |
|-------|--------------------|-----|
| ARE01 | MILLING & DRILLING | 252 |
| ARE02 | MILLING & DRILLING | 252 |

B

| | | |
|-----|--------|-----|
| BSN | CERMET | 100 |
| BTN | CERMET | 100 |

C

| | | |
|------------|-------------|-----|
| CCBN | TOOL HOLDER | 137 |
| CCGW | CERAMIC | 30 |
| CCGW | PCBN | 112 |
| CCGW | PCBN | 108 |
| CCGW | PCD | 118 |
| CCGX | CERAMIC | 29 |
| CCKN | TOOL HOLDER | 138 |
| CCLN | TOOL HOLDER | 136 |
| CCMT | CERMET | 89 |
| CDH | CERAMIC | 52 |
| CDHN | TOOL HOLDER | 139 |
| CDJN | TOOL HOLDER | 140 |
| CDNN | TOOL HOLDER | 141 |
| CEFN | TOOL HOLDER | 142 |
| CEGN | TOOL HOLDER | 143 |
| CEJN | TOOL HOLDER | 144 |
| CFLN | TOOL HOLDER | 174 |
| CGVN | TOOL HOLDER | 176 |
| CINN | TOOL HOLDER | 177 |
| CLKN | TOOL HOLDER | 173 |
| CNGA | CERAMIC | 24 |
| CNGA | PCBN | 112 |
| CNGA | PCBN | 108 |
| CNGA | PCD | 118 |
| CNGN .. AZ | CERAMIC | 73 |
| CNGN | CERAMIC | 26 |
| CNGN | PCBN | 116 |
| CNGX | CERAMIC | 28 |
| CNMA | CERAMIC | 25 |
| CNMG | CERMET | 84 |
| CNMN | CERAMIC | 27 |
| CNMX .. RD | CERAMIC | 29 |

| | | |
|-----------|----------------|-----|
| CNMX | CERAMIC | 29 |
| CNVX | CERAMIC | 28 |
| CPGN | CERAMIC | 31 |
| CPGT | CERMET | 89 |
| CPGW | PCD | 118 |
| CRDB | TOOL HOLDER | 147 |
| CRDC | TOOL HOLDER | 148 |
| CRDN | TOOL HOLDER | 145 |
| CRGN | TOOL HOLDER | 146 |
| CSBF | TOOL HOLDER | 165 |
| CSBN | TOOL HOLDER | 149 |
| CSBR | TOOL HOLDER | 166 |
| CSC | MILLING CUTTER | 220 |
| CSDN | TOOL HOLDER | 150 |
| CSGF | TOOL HOLDER | 167 |
| CSGR | TOOL HOLDER | 168 |
| CSKN | TOOL HOLDER | 151 |
| CSRC | TOOL HOLDER | 158 |
| CSRN | TOOL HOLDER | 152 |
| CSSC | TOOL HOLDER | 159 |
| CSSF | TOOL HOLDER | 169 |
| CSSN | TOOL HOLDER | 153 |
| CSSR .. N | TOOL HOLDER | 171 |
| CSSR | TOOL HOLDER | 170 |
| CSTP | TOOL HOLDER | 160 |
| CSVN | TOOL HOLDER | 175 |
| CSYN | TOOL HOLDER | 154 |
| CTFN | TOOL HOLDER | 155 |
| CTFP | TOOL HOLDER | 161 |
| CTGN | TOOL HOLDER | 156 |
| CVJN | TOOL HOLDER | 163 |
| CVVN | TOOL HOLDER | 164 |
| CWF/R | TOOL HOLDER | 172 |
| CWLN | TOOL HOLDER | 157 |

D

| | | |
|------|---------|-----|
| DCGW | CERMET | 89 |
| DCGW | PCBN | 112 |
| DCGW | PCBN | 108 |
| DCGW | PCD | 119 |
| DCGX | CERAMIC | 34 |
| DNGA | CERAMIC | 32 |

| | | |
|------|---------|-----|
| DNGA | PCBN | 113 |
| DNGA | PCBN | 108 |
| DNGA | PCD | 118 |
| DNGG | CERMET | 92 |
| DNGN | CERAMIC | 33 |
| DNGX | CERAMIC | 34 |
| DNMA | CERAMIC | 32 |
| DNMG | CERMET | 85 |
| DNMX | CERAMIC | 34 |

E

| | | |
|------|---------|----|
| ENGN | CERAMIC | 35 |
|------|---------|----|

F

| | | |
|----------|--------------------|-----|
| FBC | MILLING & DRILLING | 256 |
| F-Series | CERAMIC | 53 |
| F-Series | CERAMIC | 53 |
| F-Series | CERAMIC | 54 |
| F-Series | CERAMIC | 54 |

G

| | | |
|------|---------|----|
| GVGN | CERAMIC | 77 |
|------|---------|----|

H

| | | |
|---------|--------------------|-----|
| HFC01 | MILLING & DRILLING | 254 |
| HFC01 | MILLING & DRILLING | 254 |
| HNEN | CERAMIC | 65 |
| HPA - H | MILLING CUTTER | 224 |
| HPA - I | MILLING CUTTER | 223 |
| HPA - M | MILLING CUTTER | 225 |
| HRC D | TOOL HOLDER | 162 |

I

| | | |
|------|---------|-----|
| INGN | CERAMIC | 79 |
| INGN | CERMET | 101 |

J

| | | |
|----------|--------------------|-----|
| JSFD 2×D | MILLING & DRILLING | 261 |
| JSFD 3×D | MILLING & DRILLING | 262 |
| JSFD 4×D | MILLING & DRILLING | 263 |
| JTR 2×D | MILLING & DRILLING | 258 |
| JTR 3×D | MILLING & DRILLING | 259 |
| JTR 4×D | MILLING & DRILLING | 260 |

L

| | | |
|-----|---------|----|
| LNE | CERAMIC | 65 |
| LNJ | CERAMIC | 55 |

O

| | | |
|-------|--------------------|-----|
| OEGB | CERAMIC | 66 |
| OMR07 | MILLING & DRILLING | 257 |
| OPEN | CERAMIC | 66 |

Q

| | | |
|---------|----------------|-----|
| QCB - H | MILLING CUTTER | 230 |
| QCB - I | MILLING CUTTER | 229 |

R

| | | |
|------------|---------|-----|
| RBGN | CERAMIC | 39 |
| RBGX | CERAMIC | 56 |
| RCGN | CERAMIC | 39 |
| RCGX | CERAMIC | 56 |
| RCGX | PCBN | 115 |
| RCGX | PCBN | 115 |
| RNGA | CERAMIC | 36 |
| RNGN | CERAMIC | 36 |
| RNGN | PCBN | 115 |
| RNGN | PCBN | 116 |
| RNGX .. DP | CERAMIC | 38 |
| RPGA | CERAMIC | 37 |
| RPGN | CERAMIC | 37 |
| RPGN | PCBN | 115 |
| RPGX .. DP | CERAMIC | 38 |
| RPGX | CERAMIC | 57 |
| RXGX | CERAMIC | 57 |

TURNING & MILLING

S

| | | | | | |
|-----------------|----------------|-----|------------------|----------------|-----|
| SBAR | CERMET | 104 | SFMS .. LRF | MILLING CUTTER | 208 |
| SBE .. 1C | PCBN/PCD | 126 | SFSP .. OT | MILLING CUTTER | 202 |
| SBE .. 2C | PCBN/PCD | 126 | SFSX .. 00 .. EC | MILLING CUTTER | 198 |
| SCGN .. MZ | CERAMIC | 76 | SFSX .. 70 .. EC | MILLING CUTTER | 200 |
| SCGN .. WZ | CERAMIC | 75 | SFXN | MILLING CUTTER | 214 |
| SCGN .. XZ | CERAMIC | 75 | SFXP | MILLING CUTTER | 216 |
| SCGN .. ZZ | CERAMIC | 75 | SGF | CERAMIC | 59 |
| SCGN | CERAMIC | 43 | SGR | CERAMIC | 59 |
| SCGW .. FS | PCBN | 111 | SNCN .. ENTN | CERAMIC | 67 |
| SCGW | CERAMIC | 43 | SNCN .. GZ | CERAMIC | 74 |
| SCGW | PCBN | 113 | SNCN .. KZ | CERAMIC | 74 |
| SCGW | PCBN | 109 | SNCN .. ZZT | CERAMIC | 74 |
| SCGW | PCD | 119 | SNCN | CERAMIC | 67 |
| SCGX | CERAMIC | 43 | SNGA | CERAMIC | 40 |
| SDCN .. T | CERAMIC | 68 | SNGA | PCBN | 112 |
| SDCN | CERAMIC | 68 | SNGA | PCD | 119 |
| SDCN | CERMET | 95 | SNGF | CERAMIC | 79 |
| SDCW | CERAMIC | 68 | SNGG | CERMET | 92 |
| SDEN | CERMET | 95 | SNGL | CERMET | 92 |
| SDEW | CERMET | 96 | SNGN .. ING | CERAMIC | 67 |
| SDKN | CERMET | 95 | SNGN3812R | CERAMIC | 55 |
| SEAN .. NW | CERAMIC | 69 | SNGN | CERAMIC | 41 |
| SEAN .. T | CERAMIC | 69 | SNGN | PCBN | 109 |
| SEAN | CERAMIC | 69 | SNGN | PCBN | 116 |
| SEHW | CERMET | 96 | SNGN | PCD | 119 |
| SEKN .. R | CERMET | 97 | SNGX | CERAMIC | 42 |
| SEKN | CERMET | 97 | SNK | CERMET | 96 |
| SEXP | MILLING CUTTER | 218 | SNMA | CERAMIC | 40 |
| SFAN .. 75 | MILLING CUTTER | 196 | SNMG | CERMET | 86 |
| SFAN .. 88 | MILLING CUTTER | 194 | SNMX .. RD | CERAMIC | 42 |
| SFCN .. 00 .. R | MILLING CUTTER | 210 | SNMX | CERAMIC | 42 |
| SFCP .. 00 .. R | MILLING CUTTER | 212 | SNMX | CERAMIC | 78 |
| SFE .. 1C | PCBN/PCD | 125 | SPCN .. T | CERAMIC | 70 |
| SFE .. 2C | PCBN/PCD | 125 | SPCW | CERAMIC | 70 |
| SFKN .. 45 | MILLING CUTTER | 186 | SPEN | CERAMIC | 70 |
| SFKN .. 75 | MILLING CUTTER | 184 | SPGN | CERAMIC | 44 |
| SFKN .. 88 | MILLING CUTTER | 182 | SPGN | PCD | 120 |
| SFKN .. HX | MILLING CUTTER | 204 | SPGT | CERMET | 90 |
| SFKP .. 45 | MILLING CUTTER | 192 | SPGW | PCD | 120 |
| SFKP .. 75 | MILLING CUTTER | 190 | SPHX | CERAMIC | 71 |
| SFKP .. 88 | MILLING CUTTER | 188 | SPKN .. SP | CERAMIC | 71 |
| SFKP .. MF | MILLING CUTTER | 206 | SPKN | CERAMIC | 71 |

| | | |
|----------|---------|----|
| SPKN | CERMET | 97 |
| SPMW | CERMET | 91 |
| SSF | CERAMIC | 60 |
| SSR | CERAMIC | 60 |
| SVW | CERAMIC | 77 |
| SYBF | CERAMIC | 58 |
| SYBR | CERAMIC | 58 |
| SZT 5810 | CERAMIC | 78 |

T

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|------------|---------|-----|
| TBGW | PCD | 120 |
| TCGW | PCBN | 110 |
| TCGW | PCD | 121 |
| TCUN | CERAMIC | 47 |
| TEKN | CERAMIC | 72 |
| TEKN | CERMET | 98 |
| TNCN | CERAMIC | 72 |
| TNGA | CERAMIC | 45 |
| TNGA | PCBN | 113 |
| TNGA | PCBN | 109 |
| TNGA | PCD | 120 |
| TNGG .. F | CERMET | 93 |
| TNGG .. FS | CERMET | 93 |
| TNGG | CERMET | 93 |
| TNGN | CERAMIC | 46 |
| TNGN | PCBN | 116 |
| TNMG .. 2G | CERMET | 94 |
| TNMG .. RM | CERMET | 94 |
| TNMG | CERMET | 87 |
| TPGB | PCBN | 110 |
| TPGB | PCD | 121 |
| TPGN | CERAMIC | 48 |
| TPGN | PCBN | 110 |
| TPGN | PCD | 121 |
| TPGR | CERMET | 91 |
| TPGT .. KC | CERMET | 90 |
| TPGT | CERMET | 90 |
| TPGT | PCD | 122 |
| TPGW | PCBN | 113 |
| TPGW | PCBN | 110 |
| TPGW | PCD | 122 |
| TPKN | CERAMIC | 72 |

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|------|---------|----|
| TPKN | CERMET | 98 |
| TPUN | CERAMIC | 48 |

V

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|------|---------|-----|
| VBGW | PCBN | 114 |
| VBGW | PCBN | 111 |
| VBGW | PCD | 122 |
| VCGW | PCBN | 111 |
| VCGW | PCD | 123 |
| VNGA | CERAMIC | 49 |
| VNGA | PCBN | 114 |
| VNGA | PCBN | 111 |
| VNGA | PCD | 122 |
| VNGN | CERAMIC | 49 |
| VNGX | CERAMIC | 50 |

W

| | | |
|------|---------|----|
| WFC | CERAMIC | 61 |
| WFP | CERAMIC | 63 |
| WNGA | CERAMIC | 51 |
| WNGX | CERAMIC | 51 |
| WNMG | CERMET | 86 |
| WRC | CERAMIC | 62 |
| WRP | CERAMIC | 64 |

X

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| XCET | CERMET | 99 |
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Y

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|-----|--------|----|
| YCE | CERMET | 99 |
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ENDMILL & DRILL

A

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|----------|---------------|----|
| AB302 | ZAMUS AL-MATE | 61 |
| AE30(2)3 | ZAMUS AL-MATE | 60 |
| AE302 | ZAMUS AL-MATE | 60 |
| AF303 | ZAMUS AL-MATE | 63 |
| AF313 | ZAMUS AL-MATE | 63 |
| AR502 | ZAMUS AL-MATE | 62 |
| AR503 | ZAMUS AL-MATE | 62 |

B

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|-------|-------------------|----|
| B302 | STANDARD ENDMILL | 65 |
| B304 | STANDARD ENDMILL | 65 |
| BB302 | STANDARD ENDMILL | 69 |
| BC502 | ZAMUS COPPER-MATE | 57 |

D

| | | |
|----------|----------------|----|
| DA302 | ZAMUS THUNDER | 49 |
| DA412 | ZAMUS PLUS | 18 |
| DA512 | ZAMUS CLASSIC | 21 |
| DA514 | ZAMUS CLASSIC | 21 |
| DA522 | ZAMUS CLASSIC | 22 |
| DA542 | ZAMUS CLASSIC | 23 |
| DA552 | ZAMUS CLASSIC | 23 |
| DA702 | ZAMUS STAR | 6 |
| DB312 | ZAMUS THUNDER | 50 |
| DB342 | ZAMUS THUNDER | 51 |
| DB412 | ZAMUS PLUS | 18 |
| DB502 | ZAMUS CLASSIC | 34 |
| DB512 | ZAMUS CLASSIC | 33 |
| DB514 | ZAMUS CLASSIC | 33 |
| DB522 | ZAMUS CLASSIC | 34 |
| DB532 | ZAMUS CLASSIC | 35 |
| DB534 | ZAMUS CLASSIC | 35 |
| DB54(5)2 | ZAMUS CLASSIC | 36 |
| DB612 | ZAMUS CLASSIC | 24 |
| DB702 | ZAMUS STAR | 6 |
| DS502 | ZAMUS SUS-MATE | 59 |

E

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|-------|------------------|----|
| E302 | STANDARD ENDMILL | 64 |
| E304 | STANDARD ENDMILL | 64 |
| E322 | STANDARD ENDMILL | 66 |
| E324 | STANDARD ENDMILL | 66 |
| EB302 | STANDARD ENDMILL | 67 |
| EB304 | STANDARD ENDMILL | 67 |
| EB322 | STANDARD ENDMILL | 68 |
| EB324 | STANDARD ENDMILL | 68 |

G

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| G | ZAMUS GRA-MATE | 58 |
| GE | ZAMUS GRA-MATE | 59 |

M

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| MD502 | ZAMUS CLASSIC | 22 |
| MZ502 | ZAMUS CLASSIC | 26 |

P

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| P503A(F) | POWER MAX DRILL | 122 |
| PDMI | POWER DRILL | 134 |
| PDM | POWER DRILL | 130 |
| PDSI | POWER DRILL | 132 |
| PDS | POWER DRILL | 128 |
| PF503 | POWER MAX DRILL | 114 |
| PF505 | POWER MAX DRILL | 116 |
| PI503A(F) | POWER MAX DRILL | 124 |
| PI505A(F) | POWER MAX DRILL | 126 |
| PK503 | ZAMUS CLASSIC | 48 |

R

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| RC502 | ZAMUS COPPER-MATE | 57 |
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S

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| SF503 | POWER MAX DRILL | 118 |
| SF505 | POWER MAX DRILL | 120 |
| SM503 | ZAMUS SUS-MATE | 59 |
| SM504 | ZAMUS SUS-MATE | 60 |
| SSDL | SOLID SPIRAL DRILL | 138 |
| SSD | SOLID SPIRAL DRILL | 136 |

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| TB503 | ZAMUS CLASSIC | 46 |
| TB504 | ZAMUS CLASSIC | 46 |
| TE503 | ZAMUS CLASSIC | 45 |

Z

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|-------------------|---------------|----|
| ZA302 | ZAMUS THUNDER | 49 |
| ZA304 | ZAMUS THUNDER | 50 |
| ZA502/ZA522 | ZAMUS CLASSIC | 25 |
| ZA504/ZA524 | ZAMUS CLASSIC | 26 |
| ZA506(8)/ZA526(8) | ZAMUS CLASSIC | 27 |
| ZE304 | ZAMUS THUNDER | 51 |
| ZE322 | ZAMUS THUNDER | 52 |
| ZE324 | ZAMUS THUNDER | 52 |
| ZE502 | ZAMUS CLASSIC | 36 |
| ZE503 | ZAMUS CLASSIC | 38 |
| ZE504 | ZAMUS CLASSIC | 37 |
| ZE506 | ZAMUS CLASSIC | 38 |
| ZE512 | ZAMUS PLUS | 19 |
| ZE514 | ZAMUS PLUS | 19 |
| ZE516 | ZAMUS PLUS | 20 |
| ZE522 | ZAMUS CLASSIC | 41 |
| ZE524 | ZAMUS CLASSIC | 41 |
| ZE534 | ZAMUS CLASSIC | 42 |
| ZE612 | ZAMUS CLASSIC | 27 |
| ZE702 | ZAMUS STAR | 7 |
| ZE704 | ZAMUS STAR | 7 |
| ZE712 | ZAMUS STAR | 12 |
| ZE714 | ZAMUS STAR | 13 |
| ZE716 | ZAMUS STAR | 13 |
| ZE752 | ZAMUS STAR | 8 |
| ZE754 | ZAMUS STAR | 8 |
| ZF60 | ZAMUS CLASSIC | 47 |

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| ZF61 | ZAMUS CLASSIC | 47 |
| ZF62 | ZAMUS SUS-MATE | 60 |
| ZM502 | ZAMUS CLASSIC | 39 |
| ZM504 | ZAMUS CLASSIC | 39 |
| ZM522 | ZAMUS CLASSIC | 40 |
| ZM524 | ZAMUS CLASSIC | 40 |
| ZR304H | ZAMUS THUNDER | 54 |
| ZR322 | ZAMUS THUNDER | 53 |
| ZR324H | ZAMUS THUNDER | 54 |
| ZR324 | ZAMUS THUNDER | 53 |
| ZR502A | ZAMUS CLASSIC | 29 |
| ZR502 | ZAMUS CLASSIC | 42 |
| ZR504A | ZAMUS CLASSIC | 31 |
| ZR504 | ZAMUS CLASSIC | 43 |
| ZR506(8)A | ZAMUS CLASSIC | 32 |
| ZR512 | ZAMUS CLASSIC | 43 |
| ZR514 | ZAMUS CLASSIC | 44 |
| ZR522A | ZAMUS CLASSIC | 30 |
| ZR522 | ZAMUS CLASSIC | 44 |
| ZR524A | ZAMUS CLASSIC | 31 |
| ZR524 | ZAMUS CLASSIC | 45 |
| ZR532A | ZAMUS CLASSIC | 30 |
| ZR534A | ZAMUS CLASSIC | 32 |
| ZR702 | ZAMUS STAR | 9 |
| ZR704 | ZAMUS STAR | 11 |
| ZR706 | ZAMUS STAR | 12 |
| ZR724 | ZAMUS STAR | 11 |
| ZS1(2)04 | ZAMUS STAR | 10 |
| ZS204 | ZAMUS STAR | 10 |
| ZSLNB | ZAMUS STAR | 14 |
| ZSLNS | ZAMUS STAR | 16 |

CHUCK**B**

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| Bottle Grip Taper MAS 403-BT | SHANK INFORMATION | 58 |
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| CAT Shank (ANSI/ASME B5.50-1985) | SHANK INFORMATION | 59 |
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| D | HYDRAULIC EXPANSION CHUCK | 18 |
| DIN 2080, JIS B 6101, ISO 297 : 1988(E) | SHANK INFORMATION | 59 |
| DIN 69871-1 A/B, 7388/1 : 1983(E) | SHANK INFORMATION | 58 |
| DIN 69871-SK (Short & Heavy) | HYDRAULIC EXPANSION CHUCK | 8 |
| DIN 69871-SK40 | | 47 |
| DIN 69871-SK40 | HYDRAULIC EXPANSION CHUCK | 12 |
| DIN 69871-SK50 | | 48 |
| DIN 69871-SK50 | HYDRAULIC EXPANSION CHUCK | 13 |
| DIN 69871-SK | ER COLLET CHUCK | 39 |
| DIN 69871-SK | SINGLE MILLING CHUCK | 33 |
| DIN 69893 HSK100-Form A | SHRINK FIT CHUCK | 28 |
| DIN 69893 HSK40-Form A | SHRINK FIT CHUCK | 23 |
| DIN 69893 HSK40-Form E | SHRINK FIT CHUCK | 24 |
| DIN 69893 HSK50-Form A | SHRINK FIT CHUCK | 25 |
| DIN 69893 HSK50-Form E | SHRINK FIT CHUCK | 26 |
| DIN 69893 HSK63-Form A | SHRINK FIT CHUCK | 27 |
| DIN 69893-HSK Type A | HYDRAULIC EXPANSION CHUCK | 14 |
| DIN 69893-HSK Type C | HYDRAULIC EXPANSION CHUCK | 15 |
| DIN 69893-HSK Type E | HYDRAULIC EXPANSION CHUCK | 16 |
| DIN 69893-HSK | | 45 |
| DIN 69893-HSK | | 49 |
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| DIN 69893-HSK | | 54 |
| DIN 69893-HSK | ER COLLET CHUCK | 40 |
| DIN 69893-HSK | SINGLE MILLING CHUCK | 34 |

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| ER collet | ER COLLET CHUCK | 42 |
| ERC | ER COLLET CHUCK | 43 |
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| ERS | ER NUT/ER SPANNER | 44 |
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| Extension Sleeve | SHRINK FIT EXTENSION CHUCK | 30 |

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| FMB | | 52 |
| FMC | | 53 |

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| HSK shank DIN 69893-1, ISO 12164-1 : 2001 | | 57 |
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| K | MILLING CHUCK COLLET | 35 |
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M

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| MAS 403-BT(Short & Heavy) | HYDRAULIC EXPANSION CHUCK | 8 |
| MAS 403-BT30 | ER COLLET CHUCK | 36 |
| MAS 403-BT30 | HYDRAULIC EXPANSION CHUCK | 9 |
| MAS 403-BT30 | SHRINK FIT CHUCK | 20 |
| MAS 403-BT40 | ER COLLET CHUCK | 37 |
| MAS 403-BT40 | HYDRAULIC EXPANSION CHUCK | 10 |
| MAS 403-BT40 | SHRINK FIT CHUCK | 21 |
| MAS 403-BT | | 45 |
| MAS 403-BT | | 46 |
| MAS 403-BT50 | ER COLLET CHUCK | 38 |
| MAS 403-BT50 | HYDRAULIC EXPANSION CHUCK | 11 |
| MAS 403-BT50 | SHRINK FIT CHUCK | 22 |
| MAS 403-BT | | 55 |
| MAS 403-BT | SINGLE MILLING CHUCK | 32 |

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| NK | MILLING CHUCK COLLET | 35 |
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| OD | HYDRAULIC EXPANSION CHUCK | 17 |
| ONK | MILLING CHUCK COLLET | 35 |

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| SES | | 56 |
| Straight shank ER collet chuck | STRAIGHT SHANK ER COLLET CHUCK | 41 |

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C

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| CARBIDE CENTER DRILL A TYPE(60) | DRILL | 24 |
| CARBIDE CORNER ROUNDING END MILL | ENDMILL | 23 |
| CARBIDE HAND REAMER | CARBIDE REAMER | 16 |
| CARBIDE HI HELICAL REAMER-45 MT | CARBIDE REAMER | 15 |
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| CARBIDE NC DOUBLE POINT DRILL-KOR | DRILL | 28 |
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| CARBIDE SPIRAL CHUCKING REAMER-7 MT | CARBIDE REAMER | 13 |
| CARBIDE SPIRAL CHUCKING REAMER-7 ST | CARBIDE REAMER | 12 |
| CARBIDE V-MILL DRILL-FLAT TYPE | DRILL | 32 |
| CORNER ROUNDING END MILL | ENDMILL | 23 |
| COUNTER BORE-KOR | COUNTER | 18 |
| COUNTER SINK-90 HOLE | COUNTER | 19 |
| COUNTER SINK-90 , 1F | COUNTER | 20 |
| COUNTER SINK-90 , 3F | COUNTER | 21 |

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| HAND REAMER | HSS REAMER | 2 |
| HAND REAMER | HSS REAMER | 3 |
| HI HELICAL REAMER-45 MT | HSS REAMER | 7 |
| HI HELICAL REAMER-45 ST | HSS REAMER | 8 |
| HI HELICAL REAMER-45 ST | HSS REAMER | 9 |
| HSS CO NC SPOTTING DRILL | DRILL | 29 |
| HSS CO STEP DRILL FOR TAP | DRILL | 34 |
| HSS CO STEP DRILL-90 & 180 | DRILL | 33 |
| HSS NC DOUBLE POINT DRILL-JIS | DRILL | 25 |
| HSS NC DOUBLE POINT DRILL-KOR | DRILL | 27 |

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| LONG HSS NC SPOTTING DRILL | DRILL | 29 |
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| SPIRAL CHUCKING REAMER-7 MT | HSS REAMER | 6 |
| SPIRAL CHUCKING REAMER-7 ST | HSS REAMER | 4 |
| SPIRAL CHUCKING REAMER-7 ST | HSS REAMER | 5 |

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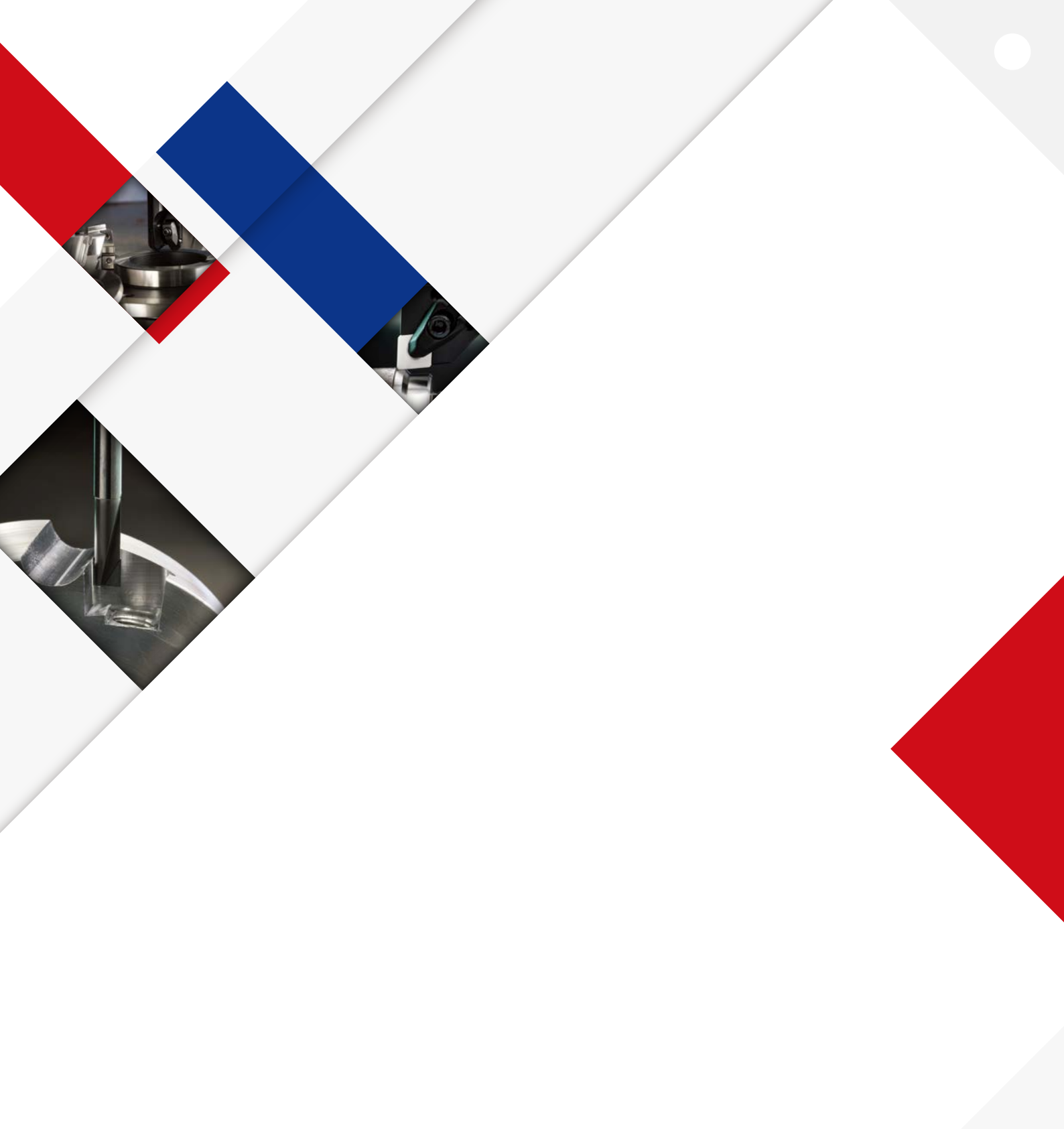
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