SGSO V.2026


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SGSO TECHNOLOGY

Safety Notice
- Please do not touch the cutting edge with your hands.
- Please use within the recommended range and replace the tool in advance.
- Sometimes there may be high-temperature cutting flying out and elongated cutting discharged. Please use protective equipment such as safety covers and goggles.
- When using non water soluble cutting fluid, fire prevention measures must be taken.
- When using a rotating tool, it is necessary to conduct a trial run to confirm whether there is any oscillation, vibration, or abnormal sound.

SGSO TECHNOLOGY

# SGSO MILLING TOOLS V.2026

SGSO
KEEP ADVANCING WITH YOU

SGSO TECHNOLOGY

# SGSO CATALOG


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# ABOUT US SGSO

**SGSO Europe** was established in October 2024, equipped with a warehouse in Krefeld Germany, ensuring rapid delivery to customers and partners. Meanwhile, SGsO Europe also provides professional technical support across the entire European region.

**SGSO China**,founded in 2013,has developed rapidly into a multi-national high-tech enterprise dedicated to the research, development, and manufacturing of high-performance nano-coated tools.

Our headquarter R&D team includes three senior German engineers and a number of highly experienced Chinese engineers, each with more than ten years of practical expertise.

SGSO integrates fundamental scientific research with practical engineering development.Through cooperation with both domestic and international research institutes, we have established an advanced coating tool technology research center.

The nano-coated high-performance tools developed and produced by SGSO are widely applied in automotive manufacturing, aerospace,information technology, and other critical industrial fields.

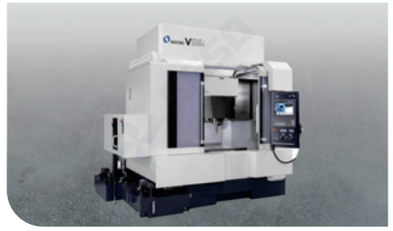
Our newly established intelligent manufacturing workshop further demonstrates our commitment to innovation, enabling us to support global smart manufacturing with enhanced product quality and superior standards.

# Production Equipment

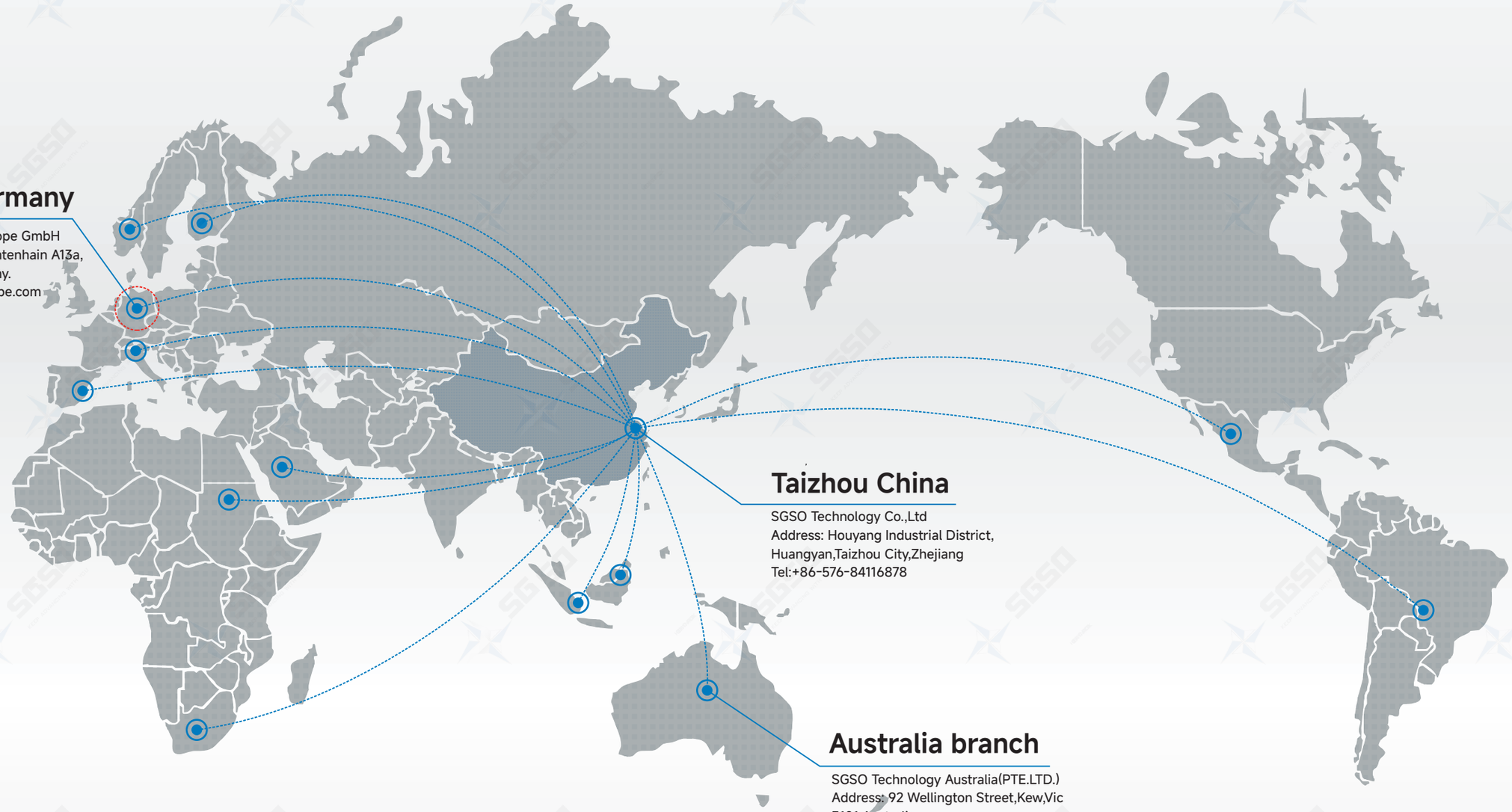
Our advanced production equipment and skilled personnel ensure high precision and superior performance in our end mill products.

# Testing Equipment

State-of-the-art testing equipment is utilized in our R&D processes to develop new products. It also ensures consistent performance, both for internal quality control and in response to specific customer requirements.



# GLOBAL SalesNetwork



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## Australia branch

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3101,Australia
Tel:+00613 9988 3502

# SGSO

## Keep Advancing With You

- High precision
- High stability
- High efficiency
- High performance hard milling
- High speed milling



# Description Of Icon

### Materials

- CBN — Cubic Boron Nitride
- UMG — Ultra Fine Grain Solid Carbide
- MG — Fine Grain Solid Carbide

### Coating

- HX — TiSiN
- AHX — TiSiN+X
- ATX — AlCrSiN

### OD Relief Angle Type

- Arc Back Angle
- Straight Line Relief Angle

### Corner Shape

- Protection Edge
- R — Corner Radius

### Number of Flutes

- 2 — 2 Flutes
- 4 — 4 Flutes
- 5 — 5 Flutes
- 6 — 6 Flutes

### Machining Hardness

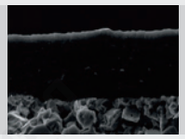
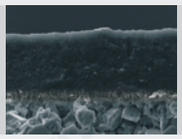
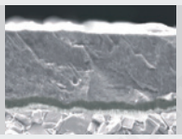
- <45 HRC — <45HRC
- <55 HRC — <45HRC
- <65 HRC — <65HRC
- ⩽70 HRC — <65HRC

### Helix Angle

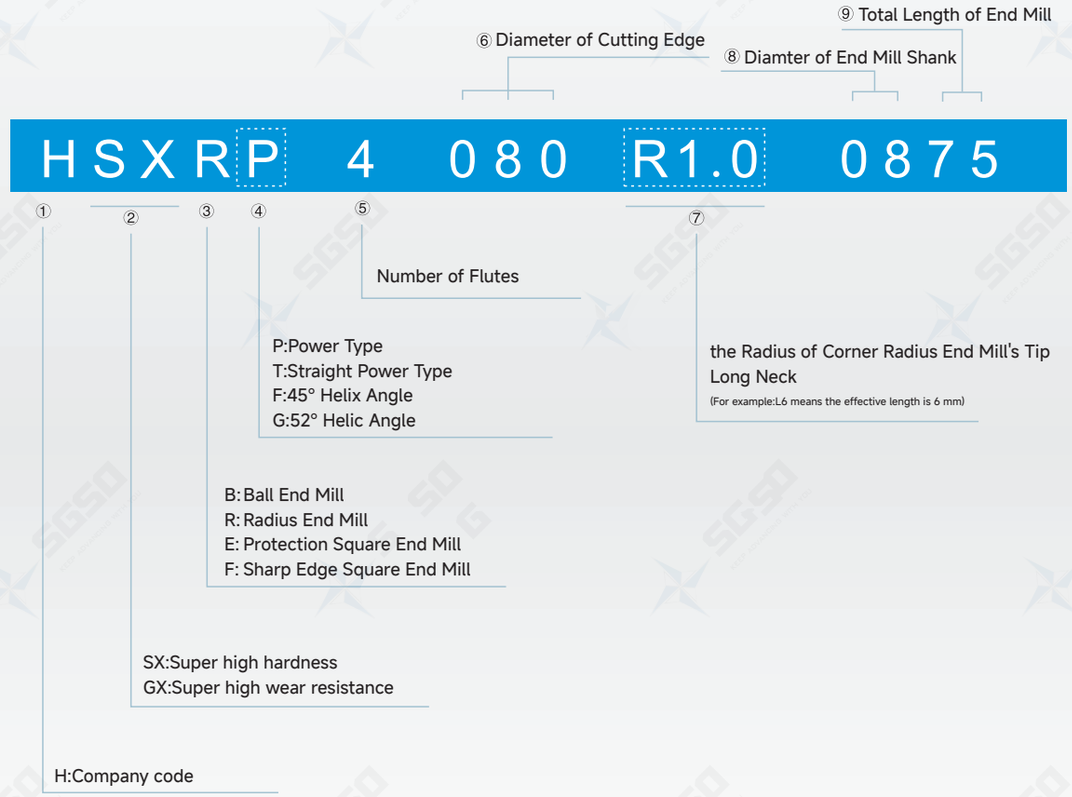
- 0° Spiral Angle — 0° Helix Angle
- −9° Spiral Angle — -9° Helix Angle
- 20° Spiral Angle — 20° Helix Angle
- 30° Spiral Angle — 30° Helix Angle
- 42° Spiral Angle — 42° Helix Angle
- 45° Spiral Angle — 45° Helix Angle
- 52° Spiral Angle — 52° Helix Angle
- LEFT BLADE — Left Blade

# Coatings

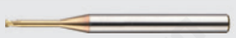
## Feature Of Coating Layer

| | | NEW PRODUCT | NEW PRODUCT |
|---|---|---|---|
| Coating Series | HX | AHX | AHX |
| Components | TiSiN | TiSiN+X | TiSiN+X |
| Color | Bronze-colored | Gold | Gold |
| Coating structure |  |  |  |
| Features | Super hardness、Super Oxidation Resistance, High adhesion | Super Hardness、Super Oxidation Resistance, High Adhesion | Super Oxidation Resistance, Low Friction |
| Hardness | 3500(HV) | 3500(HV) | 3500(HV) |
| Coefficeient of friction | 0.4 | 0.4 | 0.4 |
| Oxidation start temperature | 1100(C) | 1100(C) | 1100(C) |
| Coating thickness | 2-4um | 2-4um | 2-4um |

# Item Code Description



# SERIES INDEX

| Product Series | | Description | Φ D | Shape | Coating | Specification | Cutting Parameter |
|---|---|---|---|---|---|---|---|
| Ball Nose End Mill | SCBN-B2 | 2-Flutes CBN Deep Ball Nose End mill | 0.1-1 | | | P16-18 | P19-21 |
| | HSXB2 | 2-Flutes Ball End Mill | 0.1-12 | | AHX | P22-23 | P24 |
| | HSXBC4 | 4-Flutes High-hardness Ball End Mill | 1-12 | | AHX | P25-26 | P27-29 |
| | HSXB2L | 2-Flutes Long Neck Ball End Mill | 0.1-6 | | AHX | P30-35 | P36-41 |
| | HGXB2 | 2-Flutes Ball End Mill | 0.1-12 | | ATX | P42-43 | P44 |
| | HGXB4 | 4-Flutes Ball End Mill | 6-12 | | ATX | P45-46 | P47 |
| | HGXB2L | 2-Flutes Long Neck Ball End Mill | 0.1-6 |  | ATX | P48-54 | P55-60 |
| | HGXPB2 | 2-Flutes Taper Neck Ball End Mill | 0.6-12 | | ATX | P61-63 | P64-65 |
| Radius End Mill | HSXR2L | 2-Flutes Long Neck Corner Radius End Mill | 0.2-6 | | AHX | P66-75 | P76-80 |
| | HSXR4L | 4-Flutes Long Neck Corner Radius End Mill | 0.8-4 | | AHX | P81-87 | P88-92 |
| | HSXRP4 | 4-Flutes Short Corner Radius End Mill | 0.8-12 | | AHX | P93-96 | P97 |
| | HSXRT4 | 4-Flutes Power Corner Radius End Mill | 2-12 | | AHX | P98 | P99 |
| | HSXEF4-CR | 4-Flutes Power Corner Radius End Mill | 3-12 | | AHX | P100 | P101-102 |
| | HSXHE6-CR | 6-Flutes Hard Milling Corner Radius End Mill | 6-20 | | AHX | P103 | P104 |
| | HSXR4 | 4-Flutes Corner Radius End Mill | 0.8-16 | | AHX | P105-108 | P109-110 |
| | HGHFE4-3D-CR | 4-Flutes HPC Corner Radius 3D End Mill | 1-20 | | ATX | P111 | P113 |
| | HGHFE4-5D-CR | 4-Flutes HPC Corner Radius 5D End Mill | 1-20 | | ATX | P112 | P113 |
| | HGXRP | 4-Flutes Short Corner Radius End Mill | 1-12 | | ATX | P114-117 | P118 |
| | HGXR2 | 2-Flutes General Purpose Radius End Mill | 0.2-12 | | ATX | P119-121 | P122 |
| | HGXR4 | 4-Flutes General Purpose Radius End Mill | 0.8-16 | | ATX | P123-126 | P127-128 |
| Square End Mill | HSXE2L | 2-Flutes Long Neck End Mill | 0.1-6 |  | AHX | P129-134 | P135-140 |
| | HSXE4L | 4-Flutes Long Neck End Mill | 0.8-4 | | AHX | P141-14 | P144-14 |

# SERIES INDEX

| Product Series | | Description | Φ D | Shape | Coating | Specification | Cutting Parameter |
|---|---|---|---|---|---|---|---|
| Square End Mill | HSXEF4 | 4-Flutes Power End Mill | 1-20 | | AHX | P147-148 | P149 |
| | HSXHE | 4/6-Flutes Hard Milling End Mill | 1-20 | | AHX | P150 | P151 |
| | HSXEG6 | 6-Flutes Hard Milling End Mill | 6-20 | | AHX | P152 | P153 |
| | HGHFE4-3D | 4-Flutes HPC 3D End Mill | 1-20 | | ATX | P155 | P159 |
| | HGHFE4-3D-W | 4-Flutes HPC 3D End Mill Weldon Shank | 1-20 | | ATX | P156 | P159 |
| | HGHFE4-5D | 4-Flutes HPC 5D End Mill | 1-20 | | ATX | P157 | P159 |
| | HGHFE5-3.5D | 5-Flutes HPC 3.5D End Mill Weldon Shank | 6-20 | | ATX | P158 | P159 |
| | HGXEF4 | 4-Flutes Power End Mill | 1-20 | | ATX | P160-161 | P162 |
| | HGXE2 | 2-Flutes General Purpose End Mill | 0.1-20 | | ATX | P163-164 | P165 |
| | HGXE4 | 4-Flutes General Purpose End Mill | 0.8-20 | | ATX | P166-167 | P168 |
| | HGESW | HGESW 4-Flutes Long Flute End Mill | 8-20 | | ATX | P169-170 | P171 |
| High Feed End Mill | HSHFR4 | 4-Flutes High Feed End Mill | 6-12 | | HX | P172-173 | P174 |
| | HSXHR | 4/6-Flutes High Feed End Mill | 1-12 | | AHX | P175-176 | P177 |
| Thread Mill | HSXDT | Thread Milling Cutter-2.5D Underneck | M2-M20 | | AHX | P178-179 | P180 |
| Inserts | VSB | VSB Finishing Ball Nose Insert | 16-30 | | AHX | P181-182 | P183 |
| | MSB | MSB Finishing Ball Nose Insert | 12-30 | | AHX | P181-182 | P183 |

# HSX SERIES

## The Speciality of HSX Series

- 0.3μm ultra fine substrate.
- TiSiN multilayer coatings.
- Specially designed for hardened materials.

≤70HRC

# HGX SERIES

## The Speciality of HGX Series

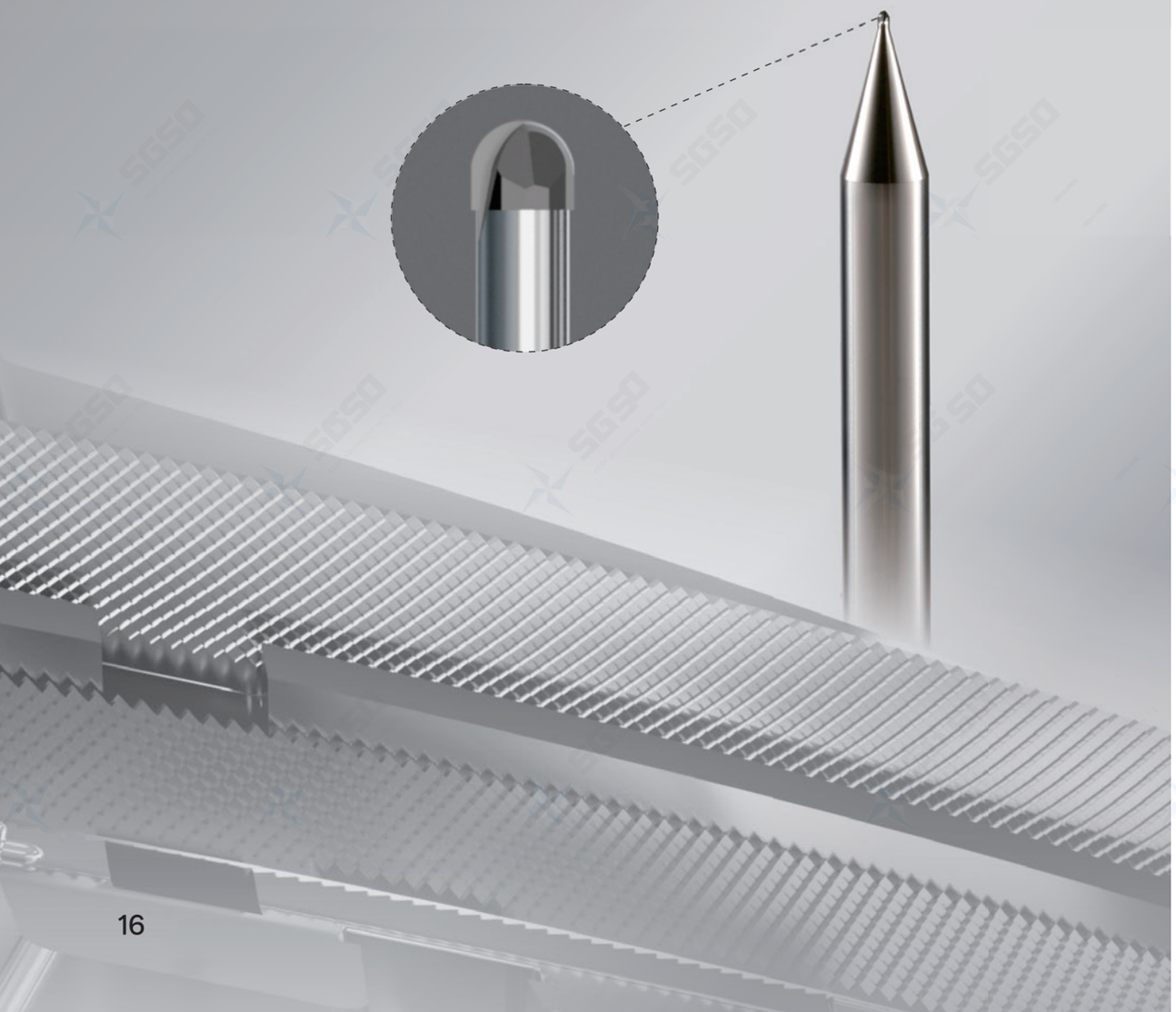
- 0.3μm ultra fine substrate.
- 'Non-drops' surface coating with high machining lubrications.
- Specially designed to satisfy general purpose machining with HRC≤55.

≤55HRC

# CBN ISERIIES

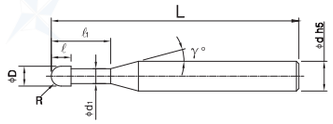
## The Speciality of CBN Series

- Newly developed brazing technology ensures high stability.
- High CBN content provides excellent wear resistance for hard materials.
- Cutting edges designed to reduce cutting forces.
- Combined with suitable cutting conditions, can achieve shiny surface finishes.





# SCBN-B2 2-Flutes CBN Deep Ball Nose End mill




CBN | 2 | 20° Spiral Angle | Straight Back Angle | ≤70 HRC

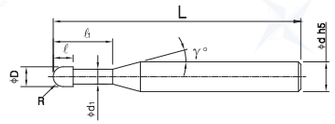
| Ø D | D Tol. [ mm ] |
|---|---|
| D<3 | 0~-0.010 |
| 3<D≤6 | 0~-0.012 |

| Ø D | R Tol. [ mm ] |
|---|---|
| D<1 | ±0.003 |
| 1≤D≤6 | ±0.005 |

Unit:mm

| Type No. | Dia. | Radius | Length of Cut | Under Neck Length | Neck Dia. | Neck Taper Angle | Overall Length | Shank Dia. | |
|---|---|---|---|---|---|---|---|---|---|
| | | R | ℓ | $\ell_1$ | $\phi d_1$ | γ/° | L | ϕd | |
| SCBN-B2001L0.3 0450 | 0.1 | R0.05 | 0.07 | 0.3 | 0.09 | 15 | 50 | 4 | ★ |
| SCBN-B2001L0.5 0450 | 0.1 | R0.05 | 0.07 | 0.5 | 0.09 | 15 | 50 | 4 | ★ |
| SCBN-B20015L0.45 0450 | 0.15 | R0.075 | 0.1 | 0.45 | 0.14 | 15 | 50 | 4 | ★ |
| SCBN-B20015L0.75 0450 | 0.15 | R0.075 | 0.1 | 0.75 | 0.14 | 15 | 50 | 4 | ★ |
| SCBN-B2002L0.3 0450 | 0.2 | R0.1 | 0.15 | 0.3 | 0.19 | 15 | 50 | 4 | |
| SCBN-B2002L0.6 0450 | 0.2 | R0.1 | 0.15 | 0.6 | 0.19 | 15 | 50 | 4 | |
| SCBN-B2002L0.8 0450 | 0.2 | R0.1 | 0.15 | 0.8 | 0.19 | 15 | 50 | 4 | |
| SCBN-B2002L1 0450 | 0.2 | R0.1 | 0.15 | 1 | 0.19 | 15 | 50 | 4 | |
| SCBN-B2003L0.3 0450 | 0.3 | R0.15 | 0.2 | 0.3 | 0.28 | 15 | 50 | 4 | |
| SCBN-B2003L0.5 0450 | 0.3 | R0.15 | 0.2 | 0.5 | 0.28 | 15 | 50 | 4 | |
| SCBN-B2003L0.75 0450 | 0.3 | R0.15 | 0.2 | 0.75 | 0.28 | 15 | 50 | 4 | |
| SCBN-B2003L0.9 0450 | 0.3 | R0.15 | 0.2 | 0.9 | 0.28 | 15 | 50 | 4 | |
| SCBN-B2003L1.2 0450 | 0.3 | R0.15 | 0.2 | 1.2 | 0.28 | 15 | 50 | 4 | |
| SCBN-B2003L1.5 0450 | 0.3 | R0.15 | 0.2 | 1.5 | 0.28 | 15 | 50 | 4 | |
| SCBN-B2004L0.5 0450 | 0.4 | R0.2 | 0.3 | 0.5 | 0.37 | 15 | 50 | 4 | |
| SCBN-B2004L0.75 0450 | 0.4 | R0.2 | 0.3 | 0.75 | 0.37 | 15 | 50 | 4 | |
| SCBN-B2004L1 0450 | 0.4 | R0.2 | 0.3 | 1 | 0.37 | 15 | 50 | 4 | |
| SCBN-B2004L1.2 0450 | 0.4 | R0.2 | 0.3 | 1.2 | 0.37 | 15 | 50 | 4 | |
| SCBN-B2004L1.5 0450 | 0.4 | R0.2 | 0.3 | 1.5 | 0.37 | 15 | 50 | 4 | |
| SCBN-B2004L2 0450 | 0.4 | R0.2 | 0.3 | 2 | 0.37 | 15 | 50 | 4 | |
| SCBN-B2004L2.5 0450 | 0.4 | R0.2 | 0.3 | 2.5 | 0.37 | 15 | 50 | 4 | |
| SCBN-B2004L3 0450 | 0.4 | R0.2 | 0.3 | 3 | 0.37 | 15 | 50 | 4 | ★ |
| SCBN-B2005L1 0450 | 0.5 | R0.25 | 0.35 | 1 | 0.46 | 15 | 50 | 4 | |
| SCBN-B2005L1.5 0450 | 0.5 | R0.25 | 0.35 | 1.5 | 0.46 | 15 | 50 | 4 | |
| SCBN-B2005L2.5 0450 | 0.5 | R0.25 | 0.35 | 2.5 | 0.46 | 15 | 50 | 4 | |
| SCBN-B2005L3.5 0450 | 0.5 | R0.25 | 0.35 | 3.5 | 0.46 | 15 | 50 | 4 | ★ |
| SCBN-B2006L1.2 0450 | 0.6 | R0.3 | 0.45 | 1.2 | 0.56 | 15 | 50 | 4 | |
| SCBN-B2006L1.5 0450 | 0.6 | R0.3 | 0.45 | 1.5 | 0.56 | 15 | 50 | 4 | |

# SCBN-B2 2-Flutes CBN Deep Ball Nose End mill




CBN | 2 | 20° Spiral Angle | Straight Back Angle | ≤70 HRC

| Ø D | D Tol. [mm] |
|---|---|
| D<3 | 0~-0.010 |
| 3<D≤6 | 0~-0.012 |

| Ø D | R Tol. [mm] |
|---|---|
| D<1 | ±0.003 |
| 1<D≤6 | ±0.005 |

Unit:mm

| Type No. | Dia. | Radius | Length of Cut | Under Neck Length | Neck Dia. | Neck Taper Angle | Overall Length | Shank Dia. | |
|---|---|---|---|---|---|---|---|---|---|
| | | R | ℓ | ℓ1 | ϕd1 | γ/° | L | ϕd | |
| SCBN-B2006L3 0450 | 0.6 | R0.3 | 0.45 | 3 | 0.56 | 15 | 50 | 4 | |
| SCBN-B2006L4 0450 | 0.6 | R0.3 | 0.45 | 4 | 0.56 | 15 | 50 | 4 | ★ |
| SCBN-B2006L5 0450 | 0.6 | R0.3 | 0.45 | 5 | 0.56 | 15 | 50 | 4 | ★ |
| SCBN-B2006L6 0450 | 0.6 | R0.3 | 0.45 | 6 | 0.56 | 15 | 50 | 4 | ★ |
| SCBN-B2008L1.6 0450 | 0.8 | R0.4 | 0.6 | 1.6 | 0.76 | 15 | 50 | 4 | |
| SCBN-B2008L2 0450 | 0.8 | R0.4 | 0.6 | 2 | 0.76 | 15 | 50 | 4 | |
| SCBN-B2008L40450 | 0.8 | R0.4 | 0.6 | 4 | 0.76 | 15 | 50 | 4 | ★ |
| SCBN-B2008L6 0450 | 0.8 | R0.4 | 0.6 | 6 | 0.76 | 15 | 50 | 4 | ★ |
| SCBN-B2010L2 0450 | 1 | R0.5 | 0.7 | 2 | 0.95 | 15 | 50 | 4 | |
| SCBN-B201OL2.5 0450 | 1 | R0.5 | 0.7 | 2.5 | 0.95 | 15 | 50 | 4 | |
| SCBN-B2010L4 0450 | 1 | R0.5 | 0.7 | 4 | 0.95 | 15 | 50 | 4 | |
| SCBN-B2010L6 0450 | 1 | R0.5 | 0.7 | 6 | 0.95 | 15 | 50 | 4 | ★ |
| SCBN-B2010L8 0450 | 1 | R0.5 | 0.7 | 8 | 0.95 | 15 | 50 | 4 | ★ |
| SCBN-B2010L10 0450 | 1 | R0.5 | 0.7 | 10 | 0.95 | 15 | 50 | 4 | ★ |

★ Available on Request

TABLE OF RECOMMENDED MILLING MATERIALS

○Very suitable ○Suitable

| CARBON STEELS | ALLOY STEELS | PREHARDENED STEELS | HARDENED STEELS | | | | CASTIRON | COPPER ALLOYS | ALUMINUM ALLOY | GRAPHITE | TITANIUM ALLOY | HEAT RESISTANT ALLOYS | PLASTIC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | ~55HRC | ~60HRC | ~65HRC | ~70HRC | DUCTILE CAST IRON | | | | | | |
| | | ○ | ◎ | ◎ | ◎ | ◎ | ○ | | | | | | |





## SCBN-B2 2-Flutes CBN Deep Ball Nose End mill 3D Milling Finishing

| Workpiece | | Pre-Hardened Steels (48-52HRC) | | | | Hardened Steels (58-62HRC) | | | | Hardened Steels (63-68HRC) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Radius/mm | Underneck/mm | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm |
| R0.05 | 0.3 | 50000 | 200 | 0.005 | 0.005 | 50000 | 140 | 0.005 | 0.005 | 50000 | 100 | 0.003 | 0.003 |
| | 0.5 | 50000 | 120 | 0.003 | 0.003 | 50000 | 84 | 0.002 | 0.002 | 50000 | 60 | 0.001 | 0.002 |
| R0.075 | 0.45 | 50000 | 300 | 0.005 | 0.005 | 50000 | 210 | 0.005 | 0.005 | 50000 | 150 | 0.003 | 0.003 |
| | 0.75 | 50000 | 200 | 0.003 | 0.003 | 50000 | 140 | 0.003 | 0.003 | 50000 | 100 | 0.002 | 0.002 |
| R0.1 | 0.3 | 40000 | 300 | 0.007 | 0.01 | 40000 | 210 | 0.007 | 0.01 | 40000 | 150 | 0.003 | 0.005 |
| | 0.6 | 40000 | 260 | 0.006 | 0.01 | 40000 | 182 | 0.006 | 0.01 | 40000 | 130 | 0.003 | 0.005 |
| | 0.8 | 40000 | 220 | 0.005 | 0.005 | 40000 | 154 | 0.005 | 0.005 | 40000 | 110 | 0.003 | 0.003 |
| | 1 | 40000 | 200 | 0.003 | 0.003 | 40000 | 140 | 0.003 | 0.003 | 40000 | 100 | 0.003 | 0.003 |
| R0.15 | 0.3 | 35000 | 500 | 0.006 | 0.01 | 35000 | 350 | 0.006 | 0.01 | 35000 | 250 | 0.006 | 0.005 |
| | 0.5 | 35000 | 462 | 0.006 | 0.01 | 35000 | 325 | 0.006 | 0.01 | 35000 | 231 | 0.006 | 0.005 |
| | 0.75 | 35000 | 428 | 0.006 | 0.01 | 35000 | 300 | 0.006 | 0.01 | 35000 | 214 | 0.006 | 0.005 |
| | 0.9 | 35000 | 384 | 0.006 | 0.01 | 35000 | 265 | 0.006 | 0.01 | 35000 | 192 | 0.006 | 0.005 |
| | 1.2 | 35000 | 384 | 0.005 | 0.007 | 35000 | 265 | 0.005 | 0.007 | 35000 | 192 | 0.005 | 0.003 |
| | 1.5 | 35000 | 384 | 0.005 | 0.005 | 35000 | 265 | 0.005 | 0.005 | 35000 | 192 | 0 | 0.00 |

# Cutting Parameter

## SCBN-B2 2-Flutes CBN Deep Ball Nose End mill 3D Milling Finishing

| Workpiece | | Pre-Hardened Steels (48-52HRC) | | | | Hardened Steels (58-62HRC) | | | | Hardened Steels (63-68HRC) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Radius/mm | Underneck/mm | n/min$^{-1}$ | Vf-mm/min | ap/mm | ae/mm | n/min$^{-1}$ | Vf-mm/min | ap/mm | ae/mm | n/min$^{-1}$ | Vf-mm/min | ap/mm | ae/mm |
| R0.2 | 0.5 | 32000 | 800 | 0.008 | 0.012 | 32000 | 560 | 0.006 | 0.012 | 32000 | 392 | 0.005 | 0.008 |
| | 0.75 | 32000 | 720 | 0.008 | 0.012 | 32000 | 504 | 0.006 | 0.012 | 32000 | 352 | 0.005 | 0.008 |
| | 1 | 32000 | 640 | 0.008 | 0.012 | 32000 | 448 | 0.006 | 0.012 | 32000 | 313 | 0.005 | 0.008 |
| | 1.2 | 32000 | 600 | 0.008 | 0.012 | 32000 | 420 | 0.006 | 0.012 | 32000 | 294 | 0.005 | 0.008 |
| | 1.5 | 32000 | 600 | 0.008 | 0.012 | 32000 | 420 | 0.006 | 0.012 | 32000 | 294 | 0.005 | 0.008 |
| | 2 | 32000 | 500 | 0.008 | 0.01 | 32000 | 350 | 0.006 | 0.01 | 32000 | 245 | 0.005 | 0.007 |
| | 2.5 | 30000 | 450 | 0.008 | 0.01 | 30000 | 315 | 0.006 | 0.01 | 30000 | 220 | 0.005 | 0.007 |
| | 3 | 30000 | 400 | 0.008 | 0.01 | 30000 | 280 | 0.006 | 0.01 | 30000 | 196 | 0.005 | 0.007 |
| R0.25 | 1 | 30000 | 1000 | 0.01 | 0.012 | 30000 | 700 | 0.01 | 0.012 | 30000 | 500 | 0.01 | 0.008 |
| | 1.5 | 30000 | 800 | 0.01 | 0.012 | 30000 | 560 | 0.01 | 0.012 | 30000 | 400 | 0.01 | 0.008 |
| | 2.5 | 28000 | 600 | 0.01 | 0.011 | 28000 | 420 | 0.01 | 0.011 | 28000 | 300 | 0.01 | 0.008 |
| | 3.5 | 28000 | 500 | 0.008 | 0.011 | 28000 | 350 | 0.008 | 0.011 | 28000 | 250 | 0.008 | 0.007 |
| R0.3 | 1.2 | 25000 | 1200 | 0.01 | 0.013 | 25000 | 1200 | 0.01 | 0.013 | 25000 | 600 | 0.01 | 0.01 |
| | 1.5 | 25000 | 1000 | 0.01 | 0.013 | 25000 | 1000 | 0.01 | 0.013 | 25000 | 500 | 0.01 | 0.01 |
| | 3 | 25000 | 800 | 0.01 | 0.013 | 25000 | 800 | 0.01 | 0.013 | 25000 | 400 | 0.01 | 0.01 |
| | 4 | 25000 | 550 | 0.008 | 0.013 | 2500O | 400 | 0.008 | 0.013 | 25000 | 280 | 0.005 | 0.006 |
| | 5 | 25000 | 360 | 0.008 | 0.012 | 25000 | 320 | 0.008 | 0.012 | 25000 | 180 | 0.005 | 0.006 |
| | 6 | 25000 | 240 | 0.006 | 0.012 | 25000 | 200 | 0.006 | 0.012 | 25000 | 120 | 0.005 | 0.005 |

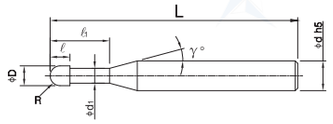


Cutting Parameter

SCBN-B2 2-Flutes CBN Deep Ball Nose End mill 3D Milling Finishing

| Workpiece | | Pre-Hardened Steels (48-52HRC) | | | | Hardened Steels (58-62HRC) | | | | Hardened Steels (63-68HRC) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Radius/mm | Underneck/mm | n/min$^{-1}$ | Vf-mm/min | ap/mm | ae/mm | n/min$^{-1}$ | Vf-mm/min | ap/mm | ae/mm | n/min$^{-1}$ | Vf-mm/min | ap/mm | ae/mm |
| R0.4 | 1.6 | 24000 | 1500 | 0.01 | 0.015 | 24000 | 1000 | 1000 | 0.015 | 24000 | 750 | 0.01 | 0.015 |
| | 2 | 24000 | 1200 | 0.01 | 0.015 | 24000 | 720 | 720 | 0.015 | 24000 | 600 | 0.01 | 0.015 |
| | 4 | 24000 | 1000 | 0.01 | 0.015 | 24000 | 700 | 700 | 0.015 | 24000 | 500 | 0.005 | 0.01 |
| | 6 | 22000 | 800 | 0.01 | 0.012 | 22000 | 560 | 560 | 0.012 | 22000 | 400 | 0.005 | 0.005 |
| R0.5 | 2 | 22000 | 1800 | 0.01 | 0.02 | 22000 | 1260 | 1260 | 0.02 | 22000 | 900 | 0.01 | 0.02 |
| | 2.5 | 22000 | 1500 | 0.01 | 0.02 | 22000 | 1050 | 1050 | 0.02 | 22000 | 750 | 0.01 | 0.02 |
| | 4 | 22000 | 1200 | 0.01 | 0.02 | 22000 | 840 | 840 | 0.02 | 22000 | 600 | 0.01 | 0.02 |
| | 6 | 20000 | 1000 | 0.01 | 0.02 | 20000 | 700 | 700 | 0.02 | 20000 | 500 | 0.01 | 0.015 |
| | 8 | 20000 | 800 | 0.007 | 0.015 | 20000 | 560 | 560 | 0.015 | 20000 | 400 | 0.007 | 0.008 |
| | 10 | 20000 | 600 | 0.006 | 0.015 | 20000 | 420 | 420 | 0.015 | 20000 | 300 | 0.005 | 0.005 |

# HSXB 2-Flutes Ball End Mill




UMG AHX 2 30° Spiral Angle Straight Back Angle <65 HRC

| Ø D | D Tol. [ mm ] |
|---|---|
| D<3 | 0~-0.010 |
| 3<D<6 | 0~-0.012 |
| 6<D<10 | 0~-0.015 |
| 10<D<12 | 0~-0.018 |

| Ø D | R Tol. [ mm ] |
|---|---|
| D<1 | ±0.003 |
| 1<D<12 | ±0.005 |

Unit:mm

| Type No. | Dia. | Radius | Length of Cut | Under Neck Length | Neck Dia. | Neck Taper Angle | Overall Length | Shank Dia. |
|---|---|---|---|---|---|---|---|---|
| | ϕD | R | ℓ | ℓ1 | ϕd1 | γ/° | L | ϕd |
| HSXB2001 0450 | 0.1 | R0.05 | 0.1 | – | – | 12 | 50 | 4 |
| HSXB20015 0450 | 0.15 | R0.075 | 0.15 | – | – | 12 | 50 | 4 |
| HSXB2002 0450 | 0.2 | R0.1 | 0.2 | – | – | 12 | 50 | 4 |
| HSXB2003 0450 | 0.3 | R0.15 | 0.3 | – | – | 12 | 50 | 4 |
| HSXB2004 0450 | 0.4 | R0.2 | 0.6 | – | – | 12 | 50 | 4 |
| HSXB2005 0450 | 0.5 | R0.25 | 0.8 | – | – | 12 | 50 | 4 |
| HSXB2006 0450 | 0.6 | R0.3 | 0.9 | – | – | 12 | 50 | 4 |
| HSXB2008 0450 | 0.8 | R0.4 | 1.2 | – | – | 12 | 50 | 4 |
| HSXB2010 0450 | 1 | R0.5 | 0.75 | 2 | 0.95 | 12 | 50 | 4 |
| HSXB2010 0650 | 1 | R0.5 | 0.75 | 2.5 | 0.95 | 12 | 50 | 6 |
| HSXB2010 0660 | 1 | R0.5 | 0.75 | 2.5 | 0.95 | 12 | 60 | 6 |
| HSXB2010 0675 | 1 | R0.5 | 0.75 | 2.5 | 0.95 | 12 | 75 | 6 |
| HSXB2012 0450 | 1.2 | R0.6 | 0.9 | 2.4 | 1.14 | 11 | 50 | 4 |
| HSXB2015 0450 | 1.5 | R0.75 | 1.2 | 3 | 1.42 | 11 | 50 | 4 |
| HSXB2015 0650 | 1.5 | R0.75 | 1.2 | 4 | 1.42 | 11 | 50 | 6 |
| HSXB2015 0660 | 1.5 | R0.75 | 1.2 | 4 | 1.42 | 11 | 60 | 6 |
| HSXB2015 0675 | 1.5 | R0.75 | 1.2 | 4 | 1.42 | 11 | 75 | 6 |
| HSXB2020 0450 | 2 | R1 | 1.6 | 4 | 1.9 | 11 | 50 | 4 |
| HSXB2020 0650 | 2 | R1 | 1.6 | 6 | 1.9 | 11 | 50 | 6 |
| HSXB2020 0660 | 2 | R1 | 1.6 | 6 | 1.9 | 11 | 60 | 6 |
| HSXB2020 0675 | 2 | R1 | 1.6 | 6 | 1.9 | 11 | 75 | 6 |
| HSXB2025 0450 | 2.5 | R1.25 | 2 | 5 | 2.4 | 11 | 50 | 4 |
| HSXB2025 0650 | 2.5 | R1.25 | 2 | 7 | 2.4 | 11 | 50 | 6 |
| HSXB2025 0660 | 2.5 | R1.25 | 2 | N | 2.4 | 11 | 60 | 6 |
| HSXB2025 0675 | 2.5 | R1.25 | 2 | 7 | 2.4 | 11 | 75 | 6 |
| HSXB2030 0450 | 3 | R1.5 | 2.4 | 6 | 2.9 | 11 | 50 | 4 |
| HSXB2030 0650 | 3 | R1.5 | 2.4 | 8 | 2.9 | 11 | 50 | 6 |
| HSXB2030 0660 | 3 | R1.5 | 2.4 | 8 | 2.9 | 11 | 60 | 6 |



BALL NOSE END MILL
HSX SERIES

# HSXB 2-Flutes Ball End Mill

Unit:mm

| Type No. | Dia. | Radius | Length of Cut | Under Neck Length | Neck Dia. | Neck Taper Angle | Overall Length | Shank Dia. |
|---|---|---|---|---|---|---|---|---|
| | ϕD | R | ℓ | ℓ1 | ϕd1 | γ/° | L | ϕd |
| HSXB2030 0675 | 3 | R1.5 | 2.4 | 8 | 2.9 | 11 | 75 | 6 |
| HSXB2040 0450 | 4 | R2 | 6 | - | - | - | 50 | 4 |
| HSXB2040 0475 | 4 | R2 | 6 | - | - | - | 75 | 4 |
| HSXB2040 0650 | 4 | R2 | 3.2 | 10 | 3.9 | 11 | 50 | 6 |
| HSXB2040 0660 | 4 | R2 | 3.2 | 10 | 3.9 | 11 | 60 | 6 |
| HSXB2040 0675 | 4 | R2 | 3.2 | 10 | 3.9 | 11 | 75 | 6 |
| HSXB2050 0650 | 5 | R2.5 | 4 | 12 | 4.85 | 11 | 50 | 6 |
| HSXB2050 0660 | 5 | R2.5 | 4 | 12 | 4.85 | 11 | 60 | 6 |
| HSXB2050 0675 | 5 | R2.5 | 4 | 12 | 4.85 | 11 | 75 | 6 |
| HSXB2060 0650 | 6 | R3 | 0 | – | – | – | 50 | 6 |
| HSXB2060 0660 | 6 | R3 | 9 | – | – | – | 60 | 6 |
| HSXB2060 0675 | 6 | R3 | 3 | – | – | – | 75 | 6 |
| HSXB2060 06100 | 6 | R3 | 9 | – | – | – | 100 | 6 |
| HSXB2080 0860 | 8 | R4 | 12 | – | – | – | 60 | 8 |
| HSXB2080 0875 | 8 | R4 | 12 | – | – | – | 75 | 8 |
| HSXB2080 08100 | 8 | R4 | 12 | – | – | – | 100 | 8 |
| HSXB2100 1075 | 10 | R5 | 15 | – | – | – | 75 | 10 |
| HSXB2100 10100 | 10 | R5 | 15 | – | – | – | 100 | 10 |
| HSXB2100 10125 | 10 | R5 | 15 | – | – | – | 125 | 10 |
| HSXB2120 1275 | 12 | R6 | 18 | – | – | – | 75 | 12 |
| HSXB2120 12100 | 12 | R6 | 18 | – | – | – | 100 | 12 |
| HSXB2120 12125 | 12 | R6 | 18 | – | – | – | 125 | 12 |

TABLE OF RECOMMENDED MILLING MATERIALS

○Very suitable ○Suitable

| CARBON STEELS | ALLOY STEELS | PREHARDENED STEELS | HARDENED STEELS | | | | CASTIRON | COPPER ALLOYS | ALUMINUM ALLOY | GRAPHITE | TITANIUM ALLOY | HEAT RESISTANT ALLOYS | PLASTIC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | ~55HRC | ~60HRC | ~65HRC | ~70HRC | DUCTILE CAST IRON | | | | | | |
| | | ○ | ○ | ○ | ○ | ○ | ○ | | | | | | |

# Cutting Parameter

## HSXB 2-Flutes Ball End Mill 3D Milling Finishing

| Workpiece | Pre-Hardened Steels (35-45HRC) | | | | Hardened Steels (45-55HRC) | | | | Hardened Steels (55-65HRC) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Type No. | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm |
| HSXB2001 | 40000 | 120 | 0.003 | 0.005 | 40000 | 100 | 0.002 | 0.005 | 40000 | 70 | 0.002 | 0.003 |
| HSXB20015 | 40000 | 180 | 0.003 | 0.005 | 40000 | 150 | 0.002 | 0.005 | 40000 | 100 | 0.002 | 0.003 |
| HSXB2002 | 40000 | 350 | 0.01 | 0.01 | 40000 | 300 | 0.006 | 0.006 | 36000 | 200 | 0.003 | 0.003 |
| HSXB2003 | 36500 | 500 | 0.01 | 0.01 | 30000 | 400 | 0.01 | 0.01 | 30000 | 280 | 0.008 | 0.01 |
| HSXB2004 | 36300 | 720 | 0.02 | 0.03 | 33000 | 720 | 0.01 | 0.03 | 30000 | 580 | 0.009 | 0.02 |
| HSXB2005 | 35500 | 800 | 0.02 | 0.03 | 31800 | 720 | 0.01 | 0.03 | 28000 | 640 | 0.01 | 0.025 |
| HSXB2006 | 33000 | 1000 | 0.03 | 0.03 | 31320 | 800 | 0.03 | 0.03 | 26800 | 760 | 0.01 | 0.03 |
| HSXB2008 | 24200 | 1920 | 0.03 | 0.05 | 22000 | 1600 | 0.03 | 0.05 | 20000 | 1200 | 0.02 | 0.05 |
| HSXB2010 | 24000 | 1920 | 0.03 | 0.05 | 22000 | 1600 | 0.03 | 0.05 | 20000 | 1200 | 0.02 | 0.05 |
| HSXB2015 | 21600 | 2000 | 0.03 | 0.05 | 19800 | 1760 | 0.03 | 0.05 | 18000 | 1600 | 0.02 | 0.05 |
| HSXB2020 | 18000 | 2000 | 0.04 | 0.06 | 16500 | 1760 | 0.04 | 0.06 | 15000 | 1600 | 0.03 | 0.06 |
| HSXB2025 | 18000 | 2500 | 0.04 | 0.06 | 16500 | 2000 | 0.04 | 0.06 | 15000 | 1600 | 0.03 | 0.06 |
| HSXB2030 | 16800 | 2500 | 0.04 | 0.08 | 15400 | 2200 | 0.04 | 0.08 | 14000 | 2000 | 0.03 | 0.08 |
| HSXB2040 | 13200 | 3000 | 0.05 | 0.1 | 12200 | 2500 | 0.05 | 0.08 | 11400 | 2000 | 0.04 | 0.08 |
| HSXB2050 | 12000 | 2800 | 0.03 | 0.1 | 11000 | 2500 | 0.05 | 0.08 | 10000 | 2000 | 0.04 | 0.1 |
| HSXB2060 | 9000 | 2800 | 0.05 | 0.15 | 9000 | 2800 | 0.05 | 0.12 | 8550 | 2400 | 0.05 | 0.1 |
| HSXB2080 | 8000 | 3000 | 0.05 | 0.2 | 8000 | 3000 | 0.05 | 0.15 | 7600 | 3000 | 0.05 | 0.15 |
| HSXB2100 | 7200 | 3000 | 0.08 | 0.25 | 7200 | 3000 | 0.08 | 0.2 | 6840 | 3000 | 0.08 | 0.25 |
| HSXB2120 | 6400 | 3000 | 0.1 | 0.25 | 6400 | 3000 | 0.08 | 0.25 | 6080 | 3000 | 0.08 | 0.25 |



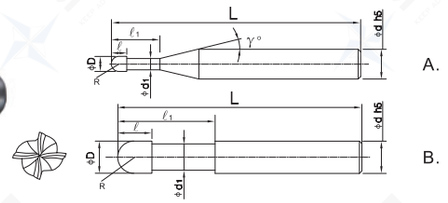
# HSX SERIES

## HSXBC-Highlights

- Possible for both side milling and profile milling.
- HSX coating leads to long tool life in hard milling.
- Excellent performance in 45-70HRC materials.
- Unequal flutes design reduces the vibration.
- Stable milling in corner by optimized chip pockets.

**45-70HRC**

# HSXBC 4-Flutes High-hardness Ball End Mill




UMG AHX 4 40° Spiral Angle Arc Back Angle ≤70 HRC

| Ø D | D Tol. [ mm ] |
|---|---|
| D≤3 | 0~-0.010 |
| 3<D≤6 | 0~-0.012 |
| 6<D≤10 | 0~-0.015 |
| 10<D≤18 | 0~-0.018 |

| Ø D | R Tol. [ mm ] |
|---|---|
| 1≤D≤3 | ±0.005 |
| 4≤D≤6 | ±0.007 |
| 8≤D≤12 | ±0.01 |

Unit:mm

| Type No. | Dia. | Radius | Length of Cut | Under Neck Length | Neck Dia. | Neck Taper Angle | Overall Length | Shank Dia. | |
|---|---|---|---|---|---|---|---|---|---|
| | ϕD | R | ℓ | ℓ1 | ϕd1 | γ/° | L | ϕd | |
| HSXBC40100450 | 1 | R0.5 | 1.8 | 3 | 0.95 | 15 | 50 | 4 | A |
| HSXBC4010 0650 | 1 | R0.5 | 1.8 | 3 | 0.95 | 15 | 50 | 6 | A |
| HSXBC4015 0450 | 1.5 | R0.75 | 2.7 | 4.5 | 1.42 | 15 | 50 | 4 | A |
| HSXBC40150650 | 1.5 | R0.75 | 2.7 | 4.5 | 1.42 | 15 | 50 | 6 | A |
| HSXBC40200450 | 2 | R1 | 4 | 6 | 1.9 | 15 | 50 | 4 | A |
| HSXBC40200650 | 2 | R1 | 4 | 6 | 1.9 | 15 | 50 | 6 | A |
| HSXBC4025 0650 | 2.5 | R1.25 | 4.5 | 7.5 | 2.4 | 15 | 50 | 6 | A |
| HSXBC40300460 | 3 | R1.5 | 5.4 | 9 | 2.9 | 15 | 60 | 4 | A |
| HSXBC40300660 | 3 | R1.5 | 5.4 | 9 | 2.9 | 15 | 60 | 6 | A |
| HSXBC40400460 | 4 | R2 | 6.4 | 12 | 3.9 | - | 60 | 4 | B |
| HSXBC40400660 | 4 | R2 | 6.4 | 12 | 3.9 | 15 | 60 | 6 | A |
| HSXBC40500660 | 5 | R2.5 | 0 | 15 | 4.85 | 15 | 60 | 6 | A |
| HSXBC4060 0660 | 6 | R3 | 10.8 | 18 | 5.85 | - | 60 | 6 | B |
| HSXBC40800875 | 8 | R4 | 14.4 | 24 | 7.8 | - | 75 | 8 | B |
| HSXBC408008100 | 8 | R4 | 14.4 | 24 | 7.8 | - | 100 | 8 | B |
| HSXBC41001075 | 10 | R5 | 18 | 30 | 9.8 | - | 75 | 10 | B |
| HSXBC410010100 | 10 | R5 | 18 | 30 | 9.8 | - | 100 | 10 | B |
| New HSXBC4120 1275 | 12 | R6 | 21.6 | 36 | 11.7 | - | 75 | 12 | B |
| HSXBC4120 12100 | 12 | R6 | 21.6 | 36 | 11.7 | - | 100 | 12 | B |

TABLE OF RECOMMENDED MILLING MATERIALS

◎Very suitable ○Suitable

| CARBON STEELS | ALLOY STEELS | PREHARDENED STEELS | HARDENED STEELS | | | | CASTIRON | COPPER ALLOYS | ALUMINUM ALLOY | GRAPHITE | TITANIUM ALLOY | HEAT RESISTANT ALLOYS | PLASTIC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | ~55HRC | ~60HRC | ~65HRC | ~70HRC | DUCTILE CAST IRON | | | | | | |
| | | ○ | ◎ | ◎ | ◎ | ◎ | ○ | | | | | | |



# Cutting Parameter

## HSXBC 4-Flutes High-hardness Ball End Mill Z Constant Milling Roughing

| Workpiece | Hardened Steels (≤52HRC) | | | | Hardened Steels (58-62HRC) | | | | Hardened Steels (63-69HRC) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Type No. | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm |
| HSXBC4010 0450 | 38216 | 1650 | 0.1 | 0.25 | 35000 | 1500 | 0.08 | 0.2 | 28700 | 1140 | 0.06 | 0.15 |
| HSXBC4010 0650 | 38216 | 1650 | 0.1 | 0.25 | 35000 | 1500 | 0.08 | 0.2 | 28700 | 1140 | 0.06 | 0.15 |
| HSXBC4015 0450 | 25477 | 1720 | 0.15 | 0.33 | 23400 | 1600 | 0.12 | 0.3 | 19100 | 1220 | 0.09 | 0.225 |
| HSXBC4015 0650 | 25477 | 1720 | 0.15 | 0.33 | 23400 | 1600 | 0.12 | 0.3 | 19100 | 1220 | 0.09 | 0.225 |
| HSXBC4020 0450 | 19108 | 1720 | 0.2 | 0.4 | 17500 | 1600 | 0.16 | 0.4 | 14300 | 1220 | 0.12 | 0.3 |
| HSXBC4020 0650 | 19108 | 1720 | 0.2 | 0.4 | 17500 | 1600 | 0.16 | 0.4 | 14300 | 1220 | 0.12 | 0.3 |
| HSXBC4025 0650 | 15286 | 1760 | 0.25 | 0.525 | 14000 | 1650 | 0.2 | 0.5 | 11500 | 1350 | 0.15 | 0.375 |
| HSXBC4030 0460 | 12738 | 1760 | 0.3 | 0.75 | 11700 | 1650 | 0.24 | 0.6 | 9600 | 1350 | 0.18 | 0.45 |
| HSXBC4030 0660 | 12738 | 1760 | 0.3 | 0.75 | 11700 | 1650 | 0.24 | 0.6 | 9600 | 1350 | 0.18 | 0.45 |
| HSXBC4040 0460 | 9554 | 1800 | 0.4 | 1 | 8800 | 1700 | 0.32 | 0.8 | 7200 | 1460 | 0.24 | 0.6 |
| HSXBC4040 0660 | 9554 | 1800 | 0.4 | 1 | 8800 | 1700 | 0.32 | 0.8 | 7200 | 1460 | 0.24 | 0.6 |
| HSXBC4040 0675 | 9554 | 1800 | 0.4 | 1 | 8800 | 1700 | 0.32 | 0.8 | 7200 | 1460 | 0.24 | 0.6 |
| HSXBC4050 0660 | 7643 | 1920 | 0.5 | 1.25 | 7000 | 1800 | 0.4 | 1 | 5700 | 1470 | 0.3 | 0.75 |
| HSXBC4050 0675 | 7643 | 1920 | 0.5 | 1.25 | 7000 | 1800 | 0.4 | 1 | 5700 | 1470 | 0.3 | 0.75 |
| HSXBC4060 0660 | 6369 | 2000 | 0.6 | 1.5 | 5800 | 1850 | 0.48 | 1.2 | 4800 | 1560 | 0.36 | 10.9 |
| HSXBC4060 0675 | 6369 | 2000 | 0.6 | 1.5 | 5800 | 1850 | 0.48 | 1.2 | 4800 | 1560 | 0.36 | 0.9 |
| HSXBC4080 0860 | 4777 | 2080 | 0.8 | 2 | 4400 | 1860 | 0.64 | 1.6 | 3600 | 1560 | 0.48 | 1.2 |
| HSXBC4080 0875 | 4777 | 2080 | 0.8 | 2 | 4400 | 1860 | 0.64 | 1.6 | 3600 | 1560 | 0.48 | 1.2 |
| HSXBC4080 08100 | 4777 | 2080 | 0.8 | 2 | 4400 | 1860 | 0.64 | 1.6 | 3600 | 1560 | 0.48 | 1.2 |
| HSXBC4100 1075 | 3821 | 2100 | 1 | 2.5 | 3500 | 1950 | 0.8 | 2 | 2900 | 1630 | 0.6 | 1.5 |
| HSXBC4100 10100 | 3821 | 2100 | 1 | 2.5 | 3500 | 1950 | 0.8 | 2 | 2900 | 1630 | 0.6 | 1.5 |
| HSXBC4120 12100 | 3184 | 2400 | 1.2 | 2.8 | 2900 | 2000 | 0.96 | 2.4 | 2400 | 1660 | 0.72 | 1.8 |

# Cutting Parameter

## HSXBC 4-Flutes High-hardness Ball End Mill Side milling

| Workpiece | Hardened Steels (≤52HRC) | | | | Hardened Steels (58-62HRC) | | | | Hardened Steels (63-69HRC) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Type No. | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm |
| HSXBC4010 0450 | 45000 | 2730 | 1 | 0.02 | 40000 | 2275 | 1 | 0.02 | 34394 | 1750 | 1 | 0.02 |
| HSXBC4010 0650 | 45000 | 2730 | 1 | 0.02 | 40000 | 2275 | 1 | 0.02 | 34394 | 1750 | 1 | 0.02 |
| HSXBC4015 0450 | 30000 | 2400 | 1.5 | 0.04 | 26750 | 2000 | 1.5 | 0.03 | 23000 | 1590 | 1.5 | 0.02 |
| HSXBC4015 0650 | 30000 | 2400 | 1.5 | 0.04 | 26750 | 2000 | 1.5 | 0.03 | 23000 | 1590 | 1.5 | 0.02 |
| HSXBC4020 0450 | 22500 | 2400 | 3 | 0.05 | 20000 | 2000 | 2 | 0.04 | 17200 | 1590 | 2 | 0.03 |
| HSXBC4020 0650 | 22500 | 2400 | 2 | 0.05 | 20000 | 2000 | 2 | 0.04 | 17200 | 1590 | 2 | 0.03 |
| HSXBC4025 0650 | 18000 | 2280 | 2.5 | 0.06 | 16050 | 1900 | 2.5 | 0.05 | 13800 | 1490 | 2.5 | 0.04 |
| HSXBC4030 0460 | 15000 | 2340 | 3 | 0.08 | 13380 | 1950 | 3 | 0.06 | 11500 | 1500 | 3 | 0.05 |
| HSXBC4030 0660 | 15000 | 2340 | 3 | 0.08 | 13380 | 1950 | 3 | 0.06 | 11500 | 1500 | 3 | 0.05 |
| HSXBC4040 0460 | 11250 | 2340 | 4 | 0.1 | 10000 | 1950 | 4 | 0.08 | 8600 | 1520 | 4 | 0.06 |
| HSXBC4040 0660 | 11250 | 2340 | 4 | 0.1 | 10000 | 1950 | 4 | 0.08 | 8600 | 1520 | 4 | 0.06 |
| HSXBC4040 0675 | 11250 | 2340 | 4 | 0.1 | 10000 | 1950 | 4 | 0.08 | 8600 | 1520 | 4 | 0.06 |
| HSXBC4050 0660 | 9000 | 2400 | 5 | 0.12 | 8050 | 2000 | 5 | 0.1 | 6800 | 1550 | 5 | 0.08 |
| HSXBC4050 0675 | 9000 | 2400 | 5 | 0.12 | 8050 | 2000 | 5 | 0.1 | 6800 | 1550 | 5 | 0.08 |
| HSXBC4060 0660 | 7500 | 2400 | 6 | 0.15 | 6687 | 2000 | o | 0.12 | 5750 | 1540 | 6 | 0.09 |
| HSXBC4060 0675 | 7500 | 2400 | co | 0.15 | 6687 | 2000 | o | 0.12 | 5750 | 1540 | 6 | 0.09 |
| HSXBC4080 0860 | 5625 | 2500 | 8 | 0.2 | 5015 | 2080 | 8 | 0.16 | 4300 | 1600 | 8 | 0.12 |
| HSXBC4080 0875 | 5625 | 2500 | 8 | 0.2 | 5015 | 2080 | 8 | 0.16 | 4300 | 1600 | 8 | 0.12 |
| HSXBC4080 08100 | 5625 | 2500 | 8 | 0.2 | 5015 | 2080 | 8 | 0.16 | 4300 | 1600 | 8 | 0.12 |
| HSXBC4100 1075 | 4500 | 2500 | 10 | 0.25 | 4012 | 2080 | 10 | 0.2 | 3400 | 1600 | 10 | 0.15 |
| HSXBC4100 10100 | 4500 | 2500 | 10 | 0.25 | 4012 | 2080 | 10 | 0.2 | 3400 | 1600 | 10 | 0.15 |
| HSXBC4120 12100 | 3750 | 2350 | 12 | 0.3 | 3343 | 1950 | 12 | 0.24 | 2880 | 1500 | 12 | 0.18 |



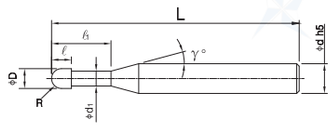
BALL NOSE END MILL
HSX SERIES

# Cutting Parameter

## HSXBC 4-Flutes High-hardness Ball End Mill Profile Finishing

| Workpiece | Hardened Steels (≤52HRC) | | | | Hardened Steels (58-62HRC) | | | | Hardened Steels (63-69HRC) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Type No. | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm |
| HSXBC4010 0450 | 40000 | 1500 | 0.02 | 0.02 | 38500 | 1500 | 0.02 | 0.02 | 38216 | 1300 | 0.02 | 0.02 |
| HSXBC4010 0650 | 40000 | 1500 | 0.02 | 0.02 | 38500 | 1500 | 0.02 | 0.02 | 38216 | 1300 | 0.02 | 0.02 |
| HSXBC4015 0450 | 35000 | 2000 | 0.03 | 0.03 | 33800 | 2000 | 0.03 | 0.03 | 25400 | 1300 | 0.02 | 0.03 |
| HSXBC4015 0650 | 35000 | 2000 | 0.03 | 0.03 | 33800 | 2000 | 0.03 | 0.03 | 25400 | 1300 | 0.02 | 0.03 |
| HSXBC4020 0450 | 32000 | 2000 | 0.04 | 0.04 | 25500 | 2000 | 0.04 | 0.04 | 19100 | 1300 | 0.02 | 0.04 |
| HSXBC4020 0650 | 32000 | 2000 | 0.04 | 0.04 | 25500 | 2000 | 0.04 | 0.04 | 19100 | 1300 | 0.02 | 0.04 |
| HSXBC4025 0650 | 25600 | 2400 | 0.05 | 0.06 | 20382 | 2400 | 0.05 | 0.06 | 15280 | 1360 | 0.03 | 0.05 |
| HSXBC4030 0460 | 21300 | 2400 | 0.05 | 0.08 | 17000 | 2400 | 0.05 | 0.08 | 12738 | 1370 | 0.03 | 0.06 |
| HSXBC4030 0660 | 21300 | 2400 | 0.05 | 0.08 | 17000 | 2400 | 0.05 | 0.08 | 12738 | 1370 | 0.03 | 0.06 |
| HSXBC4040 0460 | 16000 | 2500 | 0.05 | 0.1 | 12738 | 2500 | 0.05 | 0.1 | 9550 | 1370 | 0.03 | 0.08 |
| HSXBC4040 0660 | 16000 | 2500 | 0.05 | 0.1 | 12738 | 2500 | 0.05 | 0.1 | 9550 | 1370 | 0.03 | 0.08 |
| HSXBC4040 0675 | 16000 | 2500 | 0.05 | 0.1 | 12738 | 2500 | 0.05 | 0.1 | 9550 | 1370 | 0.03 | 0.08 |
| HSXBC4050 0660 | 12800 | 3000 | 0.06 | 0.12 | 10200 | 3000 | 0.06 | 0.12 | 7600 | 1400 | 0.04 | 0.1 |
| HSXBC4050 0675 | 12800 | 3000 | 0.06 | 0.12 | 10200 | 3000 | 0.06 | 0.12 | 7600 | 1400 | 0.04 | 0.1 |
| HSXBC4060 0660 | 10660 | 3200 | 0.08 | 0.15 | 8500 | 3200 | 0.08 | 0.15 | 6400 | 1400 | 0.04 | 0.12 |
| HSXBC4060 0675 | 10660 | 3200 | 0.08 | 0.15 | 8500 | 3200 | 0.08 | 0.15 | 6400 | 1400 | 0.04 | 0.12 |
| HSXBC4080 0860 | 8000 | 3500 | 0.08 | 0.2 | 6400 | 3500 | 0.08 | 0.2 | 4800 | 1460 | 0.05 | 0.16 |
| HSXBC4080 0875 | 8000 | 3500 | 0.08 | 0.2 | 6400 | 3500 | 0.08 | 0.2 | 4800 | 1460 | 0.05 | 0.16 |
| HSXBC4080 08100 | 8000 | 3500 | 0.08 | 0.2 | 6400 | 3500 | 0.08 | 0.2 | 4800 | 1460 | 0.05 | 0.16 |
| HSXBC4100 1075 | 6800 | 3600 | 0.1 | 0.25 | 5200 | 3600 | 0.1 | 0.25 | 3800 | 1460 | 0.05 | 0.2 |
| HSXBC4100 10100 | 6800 | 3600 | 0.1 | 0.25 | 5200 | 3600 | 0.1 | 0.25 | 3800 | 1460 | 0.05 | 0.2 |
| HSXBC4120 12100 | 6500 | 4000 | 0.1 | 0.28 | 4680 | 4000 | 0.1 | 0.28 | 3180 | 1370 | 0.05 | 0.24 |

# HSXB2L 2-Flutes Long Neck Ball End Mill




UMG AHX 2 30° Spiral Angle Straight Back Angle <65 HRC

| ⌀D | D Tol. [mm] |
|---|---|
| D<3 | 0~-0.010 |
| 3<D≤6 | 0~-0.012 |

| ⌀D | R Tol. [mm] |
|---|---|
| D<1 | ±0.003 |
| 1<D≤6 | ±0.005 |

Unit:mm

| Type No. | Dia. | Radius | Length of Cut | Under Neck Length | Neck Dia. | Neck Taper Angle | Overall Length | Shank Dia. |
|---|---|---|---|---|---|---|---|---|
| | ϕD | R | ℓ | ℓ1 | ϕd1 | γ/° | L | ϕd |
| HSXB2001L0.2 0450 | 0.1 | R0.05 | 0.07 | 0.2 | 0.085 | 12 | 50 | 4 |
| HSXB2001L0.3 0450 | 0.1 | R0.05 | 0.07 | 0.3 | 0.085 | 12 | 50 | 4 |
| HSXB2001L0.5 0450 | 0.1 | R0.05 | 0.07 | 0.5 | 0.085 | 12 | 50 | 4 |
| HSXB2001L0.75 0450 | 0.1 | R0.05 | 0.07 | 0.75 | 0.085 | 12 | 50 | 4 |
| HSXB2001L1 0450 | 0.1 | R0.05 | 0.07 | 1 | 0.085 | 12 | 50 | 4 |
| HSXB20015L0.3 0450 | 0.15 | R0.075 | 0.1 | 0.3 | 0.13 | 12 | 50 | 4 |
| HSXB20015L0.5 0450 | 0.15 | R0.075 | 0.1 | 0.5 | 0.13 | 12 | 50 | 4 |
| HSXB20015L0.75 0450 | 0.15 | R0.075 | 0.1 | 0.75 | 0.13 | 12 | 50 | 4 |
| HSXB20015L1 0450 | 0.15 | R0.075 | 0.1 | 1 | 0.13 | 12 | 50 | 4 |
| HSXB20015L1.5 0450 | 0.15 | R0.075 | 0.1 | 1.5 | 0.13 | 12 | 50 | 4 |
| HSXB2002L0.3 0450 | 0.2 | R0.1 | 0.15 | 0.3 | 0.18 | 12 | 50 | 4 |
| HSXB2002L0.5 0450 | 0.2 | R0.1 | 0.15 | 0.5 | 0.18 | 12 | 50 | 4 |
| HSXB2002L0.75 0450 | 0.2 | R0.1 | 0.15 | 0.75 | 0.18 | 12 | 50 | 4 |
| HSXB2002L1 0450 | 0.2 | R0.1 | 0.15 | 1 | 0.18 | 12 | 50 | 4 |
| HSXB2002L1.25 0450 | 0.2 | R0.1 | 0.15 | 1.25 | 0.18 | 12 | 50 | 4 |
| HSXB2002L1.5 0450 | 0.2 | R0.1 | 0.15 | 1.5 | 0.18 | 12 | 50 | 4 |
| HSXB2002L1.75 0450 | 0.2 | R0.1 | 0.15 | 1.75 | 0.18 | 12 | 50 | 4 |
| HSXB2002L2 0450 | 0.2 | R0.1 | 0.15 | 2 | 0.18 | 12 | 50 | 4 |
| HSXB2002L2.5 0450 | 0.2 | R0.1 | 0.15 | 2.5 | 0.18 | 12 | 50 | 4 |
| HSXB2003L0.6 0450 | 0.3 | R0.15 | 0.2 | 0.6 | 0.28 | 12 | 50 | 4 |
| HSXB2003L0.75 0450 | 0.3 | R0.15 | 0.2 | 0.75 | 0.28 | 12 | 50 | 4 |
| HSXB2003L1 0450 | 0.3 | R0.15 | 0.2 | 1 | 0.28 | 12 | 50 | 4 |
| HSXB2003L1.25 0450 | 0.3 | R0.15 | 0.2 | 1.25 | 0.28 | 12 | 50 | 4 |
| HSXB2003L1.5 0450 | 0.3 | R0.15 | 0.2 | 1.5 | 0.28 | 12 | 50 | 4 |
| HSXB2003L1.75 0450 | 0.3 | R0.15 | 0.2 | 1.75 | 0.28 | 12 | 50 | 4 |
| HSXB2003L2 0450 | 0.3 | R0.15 | 0.2 | 2 | 0.28 | 12 | 50 | 4 |



BALL NOSE END MILL
HSX SERIES

# HSXB2L 2-Flutes Long Neck Ball End Mill

Unit:mm

| Type No. | Dia. | Radius | Length of Cut | Under Neck Length | Neck Dia. | Neck Taper Angle | Overall Length | Shank Dia. |
|---|---|---|---|---|---|---|---|---|
| | ϕD | R | ℓ | ℓ1 | ϕd1 | γ/° | L | ϕd |
| HSXB2003L2.25 0450 | 0.3 | R0.15 | 0.2 | 2.25 | 0.28 | 12 | 50 | 4 |
| HSXB2003L2.5 0450 | 0.3 | R0.15 | 0.2 | 2.5 | 0.28 | 12 | 50 | 4 |
| HSXB2003L3 0450 | 0.3 | R0.15 | 0.2 | 3 | 0.28 | 12 | 50 | 4 |
| HSXB2004L0.5 0450 | 0.4 | R0.2 | 0.3 | 0.5 | 0.37 | 12 | 50 | 4 |
| HSXB2004L0.8 0450 | 0.4 | R0.2 | 0.3 | 0.8 | 0.37 | 12 | 50 | 4 |
| HSXB2004L1 0450 | 0.4 | R0.2 | 0.3 | 1 | 0.37 | 12 | 50 | 4 |
| HSXB2004L1.5 0450 | 0.4 | R0.2 | 0.3 | 1.5 | 0.37 | 12 | 50 | 4 |
| HSXB2004L2 0450 | 0.4 | R0.2 | 0.3 | 2 | 0.37 | 12 | 50 | 4 |
| HSXB2004L2.5 0450 | 0.4 | R0.2 | 0.3 | 2.5 | 0.37 | 12 | 50 | 4 |
| HSXB2004L3 0450 | 0.4 | R0.2 | 0.3 | 3 | 0.37 | 12 | 50 | 4 |
| HSXB2004L3.5 0450 | 0.4 | R0.2 | 0.3 | 3.5 | 0.37 | 12 | 50 | 4 |
| HSXB2004L4 0450 | 0.4 | R0.2 | 0.3 | 4 | 0.37 | 12 | 50 | 4 |
| HSXB2005L1 0450 | 0.5 | R0.25 | 0.35 | 1 | 0.46 | 12 | 50 | 4 |
| HSXB2005L1.5 0450 | 0.5 | R0.25 | 0.35 | 1.5 | 0.46 | 12 | 50 | 4 |
| HSXB2005L2 0450 | 0.5 | R0.25 | 0.35 | 2 | 0.46 | 12 | 50 | 4 |
| HSXB2005L2.5 0450 | 0.5 | R0.25 | 0.35 | 2.5 | 0.46 | 12 | 50 | 4 |
| HSXB2005L3 0450 | 0.5 | R0.25 | 0.35 | 3 | 0.46 | 12 | 50 | 4 |
| HSXB2005L4 0450 | 0.5 | R0.25 | 0.35 | 4 | 0.46 | 12 | 50 | 4 |
| HSXB2005L5 0450 | 0.5 | R0.25 | 0.35 | 5 | 0.46 | 12 | 50 | 4 |
| HSXB2005L6 0450 | 0.5 | R0.25 | 0.35 | 6 | 0.46 | 12 | 50 | 4 |
| HSXB2006L1 0450 | 0.6 | R0.3 | 0.45 | 1 | 0.56 | 12 | 50 | 4 |
| HSXB2006L1.5 0450 | 0.6 | R0.3 | 0.45 | 1.5 | 0.56 | 12 | 50 | 4 |
| HSXB2006L2 0450 | 0.6 | R0.3 | 0.45 | 2 | 0.56 | 12 | 50 | 4 |
| HSXB2006L3 0450 | 0.6 | R0.3 | 0.45 | 3 | 0.56 | 12 | 50 | 4 |
| HSXB2006L4 0450 | 0.6 | R0.3 | 0.45 | 4 | 0.56 | 12 | 50 | 4 |
| HSXB2006L6 0450 | 0.6 | R0.3 | 0.45 | 6 | 0.56 | 12 | 50 | 4 |
| HSXB2006L8 0450 | 0.6 | R0.3 | 0.45 | 8 | 0.56 | 12 | 50 | 4 |
| HSXB2007L2 0450 | 0.7 | R0.35 | 0.5 | 2 | 0.66 | 12 | 50 | 4 |
| HSXB2007L3 0450 | 0.7 | R0.35 | 0.5 | 3 | 0.66 | 12 | 50 | 4 |
| HSXB2007L4 0450 | 0.7 | R0.35 | 0.5 | 4 | 0.66 | 12 | 50 | 4 |
| HSXB2007L6 0450 | 0.7 | R0.35 | 0.5 | 6 | 0.66 | 12 | 50 | 4 |
| HSXB2008L2 0450 | 0.8 | R0.4 | 0.6 | 2 | 0.76 | 12 | 50 | 4 |
| HSXB2008L2.5 0450 | 0.8 | R0.4 | 0.6 | 2.5 | 0.76 | 12 | 50 | 4 |
| HSXB2008L3 0450 | 0.8 | R0.4 | 0.6 | 3 | 0.76 | 12 | 50 | 4 |

# HSXB2L 2-Flutes Long Neck Ball End Mill

Unit:mm

| Type No. | Dia. | Radius | Length of Cut | Under Neck Length | Neck Dia. | Neck Taper Angle | Overall Length | Shank Dia. |
|---|---|---|---|---|---|---|---|---|
| | ϕD | R | $\ell$ | $\ell_1$ | ϕd1 | γ/° | L | ϕd |
| HSXB2008L4 0450 | 0.8 | R0.4 | 0.6 | 4 | 0.76 | 12 | 50 | 4 |
| HSXB2008L6 0450 | 0.8 | R0.4 | 0.6 | 6 | 0.76 | 12 | 50 | 4 |
| HSXB2008L8 0450 | 0.8 | R0.4 | 0.6 | 8 | 0.76 | 12 | 50 | 4 |
| HSXB2008L10 0450 | 0.8 | R0.4 | 0.6 | 10 | 0.76 | 12 | 50 | 4 |
| HSXB2009L2 0450 | 0.9 | R0.45 | 0.65 | 3 | 0.86 | 12 | 50 | 4 |
| HSXB2009L4 0450 | 0.9 | R0.45 | 0.65 | 4 | 0.86 | 12 | 50 | 4 |
| HSXB2009L6 0450 | 0.9 | R0.45 | 0.65 | 6 | 0.86 | 12 | 50 | 4 |
| HSXB2009L8 0450 | 0.9 | R0.45 | 0.65 | 8 | 0.86 | 12 | 50 | 4 |
| HSXB2010L2.5 0450 | 1 | R0.5 | 0.75 | 2.5 | 0.95 | 12 | 50 | 4 |
| HSXB2010L3 0450 | 1 | R0.5 | 0.75 | 3 | 0.95 | 12 | 50 | 4 |
| HSXB2010L4 0450 | 1 | R0.5 | 0.75 | 4 | 0.95 | 12 | 50 | 4 |
| HSXB2010L4 0660 | 1 | R0.5 | 0.75 | 4 | 0.95 | 12 | 60 | 6 |
| HSXB2010L5 0450 | 1 | R0.5 | 0.75 | 5 | 0.95 | 12 | 50 | 4 |
| HSXB2010L6 0450 | 1 | R0.5 | 0.75 | 6 | 0.95 | 12 | 50 | 4 |
| HSXB2010L6 0660 | 1 | R0.5 | 0.75 | 6 | 0.95 | 12 | 60 | 6 |
| HSXB2010L7 0450 | 1 | R0.5 | 0.75 | 7 | 0.95 | 12 | 50 | 4 |
| HSXB2010L8 0450 | 1 | R0.5 | 0.75 | 8 | 0.95 | 12 | 50 | 4 |
| HSXB2010L8 0660 | 1 | R0.5 | 0.75 | 8 | 0.95 | 12 | 60 | 6 |
| HSXB2010L9 0450 | 1 | R0.5 | 0.75 | 9 | 0.95 | 12 | 50 | 4 |
| HSXB2010L10 0450 | 1 | R0.5 | 0.75 | 10 | 0.95 | 12 | 50 | 4 |
| HSXB2010L10 0660 | 1 | R0.5 | 0.75 | 10 | 0.95 | 12 | 60 | 6 |
| HSXB2010L12 0450 | 1 | R0.5 | 0.75 | 12 | 0.95 | 12 | 50 | 4 |
| HSXB2010L14 0450 | 1 | R0.5 | 0.75 | 14 | 0.95 | 12 | 50 | 4 |
| HSXB2010L16 0450 | 1 | R0.5 | 0.75 | 16 | 0.95 | 12 | 50 | 4 |
| HSXB2010L18 0460 | 1 | R0.5 | 0.75 | 18 | 0.95 | 12 | 60 | 4 |
| HSXB2010L20 0460 | 1 | R0.5 | 0.75 | 20 | 0.95 | 12 | 60 | 4 |
| HSXB2010L22 0460 | 1 | R0.5 | 0.75 | 22 | 0.95 | 12 | 60 | 4 |
| HSXB2012L4 0450 | 1.2 | R0.6 | 1 | 4 | 1.14 | 11 | 50 | 4 |
| HSXB2012L6 0450 | 1.2 | R0.6 | 1 | 6 | 1.14 | 11 | 50 | 4 |
| HSXB2012L8 0450 | 1.2 | R0.6 | 1 | 8 | 1.14 | 11 | 50 | 4 |
| HSXB2012L10 0450 | 1.2 | R0.6 | 1 | 10 | 1.14 | 11 | 50 | 4 |
| HSXB2012L12 0450 | 1.2 | R0.6 | 1 | 12 | 1.14 | 11 | 50 | 4 |
| HSXB2012L14 0450 | 1.2 | R0.6 | 1 | 14 | 1.14 | 11 | 50 | 4 |
| HSXB2014L8 0450 | 1.4 | R0.7 | 1.1 | 8 | 1.34 | 11 | 50 | 4 |



BALL NOSE END MILL
HSX SERIES

# HSXB2L 2-Flutes Long Neck Ball End Mill

Unit:mm

| Type No. | Dia. | Radius | Length of Cut | Under Neck Length | Neck Dia. | Neck Taper Angle | Overall Length | Shank Dia. |
|---|---|---|---|---|---|---|---|---|
| | ϕD | R | $\ell$ | $\ell_1$ | ϕd1 | γ/° | L | ϕd |
| HSXB2014L12 0450 | 1.4 | R0..7 | 1.1 | 12 | 1.34 | 11 | 50 | 4 |
| HSXB2015L4 0450 | 1.5 | R0.75 | 1.2 | 4 | 1.42 | 11 | 50 | 4 |
| HSXB2015L6 0450 | 1.5 | R0.75 | 1.2 | 6 | 1.42 | 11 | 50 | 4 |
| HSXB2015L6 0660 | 1.5 | R0.75 | 1.2 | 6 | 1.42 | 11 | 60 | 6 |
| HSXB2015L8 0450 | 1.5 | R0.75 | 1.2 | 8 | 1.42 | 11 | 50 | 4 |
| HSXB2015L8 0660 | 1.5 | R0.75 | 1.2 | 8 | 1.42 | 11 | 60 | 6 |
| HSXB2015L10 0450 | 1.5 | R0.75 | 1.2 | 10 | 1.42 | 11 | 50 | 4 |
| HSXB2015L10 0660 | 1.5 | R0.75 | 1.2 | 10 | 1.42 | 11 | 60 | 6 |
| HSXB2015L12 0450 | 1.5 | R0.75 | 1.2 | 12 | 1.42 | 11 | 50 | 4 |
| HSXB2015L12 0660 | 1.5 | R0.75 | 1.2 | 12 | 1.42 | 11 | 60 | 4 |
| HSXB2015L14 0450 | 1.5 | R0.75 | 1.2 | 14 | 1.42 | 11 | 50 | 4 |
| HSXB2015L16 0450 | 1.5 | R0.75 | 1.2 | 16 | 1.42 | 11 | 50 | 4 |
| HSXB2015L18 0460 | 1.5 | R0.75 | 1.2 | 18 | 1.42 | 11 | 60 | 4 |
| HSXB2016L8 0450 | 1.6 | R0.8 | 1.3 | 8 | 1.52 | 11 | 50 | 4 |
| HSXB2016L12 0450 | 1.6 | R0.8 | 1.3 | 12 | 1.52 | 11 | 50 | 4 |
| HSXB2016L16 0450 | 1.6 | R0.8 | 1.3 | 16 | 1.52 | 11 | 50 | 4 |
| HSXB2020L3 0450 | 2 | R1 | 1.6 | 3 | 1.9 | 11 | 50 | 4 |
| HSXB2020L4 0450 | 2 | R1 | 1.6 | 4 | 1.9 | 11 | 50 | 4 |
| HSXB2020L6 0450 | 2 | R1 | 1.6 | 6 | 1.9 | 11 | 50 | 4 |
| HSXB2020L8 0450 | 2 | R1 | 1.6 | 8 | 1.9 | 11 | 50 | 4 |
| HSXB2020L8 0660 | 2 | R1 | 1.6 | 8 | 1.9 | 11 | 60 | 6 |
| HSXB2020L10 0450 | 2 | R1 | 1.6 | 10 | 1.9 | 11 | 50 | 4 |
| HSXB2020L10 0660 | 2 | R1 | 1.6 | 10 | 1.9 | 11 | 60 | 6 |
| HSXB2020L12 0450 | 2 | R1 | 1.6 | 12 | 1.9 | 11 | 50 | 4 |
| HSXB2020L12 0660 | 2 | R1 | 1.6 | 12 | 1.9 | 11 | 60 | 6 |
| HSXB2020L14 0450 | 2 | R1 | 1.6 | 14 | 1.9 | 11 | 50 | 4 |
| HSXB2020L16 0450 | 2 | R1 | 1.6 | 16 | 1.9 | 11 | 50 | 4 |
| HSXB2020L16 0660 | 2 | R1 | 1.6 | 16 | 1.9 | 11 | 60 | 6 |
| HSXB2020L18 0460 | 2 | R1 | 1.6 | 18 | 1.9 | 11 | 60 | 4 |
| HSXB2020L200460 | 2 | R1 | 1.6 | 20 | 1.9 | 11 | 60 | 4 |
| HSXB2020L22 0460 | 2 | R1 | 1.6 | 22 | 1.9 | 11 | 60 | 4 |
| HSXB2020L25 0460 | 2 | R1 | 1.6 | 25 | 1.9 | 11 | 60 | 4 |
| HSXB2020L30 0475 | 2 | R1 | 1.6 | 30 | 1.9 | 11 | 75 | 4 |
| HSXB2025L6 0450 | 2.5 | R1.25 | 2 | 6 | 2.4 | 11 | 50 | 4 |

# HSXB2L 2-Flutes Long Neck Ball End Mill

Unit:mm

| Type No. | Dia. | Radius | Length of Cut | Under Neck Length | Neck Dia. | Neck Taper Angle | Overall Length | Shank Dia. |
|---|---|---|---|---|---|---|---|---|
| | ϕD | R | $\ell$ | $\ell_1$ | ϕd1 | γ/° | L | ϕd |
| HSXB2025L8 0450 | 2.5 | R1.25 | 2 | 8 | 2.4 | 11 | 50 | 4 |
| HSXB2025L10 0450 | 2.5 | R1.25 | 2 | 10 | 2.4 | 11 | 50 | 4 |
| HSXB2025L12 0450 | 2.5 | R1.25 | 2 | 12 | 2.4 | 11 | 50 | 4 |
| HSXB2025L16 0450 | 2.5 | R1.25 | 2 | 16 | 2.4 | 11 | 50 | 4 |
| HSXB2025L20 0460 | 2.5 | R1.25 | 2 | 20 | 2.4 | 11 | 60 | 4 |
| HSXB2025L25 0460 | 2.5 | R1.25 | 2 | 25 | 2.4 | 11 | 60 | 4 |
| HSXB2030L8 0450 | 3 | R1.5 | 2.4 | 8 | 2.9 | 11 | 50 | 4 |
| HSXB2030L8 0660 | 3 | R1.5 | 2.4 | 8 | 2.9 | 11 | 60 | 6 |
| HSXB2030L10 0450 | 3 | R1.5 | 2.4 | 10 | 2.9 | 11 | 50 | 4 |
| HSXB2030L10 0660 | 3 | R1.5 | 2.4 | 10 | 2.9 | 11 | 60 | 6 |
| HSXB2030L12 0450 | 3 | R1.5 | 2.4 | 12 | 2.9 | 11 | 50 | 4 |
| HSXB2030L12 0660 | 3 | R1.5 | 2.4 | 12 | 2.9 | 11 | 60 | 6 |
| HSXB2030L14 0450 | 3 | R1.5 | 2.4 | 14 | 2.9 | 11 | 50 | 4 |
| HSXB2030L14 0660 | 3 | R1.5 | 2.4 | 14 | 2.9 | 11 | 60 | 6 |
| HSXB2030L16 0450 | 3 | R1.5 | 2.4 | 16 | 2.9 | 11 | 50 | 4 |
| HSXB2030L16 0660 | 3 | R1.5 | 2.4 | 16 | 2.9 | 11 | 60 | 6 |
| HSXB2030L20 0660 | 3 | R1.5 | 2.4 | 20 | 2.9 | 11 | 60 | 6 |
| HSXB2030L25 0675 | 3 | R1.5 | 2.4 | 25 | 2.9 | 11 | 75 | 6 |
| HSXB2030L30 0675 | 3 | R1.5 | 2.4 | 30 | 2.9 | 11 | 75 | 6 |
| HSXB2030L35 0675 | 3 | R1.5 | 2.4 | 35 | 2.9 | 11 | 75 | 6 |
| HSXB2030L40 06100 | 3 | R1.5 | 2.4 | 40 | 2.9 | 11 | 100 | 6 |
| HSXB2035L16 0660 | 3.5 | R1.75 | 2.8 | 16 | 3.4 | 11 | 60 | 6 |
| HSXB2035L20 0660 | 3.5 | R1.75 | 2.8 | 20 | 3.4 | 11 | 60 | 6 |
| HSXB2035L25 0675 | 3.5 | R1.75 | 2.8 | 25 | 3.4 | 11 | 75 | 6 |
| HSXB2035L30 0675 | 3.5 | R1.75 | 2.8 | 30 | 3.4 | 11 | 75 | 6 |
| HSXB2035L35 0675 | 3.5 | R1.75 | 2.8 | 35 | 3.4 | 11 | 75 | 6 |
| HSXB2040L10 0450 | 4 | R2 | 3.2 | 10 | 3.9 | 11 | 50 | 4 |
| HSXB2040L10 0660 | 4 | R2 | 3.2 | 10 | 3.9 | 11 | 60 | 6 |
| HSXB2040L12 0660 | 4 | R2 | 3.2 | 12 | 3.9 | 11 | 60 | 6 |
| HSXB2040L14 0660 | 4 | R2 | 3.2 | 14 | 3.9 | 11 | 60 | 6 |
| HSXB2040L16 0660 | 4 | R2 | 3.2 | 16 | 3.9 | 11 | 60 | 6 |
| HSXB2040L20 0660 | 4 | R2 | 3.2 | 20 | 3.9 | 11 | 60 | 6 |
| HSXB2040L25 0675 | 4 | R2 | 3.2 | 25 | 3.9 | 11 | 75 | 6 |
| HSXB2040L30 0675 | 4 | R2 | 3.2 | 30 | 3.9 | 11 | 75 | 6 |





# HSXB2L 2-Flutes Long Neck Ball End Mill

Unit:mm

| Type No. | Dia. | Radius | Length of Cut | Under Neck Length | Neck Dia. | Neck Taper Angle | Overall Length | Shank Dia. |
|---|---|---|---|---|---|---|---|---|
| | ϕD | R | $\ell$ | $\ell_1$ | ϕd1 | γ/° | L | ϕd |
| HSXB2040L35 0675 | 4 | R2 | 3.2 | 35 | 3.9 | 11 | 75 | 6 |
| HSXB2040L40 06100 | 4 | R2 | 3.2 | 40 | 3.9 | 11 | 100 | 6 |
| HSXB2050L16 0660 | 5 | R2.5 | 4 | 16 | 4.85 | 11 | 60 | 6 |
| HSXB2050L200660 | 5 | R2.5 | 4 | 20 | 4.85 | 11 | 60 | 6 |
| HSXB2050L30 0675 | 5 | R2.5 | 4 | 30 | 4.85 | 11 | 75 | 6 |
| HSXB2050L40 06100 | 5 | R2.5 | 4 | 40 | 4.85 | 11 | 100 | 6 |
| HSXB2060L12 0660 | 6 | R3 | 4.8 | 12 | 5.85 | - | 60 | 6 |
| HSXB2060L20 0675 | 6 | R3 | 4.8 | 20 | 5.85 | - | 75 | 6 |
| HSXB2060L30 0675 | 6 | R3 | 4.8 | 30 | 5.85 | - | 75 | 6 |
| HSXB2060L40 06100 | 6 | R3 | 4.8 | 40 | 5.85 | - | 100 | 6 |

TABLE OF RECOMMENDED MILLING MATERIALS

Very suitable ○ Suitable

| CARBON STEELS PREHARDENED STEELS / ALLOY STEELS TOOL STEELS | PREHARDENED STEELS | | HARDENED STEELS | | STANLESS STEELS | CASTIRON DUCTILE CAST IRON | COPPER ALLOYS | ALUMINUM ALLOY | GRAPHITE | TITANIUM ALLOY | HEAT RESISTANT ALLOYS | PLASTIC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~40HRC | ~45HRC | ~55HRC | ~60HRC | ~65HRC | ~35HRC | ~350HB | | | | | | |
| ○ | ○ | ◎ | ◎ | ○ | ○ | ○ | ○ | | | | | |

# Cutting Parameter

## HSXB2L 2-Flutes Long Neck Ball End Mill 3D Milling

| Workpiece | | Pre-Hardened Steels (30-45HRC) | | | | Hardened Steels (45-55HRC) | | | | Hardened Steels (55-65HRC) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Radius/mm | Underneck/mm | n/min$^{-1}$ | Vf-mm/min | ap/mm | ae/mm | n/min$^{-1}$ | Vf-mm/min | ap/mm | ae/mm | n/min$^{-1}$ | Vf-mm/min | ap/mm | ae/mm |
| R0.05 | 0.2 | 40000 | 120 | 0.003 | 0.005 | 40000 | 100 | 0.002 | 0.005 | 40000 | 70 | 0.002 | 0.003 |
| | 0.3 | 40000 | 100 | 0.003 | 0.005 | 40000 | 70 | 0.002 | 0.005 | 40000 | 50 | 0.002 | 0.003 |
| | 0.5 | 40000 | 70 | 0.002 | 0.003 | 40000 | 50 | 0.001 | 0.003 | 40000 | 30 | 0.001 | 0.002 |
| | 0.75 | 40000 | 70 | 0.002 | 0.003 | 40000 | 50 | 0.001 | 0.003 | 40000 | 30 | 0.001 | 0.002 |
| | 1 | 40000 | 50 | 0.002 | 0.003 | 40000 | 30 | 0.001 | 0.003 | 40000 | 30 | 0.001 | 0.002 |
| R0.075 | 0.3 | 40000 | 180 | 0.003 | 0.005 | 40000 | 150 | 0.002 | 0.005 | 40000 | 100 | 0.002 | 0.003 |
| | 0.5 | 40000 | 150 | 0.003 | 0.005 | 40000 | 120 | 0.002 | 0.005 | 40000 | 70 | 0.002 | 0.003 |
| | 0.75 | 40000 | 70 | 0.002 | 0.003 | 40000 | 50 | 0.001 | 0.003 | 40000 | 30 | 0.001 | 0.002 |
| | 1 | 40000 | 70 | 0.002 | 0.003 | 40000 | 50 | 0.001 | 0.003 | 40000 | 30 | 0.001 | 0.002 |
| | 1.5 | 40000 | 50 | 0.002 | 0.003 | 40000 | 30 | 0.001 | 0.003 | 40000 | 30 | 0.001 | 0.002 |
| R0.1 | 0.3 | 40000 | 350 | 0.01 | 0.01 | 40000 | 300 | 0.006 | 0.005 | 36000 | 200 | 0.003 | 0.003 |
| | 0.5 | 40000 | 320 | 0.008 | 0.01 | 39600 | 280 | 0.005 | 0.005 | 36000 | 180 | 0.003 | 0.003 |
| | 0.75 | 40000 | 280 | 0.005 | 0.01 | 39600 | 200 | 0.003 | 0.005 | 36000 | 150 | 0.002 | 0.003 |
| | 1 | 40000 | 250 | 0.003 | 0.005 | 39600 | 160 | 0.002 | 0.003 | 36000 | 120 | 0.001 | 0.002 |
| | 1.25 | 40000 | 180 | 0.003 | 0.005 | 39600 | 140 | 0.002 | 0.003 | 36000 | 100 | 0.001 | 0.002 |
| | 1.5 | 40000 | 150 | 0.003 | 0.005 | 39600 | 120 | 0.002 | 0.003 | 36000 | 80 | 0.001 | 0.002 |
| | 1.75 | 40000 | 120 | 0.002 | 0.003 | 39600 | 100 | 0.001 | 0.002 | 36000 | 60 | 0.001 | 0.002 |
| | 2 | 40000 | 100 | 0.002 | 0.003 | 39600 | 80 | 0.001 | 0.002 | 36000 | 50 | 0.001 | 0.001 |
| | 2.5 | 40000 | 70 | 0.001 | 0.002 | 39600 | 60 | 0.001 | 0.001 | 36000 | 40 | 0.001 | 0.001 |
| | 3 | 40000 | 50 | 0.001 | 0.001 | 39600 | 40 | 0.001 | 0.001 | 36000 | 30 | 0.001 | 0.001 |
| R0.15 | 0.5 | 36300 | 350 | 0.01 | 0.015 | 33000 | 300 | 0.007 | 0.01 | 30000 | 280 | 0.003 | 0.005 |
| | 0.6 | 36300 | 350 | 0.007 | 0.01 | 33000 | 300 | 0.005 | 0.007 | 30000 | 250 | 0.003 | 0.005 |
| | 0.75 | 36300 | 330 | 0.007 | 0.01 | 33000 | 280 | 0.005 | 0.007 | 30000 | 230 | 0.003 | 0.005 |
| | 1 | 36300 | 320 | 0.007 | 0.01 | 33000 | 250 | 0.005 | 0.007 | 30000 | 200 | 0.003 | 0.005 |
| | 1.25 | 36300 | 280 | 0.005 | 0.007 | 33000 | 200 | 0.003 | 0.005 | 30000 | 160 | 0.002 | 0.003 |
| | 1.5 | 36300 | 230 | 0.005 | 0.007 | 33000 | 180 | 0.003 | 0.005 | 30000 | 120 | 0.002 | 0.003 |
| | 1.75 | 36300 | 180 | 0.003 | 0.005 | 33000 | 150 | 0.002 | 0.003 | 30000 | 100 | 0.002 | 0.002 |
| | 2 | 36300 | 150 | 0.003 | 0.005 | 33000 | 120 | 0.002 | 0.003 | 30000 | 90 | 0.002 | 0.002 |
| | 2.25 | 36300 | 120 | 0.002 | 0.003 | 33000 | 100 | 0.001 | 0.002 | 30000 | 80 | 0.001 | 0.001 |
| | 2.5 | 36300 | 100 | 0.002 | 0.003 | 33000 | 80 | 0.001 | 0.002 | 30000 | 70 | 0.001 | 0.001 |
| | 3 | 36300 | 80 | 0.001 | 0.003 | 33000 | 70 | 0.001 | 0.002 | 30000 | 60 | 0.001 | 0.001 |
| | 3.5 | 36300 | 70 | 0.001 | 0.002 | 33000 | 60 | 0.001 | 0.001 | 30000 | 50 | 0.001 | 0.001 |



BALL NOSE END MILL
HSX SERIES

# Cutting Parameter

## HSXB2L 2-Flutes Long Neck Ball End Mill 3D Milling

| Workpiece | | Pre-Hardened Steels (30-45HRC) | | | | Hardened Steels (45-55HRC) | | | | Hardened Steels (55-65HRC) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Radius/mm | Underneck/mm | n/min$^{-1}$ | Vf-mm/min | ap/mm | ae/mm | n/min$^{-1}$ | Vf-mm/min | ap/mm | ae/mm | n/min$^{-1}$ | Vf-mm/min | ap/mm | ae/mm |
| R0.15 | 4 | 36300 | 60 | 0.001 | 0.002 | 33000 | 50 | 0.001 | 0.001 | 30000 | 40 | 0.001 | 0.001 |
| R0.2 | 0.5 | 36300 | 800 | 0.03 | 0.05 | 33000 | 720 | 0.03 | 0.03 | 30000 | 580 | 0.009 | 0.02 |
| | 0.8 | 36300 | 800 | 0.02 | 0.05 | 33000 | 720 | 0.02 | 0.03 | 30000 | 580 | 0.008 | 0.02 |
| | 1 | 36300 | 800 | 0.02 | 0.05 | 33000 | 720 | 0.02 | 0.03 | 30000 | 580 | 0.008 | 0.02 |
| | 1.5 | 36300 | 620 | 0.01 | 0.03 | 33000 | 500 | 0.01 | 0.02 | 30000 | 400 | 0.005 | 0.01 |
| | 2 | 36300 | 500 | 0.01 | 0.02 | 33000 | 380 | 0.01 | 0.01 | 30000 | 300 | 0.005 | 0.007 |
| | 2.5 | 36300 | 420 | 0.007 | 0.01 | 33000 | 300 | 0.005 | 0.007 | 30000 | 260 | 0.003 | 0.005 |
| | 3 | 36300 | 300 | 0.007 | 0.01 | 33000 | 240 | 0.005 | 0.007 | 30000 | 200 | 0.003 | 0.005 |
| | 3.5 | 36300 | 230 | 0.005 | 0.007 | 33000 | 160 | 0.003 | 0.005 | 30000 | 120 | 0.002 | 0.003 |
| | 4 | 33000 | 160 | 0.005 | 0.005 | 30000 | 120 | 0.003 | 0.003 | 30000 | 90 | 0.002 | 0.003 |
| | 4.5 | 33000 | 100 | 0.003 | 0.005 | 30000 | 80 | 0.002 | 0.003 | 30000 | 60 | 0.001 | 0.002 |
| | 5 | 32000 | 70 | 0.002 | 0.003 | 30000 | 50 | 0.001 | 0.002 | 30000 | 40 | 0.001 | 0.002 |
| | 6 | 32000 | 50 | 0.001 | 0.002 | 30000 | 40 | 0.001 | 0.001 | 30000 | 30 | 0.001 | 0.001 |
| | 8 | 30000 | 50 | 0.001 | 0.002 | 30000 | 40 | 0.001 | 0.001 | 30000 | 30 | 0.001 | 0.001 |
| R0.25 | 1 | 35500 | 650 | 0.01 | 0.025 | 32000 | 590 | 0.01 | 0.025 | 30000 | 500 | 0.01 | 0.025 |
| | 1.5 | 35500 | 650 | 0.009 | 0.02 | 32000 | 590 | 0.009 | 0.02 | 30000 | 500 | 0.009 | 0.02 |
| | 2 | 35500 | 520 | 0.008 | 0.02 | 32000 | 470 | 0.008 | 0.02 | 30000 | 400 | 0.008 | 0.02 |
| | 2.5 | 33000 | 520 | 0.007 | 0.015 | 31800 | 470 | 0.007 | 0.015 | 28000 | 400 | 0.007 | 0.015 |
| | 3 | 33000 | 468 | 0.007 | 0.01 | 31800 | 420 | 0.007 | 0.01 | 28000 | 360 | 0.007 | 0.01 |
| | 3.5 | 31250 | 468 | 0.006 | 0.01 | 29000 | 420 | 0.006 | 0.01 | 25000 | 360 | 0.006 | 0.01 |
| | 4 | 31250 | 390 | 0.005 | 0.008 | 29000 | 350 | 0.005 | 0.008 | 25000 | 300 | 0.005 | 0.008 |
| | 4.5 | 31250 | 338 | 0.004 | 0.008 | 29000 | 300 | 0.004 | 0.008 | 25000 | 260 | 0.004 | 0.008 |
| | 5 | 31250 | 338 | 0.004 | 0.008 | 29000 | 300 | 0.004 | 0.008 | 25000 | 260 | 0.004 | 0.008 |
| | 5.5 | 31250 | 312 | 0.004 | 0.006 | 29000 | 280 | 0.004 | 0.006 | 25000 | 240 | 0.004 | 0.006 |
| | 6 | 27500 | 156 | 0.003 | 0.005 | 25520 | 140 | 0.003 | 0.005 | 22000 | 120 | 0.003 | 0.005 |
| | 8 | 25000 | 104 | 0.003 | 0.003 | 23200 | 90 | 0.003 | 0.003 | 20000 | 80 | 0.003 | 0.003 |
| | 10 | 25000 | 65 | 0.003 | 0.003 | 23200 | 60 | 0.003 | 0.003 | 20000 | 50 | 0.003 | 0.003 |
| R0.3 | 1 | 33000 | 975 | 0.02 | 0.03 | 31320 | 700 | 0.02 | 0.03 | 26000 | 600 | 0.02 | 0.03 |
| | 1.5 | 33000 | 975 | 0.02 | 0.03 | 31320 | 700 | 0.02 | 0.03 | 26000 | 600 | 0.02 | 0.03 |
| | 2 | 33000 | 780 | 0.02 | 0.03 | 31320 | 560 | 0.02 | 0.03 | 25000 | 480 | 0.02 | 0.03 |
| | 2.5 | 30800 | 780 | 0.015 | 0.02 | 29232 | 560 | 0.015 | 0.02 | 25000 | 480 | 0.015 | 0.02 |
| | 3 | 30800 | 702 | 0.015 | 0.02 | 29232 | 500 | 0.015 | 0.02 | 24000 | 432 | 0.015 | 0.02 |

# Cutting Parameter

## HSXB2L 2-Flutes Long Neck Ball End Mill 3D Milling

| Workpiece | | Pre-Hardened Steels (30-45HRC) | | | | Hardened Steels (45-55HRC) | | | | Hardened Steels (55-65HRC) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Radius/mm | Underneck/mm | n/min$^{-1}$ | Vf-mm/min | ap/mm | ae/mm | n/min$^{-1}$ | Vf-mm/min | ap/mm | ae/mm | n/min$^{-1}$ | Vf-mm/min | ap/mm | ae/mm |
| R0.3 | 3.5 | 27500 | 702 | 0.01 | 0.02 | 26100 | 500 | 0.01 | 0.02 | 24000 | 432 | 0.01 | 0.02 |
| | 4 | 27500 | 585 | 0.01 | 0.02 | 26100 | 420 | 0.01 | 0.02 | 24000 | 360 | 0.01 | 0.02 |
| | 4.5 | 27500 | 507 | 0.01 | 0.02 | 26100 | 360 | 0.01 | 0.02 | 24000 | 312 | 0.01 | 0.02 |
| | 5 | 27500 | 507 | 0.01 | 0.02 | 26100 | 360 | 0.01 | 0.02 | 24000 | 312 | 0.01 | 0.02 |
| | 5.5 | 27500 | 468 | 0.008 | 0.01 | 26100 | 336 | 0.008 | 0.01 | 24000 | 288 | 0.008 | 0.01 |
| | 6 | 24200 | 234 | 0.008 | 0.01 | 22968 | 168 | 0.008 | 0.01 | 21120 | 144 | 0.008 | 0.01 |
| | 7 | 22000 | 156 | 0.006 | 0.008 | 20880 | 108 | 0.006 | 0.008 | 19200 | 96 | 0.006 | 0.008 |
| | 8 | 22000 | 97.5 | 0.005 | 0.008 | 20880 | 70 | 0.005 | 0.008 | 19200 | 60 | 0.005 | 0.008 |
| | 9 | 19040 | 85 | 0.005 | 0.008 | 18188 | 65 | 0.005 | 0.008 | 18048 | 50 | 0.005 | 0.008 |
| | 10 | 19040 | 80 | 0.003 | 0.005 | 18188 | 60 | 0.003 | 0.005 | 18000 | 40 | 0.003 | 0.005 |
| | 12 | 19040 | 60 | 0.003 | 0.005 | 18188 | 50 | 0.003 | 0.005 | 18000 | 30 | 0.003 | 0.005 |
| R0.35 | 2 | 32500 | 1025 | 0.02 | 0.035 | 31200 | 820 | 0.02 | 0.035 | 26000 | 480 | 0.02 | 0.035 |
| | 3 | 30000 | 1000 | 0.02 | 0.03 | 30000 | 800 | 0.02 | 0.03 | 25000 | 432 | 0.02 | 0.03 |
| | 4 | 30000 | 625 | 0.015 | 0.02 | 30000 | 500 | 0.015 | 0.02 | 24000 | 360 | 0.015 | 0.02 |
| | 6 | 25000 | 325 | 0.006 | 0.01 | 25000 | 260 | 0.006 | 0.01 | 22000 | 144 | 0.006 | 0.01 |
| | 8 | 22000 | 125 | 0.005 | 0.008 | 22000 | 100 | 0.004 | 0.006 | 20000 | 80 | 0.004 | 0.006 |
| R0.4 | 2 | 24200 | 2000 | 0.03 | 0.05 | 22000 | 1600 | 0.03 | 0.05 | 20000 | 1200 | 0.03 | 0.05 |
| | 2.5 | 24200 | 2000 | 0.03 | 0.05 | 22000 | 1600 | 0.03 | 0.05 | 20000 | 1200 | 0.03 | 0.05 |
| | 3 | 24200 | 2000 | 0.03 | 0.05 | 22000 | 1600 | 0.03 | 0.05 | 20000 | 1200 | 0.03 | 0.05 |
| | 4 | 24200 | 1600 | 0.03 | 0.05 | 22000 | 1200 | 0.03 | 0.05 | 20000 | 860 | 0.03 | 0.05 |
| | 5 | 24200 | 1600 | 0.02 | 0.03 | 22000 | 1000 | 0.02 | 0.03 | 20000 | 620 | 0.02 | 0.03 |
| | 6 | 21780 | 1200 | 0.02 | 0.03 | 19800 | 760 | 0.02 | 0.03 | 18000 | 560 | 0.02 | 0.03 |
| | 7 | 21780 | 1000 | 0.02 | 0.03 | 19800 | 680 | 0.02 | 0.03 | 18000 | 520 | 0.02 | 0.03 |
| | 8 | 21780 | 820 | 0.01 | 0.02 | 19800 | 600 | 0.01 | 0.02 | 18000 | 480 | 0.01 | 0.02 |
| | 10 | 19360 | 450 | 0.008 | 0.015 | 17600 | 380 | 0.008 | 0.015 | 16000 | 320 | 0.008 | 0.015 |
| | 12 | 18150 | 320 | 0.006 | 0.012 | 16500 | 260 | 0.006 | 0.012 | 15000 | 200 | 0.006 | 0.012 |
| | 16 | 18150 | 320 | 0.005 | 0.01 | 16500 | 260 | 0.005 | 0.01 | 15000 | 200 | 0.005 | 0.01 |
| R0.45 | 2 | 24200 | 2000 | 0.03 | 0.05 | 22000 | 1600 | 0.03 | 0.05 | 20000 | 1200 | 0.03 | 0.05 |
| | 4 | 24200 | 1600 | 0.03 | 0.05 | 22000 | 1200 | 0.03 | 0.05 | 20000 | 860 | 0.03 | 0.05 |
| | 6 | 21780 | 1200 | 0.02 | 0.03 | 19800 | 760 | 0.02 | 0.03 | 18000 | 560 | 0.02 | 0.03 |
| | 8 | 21780 | 820 | 0.01 | 0.02 | 19800 | 600 | 0.01 | 0.02 | 18000 | 480 | 0.01 | 0.02 |
| R0.5 | 2.5 | 24000 | 2000 | 0.03 | 0.06 | 22000 | 1600 | 0.03 | 0.05 | 20000 | 1200 | 0.03 | 0.05 |





# Cutting Parameter

## HSXB2L 2-Flutes Long Neck Ball End Mill 3D Milling

| Workpiece | | Pre-Hardened Steels (30-45HRC) | | | | Hardened Steels (45-55HRC) | | | | Hardened Steels (55-65HRC) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Radius/mm | Underneck/mm | n/min$^{-1}$ | Vf-mm/min | ap/mm | ae/mm | n/min$^{-1}$ | Vf-mm/min | ap/mm | ae/mm | n/min$^{-1}$ | Vf-mm/min | ap/mm | ae/mm |
| R0.5 | 3 | 24000 | 2000 | 0.03 | 0.06 | 22000 | 1600 | 0.03 | 0.05 | 20000 | 1200 | 0.03 | 0.05 |
| | 4 | 24000 | 2000 | 0.03 | 0.06 | 22000 | 1600 | 0.03 | 0.05 | 20000 | 1200 | 0.03 | 0.05 |
| | 5 | 24000 | 2000 | 0.03 | 0.05 | 22000 | 1600 | 0.03 | 0.05 | 20000 | 920 | 0.03 | 0.05 |
| | 6 | 21600 | 1800 | 0.05 | 0.05 | 19800 | 1200 | 0.03 | 0.05 | 18000 | 740 | 0.02 | 0.05 |
| | 7 | 21600 | 1200 | 0.04 | 0.05 | 19800 | 950 | 0.03 | 0.04 | 18000 | 680 | 0.02 | 0.03 |
| | 8 | 21600 | 1000 | 0.04 | 0.05 | 19800 | 860 | 0.03 | 0.04 | 18000 | 560 | 0.02 | 0.03 |
| | 9 | 19200 | 820 | 0.03 | 0.05 | 17600 | 750 | 0.02 | 0.03 | 16000 | 500 | 0.01 | 0.02 |
| | 10 | 18000 | 750 | 0.03 | 0.05 | 16500 | 620 | 0.02 | 0.03 | 15000 | 450 | 0.01 | 0.02 |
| | 12 | 18000 | 600 | 0.01 | 0.03 | 16500 | 520 | 0.007 | 0.02 | 15000 | 400 | 0.005 | 0.01 |
| | 14 | 16800 | 420 | 0.005 | 0.01 | 15400 | 360 | 0.003 | 0.007 | 14000 | 320 | 0.002 | 0.005 |
| | 16 | 16800 | 300 | 0.005 | 0.005 | 15400 | 250 | 0.003 | 0.005 | 14000 | 200 | 0.002 | 0.003 |
| | 18 | 16800 | 180 | 0.003 | 0.005 | 15400 | 120 | 0.002 | 0.005 | 14000 | 85 | 0.002 | 0.002 |
| | 20 | 14400 | 100 | 0003 | 0.003 | 13200 | 75 | 0.002 | 0.003 | 12000 | 60 | 0.002 | 0.002 |
| | 22 | 12000 | 50 | 0.002 | 0.003 | 11000 | 40 | 0.002 | 0.002 | 10000 | 35 | 0.001 | 0.002 |
| R0.6 | 4 | 24000 | 2000 | 0.03 | 0.06 | 22000 | 1600 | 0.03 | 0.05 | 20000 | 1200 | 0.03 | 0.05 |
| | 6 | 21600 | 1800 | 0.05 | 0.05 | 19800 | 1200 | 0.04 | 0.05 | 18000 | 740 | 0.02 | 0.05 |
| | 8 | 21600 | 1000 | 0.04 | 0.05 | 19800 | 860 | 0.03 | 0.04 | 18000 | 560 | 0.02 | 0.03 |
| | 10 | 18000 | 750 | 0.03 | 0.05 | 16500 | 620 | 0.02 | 0.03 | 15000 | 450 | 0.01 | 0.02 |
| | 12 | 18000 | 600 | 0.01 | 0.03 | 16500 | 520 | 0.007 | 0.02 | 15000 | 400 | 0.005 | 0.01 |
| | 14 | 16800 | 420 | 0.005 | 0.01 | 15400 | 360 | 0.003 | 0.007 | 14000 | 320 | 0.002 | 0.005 |
| | 16 | 16800 | 300 | 0.005 | 0.005 | 15400 | 250 | 0.003 | 0.005 | 14000 | 200 | 0.002 | 0.003 |
| R0.7 | 8 | 21600 | 2500 | 0.03 | 0.05 | 19800 | 1600 | 0.03 | 0.05 | 18000 | 1200 | 0.03 | 0.05 |
| | 12 | 18000 | 1800 | 0.02 | 0.05 | 16500 | 920 | 0.02 | 0.05 | 15000 | 780 | 0.02 | 0.05 |
| | 16 | 18000 | 720 | 0.01 | 0.02 | 16500 | 650 | 0.01 | 0.02 | 15000 | 580 | 0.01 | 0.02 |
| R0.75 | 4 | 21600 | 2500 | 0.03 | 0.05 | 19800 | 2000 | 0.03 | 0.05 | 18000 | 1600 | 0.03 | 0.05 |
| | 6 | 21600 | 2500 | 0.03 | 0.05 | 19800 | 2000 | 0.03 | 0.05 | 18000 | 1600 | 0.03 | 0.05 |
| | 8 | 21600 | 2500 | 0.03 | 0.05 | 19800 | 1600 | 0.03 | 0.05 | 18000 | 1200 | 0.03 | 0.05 |
| | 10 | 21600 | 2500 | 0.02 | 0.05 | 19800 | 1200 | 0.02 | 0.05 | 18000 | 860 | 0.02 | 0.05 |
| | 12 | 18000 | 1800 | 0.02 | 0.05 | 16500 | 920 | 0.02 | 0.05 | 15000 | 780 | 0.02 | 0.05 |
| | 14 | 18000 | 1800 | 0.02 | 0.03 | 16500 | 820 | 0.02 | 0.03 | 15000 | 650 | 0.02 | 0.03 |
| | 16 | 18000 | 720 | 0.01 | 0.02 | 16500 | 650 | 0.01 | 0.02 | 15000 | 580 | 0.01 | 0.02 |
| | 18 | 16800 | 550 | 0.008 | 0.015 | 15400 | 400 | 0.008 | 0.015 | 14000 | 400 | 0.008 | 0.015 |

# Cutting Parameter

## HSXB2L 2-Flutes Long Neck Ball End Mill 3D Milling

| Workpiece | | Pre-Hardened Steels (30-45HRC) | | | | Hardened Steels (45-55HRC) | | | | Hardened Steels (55-65HRC) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Radius/mm | Underneck/mm | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm |
| R0.8 | 20 | 16800 | 450 | 0.007 | 0.01 | 15400 | 360 | 0.007 | 0.01 | 14000 | 300 | 0.007 | 0.01 |
| | 25 | 14400 | 330 | 0.007 | 0.007 | 13200 | 250 | 0.007 | 0.007 | 12000 | 200 | 0.007 | 0.007 |
| | 30 | 9600 | 80 | 0.003 | 0.003 | 8800 | 60 | 0.003 | 0.003 | 8000 | 40 | 0.003 | 0.003 |
| R1 | 8 | 21600 | 2500 | 0.03 | 0.05 | 19800 | 1600 | 0.03 | 0.05 | 18000 | 1200 | 0.03 | 0.05 |
| | 12 | 18000 | 1800 | 0.02 | 0.05 | 16500 | 920 | 0.02 | 0.05 | 15000 | 780 | 0.02 | 0.05 |
| | 16 | 18000 | 720 | 0.01 | 0.02 | 16500 | 650 | 0.01 | 0.02 | 15000 | 580 | 0.01 | 0.02 |
| | 20 | 16800 | 450 | 0.007 | 0.01 | 15400 | 360 | 0.007 | 0.01 | 14000 | 300 | 0.007 | 0.01 |
| | 6 | 18000 | 1920 | 0.04 | 0.06 | 16500 | 1760 | 0.04 | 0.06 | 15000 | 1600 | 0.04 | 0.06 |
| | 8 | 18000 | 1440 | 0.03 | 0.05 | 16500 | 1320 | 0.03 | 0.05 | 15000 | 1200 | 0.03 | 0.05 |
| | 10 | 16800 | 1440 | 0.03 | 0.05 | 15400 | 1320 | 0.03 | 0.05 | 14000 | 1200 | 0.03 | 0.05 |
| | 12 | 14400 | 1128 | 0.02 | 0.05 | 13200 | 1034 | 0.02 | 0.05 | 12000 | 940 | 0.02 | 0.05 |
| | 14 | 14400 | 1128 | 0.015 | 0.04 | 13200 | 1034 | 0.015 | 0.04 | 12000 | 940 | 0.015 | 0.04 |
| | 16 | 14400 | 1128 | 0.015 | 0.04 | 13200 | 1034 | 0.015 | 0.04 | 12000 | 940 | 0.015 | 0.04 |
| | 18 | 12000 | 1020 | 0.01 | 0.03 | 11000 | 935 | 0.01 | 0.03 | 10000 | 850 | 0.01 | 0.03 |
| | 20 | 12000 | 864 | 0.01 | 0.03 | 11000 | 792 | 0.01 | 0.03 | 10000 | 720 | 0.01 | 0.03 |
| | 22 | 12000 | 720 | 0.008 | 0.02 | 11000 | 660 | 0.008 | 0.02 | 10000 | 600 | 0.008 | 0.02 |
| | 25 | 10200 | 504 | 0.008 | 0.02 | 9350 | 462 | 0.008 | 0.02 | 8500 | 420 | 0.008 | 0.02 |
| | 30 | 10200 | 288 | 0.005 | 0.01 | 9350 | 264 | 0.005 | 0.01 | 8500 | 240 | 0.005 | 0.01 |
| | 35 | 8160 | 120 | 0.005 | 0.007 | 7480 | 110 | 0.005 | 0.007 | 6800 | 100 | 0.005 | 0.007 |
| | 40 | 8160 | 60 | 0.002 | 0.005 | 7480 | 55 | 0.002 | 0.005 | 6800 | 50 | 0.002 | 0.005 |
| R1.25 | 6 | 18000 | 1920 | 0.04 | 0.06 | 16500 | 1760 | 0.04 | 0.06 | 15000 | 1600 | 0.04 | 0.06 |
| | 8 | 18000 | 1440 | 0.03 | 0.05 | 16500 | 1320 | 0.03 | 0.05 | 15000 | 1200 | 0.03 | 0.05 |
| | 10 | 16800 | 1440 | 0.03 | 0.05 | 15400 | 1320 | 0.03 | 0.05 | 14000 | 1200 | 0.03 | 0.05 |
| | 12 | 15000 | 1320 | 0.02 | 0.05 | 13800 | 1180 | 0.02 | 0.04 | 13000 | 1080 | 0.02 | 0.04 |
| | 16 | 14400 | 1128 | 0.015 | 0.04 | 13200 | 1034 | 0.015 | 0.04 | 12000 | 940 | 0.015 | 0.04 |
| | 20 | 12000 | 864 | 0.01 | 0.03 | 11000 | 792 | 0.01 | 0.03 | 10000 | 720 | 0.01 | 0.03 |
| | 25 | 10200 | 504 | 0.008 | 0.02 | 9350 | 462 | 0.008 | 0.02 | 8500 | 420 | 0.008 | 0.02 |
| | 30 | 10200 | 288 | 0.005 | 0.01 | 9350 | 264 | 0.005 | 0.01 | 8500 | 240 | 0.005 | 0.01 |
| | 35 | 8160 | 120 | 0.005 | 0.007 | 7480 | 110 | 0.005 | 0.007 | 6800 | 100 | 0.005 | 0.007 |
| R1.5 | 8 | 16800 | 2500 | 0.04 | 0.08 | 15400 | 2200 | 0.04 | 0.08 | 14000 | 2000 | 0.04 | 0.08 |
| | 10 | 16800 | 1875 | 0.03 | 0.07 | 15400 | 1650 | 0.03 | 0.07 | 14000 | 1500 | 0.03 | 0.07 |
| | 12 | 14400 | 1875 | 0.03 | 0.07 | 13200 | 1650 | 0.03 | 0.07 | 12000 | 1500 | 0.03 | 0.07 |



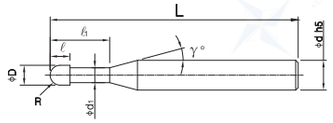
BALL NOSE END MILL
HGX SERIES

# Cutting Parameter

## HSXB2L 2-Flutes Long Neck Ball End Mill 3D Milling

| Workpiece | | Pre-Hardened Steels (30-45HRC) | | | | Hardened Steels (45-55HRC) | | | | Hardened Steels (55-65HRC) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Radius/mm | Underneck/mm | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm |
| R1.5 | 14 | 14400 | 1500 | 0.03 | 0.07 | 13200 | 1320 | 0.03 | 0.07 | 12000 | 1200 | 0.03 | 0.07 |
| | 16 | 14400 | 1500 | 0.02 | 0.05 | 13200 | 1320 | 0.02 | 0.05 | 12000 | 1200 | 0.02 | 0.05 |
| | 20 | 12000 | 1200 | 0.02 | 0.05 | 11000 | 1056 | 0.02 | 0.05 | 10000 | 960 | 0.02 | 0.05 |
| | 25 | 10320 | 1000 | 0.015 | 0.05 | 9460 | 880 | 0.015 | 0.05 | 8600 | 800 | 0.015 | 0.05 |
| | 30 | 8640 | 750 | 0.015 | 0.04 | 7920 | 660 | 0.015 | 0.04 | 7200 | 600 | 0.015 | 0.04 |
| | 35 | 7680 | 525 | 0.01 | 0.03 | 7040 | 462 | 0.01 | 0.03 | 6400 | 420 | 0.01 | 0.03 |
| | 40 | 7200 | 325 | 0.01 | 0.03 | 6600 | 286 | 0.01 | 0.03 | 6000 | 260 | 0.01 | 0.03 |
| R1.75 | 16 | 14400 | 1500 | 0.02 | 0.05 | 13200 | 1320 | 0.02 | 0.05 | 12000 | 1200 | 0.02 | 0.05 |
| | 20 | 12000 | 1200 | 0.02 | 0.05 | 11000 | 1056 | 0.02 | 0.05 | 10000 | 960 | 0.02 | 0.05 |
| | 25 | 10320 | 1000 | 0.015 | 0.05 | 9460 | 880 | 0.015 | 0.05 | 8600 | 800 | 0.015 | 0.05 |
| | 30 | 8640 | 750 | 0.015 | 0.04 | 7920 | 660 | 0.015 | 0.04 | 7200 | 600 | 0.015 | 0.04 |
| | 35 | 7680 | 525 | 0.01 | 0.03 | 7040 | 462 | 0.01 | 0.03 | 6400 | 420 | 0.01 | 0.03 |
| | 40 | 7200 | 325 | 0.01 | 0.03 | 6600 | 286 | 0.01 | 0.03 | 6000 | 260 | 0.01 | 0.03 |
| | 45 | 6800 | 300 | 0.01 | 0.03 | 6500 | 264 | 0.01 | 0.03 | 6000 | 200 | 0.01 | 0.03 |
| R2 | 12 | 13200 | 3000 | 0.04 | 0.08 | 12100 | 2500 | 0.04 | 0.08 | 11000 | 2000 | 0.04 | 0.08 |
| | 14 | 13200 | 3000 | 0.04 | 0.08 | 12100 | 2000 | 0.04 | 0.08 | 11000 | 1600 | 0.04 | 0.08 |
| | 16 | 12000 | 3000 | 0.03 | 0.06 | 11000 | 2000 | 0.03 | 0.06 | 10000 | 1600 | 0.03 | 0.06 |
| | 20 | 12000 | 2400 | 0.03 | 0.06 | 11000 | 1800 | 0.03 | 0.06 | 10000 | 1400 | 0.03 | 0.06 |
| | 25 | 10800 | 1600 | 0.03 | 0.05 | 9900 | 1200 | 0.03 | 0.05 | 9000 | 1000 | 0.03 | 0.05 |
| | 30 | 9600 | 1600 | 0.03 | 0.05 | 8800 | 1200 | 0.03 | 0.05 | 8000 | 1000 | 0.03 | 0.05 |
| | 35 | 9000 | 1200 | 0.03 | 0.05 | 8250 | 1000 | 0.03 | 0.05 | 7500 | 820 | 0.03 | 0.05 |
| | 40 | 8160 | 1200 | 0.02 | 0.04 | 7480 | 1000 | 0.02 | 0.04 | 6800 | 820 | 0.02 | 0.04 |
| | 45 | 7800 | 750 | 0.02 | 0.04 | 7150 | 620 | 0.02 | 0.04 | 6500 | 500 | 0.02 | 0.04 |
| | 50 | 6600 | 550 | 0.015 | 0.03 | 6050 | 500 | 0.015 | 0.03 | 5500 | 420 | 0.015 | 0.03 |
| R2.5 | 16 | 12000 | 3000 | 0.03 | 0.06 | 11000 | 2000 | 0.03 | 0.06 | 10000 | 1600 | 0.03 | 0.06 |
| | 20 | 12000 | 2400 | 0.03 | 0.06 | 11000 | 1800 | 0.03 | 0.06 | 10000 | 1400 | 0.03 | 0.06 |
| | 25 | 10800 | 1600 | 0.03 | 0.05 | 9900 | 1200 | 0.03 | 0.05 | 9000 | 1000 | 0.03 | 0.05 |
| | 30 | 9600 | 1600 | 0.03 | 0.05 | 8800 | 1200 | 0.03 | 0.05 | 8000 | 1000 | 0.03 | 0.05 |
| | 35 | 8500 | 1450 | 0.025 | 0.045 | 8000 | 1100 | 0.025 | 0.045 | 7500 | 950 | 0.025 | 0.045 |
| | 40 | 8160 | 1200 | 0.02 | 0.04 | 7480 | 1000 | 0.02 | 0.04 | 6800 | 820 | 0.02 | 0.04 |
| | 45 | 7800 | 750 | 0.02 | 0.04 | 7150 | 620 | 0.02 | 0.04 | 6500 | 500 | 0.02 | 0.04 |
| | 50 | 6600 | 550 | 0.015 | 0.03 | 6050 | 500 | 0.015 | 0.03 | 5500 | 420 | 0.015 | 0.03 |

# HGXB 2-Flutes Ball End Mill




UMG ATX 2 30° Spiral Angle Straight Back Angle <55 HRC

| ⌀D | D Tol. [ mm ] |
|---|---|
| D<3 | 0~-0.010 |
| 3<D<6 | 0~-0.012 |
| 6<D<10 | 0~-0.015 |
| 10<D<12 | 0~-0.018 |

| ⌀D | R Tol. [ mm ] |
|---|---|
| D<1 | ±0.003 |
| 1<D<12 | ±0.005 |

Unit:mm

| Type No. | Dia. | Radius | Length of Cut | Under Neck Length | Neck Dia. | Neck Taper Angle | Overall Length | Shank Dia. |
|---|---|---|---|---|---|---|---|---|
| | ϕD | R | ℓ | ℓ1 | ϕd1 | γ/° | L | ϕd |
| HGXB2001 0450 | 0.1 | R0.05 | 0.1 | – | – | 12 | 50 | 4 |
| HGXB20015 0450 | 0.15 | R0.075 | 0.15 | – | – | 12 | 50 | 4 |
| HGXB2002 0450 | 0.2 | R0.1 | 0.2 | – | – | 12 | 50 | 4 |
| HGXB2003 0450 | 0.3 | R0.15 | 0.3 | – | – | 12 | 50 | 4 |
| HGXB2004 0450 | 0.4 | R0.2 | 0.6 | – | – | 12 | 50 | 4 |
| HGXB2005 0450 | 0.5 | R0.25 | 0.8 | – | – | 12 | 50 | 4 |
| HGXB2006 0450 | 0.6 | R0.3 | 0.9 | – | – | 12 | 50 | 4 |
| HGXB2008 0450 | 0.8 | R0.4 | 1.2 | – | – | 12 | 50 | 4 |
| HGXB2010 0450 | 1 | R0.5 | 0.75 | 2 | 0.95 | 12 | 50 | 4 |
| HGXB2010 0650 | 1 | R0.5 | 0.75 | 2.5 | 0.95 | 12 | 50 | 6 |
| HGXB2010 0660 | 1 | R0.5 | 0.75 | 2.5 | 0.95 | 12 | 60 | 6 |
| HGXB2010 0675 | 1 | R0.5 | 0.75 | 2.5 | 0.95 | 12 | 75 | 6 |
| HGXB2012 0450 | 1.2 | R0.6 | 0.9 | 2.4 | 1.14 | 11 | 50 | 4 |
| HGXB2015 0450 | 1.5 | R0.75 | 1.2 | 3 | 1.42 | 11 | 50 | 4 |
| HGXB2015 0650 | 1.5 | R0.75 | 1.2 | 4 | 1.42 | 11 | 50 | 6 |
| HGXB2015 0660 | 1.5 | R0.75 | 1.2 | 4 | 1.42 | 11 | 60 | 6 |
| HGXB2015 0675 | 1.5 | R0.75 | 1.2 | 4 | 1.42 | 11 | 75 | 6 |
| HGXB2020 0450 | 2 | R1 | 1.6 | 4 | 1.9 | 11 | 50 | 4 |
| HGXB2020 0650 | 2 | R1 | 1.6 | 6 | 1.9 | 11 | 50 | 6 |
| HGXB2020 0660 | 2 | R1 | 1.6 | 6 | 1.9 | 11 | 60 | 6 |
| HGXB2020 0675 | 2 | R1 | 1.6 | 6 | 1.9 | 11 | 75 | 6 |
| HGXB2025 0450 | 2.5 | R1.25 | 2 | 5 | 2.4 | 11 | 50 | 4 |
| HGXB2025 0650 | 2.5 | R1.25 | 2 | 17 | 2.4 | 11 | 50 | 6 |
| HGXB2025 0660 | 2.5 | R1.25 | 2 | 7 | 2.4 | 11 | 60 | 6 |
| HGXB2025 0675 | 2.5 | R1.25 | 2 | 7 | 2.4 | 11 | 75 | 6 |
| HGXB2030 0450 | 3 | R1.5 | 2.4 | 6 | 2.9 | 11 | 50 | 4 |
| HGXB2030 0650 | 3 | R1.5 | 2.4 | 8 | 2.9 | 11 | 50 | 6 |
| HGXB2030 0660 | 3 | R1.5 | 2.4 | 8 | 2.9 | 11 | 60 | 6 |



HGXB 2-Flutes Ball End Mill

Unit:mm

| Type No. | Dia. | Radius | Length of Cut | Under Neck Length | Neck Dia. | Neck Taper Angle | Overall Length | Shank Dia. |
|---|---|---|---|---|---|---|---|---|
| | ϕD | R | ℓ | ℓ1 | ϕd1 | γ/° | L | ϕd |
| HGXB2030 0675 | 3 | R1.5 | 2.4 | 8 | 2.9 | 11 | 75 | 6 |
| HGXB2040 0450 | 4 | R2 | 6 | - | - | - | 50 | 4 |
| HGXB20400475 | 4 | R2 | 6 | - | - | - | 75 | 4 |
| HGXB2040 0650 | 4 | R2 | 3.2 | 10 | 3.9 | 11 | 50 | 6 |
| HGXB2040 0660 | 4 | R2 | 3.2 | 10 | 3.9 | 11 | 60 | o |
| HGXB2040 0675 | 4 | R2 | 3.2 | 10 | 3.9 | 11 | 75 | 6 |
| HGXB2050 0650 | 5 | R2.5 | 4 | 12 | 4.85 | 11 | 50 | 6 |
| HGXB20500660 | 5 | R2.5 | 4 | 12 | 4.85 | 11 | 60 | 6 |
| HGXB2050 0675 | 5 | R2.5 | 4 | 12 | 4.85 | 11 | 75 | 6 |
| HGXB2060 0650 | 6 | R3 | 9 | – | – | – | 50 | 6 |
| HGXB2060 0660 | 6 | R3 | 9 | – | – | – | 60 | 6 |
| HGXB2060 0675 | 6 | R3 | 9 | – | – | – | 75 | 6 |
| HGXB2060 06100 | 6 | R3 | 9 | – | – | – | 100 | 6 |
| HGXB2080 0860 | 8 | R4 | 12 | – | – | – | 60 | 8 |
| HGXB2080 0875 | 8 | R4 | 12 | – | – | – | 75 | 8 |
| HGXB2080 08100 | 8 | R4 | 12 | – | – | – | 100 | 8 |
| HGXB2100 1075 | 10 | R5 | 15 | – | – | – | 75 | 10 |
| HGXB2100 10100 | 10 | R5 | 15 | – | – | – | 100 | 10 |
| HGXB2100 10125 | 10 | R5 | 15 | – | – | – | 125 | 10 |
| HGXB21201275 | 12 | R6 | 18 | – | – | – | 75 | 12 |
| HGXB2120 12100 | 12 | R6 | 18 | – | – | – | 100 | 12 |
| HGXB2120 12125 | 12 | R6 | 18 | – | – | – | 125 | 12 |

TABLE OF RECOMMENDED MILLING MATERIALS

○Very suitable ○Suitable

| CARBON STEELS PREHARDENED STEELS / ALLOY STEELS TOOL STEELS | PREHARDENED STEELS | | HARDENED STEELS | | STANLESS STEELS | CASTIRON DUCTILE CAST IRON | COPPER ALLOYS | ALUMINUM ALLOY | GRAPHITE | TITANIUM ALLOY | HEAT RESISTANT ALLOYS | PLASTIC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~40HRC | ~45HRC | ~55HRC | ~60HRC | ~65HRC | ~35HRC | ~350HB | | | | | | |
| ○ | ○ | ○ | | | ○ | ○ | ○ | ○ | | ○ | ○ | |



BALL NOSE END MILL
HGX SERIES

# Cutting Parameter

## HGXB 2-Flutes Ball End Mill 3D Milling

| Workpiece | Carbon Steels、Alloy Steels (≤35HRC) | | | | Pre-Hardened Steels (35-45HRC) | | | | Hardened Steels (45-55HRC) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Type No. | n/min$^{-1}$ | Vf-mm/min | ap/mm | ae/mm | n/min$^{-1}$ | Vf-mm/min | ap/mm | ae/mm | n/min$^{-1}$ | Vf-mm/min | ap/mm | ae/mm |
| HGXB2001 | 40000 | 150 | 0.003 | 0.005 | 40000 | 100 | 0.003 | 0.005 | 40000 | 70 | 0.002 | 0.003 |
| HGXB20015 | 40000 | 200 | 0.003 | 0.005 | 40000 | 180 | 0.003 | 0.005 | 40000 | 100 | 0.003 | 0.004 |
| HGXB2002 | 35000 | 300 | 0.005 | 0.008 | 35000 | 284 | 0.005 | 0.008 | 32000 | 200 | 0.005 | 0.008 |
| HGXB2003 | 32000 | 500 | 0.01 | 0.01 | 30000 | 400 | 0.01 | 0.01 | 32000 | 364 | 0.008 | 0.01 |
| HGXB2004 | 28000 | 600 | 0.01 | 0.03 | 28000 | 600 | 0.01 | 0.03 | 28000 | 600 | 0.01 | 0.03 |
| HGXB2005 | 25000 | 720 | 0.01 | 0.03 | 25000 | 720 | 0.01 | 0.03 | 25000 | 720 | 0.01 | 0.03 |
| HGXB2006 | 22000 | 800 | 0.02 | 0.03 | 22000 | 800 | 0.02 | 0.03 | 22000 | 800 | 0.02 | 0.03 |
| HGXB2008 | 20000 | 1000 | 0.02 | 0.03 | 20000 | 1000 | 0.02 | 0.03 | 20000 | 1000 | 0.02 | 0.03 |
| HGXB2010 | 18000 | 1200 | 0.03 | 0.05 | 18000 | 1200 | 0.03 | 0.05 | 18000 | 1200 | 0.03 | 0.05 |
| HGXB2012 | 17000 | 1350 | 0.03 | 0.05 | 17000 | 1350 | 0.03 | 0.05 | 17000 | 1350 | 0.03 | 0.05 |
| HGXB2015 | 16000 | 1500 | 0.03 | 0.05 | 16000 | 1500 | 0.03 | 0.05 | 16000 | 1500 | 0.03 | 0.05 |
| HGXB2020 | 14800 | 1560 | 0.04 | 0.06 | 14800 | 1560 | 0.04 | 0.06 | 14800 | 1560 | 0.04 | 0.06 |
| HGXB2025 | 14400 | 1680 | 0.04 | 0.06 | 14400 | 1680 | 0.04 | 0.06 | 14400 | 1680 | 0.04 | 0.06 |
| HGXB2030 | 13000 | 2000 | 0.05 | 0.08 | 13000 | 2000 | 0.05 | 0.08 | 13000 | 2000 | 0.05 | 0.08 |
| HGXB2040 | 12000 | 2400 | 0.05 | 0.1 | 12000 | 2400 | 0.05 | 0.1 | 2000 | 2400 | 0.05 | 0.1 |
| HGXB2050 | 10000 | 2500 | 0.05 | 0.1 | 10000 | 2500 | 0.05 | 0.1 | 1000 | 2500 | 0.05 | 0.1 |
| HGXB2060 | 9000 | 2800 | 0.05 | 0.15 | 9000 | 2800 | 0.05 | 0.15 | 9000 | 2800 | 0.05 | 0.15 |
| HGXB2080 | 8000 | 3000 | 0.08 | 0.2 | 8000 | 3000 | 0.08 | 0.2 | 8000 | 3000 | 0.05 | 0.2 |
| HGXB2100 | 7200 | 3000 | 0.08 | 0.25 | 7200 | 3000 | 0.08 | 0.2 | 7200 | 3000 | 0.06 | 0.25 |
| HGXB2120 | 6400 | 3200 | 0.1 | 0.25 | 6400 | 3200 | 0.1 | 0.25 | 6400 | 3200 | 0.08 | 0.25 |
| HGXB2160 | 6000 | 3600 | 0.1 | 0.3 | 6000 | 3600 | 0.1 | 0.3 | 6000 | 3600 | 0.1 | 0.3 |



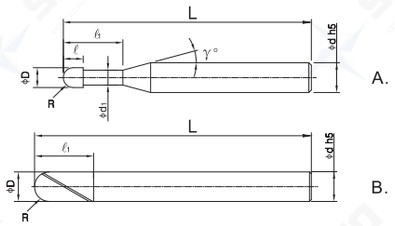
# HGX SERIES

## HGXB4 - Highlights

- Excellent surface finish with HGX coating.
- For both roughing and finishing.
- Suitable for materials up to 55HRC.
- Stable milling in corner by optimized chip pocket.
- High preicision thanks to dual edge chisel design.

≤55HRC

# HGXB 4-Flutes Ball End Mill




UMG ATX 4 30° Spiral Angle Arc Back Angle ≤55 HRC

| ⌀D | D Tol. [mm] |
|---|---|
| D<3 | 0~-0.010 |
| 3<D≤6 | 0~-0.012 |
| 6<D≤10 | 0~-0.015 |
| 10<D≤12 | 0~-0.018 |

| ⌀D | R Tol. [mm] |
|---|---|
| 1<D<12 | ±0.005 |

Unit:mm

| Type No. | Dia. | Radius | Length of Cut | Under Neck Length | Neck Dia. | Neck Taper Angle | Overall Length | Shank Dia. | |
|---|---|---|---|---|---|---|---|---|---|
| | ϕD | R | $\ell$ | $\ell_1$ | ϕd1 | γ/° | L | ϕd | |
| HGXB4010 0450 | 1 | R0.5 | 0.75 | 2 | 0.95 | 12 | 50 | 4 | A |
| HGXB4010 0650 | 1 | R0.5 | 0.75 | 2 | 0.95 | 12 | 50 | 6 | A |
| HGXB4015 0450 | 1.5 | R0.75 | 1.2 | 3 | 1.42 | 11 | 50 | 4 | A |
| HGXB4015 0650 | 1.5 | R0.75 | 1.2 | 4 | 1.42 | 11 | 50 | 6 | A |
| HGXB4020 0450 | 2 | R1 | 2 | 4 | 1.9 | 11 | 50 | 4 | A |
| HGXB4020 0650 | 2 | R1 | 2 | 6 | 1.9 | 11 | 50 | 6 | A |
| HGXB4025 0450 | 2.5 | R1.25 | 2 | 5 | 2.4 | 11 | 50 | 4 | A |
| HGXB4025 0650 | 2.5 | R1.25 | 2 | 7 | 2.4 | 11 | 50 | 6 | A |
| HGXB4030 0450 | 3 | R1.5 | 2.4 | 6 | 2.9 | 11 | 50 | 4 | A |
| HGXB4030 0660 | 3 | R1.5 | 2.4 | 8 | 2.9 | 11 | 60 | 6 | A |
| HGXB4040 0450 | 4 | R2 | 3.2 | - | - | - | 50 | 4 | B |
| HGXB4040 0660 | 4 | R2 | 3.2 | 10 | 3.9 | 11 | 60 | 6 | A |
| HGXB4050 0660 | 5 | R2.5 | 4 | 12 | 4.85 | 11 | 60 | 6 | A |
| HGXB4060 0660 | 6 | R3 | 9 | – | – | – | 60 | 6 | B |
| HGXB4060 0675 | 6 | R3 | 9 | – | – | – | 75 | 6 | B |
| HGXB4080 0875 | 8 | R4 | 12 | – | – | – | 75 | 8 | B |
| HGXB4080 08100 | 8 | R4 | 12 | – | – | – | 100 | 8 | B |
| HGXB4100 1075 | 10 | R5 | 15 | – | – | – | 75 | 10 | B |
| HGXB4100 10100 | 10 | R5 | 15 | – | – | – | 100 | 10 | B |
| HGXB4120 1275 | 12 | R6 | 18 | – | – | – | 75 | 12 | B |
| HGXB4120 12100 | 12 | R6 | 18 | – | – | – | 100 | 12 | B |

TABLE OF RECOMMENDED MILLING MATERIALS

○Very suitable ○Suitable

| CARBON STEELS | ALLOY STEELS | PREHARDENED STEELS | HARDENED STEELS | | | | CASTIRON | COPPER ALLOYS | ALUMINUM ALLOY | GRAPHITE | TITANIUM ALLOY | HEAT RESISTANT ALLOYS | PLASTIC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | ~55HRC | ~60HRC | ~65HRC | ~70HRC | DUCTILE CAST IRON | | | | | | |
| ○ | ○ | ○ | ○ | | | | | ○ | | | | | |



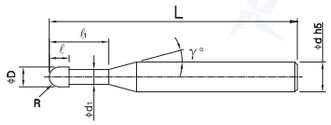


# Cutting Parameter

## HGXB 4-Flutes Ball End Mill 3D Milling Finishing

| Workpiece | Carbon Steels、Alloy Steels (30-40HRC) | | | | Pre-Hardened Steels (35-45HRC) | | | | High Speed Steels Hardened Steels (46-52HRC) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Type No. | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm |
| HGXB40100450 | 27000 | 2160 | 0.03 | 0.05 | 27000 | 2040 | 0.03 | 0.05 | 24300 | 1920 | 0.02 | 0.02 |
| HGXB4010 0650 | 27000 | 2160 | 0.03 | 0.05 | 27000 | 2040 | 0.03 | 0.05 | 24300 | 1920 | 0.02 | 0.02 |
| HGXB4015 0450 | 24000 | 2700 | 0.03 | 0.05 | 24000 | 2550 | 0.03 | 0.05 | 21600 | 2400 | 0.02 | 0.03 |
| HGXB4015 0650 | 24000 | 2700 | 0.03 | 0.05 | 24000 | 2550 | 0.03 | 0.05 | 21600 | 2400 | 0.02 | 0.03 |
| HGXB40200450 | 22200 | 2808 | 0.04 | 0.06 | 22200 | 2650 | 0.04 | 0.06 | 19980 | 2496 | 0.03 | 0.04 |
| HGXB4020 0650 | 22200 | 2808 | 0.04 | 0.06 | 22200 | 2650 | 0.04 | 0.06 | 19980 | 2496 | 0.03 | 0.04 |
| HGXB4025 0650 | 21600 | 3024 | 0.04 | 0.06 | 21600 | 2856 | 0.04 | 0.06 | 19940 | 2688 | 0.03 | 0.06 |
| HGXB4030 0460 | 19500 | 3600 | 0.05 | 0.08 | 19500 | 3400 | 0.05 | 0.08 | 17550 | 3200 | 0.03 | 0.08 |
| HGXB4030 0660 | 19500 | 3600 | 0.05 | 0.08 | 19500 | 3400 | 0.05 | 0.08 | 17550 | 3200 | 0.03 | 0.08 |
| HGXB4040 0460 | 18000 | 4320 | 0.05 | 0.1 | 18000 | 4080 | 0.05 | 0.1 | 16200 | 3840 | 0.05 | 0.1 |
| HGXB4040 0660 | 18000 | 4320 | 0.05 | 0.1 | 18000 | 4080 | 0.05 | 0.1 | 16200 | 3840 | 0.05 | 0.1 |
| HGXB4050 0660 | 15000 | 4500 | 0.05 | 0.1 | 15000 | 4250 | 0.05 | 0.1 | 13500 | 4000 | 0.05 | 0.12 |
| HGXB4060 0660 | 13500 | 5040 | 0.05 | 0.15 | 13500 | 4760 | 0.05 | 0.15 | 12150 | 4480 | 0.05 | 0.15 |
| HGXB4060 0675 | 13500 | 5040 | 0.05 | 0.15 | 13500 | 4760 | 0.05 | 0.15 | 12150 | 4480 | 0.05 | 0.15 |
| HGXB4080 0875 | 12000 | 5400 | 0.08 | 0.2 | 12000 | 5100 | 0.08 | 0.2 | 10800 | 5000 | 0.05 | 0.2 |
| HGXB408008100 | 12000 | 5400 | 0.08 | 0.2 | 12000 | 5100 | 0.08 | 0.2 | 10800 | 5000 | 0.05 | 0.2 |
| HGXB4100 1075 | 10000 | 5400 | 0.08 | 0.25 | 10000 | 5100 | 0.08 | 0.2 | 9000 | 5000 | 0.05 | 0.25 |
| HGXB410010100 | 10000 | 5400 | 0.08 | 0.25 | 10000 | 5100 | 0.08 | 0.2 | 9000 | 5000 | 0.05 | 0.25 |
| HGXB412012100 | 10204 | 5760 | 0.1 | 0.25 | 10204 | 5440 | 0.1 | 0.25 | 9180 | 5120 | 0.08 | 0.25 |

# HGXB2L 2-Flutes Long Neck Ball End Mill




UMG ATX 2 30° Spiral Angle Straight Back Angle <55 HRC

| ⌀D | D Tol. [mm] |
|---|---|
| D<3 | 0~-0.010 |
| 3<D<6 | 0~-0.012 |

| ⌀D | R Tol. [mm] |
|---|---|
| D<1 | ±0.003 |
| 1<D<6 | ±0.005 |

Unit:mm

| Type No. | Dia. | Radius | Length of Cut | Under Neck Length | Neck Dia. | Neck Taper Angle | Overall Length | Shank Dia. |
|---|---|---|---|---|---|---|---|---|
| | ϕD | R | ℓ | ℓ1 | ϕd1 | γ/° | L | ϕd |
| HGXB2001L0.2 0450 | 0.1 | R0.05 | 0.07 | 0.2 | 0.085 | 12 | 50 | 4 |
| HGXB2001L0.3 0450 | 0.1 | R0.05 | 0.07 | 0.3 | 0.085 | 12 | 50 | 4 |
| HGXB2001L0.5 0450 | 0.1 | R0.05 | 0.07 | 0.5 | 0.085 | 12 | 50 | 4 |
| HGXB2001L0.75 0450 | 0.1 | R0.05 | 0.07 | 0.75 | 0.085 | 12 | 50 | 4 |
| HGXB2001L1 0450 | 0.1 | R0.05 | 0.07 | 1 | 0.085 | 12 | 50 | 4 |
| HGXB20015L0.3 0450 | 0.15 | R0.075 | 0.1 | 0.3 | 0.13 | 12 | 50 | 4 |
| HGXB20015L0.5 0450 | 0.15 | R0.075 | 0.1 | 0.5 | 0.13 | 12 | 50 | 4 |
| HGXB20015L0.75 0450 | 0.15 | R0.075 | 0.1 | 0.75 | 0.13 | 12 | 50 | 4 |
| HGXB20015L1 0450 | 0.15 | R0.075 | 0.1 | 1 | 0.13 | 12 | 50 | 4 |
| HGXB20015L1.5 0450 | 0.15 | R0.075 | 0.1 | 1.5 | 0.13 | 12 | 50 | 4 |
| HGXB2002L0.3 0450 | 0.2 | R0.1 | 0.15 | 0.3 | 0.18 | 12 | 50 | 4 |
| HGXB2002L0.5 0450 | 0.2 | R0.1 | 0.15 | 0.5 | 0.18 | 12 | 50 | 4 |
| HGXB2002L0.75 0450 | 0.2 | R0.1 | 0.15 | 0.75 | 0.18 | 12 | 50 | 4 |
| HGXB2002L1 0450 | 0.2 | R0.1 | 0.15 | 1 | 0.18 | 12 | 50 | 4 |
| HGXB2002L1.25 0450 | 0.2 | R0.1 | 0.15 | 1.25 | 0.18 | 12 | 50 | 4 |
| HGXB2002L1.5 0450 | 0.2 | R0.1 | 0.15 | 1.5 | 0.18 | 12 | 50 | 4 |
| HGXB2002L1.75 0450 | 0.2 | R0.1 | 0.15 | 1.75 | 0.18 | 12 | 50 | 4 |
| HGXB2002L2 0450 | 0.2 | R0.1 | 0.15 | 2 | 0.18 | 12 | 50 | 4 |
| HGXB2003L0.5 0450 | 0.3 | R0.15 | 0.2 | 0.5 | 0.28 | 12 | 50 | 4 |
| HGXB2003L0.6 0450 | 0.3 | R0.15 | 0.2 | 0.6 | 0.28 | 12 | 50 | 4 |
| HGXB2003L0.75 0450 | 0.3 | R0.15 | 0.2 | 0.75 | 0.28 | 12 | 50 | 4 |
| HGXB2003L1 0450 | 0.3 | R0.15 | 0.2 | 1 | 0.28 | 12 | 50 | 4 |
| HGXB2003L1.25 0450 | 0.3 | R0.15 | 0.2 | 1.25 | 0.28 | 12 | 50 | 4 |
| HGXB2003L1.5 0450 | 0.3 | R0.15 | 0.2 | 1.5 | 0.28 | 12 | 50 | 4 |
| HGXB2003L1.75 0450 | 0.3 | R0.15 | 0.2 | 1.75 | 0.28 | 12 | 50 | 4 |
| HGXB2003L2 0450 | 0.3 | R0.15 | 0.2 | 2 | 0.28 | 12 | 50 | 4 |



HGXB2L 2-Flutes Long Neck Ball End Mill

Unit:mm

| Type No. | Dia. | Radius | Length of Cut | Under Neck Length | Neck Dia. | Neck Taper Angle | Overall Length | Shank Dia. |
|---|---|---|---|---|---|---|---|---|
| | ϕD | R | ℓ | ℓ1 | ϕd1 | γ/° | L | ϕd |
| HGXB2003L2.25 0450 | 0.3 | R0.15 | 0.2 | 2.25 | 0.28 | 12 | 50 | 4 |
| HGXB2003L2.5 0450 | 0.3 | R0.15 | 0.2 | 2.5 | 0.28 | 12 | 50 | 4 |
| HGXB2003L3 0450 | 0.3 | R0.15 | 0.2 | 3 | 0.28 | 12 | 50 | 4 |
| HGXB2004L0.5 0450 | 0.4 | R0.2 | 0.3 | 0.5 | 0.37 | 12 | 50 | 4 |
| HGXB2004L0.8 0450 | 0.4 | R0.2 | 0.3 | 0.8 | 0.37 | 12 | 50 | 4 |
| HGXB2004L1 0450 | 0.4 | R0.2 | 0.3 | 1 | 0.37 | 12 | 50 | 4 |
| HGXB2004L1.5 0450 | 0.4 | R0.2 | 0.3 | 1.5 | 0.37 | 12 | 50 | 4 |
| HGXB2004L2 0450 | 0.4 | R0.2 | 0.3 | 2 | 0.37 | 12 | 50 | 4 |
| HGXB2004L2.5 0450 | 0.4 | R0.2 | 0.3 | 2.5 | 0.37 | 12 | 50 | 4 |
| HGXB2004L3 0450 | 0.4 | R0.2 | 0.3 | 3 | 0.37 | 12 | 50 | 4 |
| HGXB2004L3.5 0450 | 0.4 | R0.2 | 0.3 | 3.5 | 0.37 | 12 | 50 | 4 |
| HGXB2004L4 0450 | 0.4 | R0.2 | 0.3 | 4 | 0.37 | 12 | 50 | 4 |
| HGXB2004L4.5 0450 | 0.4 | R0.2 | 0.3 | 4.5 | 0.37 | 12 | 50 | 4 |
| HGXB2005L1 0450 | 0.5 | R0.25 | 0.35 | 1 | 0.46 | 12 | 50 | 4 |
| HGXB2005L1.5 0450 | 0.5 | R0.25 | 0.35 | 1.5 | 0.46 | 12 | 50 | 4 |
| HGXB2005L2 0450 | 0.5 | R0.25 | 0.35 | 2 | 0.46 | 12 | 50 | 4 |
| HGXB2005L2.5 0450 | 0.5 | R0.25 | 0.35 | 2.5 | 0.46 | 12 | 50 | 4 |
| HGXB2005L3 0450 | 0.5 | R0.25 | 0.35 | 3 | 0.46 | 12 | 50 | 4 |
| HGXB2005L3.5 0450 | 0.5 | R0.25 | 0.35 | 3.5 | 0.46 | 12 | 50 | 4 |
| HGXB2005L4 0450 | 0.5 | R0.25 | 0.35 | 4 | 0.46 | 12 | 50 | 4 |
| HGXB2005L4.5 0450 | 0.5 | R0.25 | 0.35 | 4.5 | 0.46 | 12 | 50 | 4 |
| HGXB2005L5 0450 | 0.5 | R0.25 | 0.35 | 5 | 0.46 | 12 | 50 | 4 |
| HGXB2005L5.5 0450 | 0.5 | R0.25 | 0.35 | 5.5 | 0.46 | 12 | 50 | 4 |
| HGXB2005L6 0450 | 0.5 | R0.25 | 0.35 | 6 | 0.46 | 12 | 50 | 4 |
| HGXB2006L1 0450 | 0.6 | R0.3 | 0.45 | 1 | 0.56 | 12 | 50 | 4 |
| HGXB2006L1.5 0450 | 0.6 | R0.3 | 0.45 | 1.5 | 0.56 | 12 | 50 | 4 |
| HGXB2006L2 0450 | 0.6 | R0.3 | 0.45 | 2 | 0.56 | 12 | 50 | 4 |
| HGXB2006L3 0450 | 0.6 | R0.3 | 0.45 | 3 | 0.56 | 12 | 50 | 4 |
| HGXB2006L4 0450 | 0.6 | R0.3 | 0.45 | 4 | 0.56 | 12 | 50 | 4 |
| HGXB2006L5 0450 | 0.6 | R0.3 | 0.45 | 5 | 0.56 | 12 | 50 | 4 |
| HGXB2006L6 0450 | 0.6 | R0.3 | 0.45 | 6 | 0.56 | 12 | 50 | 4 |
| HGXB2006L7 0450 | 0.6 | R0.3 | 0.45 | 7 | 0.56 | 12 | 50 | 4 |
| HGXB2006L8 0450 | 0.6 | R0.3 | 0.45 | 8 | 0.56 | 12 | 50 | 4 |
| HGXB2007L2 0450 | 0.7 | R0.35 | 0.5 | 2 | 0.66 | 12 | 50 | 4 |

# HGXB2L 2-Flutes Long Neck Ball End Mill

Unit:mm

| Type No. | Dia. | Radius | Length of Cut | Under Neck Length | Neck Dia. | Neck Taper Angle | Overall Length | Shank Dia. |
|---|---|---|---|---|---|---|---|---|
| | ϕD | R | $\ell$ | $\ell_1$ | ϕd1 | $\gamma/°$ | L | ϕd |
| HGXB2007L3 0450 | 0.7 | R0.35 | 0.5 | 3 | 0.66 | 12 | 50 | 4 |
| HGXB2007L4 0450 | 0.7 | R0.35 | 0.5 | 4 | 0.66 | 12 | 50 | 4 |
| HGXB2007L6 0450 | 0.7 | R0.35 | 0.5 | 6 | 0.66 | 12 | 50 | 4 |
| HGXB2007L8 0450 | 0.7 | R0.35 | 0.5 | 8 | 0.66 | 12 | 50 | 4 |
| HGXB2008L2 0450 | 0.8 | R0.4 | 0.6 | 2 | 0.76 | 12 | 50 | 4 |
| HGXB2008L2.5 0450 | 0.8 | R0.4 | 0.6 | 2.5 | 0.76 | 12 | 50 | 4 |
| HGXB2008L3 0450 | 0.8 | R0.4 | 0.6 | 3 | 0.76 | 12 | 50 | 4 |
| HGXB2008L40450 | 0.8 | R0.4 | 0.6 | 4 | 0.76 | 12 | 50 | 4 |
| HGXB2008L5 0450 | 0.8 | R0.4 | 0.6 | 5 | 0.76 | 12 | 50 | 4 |
| HGXB2008L6 0450 | 0.8 | R0.4 | 0.6 | 6 | 0.76 | 12 | 50 | 4 |
| HGXB2008L7 0450 | 0.8 | R0.4 | 0.6 | 7 | 0.76 | 12 | 50 | 4 |
| HGXB2008L8 0450 | 0.8 | R0.4 | 0.6 | 8 | 0.76 | 12 | 50 | 4 |
| HGXB2008L10 0450 | 0.8 | R0.4 | 0.6 | 10 | 0.76 | 12 | 50 | 4 |
| HGXB2008L12 0450 | 0.8 | R0.4 | 0.6 | 12 | 0.76 | 12 | 50 | 4 |
| HGXB2008L16 0450 | 0.8 | R0.4 | 0.6 | 16 | 0.76 | 12 | 50 | 4 |
| HGXB2009L2 0450 | 0.9 | R0.45 | 0.65 | 2 | 0.86 | 12 | 50 | 4 |
| HGXB2009L4 0450 | 0.9 | R0.45 | 0.65 | 4 | 0.86 | 12 | 50 | 4 |
| HGXB2009L6 0450 | 0.9 | R0.45 | 0.65 | 6 | 0.86 | 12 | 50 | 4 |
| HGXB2009L8 0450 | 0.9 | R0.45 | 0.65 | 8 | 0.86 | 12 | 50 | 4 |
| HGXB2010L2.5 0450 | 1 | R0.5 | 0.75 | 2.5 | 0.95 | 12 | 50 | 4 |
| HGXB2010L3 0450 | 1 | R0.5 | 0.75 | 3 | 0.95 | 12 | 50 | 4 |
| HGXB2010L4 0450 | 1 | R0.5 | 0.75 | 4 | 0.95 | 12 | 50 | 4 |
| HGXB2010L4 0660 | 1 | R0.5 | 0.75 | 4 | 0.95 | 12 | 60 | 6 |
| HGXB2010L5 0450 | 1 | R0.5 | 0.75 | 5 | 0.95 | 12 | 50 | 4 |
| HGXB2010L6 0450 | 1 | R0.5 | 0.75 | 6 | 0.95 | 12 | 50 | 4 |
| HGXB2010L6 0660 | 1 | R0.5 | 0.75 | 6 | 0.95 | 12 | 60 | 6 |
| HGXB2010L7 0450 | 1 | R0.5 | 0.75 | 7 | 0.95 | 12 | 50 | 4 |
| HGXB2010L8 0450 | 1 | R0.5 | 0.75 | 8 | 0.95 | 12 | 50 | 4 |
| HGXB2010L8 0660 | 1 | R0.5 | 0.75 | 8 | 0.95 | 12 | 60 | 6 |
| HGXB2010L9 0450 | 1 | R0.5 | 0.75 | 9 | 0.95 | 12 | 50 | 4 |



BALL NOSE END MILL
HGX SERIES

# HGXB2L 2-Flutes Long Neck Ball End Mill

Unit:mm

| Type No. | Dia. | Radius | Length of Cut | Under Neck Length | Neck Dia. | Neck Taper Angle | Overall Length | Shank Dia. |
|---|---|---|---|---|---|---|---|---|
| | ϕD | R | $\ell$ | $\ell_1$ | ϕd1 | $\gamma/°$ | L | ϕd |
| HGXB2010L10 0450 | 1 | R0.5 | 0.75 | 10 | 0.95 | 12 | 50 | 4 |
| HGXB2010L10 0660 | 1 | R0.5 | 0.75 | 10 | 0.95 | 12 | 60 | 6 |
| HGXB2010L12 0450 | 1 | R0.5 | 0.75 | 12 | 0.95 | 12 | 50 | 4 |
| HGXB2010L13 0450 | 1 | R0.5 | 0.75 | 13 | 0.95 | 12 | 50 | 4 |
| HGXB2010L14 0450 | 1 | R0.5 | 0.75 | 14 | 0.95 | 12 | 50 | 4 |
| HGXB2010L16 0450 | 1 | R0.5 | 0.75 | 16 | 0.95 | 12 | 50 | 4 |
| HGXB2010L18 0460 | 1 | R0.5 | 0.75 | 18 | 0.95 | 12 | 60 | 4 |
| HGXB2010L20 0460 | 1 | R0.5 | 0.75 | 20 | 0.95 | 12 | 60 | 4 |
| HGXB2010L22 0460 | 1 | R0.5 | 0.75 | 22 | 0.95 | 12 | 60 | 4 |
| HGXB2012L4 0450 | 1.2 | R0.6 | 1 | 4 | 1.14 | 11 | 50 | 4 |
| HGXB2012L6 0450 | 1.2 | R0.6 | 1 | 6 | 1.14 | 11 | 50 | 4 |
| HGXB2012L8 0450 | 1.2 | R0.6 | 1 | 8 | 1.14 | 11 | 50 | 4 |
| HGXB2012L10 0450 | 1.2 | R0.6 | 1 | 10 | 1.14 | 11 | 50 | 4 |
| HGXB2012L12 0450 | 1.2 | R0.6 | 1 | 12 | 1.14 | 11 | 50 | 4 |
| HGXB2012L14 0450 | 1.2 | R0.6 | 1 | 14 | 1.14 | 11 | 50 | 4 |
| HGXB2014L8 0450 | 1.4 | R0.7 | 1.1 | 8 | 1.34 | 11 | 50 | 4 |
| HGXB2014L12 0450 | 1.4 | R0.7 | 1.1 | 12 | 1.34 | 11 | 50 | 4 |
| HGXB2014L16 0450 | 1.4 | R0.7 | 1.1 | 16 | 1.34 | 11 | 50 | 4 |
| HGXB2015L4 0450 | 1.5 | R0.75 | 1.2 | 4 | 1.42 | 11 | 50 | 4 |
| HGXB2015L6 0450 | 1.5 | R0.75 | 1.2 | 6 | 1.42 | 11 | 50 | 4 |
| HGXB2015L6 0660 | 1.5 | R0.75 | 1.2 | 6 | 1.42 | 11 | 60 | 6 |
| HGXB2015L8 0450 | 1.5 | R0.75 | 1.2 | 8 | 1.42 | 11 | 50 | 4 |
| HGXB2015L8 0660 | 1.5 | R0.75 | 1.2 | 8 | 1.42 | 11 | 60 | 6 |
| HGXB2015L10 0450 | 1.5 | R0.75 | 1.2 | 10 | 1.42 | 11 | 50 | 4 |
| HGXB2015L10 0660 | 1.5 | R0.75 | 1.2 | 10 | 1.42 | 11 | 60 | 6 |
| HGXB2015L12 0450 | 1.5 | R0.75 | 1.2 | 12 | 1.42 | 11 | 50 | 4 |
| HGXB2015L12 0660 | 1.5 | R0.75 | 1.2 | 12 | 1.42 | 11 | 60 | 6 |
| HGXB2015L14 0450 | 1.5 | R0.75 | 1.2 | 14 | 1.42 | 11 | 50 | 4 |
| HGXB2015L16 0450 | 1.5 | R0.75 | 1.2 | 16 | 1.42 | 11 | 50 | 4 |
| HGXB2015L18 0460 | 1.5 | R0.75 | 1.2 | 18 | 1.42 | 11 | 60 | 4 |

# HGXB2L 2-Flutes Long Neck Ball End Mill

Unit:mm

| Type No. | Dia. | Radius | Length of Cut | Under Neck Length | Neck Dia. | Neck Taper Angle | Overall Length | Shank Dia. |
|---|---|---|---|---|---|---|---|---|
| | ϕD | R | ℓ | $\ell_1$ | ϕd1 | γ/° | L | ϕd |
| HGXB2015L20 0460 | 1.5 | R0.75 | 1.2 | 20 | 1.42 | 11 | 60 | 4 |
| HGXB2016L8 0450 | 1.6 | R0.8 | 1.3 | 8 | 1.52 | 11 | 50 | 4 |
| HGXB2016L12 0450 | 1.6 | R0.8 | 1.3 | 12 | 1.52 | 11 | 50 | 4 |
| HGXB2016L16 0450 | 1.6 | R0.8 | 1.3 | 16 | 1.52 | 11 | 50 | 4 |
| HGXB2020L6 0450 | 2 | R1 | 1.6 | 6 | 1.9 | 11 | 50 | 4 |
| HGXB2020L8 0450 | 2 | R1 | 1.6 | 8 | 1.9 | 11 | 50 | 4 |
| HGXB2020L8 0660 | 2 | R1 | 1.6 | 8 | 1.9 | 11 | 60 | 6 |
| HGXB2020L10 0450 | 2 | R1 | 1.6 | 10 | 1.9 | 11 | 50 | 4 |
| HGXB2020L10 0660 | 2 | R1 | 1.6 | 10 | 1.9 | 11 | 60 | 6 |
| HGXB2020L12 0450 | 2 | R1 | 1.6 | 12 | 1.9 | 11 | 50 | 4 |
| HGXB2020L12 0660 | 2 | R1 | 1.6 | 12 | 1.9 | 11 | 60 | 6 |
| HGXB2020L14 0450 | 2 | R1 | 1.6 | 14 | 1.9 | 11 | 50 | 4 |
| HGXB2020L16 0450 | 2 | R1 | 1.6 | 16 | 1.9 | 11 | 50 | 4 |
| HGXB2020L16 0660 | 2 | R1 | 1.6 | 16 | 1.9 | 11 | 60 | 6 |
| HGXB2020L18 0460 | 2 | R1 | 1.6 | 18 | 1.9 | 11 | 60 | 4 |
| HGXB2020L20 0460 | 2 | R1 | 1.6 | 20 | 1.9 | 11 | 60 | 4 |
| HGXB2020L22 0460 | 2 | R1 | 1.6 | 22 | 1.9 | 11 | 60 | 4 |
| HGXB2020L25 0460 | 2 | R1 | 1.6 | 25 | 1.9 | 11 | 60 | 4 |
| HGXB2020L30 0475 | 2 | R1 | 1.6 | 30 | 1.9 | 11 | 75 | 4 |
| HGXB2020L35 0475 | 2 | R1 | 1.6 | 35 | 1.9 | 11 | 75 | 4 |
| HGXB2020L40 0475 | 2 | R1 | 1.6 | 40 | 1.9 | 11 | 75 | 4 |
| HGXB2025L6 0450 | 2.5 | R1.25 | 2 | 6 | 2.4 | 11 | 50 | 4 |
| HGXB2025L8 0450 | 2.5 | R1.25 | 2 | 8 | 2.4 | 11 | 50 | 4 |
| HGXB2025L10 0450 | 2.5 | R1.25 | 2 | 10 | 2.4 | 11 | 50 | 4 |
| HGXB2025L12 0450 | 2.5 | R1.25 | 2 | 12 | 2.4 | 11 | 50 | 4 |
| HGXB2025L16 0450 | 2.5 | R1.25 | 2 | 16 | 2.4 | 11 | 50 | 4 |
| HGXB2025L20 0460 | 2.5 | R1.25 | 2 | 20 | 2.4 | 11 | 60 | 4 |
| HGXB2025L25 0460 | 2.5 | R1.25 | 2 | 25 | 2.4 | 11 | 60 | 4 |
| HGXB2025L300475 | 2.5 | R1.25 | 2 | 30 | 2.4 | 11 | 75 | 4 |
| HGXB2025L35 0475 | 2.5 | R1.25 | 2 | 35 | 2.4 | 11 | 75 | 4 |



BALL NOSE END MILL
HGX SERIES

# HGXB2L 2-Flutes Long Neck Ball End Mill

Unit:mm

| Type No. | Dia. | Radius | Length of Cut | Under Neck Length | Neck Dia. | Neck Taper Angle | Overall Length | Shank Dia. |
|---|---|---|---|---|---|---|---|---|
| | ϕD | R | ℓ | $\ell_1$ | ϕd1 | γ/° | L | ϕd |
| HGXB2030L8 0450 | 3 | R1.5 | 2.4 | 8 | 2.9 | 11 | 50 | 4 |
| HGXB2030L10 0450 | 3 | R1.5 | 2.4 | 10 | 2.9 | 11 | 50 | 4 |
| HGXB2030L10 0660 | 3 | R1.5 | 2.4 | 10 | 2.9 | 11 | 60 | 6 |
| HGXB2030L12 0450 | 3 | R1.5 | 2.4 | 12 | 2.9 | 11 | 50 | 4 |
| HGXB2030L12 0660 | 3 | R1.5 | 2.4 | 12 | 2.9 | 11 | 60 | 6 |
| HGXB2030L14 0450 | 3 | R1.5 | 2.4 | 14 | 2.9 | 11 | 50 | 4 |
| HGXB2030L14 0660 | 3 | R1.5 | 2.4 | 14 | 2.9 | 11 | 60 | 6 |
| HGXB2030L16 0450 | 3 | R1.5 | 2.4 | 16 | 2.9 | 11 | 50 | 4 |
| HGXB2030L16 0660 | 3 | R1.5 | 2.4 | 16 | 2.9 | 11 | 60 | 6 |
| HGXB2030L20 0660 | 3 | R1.5 | 2.4 | 20 | 2.9 | 11 | 60 | 6 |
| HGXB2030L25 0675 | 3 | R1.5 | 2.4 | 25 | 2.9 | 11 | 75 | 6 |
| HGXB2030L30 0675 | 3 | R1.5 | 2.4 | 30 | 2.9 | 11 | 75 | 6 |
| HGXB2030L35 0675 | 3 | R1.5 | 2.4 | 35 | 2.9 | 11 | 75 | 6 |
| HGXB2030L40 06100 | 3 | R1.5 | 2.4 | 40 | 2.9 | 11 | 100 | 6 |
| HGXB2035L16 0660 | 3.5 | R1.75 | 2.8 | 16 | 3.4 | 11 | 60 | 6 |
| HGXB2035L20 0660 | 3.5 | R1.75 | 2.8 | 20 | 3.4 | 11 | 60 | 6 |
| HGXB2035L25 0675 | 3.5 | R1.75 | 2.8 | 25 | 3.4 | 11 | 75 | 6 |
| HGXB2035L30 0675 | 3.5 | R1.75 | 2.8 | 30 | 3.4 | 11 | 75 | 6 |
| HGXB2035L35 0675 | 3.5 | R1.75 | 2.8 | 35 | 3.4 | 11 | 75 | 6 |
| HGXB2040L12 0660 | 4 | R2 | 3.2 | 12 | 3.9 | 11 | 60 | 6 |
| HGXB2040L14 0660 | 4 | R2 | 3.2 | 14 | 3.9 | 11 | 60 | 6 |
| HGXB2040L16 0660 | 4 | R2 | 3.2 | 16 | 3.9 | 11 | 60 | 6 |
| HGXB2040L20 0660 | 4 | R2 | 3.2 | 20 | 3.9 | 11 | 60 | 6 |
| HGXB2040L20 0675 | 4 | R2 | 3.2 | 20 | 3.9 | 11 | 75 | 6 |
| HGXB2040L25 0675 | 4 | R2 | 3.2 | 25 | 3.9 | 11 | 75 | 6 |
| HGXB2040L30 0675 | 4 | R2 | 3.2 | 30 | 3.9 | 11 | 75 | 6 |
| HGXB2040L35 0675 | 4 | R2 | 3.2 | 35 | 3.9 | 11 | 75 | 6 |
| HGXB2040L40 06100 | 4 | R2 | 3.2 | 40 | 3.9 | 11 | 100 | 6 |
| HGXB2040L45 06100 | 4 | R2 | 3.2 | 45 | 3.9 | 11 | 100 | 6 |
| HGXB2040L50 06100 | 4 | R2 | 3.2 | 50 | 3.9 | 11 | 100 | 6 |

# HGXB2L 2-Flutes Long Neck Ball End Mill

Unit:mm

| Type No. | Dia. | Radius | Length of Cut | Under Neck Length | Neck Dia. | Neck Taper Angle | Overall Length | Shank Dia. |
|---|---|---|---|---|---|---|---|---|
| | ϕD | R | $\ell$ | $\ell_1$ | ϕd1 | $\gamma$/° | L | ϕd |
| HGXB2050L16 0660 | 5 | R2.5 | 4 | 16 | 4.85 | 11 | 60 | 6 |
| HGXB2050L20 0660 | 5 | R2.5 | 4 | 20 | 4.85 | 11 | 60 | 6 |
| HGXB2050L25 0675 | 5 | R2.5 | 4 | 25 | 4.85 | 11 | 75 | 6 |
| HGXB2050L30 0675 | 5 | R2.5 | 4 | 30 | 4.85 | 11 | 75 | 6 |
| HGXB2050L35 0675 | 5 | R2.5 | 4 | 35 | 4.85 | 11 | 75 | 6 |
| HGXB2050L40 06100 | 5 | R2.5 | 4 | 40 | 4.85 | 11 | 100 | 6 |
| HGXB2050L45 06100 | 5 | R2.5 | 4 | 45 | 4.85 | 11 | 100 | 6 |
| HGXB2050L50 06100 | 5 | R2.5 | 4 | 50 | 4.85 | 11 | 100 | 6 |
| HGXB2060L12 0660 | 6 | R3 | 4.8 | 12 | 5.85 | - | 60 | 6 |
| HGXB2060L20 0675 | 6 | R3 | 4.8 | 20 | 5.85 | - | 75 | 6 |
| HGXB2060L30 0675 | 6 | R3 | 4.8 | 30 | 5.85 | - | 75 | 6 |
| HGXB2060L40 06100 | 6 | R3 | 4.8 | 40 | 5.85 | - | 100 | 6 |

TABLE OF RECOMMENDED MILLING MATERIALS

Very suitable Suitable

| CARBON STEELS ALLOY STEELS PREHARDENED STEELS TOOL STEELS | PREHARDENED STEELS | | HARDENED STEELS | | STANLESS STEELS | CASTIRON DUCTILE CAST IRON | COPPER ALLOYS | ALUMINUM ALLOY | GRAPHITE | TITANIUM ALLOY | HEAT RESISTANT ALLOYS | PLASTIC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~40HRC | ~45HRC | ~55HRC | ~60HRC | ~65HRC | ~35HRC | ~350HB | | | | | | |
| ○ | ○ | ○ | | | ○ | ○ | ○ | ○ | | ○ | ○ | |



# Cutting Parameter

## HGXB2L 2-Flutes Long Neck Ball End Mill 3D Milling

| Workpiece | | Carbon Steels、Alloy Steels (≤35HRC) | | | | Pre-Hardened Steels (35-45HRC) | | | | Hardened Steels (45-55HRC) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Radius/mm | Underneck/mm | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm |
| R0.05 | 0.2 | 40000 | 120 | 0.003 | 0.005 | 40000 | 100 | 0.002 | 0.005 | 40000 | 70 | 0.002 | 0.003 |
| | 0.3 | 40000 | 100 | 0.003 | 0.005 | 40000 | 70 | 0.002 | 0.005 | 40000 | 50 | 0.002 | 0.003 |
| | 0.5 | 40000 | 70 | 0.002 | 0.003 | 40000 | 50 | 0.001 | 0.003 | 40000 | 30 | 0.001 | 0.002 |
| | 0.75 | 40000 | 70 | 0.002 | 0.003 | 40000 | 50 | 0.001 | 0.003 | 40000 | 30 | 0.001 | 0.002 |
| | 1 | 40000 | 50 | 0.002 | 0.003 | 40000 | 30 | 0.001 | 0.003 | 40000 | 30 | 0.001 | 0.002 |
| R0.075 | 0.3 | 40000 | 180 | 0.003 | 0.005 | 40000 | 150 | 0.002 | 0.005 | 40000 | 100 | 0.002 | 0.003 |
| | 0.5 | 40000 | 150 | 0.003 | 0.005 | 40000 | 120 | 0.002 | 0.005 | 40000 | 70 | 0.002 | 0.003 |
| | 0.75 | 40000 | 70 | 0.002 | 0.003 | 40000 | 50 | 0.001 | 0.003 | 40000 | 30 | 0.001 | 0.002 |
| | 1 | 40000 | 70 | 0.002 | 0.003 | 40000 | 50 | 0.001 | 0.003 | 40000 | 30 | 0.001 | 0.002 |
| | 1.5 | 40000 | 50 | 0.002 | 0.003 | 40000 | 30 | 0.001 | 0.003 | 40000 | 30 | 0.001 | 0.002 |
| R0.1 | 0.3 | 40000 | 350 | 0.01 | 0.01 | 40000 | 300 | 0.006 | 0.005 | 36000 | 200 | 0.003 | 0.003 |
| | 0.5 | 40000 | 320 | 0.008 | 0.01 | 39600 | 280 | 0.005 | 0.005 | 36000 | 180 | 0.003 | 0.003 |
| | 0.75 | 40000 | 280 | 0.005 | 0.01 | 39600 | 200 | 0.003 | 0.005 | 36000 | 150 | 0.002 | 0.003 |
| | 1 | 40000 | 250 | 0.003 | 0.005 | 39600 | 160 | 0.002 | 0.003 | 36000 | 120 | 0.001 | 0.002 |
| | 1.25 | 40000 | 180 | 0.003 | 0.005 | 39600 | 140 | 0.002 | 0.003 | 36000 | 100 | 0.001 | 0.002 |
| | 1.5 | 40000 | 150 | 0.003 | 0.005 | 39600 | 120 | 0.002 | 0.003 | 36000 | 80 | 0.001 | 0.002 |
| | 1.75 | 40000 | 120 | 0.002 | 0.003 | 39600 | 100 | 0.001 | 0.002 | 36000 | 60 | 0.001 | 0.002 |
| | 2 | 40000 | 100 | 0.002 | 0.003 | 39600 | 80 | 0.001 | 0.002 | 36000 | 50 | 0.001 | 0.001 |
| | 2.5 | 40000 | 70 | 0.001 | 0.002 | 39600 | 60 | 0.001 | 0.001 | 36000 | 40 | 0.001 | 0.001 |
| | 3 | 40000 | 50 | 0.001 | 0.001 | 39600 | 40 | 0.001 | 0.001 | 36000 | 30 | 0.001 | 0.001 |
| R0.15 | 0.5 | 36300 | 350 | 0.01 | 0.015 | 33000 | 300 | 0.007 | 0.01 | 30000 | 280 | 0.003 | 0.005 |
| | 0.6 | 36300 | 350 | 0.007 | 0.01 | 33000 | 300 | 0.005 | 0.007 | 30000 | 250 | 0.003 | 0.005 |
| | 0.75 | 36300 | 330 | 0.007 | 0.01 | 33000 | 280 | 0.005 | 0.007 | 30000 | 230 | 0.003 | 0.005 |
| | 1 | 36300 | 320 | 0.007 | 0.01 | 33000 | 250 | 0.005 | 0.007 | 30000 | 200 | 0.003 | 0.005 |
| | 1.25 | 36300 | 280 | 0.005 | 0.007 | 33000 | 200 | 0.003 | 0.005 | 30000 | 160 | 0.002 | 0.003 |
| | 1.5 | 36300 | 230 | 0.005 | 0.007 | 33000 | 180 | 0.003 | 0.005 | 30000 | 120 | 0.002 | 0.003 |
| | 1.75 | 36300 | 180 | 0.003 | 0.005 | 33000 | 150 | 0.002 | 0.003 | 30000 | 100 | 0.002 | 0.002 |
| | 2 | 36300 | 150 | 0.003 | 0.005 | 33000 | 120 | 0.002 | 0.003 | 30000 | 90 | 0.002 | 0.002 |
| | 2.25 | 36300 | 120 | 0.002 | 0.003 | 33000 | 100 | 0.001 | 0.002 | 30000 | 80 | 0.001 | 0.001 |
| | 2.5 | 36300 | 100 | 0.002 | 0.003 | 33000 | 80 | 0.001 | 0.002 | 30000 | 70 | 0.001 | 0.001 |
| | 3 | 36300 | 80 | 0.001 | 0.003 | 33000 | 70 | 0.001 | 0.002 | 30000 | 60 | 0.001 | 0.001 |
| | 3.5 | 36300 | 70 | 0.001 | 0.002 | 33000 | 60 | 0.001 | 0.001 | 30000 | 50 | 0.001 | 0.001 |

# Cutting Parameter

## HGXB2L 2-Flutes LongNeckBall End Mill 3D Milling

| Workpiece | | Carbon Steels、Alloy Steels (≤35HRC) | | | | Pre-Hardened Steels (35-45HRC) | | | | Hardened Steels (45-55HRC) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Radius/mm | Underneck/mm | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm |
| R0.15 | 4 | 36300 | 60 | 0.001 | 0.002 | 33000 | 50 | 0.001 | 0.001 | 30000 | 40 | 0.001 | 0.001 |
| R0.2 | 0.5 | 36300 | 800 | 0.03 | 0.05 | 33000 | 720 | 0.03 | 0.03 | 30000 | 580 | 0.009 | 0.02 |
| | 0.8 | 36300 | 800 | 0.02 | 0.05 | 33000 | 720 | 0.02 | 0.03 | 30000 | 580 | 0.008 | 0.02 |
| | 1 | 36300 | 800 | 0.02 | 0.05 | 33000 | 720 | 0.02 | 0.03 | 30000 | 580 | 0.008 | 0.02 |
| | 1.5 | 36300 | 620 | 0.01 | 0.03 | 33000 | 500 | 0.01 | 0.02 | 30000 | 400 | 0.005 | 0.01 |
| | 2 | 36300 | 500 | 0.01 | 0.02 | 33000 | 380 | 0.01 | 0.01 | 30000 | 300 | 0.005 | 0.007 |
| | 2.5 | 36300 | 420 | 0.007 | 0.01 | 33000 | 300 | 0.005 | 0.007 | 30000 | 260 | 0.003 | 0.005 |
| | 3 | 36300 | 300 | 0.007 | 0.01 | 33000 | 240 | 0.005 | 0.007 | 30000 | 200 | 0.003 | 0.005 |
| | 3.5 | 36300 | 230 | 0.005 | 0.007 | 33000 | 160 | 0.003 | 0.005 | 30000 | 120 | 0.002 | 0.003 |
| | 4 | 33000 | 160 | 0.005 | 0.005 | 30000 | 120 | 0.003 | 0.003 | 30000 | 90 | 0.002 | 0.003 |
| | 4.5 | 33000 | 100 | 0.003 | 0.005 | 30000 | 80 | 0.002 | 0.003 | 30000 | 60 | 0.001 | 0.002 |
| | 5 | 32000 | 70 | 0.002 | 0.003 | 30000 | 50 | 0.001 | 0.002 | 30000 | 40 | 0.001 | 0.002 |
| | 6 | 32000 | 50 | 0.001 | 0.002 | 30000 | 40 | 0.001 | 0.001 | 30000 | 30 | 0.001 | 0.001 |
| | 8 | 30000 | 50 | 0.001 | 0.002 | 30000 | 40 | 0.001 | 0.001 | 30000 | 30 | 0.001 | 0.001 |
| R0.25 | 1 | 35500 | 650 | 0.01 | 0.025 | 32000 | 590 | 0.01 | 0.025 | 30000 | 500 | 0.01 | 0.025 |
| | 1.5 | 35500 | 650 | 0.009 | 0.02 | 32000 | 590 | 0.009 | 0.02 | 30000 | 500 | 0.009 | 0.02 |
| | 2 | 35500 | 520 | 0.008 | 0.02 | 32000 | 470 | 0.008 | 0.02 | 30000 | 400 | 0.008 | 0.02 |
| | 2.5 | 33000 | 520 | 0.007 | 0.015 | 31800 | 470 | 0.007 | 0.015 | 28000 | 400 | 0.007 | 0.015 |
| | 3 | 33000 | 468 | 0.007 | 0.01 | 31800 | 420 | 0.007 | 0.01 | 28000 | 360 | 0.007 | 0.01 |
| | 3.5 | 31250 | 468 | 0.006 | 0.01 | 29000 | 420 | 0.006 | 0.01 | 25000 | 360 | 0.006 | 0.01 |
| | 4 | 31250 | 390 | 0.005 | 0.008 | 29000 | 350 | 0.005 | 0.008 | 25000 | 300 | 0.005 | 0.008 |
| | 4.5 | 31250 | 338 | 0.004 | 0.008 | 29000 | 300 | 0.004 | 0.008 | 25000 | 260 | 0.004 | 0.008 |
| | 5 | 31250 | 338 | 0.004 | 0.008 | 29000 | 300 | 0.004 | 0.008 | 25000 | 260 | 0.004 | 0.008 |
| | 5.5 | 31250 | 312 | 0.004 | 0.006 | 29000 | 280 | 0.004 | 0.006 | 25000 | 240 | 0.004 | 0.006 |
| | 6 | 27500 | 156 | 0.003 | 0.005 | 25520 | 140 | 0.003 | 0.005 | 22000 | 120 | 0.003 | 0.005 |
| | 8 | 25000 | 104 | 0.003 | 0.03 | 23200 | 90 | 0.003 | 0.003 | 20000 | 80 | 0.003 | 0.003 |
| | 10 | 25000 | 65 | 0.003 | 0.003 | 23200 | 60 | 0.003 | 0.003 | 20000 | 50 | 0.003 | 0.003 |
| R0.3 | 1 | 33000 | 975 | 0.02 | 0.03 | 31320 | 700 | 0.02 | 0.03 | 26000 | 600 | 0.02 | 0.03 |
| | 1.5 | 33000 | 975 | 0.02 | 0.03 | 31320 | 700 | 0.02 | 0.03 | 26000 | 600 | 0.02 | 0.03 |
| | 2 | 33000 | 780 | 0.02 | 0.03 | 31320 | 560 | 0.02 | 0.03 | 25000 | 480 | 0.02 | 0.03 |
| | 2.5 | 30800 | 780 | 0.015 | 0.02 | 29232 | 560 | 0.015 | 0.02 | 25000 | 480 | 0.015 | 0.02 |
| | 3 | 30800 | 702 | 0.015 | 0.02 | 29232 | 500 | 0.015 | 0.02 | 24000 | 432 | 0.015 | 0.02 |



BALL NOSE END MILL
HGX SERIES

# Cutting Parameter

## HGXB2L 2-Flutes LongNeckBall End Mill 3D Milling

| Workpiece | | Carbon Steels、Alloy Steels (≤35HRC) | | | | Pre-Hardened Steels (35-45HRC) | | | | Hardened Steels (45-55HRC) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Radius/mm | Underneck/mm | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm |
| R0.3 | 3.5 | 27500 | 702 | 0.01 | 0.02 | 26100 | 500 | 0.01 | 0.02 | 24000 | 432 | 0.01 | 0.02 |
| | 4 | 27500 | 585 | 0.01 | 0.02 | 26100 | 420 | 0.01 | 0.02 | 24000 | 360 | 0.01 | 0.02 |
| | 4.5 | 27500 | 507 | 0.01 | 0.02 | 26100 | 360 | 0.01 | 0.02 | 24000 | 312 | 0.01 | 0.02 |
| | 5 | 27500 | 507 | 0.01 | 0.02 | 26100 | 360 | 0.01 | 0.02 | 24000 | 312 | 0.01 | 0.02 |
| | 5.5 | 27500 | 468 | 0.008 | 0.01 | 26100 | 336 | 0.008 | 0.01 | 24000 | 288 | 0.008 | 0.01 |
| | 6 | 24200 | 234 | 0.008 | 0.01 | 22968 | 168 | 0.008 | 0.01 | 21120 | 144 | 0.008 | 0.01 |
| | 7 | 22000 | 156 | 0.006 | 0.008 | 20880 | 108 | 0.006 | 0.008 | 19200 | 96 | 0.006 | 0.008 |
| | 8 | 22000 | 97.5 | 0.005 | 0.008 | 20880 | 70 | 0.005 | 0.008 | 19200 | 60 | 0.005 | 0.008 |
| | 9 | 19040 | 85 | 0.005 | 0.008 | 18188 | 65 | 0.005 | 0.008 | 18048 | 50 | 0.005 | 0.008 |
| | 10 | 19040 | 80 | 0.003 | 0.005 | 18188 | 60 | 0.003 | 0.005 | 18000 | 40 | 0.003 | 0.005 |
| | 12 | 19040 | 60 | 0.003 | 0.005 | 18188 | 50 | 0.003 | 0.005 | 18000 | 30 | 0.003 | 0.005 |
| R0.35 | 2 | 32500 | 1025 | 0.02 | 0.035 | 31200 | 820 | 0.02 | 0.035 | 26000 | 480 | 0.02 | 0.035 |
| | 3 | 30000 | 1000 | 0.02 | 0.03 | 30000 | 800 | 0.02 | 0.03 | 25000 | 432 | 0.02 | 0.03 |
| | 4 | 30000 | 625 | 0.015 | 0.02 | 30000 | 500 | 0.015 | 0.02 | 24000 | 360 | 0.015 | 0.02 |
| | 6 | 25000 | 325 | 0.006 | 0.01 | 25000 | 260 | 0.006 | 0.01 | 22000 | 144 | 0.006 | 0.01 |
| | 8 | 22000 | 125 | 0.005 | 0.008 | 22000 | 100 | 0.004 | 0.006 | 20000 | 80 | 0.004 | 0.006 |
| R0.4 | 2 | 24200 | 2000 | 0.03 | 0.05 | 22000 | 1600 | 0.03 | 0.05 | 20000 | 1200 | 0.03 | 0.05 |
| | 2.5 | 24200 | 2000 | 0.03 | 0.05 | 22000 | 1600 | 0.03 | 0.05 | 20000 | 1200 | 0.03 | 0.05 |
| | 3 | 24200 | 2000 | 0.03 | 0.05 | 22000 | 1600 | 0.03 | 0.05 | 20000 | 1200 | 0.03 | 0.05 |
| | 4 | 24200 | 1600 | 0.03 | 0.05 | 22000 | 1200 | 0.03 | 0.05 | 20000 | 860 | 0.03 | 0.05 |
| | 5 | 24200 | 1600 | 0.02 | 0.03 | 22000 | 1000 | 0.02 | 0.03 | 20000 | 620 | 0.02 | 0.03 |
| | 6 | 21780 | 1200 | 0.02 | 0.03 | 19800 | 760 | 0.02 | 0.03 | 18000 | 560 | 0.02 | 0.03 |
| | 7 | 21780 | 1000 | 0.02 | 0.03 | 19800 | 680 | 0.02 | 0.03 | 18000 | 520 | 0.02 | 0.03 |
| | 8 | 21780 | 820 | 0.01 | 0.02 | 19800 | 600 | 0.01 | 0.02 | 18000 | 480 | 0.01 | 0.02 |
| | 10 | 19360 | 450 | 0.008 | 0.015 | 17600 | 380 | 0.008 | 0.015 | 16000 | 320 | 0.008 | 0.015 |
| | 12 | 18150 | 320 | 0.006 | 0.012 | 16500 | 260 | 0.006 | 0.012 | 15000 | 200 | 0.006 | 0.012 |
| | 16 | 18150 | 320 | 0.005 | 0.01 | 16500 | 260 | 0.005 | 0.01 | 15000 | 200 | 0.005 | 0.01 |
| R0.45 | 2 | 24200 | 2000 | 0.03 | 0.05 | 22000 | 1600 | 0.03 | 0.05 | 20000 | 1200 | 0.03 | 0.05 |
| | 4 | 24200 | 1600 | 0.03 | 0.05 | 22000 | 1200 | 0.03 | 0.05 | 20000 | 860 | 0.03 | 0.05 |
| | 6 | 21780 | 1200 | 0.02 | 0.03 | 19800 | 760 | 0.02 | 0.03 | 18000 | 560 | 0.02 | 0.03 |
| | 8 | 21780 | 820 | 0.01 | 0.02 | 19800 | 600 | 0.01 | 0.02 | 18000 | 480 | 0.01 | 0.02 |
| R0.5 | 2.5 | 24000 | 2000 | 0.03 | 0.06 | 22000 | 1600 | 0.03 | 0.05 | 20000 | 1200 | 0.03 | 0.05 |

# Cutting Parameter

## HGXB2L 2-Flutes Long Neck Ball End Mill 3D Milling

| Workpiece | | Carbon Steels、Alloy Steels (≤35HRC) | | | | Pre-Hardened Steels (35-45HRC) | | | | Hardened Steels (45-55HRC) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Radius/mm | Underneck/mm | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm |
| R0.5 | 3 | 24000 | 2000 | 0.03 | 0.06 | 22000 | 1600 | 0.03 | 0.05 | 20000 | 1200 | 0.03 | 0.05 |
| | 4 | 24000 | 2000 | 0.03 | 0.06 | 22000 | 1600 | 0.03 | 0.05 | 20000 | 1200 | 0.03 | 0.05 |
| | 5 | 24000 | 2000 | 0.03 | 0.05 | 22000 | 1600 | 0.03 | 0.05 | 20000 | 920 | 0.03 | 0.05 |
| | 6 | 21600 | 1800 | 0.05 | 0.05 | 19800 | 1200 | 0.03 | 0.05 | 18000 | 740 | 0.02 | 0.05 |
| | 7 | 21600 | 1200 | 0.04 | 0.05 | 19800 | 950 | 0.03 | 0.04 | 18000 | 680 | 0.02 | 0.03 |
| | 8 | 21600 | 1000 | 0.04 | 0.05 | 19800 | 860 | 0.03 | 0.04 | 18000 | 560 | 0.02 | 0.03 |
| | 0 | 19200 | 820 | 0.03 | 0.05 | 17600 | 750 | 0.02 | 0.03 | 16000 | 500 | 0.01 | 0.02 |
| | 10 | 18000 | 750 | 0.03 | 0.05 | 16500 | 620 | 0.02 | 0.03 | 15000 | 450 | 0.01 | 0.02 |
| | 12 | 18000 | 600 | 0.01 | 0.03 | 16500 | 520 | 0.007 | 0.02 | 15000 | 400 | 0.005 | 0.01 |
| | 14 | 16800 | 420 | 0.005 | 0.01 | 15400 | 360 | 0.003 | 0.007 | 14000 | 320 | 0.002 | 0.005 |
| | 16 | 16800 | 300 | 0.005 | 0.005 | 15400 | 250 | 0.003 | 0.005 | 14000 | 200 | 0.002 | 0.003 |
| | 18 | 16800 | 180 | 0.003 | 0.005 | 15400 | 120 | 0.002 | 0.005 | 14000 | 85 | 0.002 | 0.002 |
| | 20 | 14400 | 100 | 0003 | 0.003 | 13200 | 75 | 0.002 | 0.003 | 12000 | 60 | 0.002 | 0.002 |
| | 22 | 12000 | 50 | 0.002 | 0.003 | 11000 | 40 | 0.002 | 0.002 | 10000 | 35 | 0.001 | 0.002 |
| R0.6 | 4 | 24000 | 2000 | 0.03 | 0.06 | 22000 | 1600 | 0.03 | 0.05 | 20000 | 1200 | 0.03 | 0.05 |
| | 6 | 21600 | 1800 | 0.05 | 0.05 | 19800 | 1200 | 0.04 | 0.05 | 18000 | 740 | 0.02 | 0.05 |
| | 8 | 21600 | 1000 | 0.04 | 0.05 | 19800 | 860 | 0.03 | 0.04 | 18000 | 560 | 0.02 | 0.03 |
| | 10 | 18000 | 750 | 0.03 | 0.05 | 16500 | 620 | 0.02 | 0.03 | 15000 | 450 | 0.01 | 0.02 |
| | 12 | 18000 | 600 | 0.01 | 0.03 | 16500 | 520 | 0.007 | 0.02 | 15000 | 400 | 0.005 | 0.01 |
| | 14 | 16800 | 420 | 0.005 | 0.01 | 15400 | 360 | 0.003 | 0.007 | 14000 | 320 | 0.002 | 0.005 |
| | 16 | 16800 | 300 | 0.005 | 0.005 | 15400 | 250 | 0.003 | 0.005 | 14000 | 200 | 0.002 | 0.003 |
| R0.7 | 8 | 21600 | 2500 | 0.03 | 0.05 | 19800 | 1600 | 0.03 | 0.05 | 18000 | 1200 | 0.03 | 0.05 |
| | 12 | 18000 | 1800 | 0.02 | 0.05 | 16500 | 920 | 0.02 | 0.05 | 15000 | 780 | 0.02 | 0.05 |
| | 16 | 18000 | 720 | 0.01 | 0.02 | 16500 | 650 | 0.01 | 0.02 | 15000 | 580 | 0.01 | 0.02 |
| R0.75 | 4 | 21600 | 2500 | 0.03 | 0.05 | 19800 | 2000 | 0.03 | 0.05 | 18000 | 1600 | 0.03 | 0.05 |
| | 6 | 21600 | 2500 | 0.03 | 0.05 | 19800 | 2000 | 0.03 | 0.05 | 18000 | 1600 | 0.03 | 0.05 |
| | 8 | 21600 | 2500 | 0.03 | 0.05 | 19800 | 1600 | 0.03 | 0.05 | 18000 | 1200 | 0.03 | 0.05 |
| | 10 | 21600 | 2500 | 0.02 | 0.05 | 19800 | 1200 | 0.02 | 0.05 | 18000 | 860 | 0.02 | 0.05 |
| | 12 | 18000 | 1800 | 0.02 | 0.05 | 16500 | 920 | 0.02 | 0.05 | 15000 | 780 | 0.02 | 0.05 |
| | 14 | 18000 | 1800 | 0.02 | 0.03 | 16500 | 820 | 0.02 | 0.03 | 15000 | 650 | 0.02 | 0.03 |
| | 16 | 18000 | 720 | 0.01 | 0.02 | 16500 | 650 | 0.01 | 0.02 | 15000 | 580 | 0.01 | 0.02 |
| | 18 | 16800 | 550 | 0.008 | 0.015 | 15400 | 400 | 0.008 | 0.015 | 14000 | 400 | 0.008 | 0.015 |



BALL NOSE END MILL
HGX SERIES

# Cutting Parameter

## HGXB2L 2-Flutes Long Neck Ball End Mill 3D Milling

| Workpiece | | Carbon Steels、Alloy Steels (≤35HRC) | | | | Pre-Hardened Steels (35-45HRC) | | | | Hardened Steels (45-55HRC) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Radius/mm | Underneck/mm | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm |
| R0.75 | 20 | 16800 | 450 | 0.007 | 0.01 | 15400 | 360 | 0.007 | 0.01 | 14000 | 300 | 0.007 | 0.01 |
| | 25 | 14400 | 330 | 0.007 | 0.007 | 13200 | 250 | 0.007 | 0.007 | 12000 | 200 | 0.007 | 0.007 |
| | 30 | 9600 | 80 | 0.003 | 0.003 | 8800 | 60 | 0.003 | 0.003 | 8000 | 40 | 0.003 | 0.003 |
| R0.8 | 8 | 21600 | 2500 | 0.03 | 0.05 | 19800 | 1600 | 0.03 | 0.05 | 18000 | 1200 | 0.03 | 0.05 |
| | 12 | 18000 | 1800 | 0.02 | 0.05 | 16500 | 920 | 0.02 | 0.05 | 15000 | 780 | 0.02 | 0.05 |
| | 16 | 18000 | 720 | 0.01 | 0.02 | 16500 | 650 | 0.01 | 0.02 | 15000 | 580 | 0.01 | 0.02 |
| | 20 | 16800 | 450 | 0.007 | 0.01 | 15400 | 360 | 0.007 | 0.01 | 14000 | 300 | 0.007 | 0.01 |
| R1 | 6 | 18000 | 1920 | 0.04 | 0.06 | 16500 | 1760 | 0.04 | 0.06 | 15000 | 1600 | 0.04 | 0.06 |
| | 8 | 18000 | 1440 | 0.03 | 0.05 | 16500 | 1320 | 0.03 | 0.05 | 15000 | 1200 | 0.03 | 0.05 |
| | 10 | 16800 | 1440 | 0.03 | 0.05 | 15400 | 1320 | 0.03 | 0.05 | 14000 | 1200 | 0.03 | 0.05 |
| | 12 | 14400 | 1128 | 0.02 | 0.05 | 13200 | 1034 | 0.02 | 0.05 | 12000 | 940 | 0.02 | 0.05 |
| | 14 | 14400 | 1128 | 0.015 | 0.04 | 13200 | 1034 | 0.015 | 0.04 | 12000 | 940 | 0.015 | 0.04 |
| | 16 | 14400 | 1128 | 0.015 | 0.04 | 13200 | 1034 | 0.015 | 0.04 | 12000 | 940 | 0.015 | 0.04 |
| | 18 | 12000 | 1020 | 0.01 | 0.03 | 11000 | 935 | 0.01 | 0.03 | 10000 | 850 | 0.01 | 0.03 |
| | 20 | 12000 | 864 | 0.01 | 0.03 | 11000 | 792 | 0.01 | 0.03 | 10000 | 720 | 0.01 | 0.03 |
| | 22 | 12000 | 720 | 0.008 | 0.02 | 11000 | 660 | 0.008 | 0.02 | 10000 | 600 | 0.008 | 0.02 |
| | 25 | 10200 | 504 | 0.008 | 0.02 | 9350 | 462 | 0.008 | 0.02 | 8500 | 420 | 0.008 | 0.02 |
| | 30 | 10200 | 288 | 0.005 | 0.01 | 9350 | 264 | 0.005 | 0.01 | 8500 | 240 | 0.005 | 0.01 |
| | 35 | 8160 | 120 | 0.005 | 0.007 | 7480 | 110 | 0.005 | 0.007 | 6800 | 100 | 0.005 | 0.007 |
| | 40 | 8160 | 60 | 0.002 | 0.005 | 7480 | 55 | 0.002 | 0.005 | 6800 | 50 | 0.002 | 0.005 |
| R1.25 | 6 | 18000 | 1920 | 0.04 | 0.06 | 16500 | 1760 | 0.04 | 0.06 | 15000 | 1600 | 0.04 | 0.06 |
| | 8 | 18000 | 1440 | 0.03 | 0.05 | 16500 | 1320 | 0.03 | 0.05 | 15000 | 1200 | 0.03 | 0.05 |
| | 10 | 16800 | 1440 | 0.03 | 0.05 | 15400 | 1320 | 0.03 | 0.05 | 14000 | 1200 | 0.03 | 0.05 |
| | 12 | 15000 | 1320 | 0.02 | 0.05 | 13800 | 1180 | 0.02 | 0.04 | 13000 | 1080 | 0.02 | 0.04 |
| | 16 | 14400 | 1128 | 0.015 | 0.04 | 13200 | 1034 | 0.015 | 0.04 | 12000 | 940 | 0.015 | 0.04 |
| | 20 | 12000 | 864 | 0.01 | 0.03 | 11000 | 792 | 0.01 | 0.03 | 10000 | 720 | 0.01 | 0.03 |
| | 25 | 10200 | 504 | 0.008 | 0.02 | 9350 | 462 | 0.008 | 0.02 | 8500 | 420 | 0.008 | 0.02 |
| | 30 | 10200 | 288 | 0.005 | 0.01 | 9350 | 264 | 0.005 | 0.01 | 8500 | 240 | 0.005 | 0.01 |
| | 35 | 8160 | 120 | 0.005 | 0.007 | 7480 | 110 | 0.005 | 0.007 | 6800 | 100 | 0.005 | 0.007 |
| R1.5 | 8 | 16800 | 2500 | 0.04 | 0.08 | 15400 | 2200 | 0.04 | 0.08 | 14000 | 2000 | 0.04 | 0.08 |
| | 10 | 16800 | 1875 | 0.03 | 0.07 | 15400 | 1650 | 0.03 | 0.07 | 14000 | 1500 | 0.03 | 0.07 |
| | 12 | 14400 | 1875 | 0.03 | 0.07 | 13200 | 1650 | 0.03 | 0.07 | 12000 | 1500 | 0.03 | 0.07 |

# Cutting Parameter

## HGXB2L 2-Flutes Long Neck Ball End Mill 3D Milling

| Workpiece | | Carbon Steels、Alloy Steels (≤35HRC) | | | | Pre-Hardened Steels (35-45HRC) | | | | Hardened Steels (45-55HRC) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Radius/mm | Underneck/mm | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm |
| R1.5 | 14 | 14400 | 1500 | 0.03 | 0.07 | 13200 | 1320 | 0.03 | 0.07 | 12000 | 1200 | 0.03 | 0.07 |
| | 16 | 14400 | 1500 | 0.02 | 0.05 | 13200 | 1320 | 0.02 | 0.05 | 12000 | 1200 | 0.02 | 0.05 |
| | 20 | 12000 | 1200 | 0.02 | 0.05 | 11000 | 1056 | 0.02 | 0.05 | 10000 | 960 | 0.02 | 0.05 |
| | 25 | 10320 | 1000 | 0.015 | 0.05 | 9460 | 880 | 0.015 | 0.05 | 8600 | 800 | 0.015 | 0.05 |
| | 30 | 8640 | 750 | 0.015 | 0.04 | 7920 | 660 | 0.015 | 0.04 | 7200 | 600 | 0.015 | 0.04 |
| | 35 | 7680 | 525 | 0.01 | 0.03 | 7040 | 462 | 0.01 | 0.03 | 6400 | 420 | 0.01 | 0.03 |
| | 40 | 7200 | 325 | 0.01 | 0.03 | 6600 | 286 | 0.01 | 0.03 | 6000 | 260 | 0.01 | 0.03 |
| R1.75 | 16 | 14400 | 1500 | 0.02 | 0.05 | 13200 | 1320 | 0.02 | 0.05 | 12000 | 1200 | 0.02 | 0.05 |
| | 20 | 12000 | 1200 | 0.02 | 0.05 | 11000 | 1056 | 0.02 | 0.05 | 10000 | 960 | 0.02 | 0.05 |
| | 25 | 10320 | 1000 | 0.015 | 0.05 | 9460 | 880 | 0.015 | 0.05 | 8600 | 800 | 0.015 | 0.05 |
| | 30 | 8640 | 750 | 0.015 | 0.04 | 7920 | 660 | 0.015 | 0.04 | 7200 | 600 | 0.015 | 0.04 |
| | 35 | 7680 | 525 | 0.01 | 0.03 | 7040 | 462 | 0.01 | 0.03 | 6400 | 420 | 0.01 | 0.03 |
| | 40 | 7200 | 325 | 0.01 | 0.03 | 6600 | 286 | 0.01 | 0.03 | 6000 | 260 | 0.01 | 0.03 |
| | 45 | 6800 | 300 | 0.01 | 0.03 | 6500 | 264 | 0.01 | 0.03 | 6000 | 200 | 0.01 | 0.03 |
| R2 | 12 | 13200 | 3000 | 0.04 | 0.08 | 12100 | 2500 | 0.04 | 0.08 | 11000 | 2000 | 0.04 | 0.08 |
| | 14 | 13200 | 3000 | 0.04 | 0.08 | 12100 | 2000 | 0.04 | 0.08 | 11000 | 1600 | 0.04 | 0.08 |
| | 16 | 12000 | 3000 | 0.03 | 0.06 | 11000 | 2000 | 0.03 | 0.06 | 10000 | 1600 | 0.03 | 0.06 |
| | 20 | 12000 | 2400 | 0.03 | 0.06 | 11000 | 1800 | 0.03 | 0.06 | 10000 | 1400 | 0.03 | 0.06 |
| | 25 | 10800 | 1600 | 0.03 | 0.05 | 9900 | 1200 | 0.03 | 0.05 | 9000 | 1000 | 0.03 | 0.05 |
| | 30 | 9600 | 1600 | 0.03 | 0.05 | 8800 | 1200 | 0.03 | 0.05 | 8000 | 1000 | 0.03 | 0.05 |
| | 35 | 9000 | 1200 | 0.03 | 0.05 | 8250 | 1000 | 0.03 | 0.05 | 7500 | 820 | 0.03 | 0.05 |
| | 40 | 8160 | 1200 | 0.02 | 0.04 | 7480 | 1000 | 0.02 | 0.04 | 6800 | 820 | 0.02 | 0.04 |
| | 45 | 7800 | 750 | 0.02 | 0.04 | 7150 | 620 | 0.02 | 0.04 | 6500 | 500 | 0.02 | 0.04 |
| | 50 | 6600 | 550 | 0.015 | 0.03 | 6050 | 500 | 0.015 | 0.03 | 5500 | 420 | 0.015 | 0.03 |
| R2.5 | 16 | 12000 | 3000 | 0.03 | 0.06 | 11000 | 2000 | 0.03 | 0.06 | 10000 | 1600 | 0.03 | 0.06 |
| | 20 | 12000 | 2400 | 0.03 | 0.06 | 11000 | 1800 | 0.03 | 0.06 | 10000 | 1400 | 0.03 | 0.06 |
| | 25 | 10800 | 1600 | 0.03 | 0.05 | 9900 | 1200 | 0.03 | 0.05 | 9000 | 1000 | 0.03 | 0.05 |
| | 30 | 9600 | 1600 | 0.03 | 0.05 | 8800 | 1200 | 0.03 | 0.05 | 8000 | 1000 | 0.03 | 0.05 |
| | 35 | 8500 | 1450 | 0.025 | 0.045 | 8000 | 1100 | 0.025 | 0.045 | 7500 | 950 | 0.025 | 0.045 |
| | 40 | 8160 | 1200 | 0.02 | 0.04 | 7480 | 1000 | 0.02 | 0.04 | 6800 | 820 | 0.02 | 0.04 |
| | 45 | 7800 | 750 | 0.02 | 0.04 | 7150 | 620 | 0.02 | 0.04 | 6500 | 500 | 0.02 | 0.04 |
| | 50 | 6600 | 550 | 0.015 | 0.03 | 6050 | 500 | 0.015 | 0.03 | 5500 | 420 | 0.015 | 0.03 |



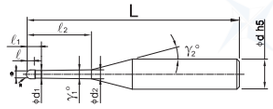
# HGX SERIES

## HGXPB2 -Highlights

- Two tapered angles available.
- Excellent chip evacuation in deep areas.
- Stable milling with optimized neck design.
- Smooth coating for superior surface finish.
- High precision for tight tolerances.

**≤55HRC**

# HGXPB 2-Flutes Taper Neck Ball End Mill




UMG ATX 2 30° Spiral Angle Straight Back Angle ≤55 HRC

| Ø D | D Tol. [mm] |
|---|---|
| D<3 | 0~-0.010 |
| 3<D≤6 | 0~-0.012 |

| Ø D | R Tol. [mm] |
|---|---|
| D<1 | ±0.003 |
| 1≤D≤6 | ±0.005 |

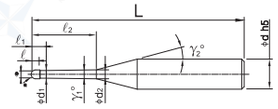
Unit:mm

| Type No. | Dia. | Radius | Length of Cut | Under Neck Length | Straight Under Neck | Taper Angle | Neck Taper Angle | Tip Dia. | Shank Dia. | Overall Length | Shank Dia. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | ϕD | R | $\ell$ | $\ell_2$ | $\ell_1$ | $\gamma_1$/° | $\gamma_2$/° | ϕd1 | ϕd2 | L | ϕd |
| HGXPB2006-2-T0.40450 | 0.6 | R0.3 | 0.36 | 2 | 0.6 | 0.4 | 12 | 0.56 | 0.58 | 50 | 4 |
| HGXPB2006-4-T0.4 0450 | 0.6 | R0.3 | 0.36 | 4 | 0.6 | 0.4 | 12 | 0.56 | 0.607 | 50 | 4 |
| HGXPB2006-6-T0.9 0450 | 0.6 | R0.3 | 0.36 | 6 | 0.6 | 0.9 | 12 | 0.56 | 0.635 | 50 | 4 |
| HGXPB2008-4-T0.4 0450 | 0.8 | R0.4 | 0.48 | 4 | 0.7 | 0.4 | 12 | 0.76 | 0.806 | 50 | 4 |
| HGXPB2008-6-T0.40450 | 0.8 | R0.4 | 0.48 | 6 | 0.7 | 0.4 | 12 | 0.76 | 0.834 | 50 | 4 |
| HGXPB2010-6-T0.4 0450 | 1 | R0.5 | 0.6 | 6 | 0.8 | 0.4 | 12 | 0.95 | 1.023 | 50 | 4 |
| HGXPB2010-6-T0.4 0650 | 1 | R0.5 | 0.6 | 6 | 0.8 | 0.4 | 12 | 0.95 | 1.023 | 50 | 6 |
| HGXPB2010-8-T0.4 0450 | 1 | R0.5 | 0.6 | 8 | 0.8 | 0.4 | 12 | 0.95 | 1.051 | 50 | 4 |
| HGXPB2010-8-T0.4 0660 | 1 | R0.5 | 0.6 | 8 | 0.8 | 0.4 | 12 | 0.95 | 1.051 | 60 | 6 |
| HGXPB2010-10-T0.4 0450 | 1 | R0.5 | 0.6 | 10 | 0.8 | 0.4 | 12 | 0.95 | 1.078 | 50 | 4 |
| HGXPB2010-10-T0.4 0660 | 1 | R0.5 | 0.6 | 10 | 0.8 | 0.4 | 12 | 0.95 | 1.078 | 60 | 6 |
| HGXPB2010-15-T0.4 0450 | 1 | R0.5 | 0.6 | 15 | 0.8 | 0.4 | 12 | 0.95 | 1.148 | 50 | 4 |
| HGXPB2010-15-T0.4 0660 | 1 | R0.5 | 0.6 | 15 | 0.8 | 0.4 | 12 | 0.95 | 1.148 | 60 | 6 |
| HGXPB2010-6-T0.9 0450 | 1 | R0.5 | 0.6 | 6 | 0.8 | 0.9 | 12 | 0.95 | 1.113 | 50 | 4 |
| HGXPB2010-6-T0.9 0650 | 1 | R0.5 | 0.6 | 6 | 0.8 | 0.9 | 12 | 0.95 | 1.113 | 50 | 6 |
| HGXPB2010-10-T0.9 0450 | 1 | R0.5 | 0.6 | 10 | 0.8 | 0.9 | 12 | 0.95 | 1.239 | 50 | 4 |
| HGXPB2010-10-T0.9 0660 | 1 | R0.5 | 0.6 | 10 | 0.8 | 0.9 | 12 | 0.95 | 1.239 | 60 | 6 |
| HGXPB2010-15-T0.9 0450 | 1 | R0.5 | 0.6 | 15 | 0.8 | 0.9 | 12 | 0.95 | 1.396 | 50 | 4 |
| HGXPB2010-15-T0.9 0660 | 1 | R0.5 | 0.6 | 15 | 0.8 | 0.9 | 12 | 0.95 | 1.396 | 60 | 6 |
| HGXPB2010-20-T0.9 0460 | 1 | R0.5 | 0.6 | 20 | 0.8 | 0.9 | 12 | 0.95 | 1.553 | 60 | 4 |
| HGXPB2010-20-T0.9 0675 | 1 | R0.5 | 0.6 | 20 | 0.8 | 0.9 | 12 | 0.95 | 1.553 | 75 | 6 |
| HGXPB2015-8-T0.4 0660 | 1.5 | R0.75 | 0.9 | 8 | 1.35 | 0.4 | 12 | 1.42 | 1.513 | 60 | 6 |
| HGXPB2015-10-T0.4 0660 | 1.5 | R0.75 | 0.9 | 10 | 1.35 | 0.4 | 12 | 1.42 | 1.541 | 60 | 6 |
| HGXPB2015-12-T0.4 0660 | 1.5 | R0.75 | 0.9 | 12 | 1.35 | 0.4 | 12 | 1.42 | 1.569 | 60 | 6 |
| HGXPB2015-15-T0.9 0660 | 1.5 | R0.75 | 0.9 | 15 | 1.35 | 0.9 | 12 | 1.42 | 1.848 | 60 | 6 |
| HGXPB2015-20-T0.9 0675 | 1.5 | R0.75 | 0.9 | 20 | 1.35 | 0.9 | 12 | 1.42 | 2.006 | 75 | 6 |
| HGXPB2020-8-T0.4 0650 | 2 | R1 | 1.2 | 8 | 1.7 | 0.4 | 12 | 1.9 | 1.988 | 50 | 6 |
| HGXPB2020-12-T0.4 0660 | 2 | R1 | 1.2 | 12 | 1.7 | 0.4 | 12 | 1.9 | 2.044 | 60 | 6 |



BALL NOSE END MILL
HGX SERIES

# HGXPB 2-Flutes Taper Neck Ball End Mill




UMG ATX 2 30° Spiral Angle Straight Back Angle <55 HRC

| Ø D | D Tol. [mm] |
|---|---|
| D<3 | 0~-0.010 |
| 3<D≤6 | 0~-0.012 |

| Ø D | R Tol. [mm] |
|---|---|
| D<1 | ±0.003 |
| 1≤D≤6 | ±0.005 |

Unit:mm

| Type No. | Dia. | Radius | Length of Cut | Under Neck Length | Straight Under Neck | Taper Angle | Neck Taper Angle | Tip Dia. | Shank Dia. | Overall Length | Shank Dia. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | ϕD | R | $\ell$ | $\ell_2$ | $\ell_1$ | $\gamma_1$/° | $\gamma_2$/° | ϕd1 | ϕd2 | L | ϕd |
| HGXPB2020-16-T0.4 0660 | 2 | R1 | 1.2 | 16 | 1.7 | 0.4 | 12 | 1.9 | 2.1 | 60 | 6 |
| HGXPB2020-20-T0.4 0675 | 2 | R1 | 1.2 | 20 | 1.7 | 0.4 | 12 | 1.9 | 2.156 | 75 | 6 |
| HGXPB2020-12-T0.9 0660 | 2 | R1 | 1.2 | 12 | 1.7 | 0.9 | 12 | 1.9 | 2.224 | 60 | 6 |
| HGXPB2020-16-T0.9 0660 | 2 | R1 | 1.2 | 16 | 1.7 | 0.9 | 12 | 1.9 | 2.349 | 60 | 6 |
| HGXPB2020-20-T0.9 0675 | 2 | R1 | 1.2 | 20 | 1.7 | 0.9 | 12 | 1.9 | 2.475 | 75 | 6 |
| HGXPB2020-25-T0.9 0675 | 2 | R1 | 1.2 | 25 | 1.7 | 0.9 | 12 | 1.9 | 2.631 | 75 | 6 |
| HGXPB2020-30-T0.9 0675 | 2 | R1 | 1.2 | 30 | 1.7 | 0.9 | 12 | 1.9 | 2.699 | 75 | 6 |
| HGXPB2020-40-T0.9 06100 | 2 | R1 | 1.2 | 40 | 1.7 | 0.9 | 12 | 1.9 | 3.103 | 100 | 6 |
| HGXPB2030-8-T0.4 0650 | 3 | R1.5 | 1.8 | 8 | 2.5 | 0.4 | 12 | 2.9 | 2.977 | 50 | 6 |
| HGXPB2030-16-T0.4 0660 | 3 | R1.5 | 1.8 | 16 | 2.5 | 0.4 | 12 | 2.9 | 3.088 | 60 | 6 |
| HGXPB2030-20-T0.4 0660 | 3 | R1.5 | 1.8 | 20 | 2.5 | 0.4 | 12 | 2.9 | 3.144 | 60 | 6 |
| HGXPB2030-16-T0.9 0660 | 3 | R1.5 | 1.8 | 16 | 2.5 | 0.9 | 12 | 2.9 | 3.292 | 60 | 6 |
| HGXPB2030-20-T0.9 0660 | 3 | R1.5 | 1.8 | 20 | 2.5 | 0.9 | 12 | 2.9 | 3.45 | 60 | 6 |
| HGXPB2030-30-T0.9 0675 | 3 | R1.5 | 1.8 | 30 | 2.5 | 0.9 | 12 | 2.9 | 3.764 | 75 | 6 |
| HGXPB2030-40-T0.9 06100 | 3 | R1.5 | 1.8 | 40 | 2.5 | 0.9 | 12 | 2.9 | 4.392 | 100 | 6 |
| HGXPB2040-20-T0.9 0875 | 4 | R2 | 6 | 20 | 8 | 0.9 | 12 | 2.9 | 4.277 | 75 | 8 |
| HGXPB2040-30-T0.9 08100 | 4 | R2 | 6 | 30 | 8 | 0.9 | 12 | 3.9 | 4.591 | 100 | 8 |
| HGXPB2040-40-T0.9 08100 | 4 | R2 | 6 | 40 | 8 | 0.9 | 12 | 3.9 | 4.905 | 100 | 8 |
| HGXPB2060-30-T0.9 08100 | 6 | R3 | 3 | 30 | 12 | 0.9 | 12 | 5.85 | 6.416 | 100 | 8 |
| HGXPB2060-45-T0.9 08100 | 6 | R3 | 9 | 45 | 12 | 0.9 | 12 | 5.85 | 6.887 | 100 | 8 |

TABLE OF RECOMMENDED MILLING MATERIALS

◎ Very suitable ○ Suitable

| CARBON STEELS | ALLOY STEELS | PREHARDENED STEELS | HARDENED STEELS | | | | CASTIRON | COPPER ALLOYS | ALUMINUM ALLOY | GRAPHITE | TITANIUM ALLOY | HEAT RESISTANT ALLOYS | PLASTIC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | ~55HRC | ~60HRC | ~65HRC | ~70HRC | DUCTILE CAST IRON | | | | | | |
| ◎ | ◎ | ◎ | ◎ | | | | | ○ | | | | | |

# Cutting Parameter

## HGXPB 2-Flutes Taper Neck Ball End Mill

| Workpiece | | | | | Carbon Steels 、Alloy Steels (30-40HRC) | | | | Pre-Hardened Steels (35-45HRC) | | | | High Speed Steels Hardened Steels (46-55HRC) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Type No. | Ball radius /mm | Tool dia. /mm | BHTA2 Neck Angle | Under Neck Length | n/min$^{-1}$ | Vf-mm/min | ap/mm | ae/mm | n/min$^{-1}$ | Vf-mm/min | ap/mm | ae/mm | n/min$^{-1}$ | Vf-mm/min | ap/mm | ae/mm |
| HGXPB2006-2-T0.4 0450 | 0.3 | 0.6 | 0.4 | 2 | 32500 | 1480 | 0.03 | 0.035 | 29250 | 1332 | 0.025 | 0.025 | 26000 | 1184 | 0.015 | 0.02 |
| HGXPB2006-4-T0.4 0450 | 0.3 | 0.6 | 0.4 | 4 | 31800 | 1420 | 0.025 | 0.033 | 28626 | 1278 | 0.02 | 0.03 | 26000 | 1136 | 0.012 | 0.018 |
| HGXPB2006-6-T0.9 0450 | 0.3 | 0.6 | 0.9 | 6 | 31800 | 1420 | 0.025 | 0.033 | 28626 | 1278 | 0.02 | 0.03 | 20800 | 1136 | 0.012 | 0.018 |
| HGXPB2008-4-T0.4 0450 | 0.4 | 0.8 | 0.4 | 4 | 26980 | 1523 | 0.032 | 0.04 | 24282 | 1370 | 0.03 | 0.035 | 21584 | 1218 | 0.025 | 0.03 |
| HGXPB2008-6-T0.4 0450 | 0.4 | 0.8 | 0.4 | 6 | 25386 | 1269 | 0.028 | 0.038 | 22847 | 1142 | 0.025 | 0.033 | 20308 | 1015 | 0.02 | 0.028 |
| HGXPB2010-6-T0.4 0450 | 0.5 | 1 | 0.4 | o | 21252 | 1523 | 0.05 | 0.045 | 17920 | 1368 | 0.04 | 0.045 | 16640 | 1218 | 0.03 | 0.04 |
| HGXPB2010-6-T0.4 0650 | 0.5 | 1 | 0.4 | 6 | 21252 | 1523 | 0.05 | 0.045 | 17920 | 1368 | 0.04 | 0.045 | 16640 | 1218 | 0.03 | 0.04 |
| HGXPB2010-8-T0.4 0450 | 0.5 | 1 | 0.4 | 8 | 20252 | 1523 | 0.05 | 0.045 | 17920 | 1368 | 0.04 | 0.045 | 16640 | 1218 | 0.03 | 0.035 |
| HGXPB2010-8-T0.4 0660 | 0.5 | F | 0.4 | 8 | 20252 | 1523 | 0.05 | 0.045 | 17920 | 1368 | 0.04 | 0.045 | 16640 | 1218 | 0.03 | 0.035 |
| HGXPB2010-10-T0.4 0450 | 0.5 | 1 | 0.4 | 10 | 17688 | 1114 | 0.035 | 0.04 | 14560 | 1000 | 0.032 | 0.04 | 13520 | 890 | 0.028 | 0.032 |
| HGXPB2010-10-T0.4 0660 | 0.5 | 7 | 0.4 | 10 | 17688 | 1114 | 0.035 | 0.04 | 14560 | 1000 | 0.032 | 0.04 | 13520 | 890 | 0.028 | 0.032 |
| HGXPB2010-15-T0.4 0450 | 0.5 | F | 0.4 | 15 | 15240 | 792 | 0.025 | 0.038 | 11650 | 712 | 0.022 | 0.038 | 10820 | 632 | 0.02 | 0.03 |
| HGXPB2010-15-T0.4 0660 | 0.5 | F | 0.4 | 15 | 15240 | 792 | 0.025 | 0.038 | 11650 | 712 | 0.022 | 0.038 | 10820 | 632 | 0.02 | 0.03 |
| HGXPB2010-6-T0.9 0450 | 0.5 | 1 | 0.9 | 6 | 21252 | 1523 | 0.05 | 0.045 | 17920 | 1368 | 0.04 | 0.045 | 16640 | 1218 | 0.03 | 0.04 |
| HGXPB2010-6-T0.9 0650 | 0.5 | 1 | 0.9 | 6 | 21252 | 1523 | 0.05 | 0.045 | 17920 | 1368 | 0.04 | 0.045 | 16640 | 1218 | 0.03 | 0.04 |
| HGXPB2010-10-T0.9 0450 | 0.5 | 7 | 0.9 | 10 | 17688 | 1114 | 0.035 | 0.04 | 14560 | 1000 | 0.032 | 0.04 | 13520 | 890 | 0.028 | 0.032 |
| HGXPB2010-10-T0.9 0660 | 0.5 | 1 | 0.9 | 10 | 17688 | 1114 | 0.035 | 0.04 | 14560 | 1000 | 0.032 | 0.04 | 13520 | 890 | 0.028 | 0.032 |
| HGXPB2010-15-T0.9 0450 | 0.5 | 1 | 0.9 | 15 | 15240 | 792 | 0.025 | 0.038 | 11650 | 712 | 0.022 | 0.038 | 10820 | 632 | 0.02 | 0.03 |
| HGXPB2010-15-T0.9 0660 | 0.5 | 1 | 0.9 | 15 | 15240 | 792 | 0.025 | 0.038 | 11650 | 712 | 0.022 | 0.038 | 10820 | 632 | 0.02 | 0.03 |
| HGXPB2010-20-T0.9 0460 | 0.5 | 1 | 0.9 | 20 | 14340 | 792 | 0.02 | 0.035 | 11650 | 712 | 0.018 | 0.035 | 10820 | 632 | 0.015 | 0.025 |
| HGXPB2010-20-T0.9 0675 | 0.5 | 1 | 0.9 | 20 | 14340 | 792 | 0.02 | 0.035 | 11650 | 712 | 0.018 | 0.035 | 10820 | 632 | 0.015 | 0.025 |
| HGXPB2015-8-T0.4 0660 | 0.75 | 1.5 | 0.4 | 8 | 18200 | 1680 | 0.05 | 0.05 | 16380 | 1512 | 0.04 | 0.05 | 14560 | 1344 | 0.03 | 0.05 |
| HGXPB2015-10-T0.4 0660 | 0.75 | 1.5 | 0.4 | 10 | 17230 | 1650 | 0.05 | 0.05 | 15508 | 1485 | 0.04 | 0.05 | 13784 | 1320 | 0.03 | 0.05 |
| HGXPB2015-12-T0.4 0660 | 0.75 | 1.5 | 0.4 | 12 | 16800 | 1520 | 0.05 | 0.05 | 15120 | 1368 | 0.04 | 0.05 | 13440 | 1216 | 0.03 | 0.05 |
| HGXPB2015-15-T0.9 0660 | 0.75 | 1.5 | 0.9 | 15 | 15200 | 1480 | 0.04 | 0.04 | 13680 | 1332 | 0.035 | 0.04 | 12160 | 1184 | 0.025 | 0.04 |
| HGXPB2015-20-T0.9 0675 | 0.75 | 1.5 | 0.9 | 20 | 13650 | 1200 | 0.04 | 0.04 | 12285 | 1080 | 0.03 | 0.04 | 10926 | 960 | 0.02 | 0.04 |
| HGXPB2020-8-T0.4 0650 | 1 | N | 0.4 | 8 | 15200 | 1800 | 0.08 | 0.08 | 13680 | 1620 | 0.08 | 0.06 | 12160 | 1440 | 0.05 | 0.05 |
| HGXPB2020-12-T0.4 0660 | 1 | N | 0.4 | 12 | 13820 | 1780 | 0.07 | 0.08 | 12438 | 1602 | 0.07 | 0.06 | 11050 | 1424 | 0.05 | 0.05 |
| HGXPB2020-16-T0.4 0660 | 1 | 2 | 0.4 | 16 | 12680 | 1660 | 0.063 | 0.07 | 11412 | 1494 | 0.063 | 0.06 | 10144 | 1328 | 0.04 | 0.05 |
| HGXPB2020-20-T0.4 0675 | 1 | 3 | 0.4 | 20 | 10500 | 1320 | 0.043 | 0.07 | 9450 | 1188 | 0.043 | 0.05 | 8400 | 1056 | 0.03 | 0.04 |
| HGXPB2020-12-T0.9 0660 | 1 | 2 | 0.9 | 12 | 15200 | 1850 | 0.08 | 0.08 | 13680 | 1660 | 0.08 | 0.06 | 12160 | 1470 | 0.05 | 0.05 |



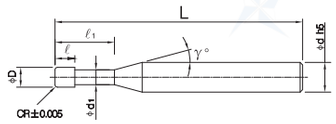
BALL NOSE END MILL
CBN SERIES

# Cutting Parameter

## HGXPB 2-Flutes Taper Neck Ball End Mill

| Workpiece | | | | | Carbon Steels 、Alloy Steels (30-40HRC) | | | | Pre-Hardened Steels (35-45HRC) | | | | High Speed Steels Hardened Steels (46-55HRC) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Type No. | Ball radius /mm | Tool dia. /mm | BHTA2 Neck Angle | Under Neck Length | n/min$^{-1}$ | Vf-mm/min | ap/mm | ae/mm | n/min$^{-1}$ | Vf-mm/min | ap/mm | ae/mm | n/min$^{-1}$ | Vf-mm/min | ap/mm | ae/mm |
| HGXPB2020-16-T0.9 0660 | 1 | 2 | 0.9 | 16 | 13820 | 1830 | 0.07 | 0.08 | 12438 | 1642 | 0.07 | 0.06 | 11050 | 1454 | 0.05 | 0.05 |
| HGXPB2020-20-T0.9 0675 | 1 | 2 | 0.9 | 20 | 12680 | 1710 | 0.063 | 0.07 | 11412 | 1534 | 0.063 | 0.06 | 10144 | 1358 | 0.04 | 0.05 |
| HGXPB2020-25-T0.9 0675 | 1 | 2 | 0.9 | 25 | 10500 | 1380 | 0.043 | 0.07 | 9450 | 1228 | 0.043 | 0.05 | 8400 | 1086 | 0.03 | 0.04 |
| HGXPB2020-30-T0.9 0675 | 1 | 2 | 0.9 | 30 | 9500 | 1020 | 0.042 | 0.06 | 8550 | 909 | 0.042 | 0.05 | 7600 | 807 | 0.03 | 0.04 |
| HGXPB2020-40-T0.9 06100 | 1 | 2 | 0.9 | 40 | 7800 | 738 | 0.026 | 0.05 | 7020 | 659 | 0.026 | 0.04 | 6240 | 590 | 0.025 | 0.03 |
| HGXPB2030-8-T0.4 0650 | 1.5 | 3 | 0.4 | 8 | 12,738 | 2,200 | 0.08 | 0.1 | 11,464 | 1,980 | 0.08 | 0.1 | 10,190 | 1,760 | 0.05 | 0.1 |
| HGXPB2030-16-T0.4 0660 | 1.5 | 3 | 0.4 | 16 | 11,354 | 2,000 | 0.07 | 0.1 | 10,219 | 1,800 | 0.07 | 0.1 | 9,083 | 1,600 | 0.05 | 0.1 |
| HGXPB2030-20-T0.4 0660 | 1.5 | 3 | 0.4 | 20 | 10,386 | 1,800 | 0.063 | 0.1 | 9,374 | 1,620 | 0.063 | 0.1 | 8,309 | 1,440 | 0.05 | 0.1 |
| HGXPB2030-16-T0.9 0660 | 1.5 | 3 | 0.9 | 16 | 12,738 | 2,250 | 0.08 | 0.1 | 11,464 | 2,020 | 0.08 | 0.1 | 10,190 | 1,780 | 0.05 | 0.1 |
| HGXPB2030-20-T0.9 0660 | 1.5 | 3 | 0.9 | 20 | 11,354 | 2,050 | 0.07 | 0.1 | 10,219 | 1,840 | 0.07 | 0.1 | 9,083 | 4,620 | 0.05 | 0.1 |
| HGXPB2030-30-T0.9 0675 | 1.5 | 3 | 0.9 | 30 | 10,386 | 1,850 | 0.063 | 0.1 | 9,374 | 1,660 | 0.063 | 0.1 | 8,309 | 1,460 | 0.05 | 0.1 |
| HGXPB2030-40-T0.9 06100 | 1.5 | 3 | 0.9 | 40 | 7,680 | 1,250 | 0.042 | 0.08 | 6,912 | 1,120 | 0.042 | 0.08 | 6,144 | 980 | 0.04 | 0.08 |
| HGXPB2040-20-T0.9 0875 | 2 | 4 | 0.9 | 20 | 12,000 | 2400 | 0.03 | 0.06 | 11,000 | 1800 | 0.03 | 0.06 | 10,000 | 1400 | 0.03 | 0.06 |
| HGXPB2040-30-T0.9 08100 | 2 | 4 | 0.9 | 30 | 10,100 | 1,526 | 0.065 | 0.1 | 9,000 | 1,295 | 0.065 | 0.1 | 7,800 | 1,064 | 0.05 | 0.08 |
| HGXPB2040-40-T0.9 08100 | 2 | 4 | 0.9 | 40 | 8,100 | 1,155 | 0.05 | 0.08 | 7,200 | 980 | 0.05 | 0.08 | 6,200 | 798 | 0.04 | 0.08 |
| HGXPB2060-30-T0.9 08100 | 3 | 6 | 0.9 | 30 | 9,000 | 3,000 | 0.08 | 0.15 | 9,000 | 2,800 | 0.08 | 0.15 | 9,000 | 2,500 | 0.06 | 0.15 |
| HGXPB2060-45-T0.9 08100 | 3 | 6 | 0.9 | 45 | 7,600 | 1,800 | 0.06 | 0.12 | 6,000 | 1,800 | 0.06 | 0.12 | 5,200 | 735 | 0.05 | 0.1 |

# HSXR2L 2-Flutes Long Neck Corner Radius End Mill




UMG AHX 2 30° Spiral Angle Arc Back Angle R <65 HRC

| Ø D | D Tol. [ mm ] |
|---|---|
| D<3 | 0~-0.010 |
| 3<D<6 | 0~-0.012 |

Unit:mm

| Type No. | Dia. | Radius | Length of Cut | Under Neck Length | Neck Dia. | Neck Taper Angle | Overall Length | Shank Dia. |
|---|---|---|---|---|---|---|---|---|
| | ϕD | CR | ℓ | ℓ1 | ϕd1 | γ/° | L | ϕd |
| HSXR2002R0.05L0.5 0450 | 0.2 | R0.05 | 0.15 | 0.5 | 0.18 | 12 | 50 | 4 |
| HSXR2002R0.05L1 0450 | 0.2 | R0.05 | 0.15 | 1 | 0.18 | 12 | 50 | 4 |
| HSXR2002R0.05L1.5 0450 | 0.2 | R0.05 | 0.15 | 1.5 | 0.18 | 12 | 50 | 4 |
| HSXR2002R0.05L2 0450 | 0.2 | R0.05 | 0.15 | 2 | 0.18 | 12 | 50 | 4 |
| HSXR2003R0.05L1 0450 | 0.3 | R0.05 | 0.2 | 1 | 0.28 | 12 | 50 | 4 |
| HSXR2003R0.05L1.5 0450 | 0.3 | R0.05 | 0.2 | 1.5 | 0.28 | 12 | 50 | 4 |
| HSXR2003R0.05L2 0450 | 0.3 | R0.05 | 0.2 | 2 | 0.28 | 12 | 50 | 4 |
| HSXR2003R0.05L2.5 0450 | 0.3 | R0.05 | 0.2 | 2.5 | 0.28 | 12 | 50 | 4 |
| HSXR2003R0.05L3 0450 | 0.3 | R0.05 | 0.2 | 3 | 0.28 | 12 | 50 | 4 |
| HSXR2004R0.05L1 0450 | 0.4 | R0.05 | 0.3 | 1 | 0.37 | 12 | 50 | 4 |
| HSXR2004R0.05L1.5 0450 | 0.4 | R0.05 | 0.3 | 1.5 | 0.37 | 12 | 50 | 4 |
| HSXR2004R0.05L2 0450 | 0.4 | R0.05 | 0.3 | 2 | 0.37 | 12 | 50 | 4 |
| HSXR2004R0.05L2.5 0450 | 0.4 | R0.05 | 0.3 | 2.5 | 0.37 | 12 | 50 | 4 |
| HSXR2004R0.05L3 0450 | 0.4 | R0.05 | 0.3 | 3 | 0.37 | 12 | 50 | 4 |
| HSXR2004R0.05L4 0450 | 0.4 | R0.05 | 0.3 | 4 | 0.37 | 12 | 50 | 4 |
| HSXR2004R0.1L1 0450 | 0.4 | R0.1 | 0.3 | 1 | 0.37 | 12 | 50 | 4 |
| HSXR2004R0.1L1.5 0450 | 0.4 | R0.1 | 0.3 | 1.5 | 0.37 | 12 | 50 | 4 |
| HSXR2004R0.1L2 0450 | 0.4 | R0.1 | 0.3 | 2 | 0.37 | 12 | 50 | 4 |
| HSXR2004R0.1L2.5 0450 | 0.4 | R0.1 | 0.3 | 2.5 | 0.37 | 12 | 50 | 4 |
| HSXR2004R0.1L3 0450 | 0.4 | R0.1 | 0.3 | 3 | 0.37 | 12 | 50 | 4 |
| HSXR2004R0.1L4 0450 | 0.4 | R0.1 | 0.3 | 4 | 0.37 | 12 | 50 | 4 |
| HSXR2005R0.05L1 0450 | 0.5 | R0.05 | 0.35 | 1 | 0.46 | 12 | 50 | 4 |
| HSXR2005R0.05L1.5 0450 | 0.5 | R0.05 | 0.35 | 1.5 | 0.46 | 12 | 50 | 4 |
| HSXR2005R0.05L2 0450 | 0.5 | R0.05 | 0.35 | 2 | 0.46 | 12 | 50 | 4 |
| HSXR2005R0.05L2.5 0450 | 0.5 | R0.05 | 0.35 | 2.5 | 0.46 | 12 | 50 | 4 |
| HSXR2005R0.05L3 0450 | 0.5 | R0.05 | 0.35 | 3 | 0.46 | 12 | 50 | 4 |



HSXR2L 2-Flutes Long Neck Corner Radius End Mill

Unit:mm

| Type No. | Dia. | Radius | Length of Cut | Under Neck Length | Neck Dia. | Neck Taper Angle | Overall Length | Shank Dia. |
|---|---|---|---|---|---|---|---|---|
| | ϕD | CR | ℓ | ℓ1 | ϕd1 | γ/° | L | ϕd |
| HSXR2005R0.05L4 0450 | 0.5 | R0.05 | 0.35 | 4 | 0.46 | 12 | 50 | 4 |
| HSXR2005R0.05L5 0450 | 0.5 | R0.05 | 0.35 | 5 | 0.46 | 12 | 50 | 4 |
| HSXR2005R0.05L6 0450 | 0.5 | R0.05 | 0.35 | 6 | 0.46 | 12 | 50 | 4 |
| HSXR2005R0.1L1 0450 | 0.5 | R0.1 | 0.35 | 1 | 0.46 | 12 | 50 | 4 |
| HSXR2005R0.1L1.5 0450 | 0.5 | R0.1 | 0.35 | 1.5 | 0.46 | 12 | 50 | 4 |
| HSXR2005R0.1L2 0450 | 0.5 | R0.1 | 0.35 | 2 | 0.46 | 12 | 50 | 4 |
| HSXR2005R0.1L2.5 0450 | 0.5 | R0.1 | 0.35 | 2.5 | 0.46 | 12 | 50 | 4 |
| HSXR2005R0.1L3 0450 | 0.5 | R0.1 | 0.35 | 3 | 0.46 | 12 | 50 | 4 |
| HSXR2005R0.1L4 0450 | 0.5 | R0.1 | 0.35 | 4 | 0.46 | 12 | 50 | 4 |
| HSXR2005R0.1L5 0450 | 0.5 | R0.1 | 0.35 | 5 | 0.46 | 12 | 50 | 4 |
| HSXR2005R0.1L6 0450 | 0.5 | R0.1 | 0.35 | 6 | 0.46 | 12 | 50 | 4 |
| HSXR2006R0.05L2 0450 | 0.6 | R0.05 | 0.45 | 2 | 0.56 | 12 | 50 | 4 |
| HSXR2006R0.05L3 0450 | 0.6 | R0.05 | 0.45 | 3 | 0.56 | 12 | 50 | 4 |
| HSXR2006R0.05L4 0450 | 0.6 | R0.05 | 0.45 | 4 | 0.56 | 12 | 50 | 4 |
| HSXR2006R0.05L6 0450 | 0.6 | R0.05 | 0.45 | 6 | 0.56 | 12 | 50 | 4 |
| HSXR2006R0.05L8 0450 | 0.6 | R0.05 | 0.45 | 8 | 0.56 | 12 | 50 | 4 |
| HSXR2006R0.05L10 0450 | 0.6 | R0.05 | 0.45 | 10 | 0.56 | 12 | 50 | 4 |
| HSXR2006R0.1L2 0450 | 0.6 | R0.1 | 0.45 | 2 | 0.56 | 12 | 50 | 4 |
| HSXR2006R0.1L3 0450 | 0.6 | R0.1 | 0.45 | 3 | 0.56 | 12 | 50 | 4 |
| HSXR2006R0.1L4 0450 | 0.6 | R0.1 | 0.45 | 4 | 0.56 | 12 | 50 | 4 |
| HSXR2006R0.1L6 0450 | 0.6 | R0.1 | 0.45 | 6 | 0.56 | 12 | 50 | 4 |
| HSXR2006R0.1L8 0450 | 0.6 | R0.1 | 0.45 | 8 | 0.56 | 12 | 50 | 4 |
| HSXR2006R0.1L10 0450 | 0.6 | R0.1 | 0.45 | 10 | 0.56 | 12 | 50 | 4 |
| HSXR2007R0.05L2 0450 | 0.7 | R0.05 | 0.5 | 2 | 0.66 | 12 | 50 | 4 |
| HSXR2007R0.05L3 0450 | 0.7 | R0.05 | 0.5 | 3 | 0.66 | 12 | 50 | 4 |
| HSXR2007R0.05L4 0450 | 0.7 | R0.05 | 0.5 | 4 | 0.66 | 12 | 50 | 4 |
| HSXR2007R0.05L6 0450 | 0.7 | R0.05 | 0.5 | 6 | 0.66 | 12 | 50 | 4 |
| HSXR2007R0.05L8 0450 | 0.7 | R0.05 | 0.5 | 8 | 0.66 | 12 | 50 | 4 |
| HSXR2007R0.05L10 0450 | 0.7 | R0.05 | 0.5 | 10 | 0.66 | 12 | 50 | 4 |
| HSXR2007R0.1L2 0450 | 0.7 | R0.1 | 0.5 | 2 | 0.66 | 12 | 50 | 4 |
| HSXR2007R0.1L3 0450 | 0.7 | R0.1 | 0.5 | 3 | 0.66 | 12 | 50 | 4 |
| HSXR2007R0.1L4 0450 | 0.7 | R0.1 | 0.5 | 4 | 0.66 | 12 | 50 | 4 |
| HSXR2007R0.1L6 0450 | 0.7 | R0.1 | 0.5 | 6 | 0.66 | 12 | 50 | 4 |
| HSXR2007R0.1L8 0450 | 0.7 | R0.1 | 0.5 | 8 | 0.66 | 12 | 50 | 4 |

# HSXR2L 2-Flutes Long Neck Corner Radius End Mill

Unit:mm

| Type No. | Dia. | Radius | Length of Cut | Under Neck Length | Neck Dia. | Neck Taper Angle | Overall Length | Shank Dia. |
|---|---|---|---|---|---|---|---|---|
| | ϕD | CR | $\ell$ | $\ell_1$ | ϕd1 | $\gamma/°$ | L | ϕd |
| HSXR2007R0.1L10 0450 | 0.7 | R0.1 | 0.5 | 10 | 0.66 | 12 | 50 | 4 |
| HSXR2008R0.05L2 0450 | 0.8 | R0.05 | 0.6 | 2 | 0.76 | 12 | 50 | 4 |
| HSXR2008R0.05L3 0450 | 0.8 | R0.05 | 0.6 | 3 | 0.76 | 12 | 50 | 4 |
| HSXR2008R0.05L4 0450 | 0.8 | R0.05 | 0.6 | 4 | 0.76 | 12 | 50 | 4 |
| HSXR2008R0.05L6 0450 | 0.8 | R0.05 | 0.6 | 6 | 0.76 | 12 | 50 | 4 |
| HSXR2008R0.05L8 0450 | 0.8 | R0.05 | 0.6 | 8 | 0.76 | 12 | 50 | 4 |
| HSXR2008R0.05L10 0450 | 0.8 | R0.05 | 0.6 | 10 | 0.76 | 12 | 50 | 4 |
| HSXR2008R0.05L12 0450 | 0.8 | R0.05 | 0.6 | 12 | 0.76 | 12 | 50 | 4 |
| HSXR2008R0.1L2 0450 | 0.8 | R0.1 | 0.6 | 2 | 0.76 | 12 | 50 | 4 |
| HSXR2008R0.1L3 0450 | 0.8 | R0.1 | 0.6 | 3 | 0.76 | 12 | 50 | 4 |
| HSXR2008R0.1L4 0450 | 0.8 | R0.1 | 0.6 | 4 | 0.76 | 12 | 50 | 4 |
| HSXR2008R0.1L6 0450 | 0.8 | R0.1 | 0.6 | 6 | 0.76 | 12 | 50 | 4 |
| HSXR2008R0.1L8 0450 | 0.8 | R0.1 | 0.6 | 8 | 0.76 | 12 | 50 | 4 |
| HSXR2008R0.1L10 0450 | 0.8 | R0.1 | 0.6 | 10 | 0.76 | 12 | 50 | 4 |
| HSXR2008R0.1L12 0450 | 0.8 | R0.1 | 0.6 | 12 | 0.76 | 12 | 50 | 4 |
| HSXR2008R0.2L2 0450 | 0.8 | R0.2 | 0.6 | 2 | 0.76 | 12 | 50 | 4 |
| HSXR2008R0.2L3 0450 | 0.8 | R0.2 | 0.6 | 3 | 0.76 | 12 | 50 | 4 |
| HSXR2008R0.2L4 0450 | 0.8 | R0.2 | 0.6 | 4 | 0.76 | 12 | 50 | 4 |
| HSXR2008R0.2L6 0450 | 0.8 | R0.2 | 0.6 | 6 | 0.76 | 12 | 50 | 4 |
| HSXR2008R0.2L8 0450 | 0.8 | R0.2 | 0.6 | 8 | 0.76 | 12 | 50 | 4 |
| HSXR2008R0.2L10 0450 | 0.8 | R0.2 | 0.6 | 10 | 0.76 | 12 | 50 | 4 |
| HSXR2008R0.2L12 0450 | 0.8 | R0.2 | 0.6 | 12 | 0.76 | 12 | 50 | 4 |
| HSXR2009R0.1L4 0450 | 0.9 | R0.1 | 0.65 | 4 | 0.86 | 12 | 50 | 4 |
| HSXR2009R0.1L8 0450 | 0.9 | R0.1 | 0.65 | 8 | 0.86 | 12 | 50 | 4 |
| HSXR2009R0.2L4 0450 | 0.9 | R0.2 | 0.65 | 4 | 0.86 | 12 | 50 | 4 |
| HSXR2009R0.2L8 0450 | 0.9 | R0.2 | 0.65 | 8 | 0.86 | 12 | 50 | 4 |
| HSXR2010R0.05L3 0450 | 1 | R0.05 | 0.75 | 3 | 0.95 | 12 | 50 | 4 |
| HSXR2010R0.05L4 0450 | 1 | R0.05 | 0.75 | 4 | 0.95 | 12 | 50 | 4 |
| HSXR2010R0.05L5 0450 | 1 | R0.05 | 0.75 | 5 | 0.95 | 12 | 50 | 4 |
| HSXR2010R0.05L6 0450 | 1 | R0.05 | 0.75 | 6 | 0.95 | 12 | 50 | 4 |
| HSXR2010R0.05L8 0450 | 1 | R0.05 | 0.75 | 8 | 0.95 | 12 | 50 | 4 |
| HSXR2010R0.05L10 0450 | 1 | R0.05 | 0.75 | 10 | 0.95 | 12 | 50 | 4 |
| HSXR2010R0.05L12 0450 | 1 | R0.05 | 0.75 | 12 | 0.95 | 12 | 50 | 4 |
| HSXR2010R0.05L16 0450 | 1 | R0.05 | 0.75 | 16 | 0.95 | 12 | 50 | 4 |



HSXR2L 2-Flutes Long Neck Corner Radius End Mill

Unit:mm

| Type No. | Dia. | Radius | Length of Cut | Under Neck Length | Neck Dia. | Neck Taper Angle | Overall Length | Shank Dia. |
|---|---|---|---|---|---|---|---|---|
| | ϕD | CR | $\ell$ | $\ell_1$ | ϕd1 | $\gamma/°$ | L | ϕd |
| HSXR2010R0.05L20 0460 | 1 | R0.05 | 0.75 | 20 | 0.95 | 12 | 60 | 4 |
| HSXR2010R0.1L2 0450 | 1 | R0.1 | 0.75 | 3 | 0.95 | 12 | 50 | 4 |
| HSXR2010R0.1L3 0450 | 1 | R0.1 | 0.75 | 3 | 0.95 | 12 | 50 | 4 |
| HSXR2010R0.1L4 0450 | 1 | R0.1 | 0.75 | 4 | 0.95 | 12 | 50 | 4 |
| HSXR2010R0.1L5 0450 | 1 | R0.1 | 0.75 | 5 | 0.95 | 12 | 50 | 4 |
| HSXR2010R0.1L6 0450 | 1 | R0.1 | 0.75 | 6 | 0.95 | 12 | 50 | 4 |
| HSXR2010R0.1L8 0450 | 1 | R0.1 | 0.75 | 8 | 0.95 | 12 | 50 | 4 |
| HSXR2010R0.1L10 0450 | 1 | R0.1 | 0.75 | 10 | 0.95 | 12 | 50 | 4 |
| HSXR2010R0.1L12 0450 | 1 | R0.1 | 0.75 | 12 | 0.95 | 12 | 50 | 4 |
| HSXR2010R0.1L16 0450 | 1 | R0.1 | 0.75 | 16 | 0.95 | 12 | 50 | 4 |
| HSXR2010R0.1L20 0460 | 1 | R0.1 | 0.75 | 20 | 0.95 | 12 | 60 | 4 |
| HSXR2010R0.2L2 0450 | 1 | R0.2 | 0.75 | 2 | 0.95 | 12 | 50 | 4 |
| HSXR2010R0.2L3 0450 | 1 | R0.2 | 0.75 | 3 | 0.95 | 12 | 50 | 4 |
| HSXR2010R0.2L4 0450 | 1 | R0.2 | 0.75 | 4 | 0.95 | 12 | 50 | 4 |
| HSXR2010R0.2L5 0450 | 1 | R0.2 | 0.75 | 5 | 0.95 | 12 | 50 | 4 |
| HSXR2010R0.2L6 0450 | 1 | R0.2 | 0.75 | 6 | 0.95 | 12 | 50 | 4 |
| HSXR2010R0.2L8 0450 | 1 | R0.2 | 0.75 | 8 | 0.95 | 12 | 50 | 4 |
| HSXR2010R0.2L10 0450 | 1 | R0.2 | 0.75 | 10 | 0.95 | 12 | 50 | 4 |
| HSXR2010R0.2L12 0450 | 1 | R0.2 | 0.75 | 12 | 0.95 | 12 | 50 | 4 |
| HSXR2010R0.2L16 0450 | 1 | R0.2 | 0.75 | 16 | 0.95 | 12 | 50 | 4 |
| HSXR2010R0.2L20 0460 | 1 | R0.2 | 0.75 | 20 | 0.95 | 12 | 60 | 4 |
| HSXR2010R0.3L3 0450 | 1 | R0.3 | 0.75 | 3 | 0.95 | 12 | 50 | 4 |
| HSXR2010R0.3L4 0450 | 1 | R0.3 | 0.75 | 4 | 0.95 | 12 | 50 | 4 |
| HSXR2010R0.3L5 0450 | 1 | R0.3 | 0.75 | 5 | 0.95 | 12 | 50 | 4 |
| HSXR2010R0.3L6 0450 | 1 | R0.3 | 0.75 | 6 | 0.95 | 12 | 50 | 4 |
| HSXR2010R0.3L8 0450 | 1 | R0.3 | 0.75 | 8 | 0.95 | 12 | 50 | 4 |
| HSXR2010R0.3L10 0450 | 1 | R0.3 | 0.75 | 10 | 0.95 | 12 | 50 | 4 |
| HSXR2010R0.3L12 0450 | 1 | R0.3 | 0.75 | 12 | 0.95 | 12 | 50 | 4 |
| HSXR2010R0.3L16 0450 | 1 | R0.3 | 0.75 | 16 | 0.95 | 12 | 50 | 4 |
| HSXR2010R0.3L20 0460 | 1 | R0.3 | 0.75 | 20 | 0.95 | 12 | 60 | 4 |
| HSXR2015R0.05L4 0450 | 1.5 | R0.05 | 1.2 | 4 | 1.42 | 11 | 50 | 4 |
| HSXR2015R0.05L6 0450 | 1.5 | R0.05 | 1.2 | 6 | 1.42 | 11 | 50 | 4 |
| HSXR2015R0.05L8 0450 | 1.5 | R0.05 | 1.2 | 8 | 1.42 | 11 | 50 | 4 |
| HSXR2015R0.05L10 0450 | 1.5 | R0.05 | 1.2 | 10 | 1.42 | 11 | 50 | 4 |

# HSXR2L 2-Flutes Long Neck Corner Radius End Mill

Unit:mm

| Type No. | Dia. | Radius | Length of Cut | Under Neck Length | Neck Dia. | Neck Taper Angle | Overall Length | Shank Dia. |
|---|---|---|---|---|---|---|---|---|
| | ϕD | CR | ℓ | $\ell_1$ | $\phi d_1$ | γ/° | L | ϕd |
| HSXR2015R0.05L12 0450 | 1.5 | R0.05 | 1.2 | 12 | 1.42 | 11 | 50 | 4 |
| HSXR2015R0.05L16 0450 | 1.5 | R0.05 | 1.2 | 16 | 1.42 | 11 | 50 | 4 |
| HSXR2015R0.05L20 0460 | 1.5 | R0.05 | 1.2 | 20 | 1.42 | 11 | 60 | 4 |
| HSXR2015R0.1L4 0450 | 1.5 | R0.1 | 1.2 | 4 | 1.42 | 11 | 50 | 4 |
| HSXR2015R0.1L6 0450 | 1.5 | R0.1 | 1.2 | 6 | 1.42 | 11 | 50 | 4 |
| HSXR2015R0.1L8 0450 | 1.5 | R0.1 | 1.2 | 8 | 1.42 | 11 | 50 | 4 |
| HSXR2015R0.1L10 0450 | 1.5 | R0.1 | 1.2 | 10 | 1.42 | 11 | 50 | 4 |
| HSXR2015R0.1L12 0450 | 1.5 | R0.1 | 1.2 | 12 | 1.42 | 11 | 50 | 4 |
| HSXR2015R0.1L16 0450 | 1.5 | R0.1 | 1.2 | 16 | 1.42 | 11 | 50 | 4 |
| HSXR2015R0.1L20 0460 | 1.5 | R0.1 | 1.2 | 20 | 1.42 | 11 | 60 | 4 |
| HSXR2015R0.2L4 0450 | 1.5 | R0.2 | 1.2 | 4 | 1.42 | 11 | 50 | 4 |
| HSXR2015R0.2L6 0450 | 1.5 | R0.2 | 1.2 | 6 | 1.42 | 11 | 50 | 4 |
| HSXR2015R0.2L8 0450 | 1.5 | R0.2 | 1.2 | 8 | 1.42 | 11 | 50 | 4 |
| HSXR2015R0.2L10 0450 | 1.5 | R0.2 | 1.2 | 10 | 1.42 | 11 | 50 | 4 |
| HSXR2015R0.2L12 0450 | 1.5 | R0.2 | 1.2 | 12 | 1.42 | 11 | 50 | 4 |
| HSXR2015R0.2L15 0450 | 1.5 | R0.2 | 1.2 | 15 | 1.42 | 11 | 50 | 4 |
| HSXR2015R0.2L16 0450 | 1.5 | R0.2 | 1.2 | 16 | 1.42 | 11 | 50 | 4 |
| HSXR2015R0.2L20 0460 | 1.5 | R0.2 | 1.2 | 20 | 1.42 | 11 | 60 | 4 |
| HSXR2015R0.3L4 0450 | 1.5 | R0.3 | 1.2 | 4 | 1.42 | 11 | 50 | 4 |
| HSXR2015R0.3L6 0450 | 1.5 | R0.3 | 1.2 | 6 | 1.42 | 11 | 50 | 4 |
| HSXR2015R0.3L8 0450 | 1.5 | R0.3 | 1.2 | 8 | 1.42 | 11 | 50 | 4 |
| HSXR2015R0.3L10 0450 | 1.5 | R0.3 | 1.2 | 10 | 1.42 | 11 | 50 | 4 |
| HSXR2015R0.3L12 0450 | 1.5 | R0.3 | 1.2 | 12 | 1.42 | 11 | 50 | 4 |
| HSXR2015R0.3L16 0450 | 1.5 | R0.3 | 1.2 | 16 | 1.42 | 11 | 50 | 4 |
| HSXR2015R0.3L20 0460 | 1.5 | R0.3 | 1.2 | 20 | 1.42 | 11 | 60 | 4 |
| HSXR2015R0.5L4 0450 | 1.5 | R0.5 | 1.2 | 4 | 1.42 | 11 | 50 | 4 |
| HSXR2015R0.5L6 0450 | 1.5 | R0.5 | 1.2 | 6 | 1.42 | 11 | 50 | 4 |
| HSXR2015R0.5L8 0450 | 1.5 | R0.5 | 1.2 | 8 | 1.42 | 11 | 50 | 4 |
| HSXR2015R0.5L10 0450 | 1.5 | R0.5 | 1.2 | 10 | 1.42 | 11 | 50 | 4 |
| HSXR2015R0.5L12 0450 | 1.5 | R0.5 | 1.2 | 12 | 1.42 | 11 | 50 | 4 |
| HSXR2015R0.5L16 0450 | 1.5 | R0.5 | 1.2 | 16 | 1.42 | 11 | 50 | 4 |
| HSXR2015R0.5L20 0460 | 1.5 | R0.5 | 1.2 | 20 | 1.42 | 11 | 60 | 4 |
| HSXR20175R0.2L5 0450 | 1.75 | R0.2 | 1.4 | 5 | 1.67 | 11 | 50 | 4 |
| HSXR20175R0.2L10 0450 | 1.75 | R0.2 | 1.4 | 10 | 1.67 | 11 | 50 | 4 |



BALL NOSE END MILL
HSX SERIES

# HSXR2L 2-Flutes Long Neck Corner Radius End Mill

Unit:mm

| Type No. | Dia. | Radius | Length of Cut | Under Neck Length | Neck Dia. | Neck Taper Angle | Overall Length | Shank Dia. |
|---|---|---|---|---|---|---|---|---|
| | ϕD | CR | ℓ | $\ell_1$ | $\phi d_1$ | γ/° | L | ϕd |
| HSXR20175R0.2L15 0450 | 1.75 | R0.2 | 1.4 | 15 | 1.67 | 11 | 50 | 4 |
| HSXR2020R0.05L6 0450 | 2 | R0.05 | 1.6 | 6 | 1.9 | 11 | 50 | 4 |
| HSXR2020R0.05L8 0450 | 2 | R0.05 | 1.6 | 8 | 1.9 | 11 | 50 | 4 |
| HSXR2020R0.05L10 0450 | 2 | R0.05 | 1.6 | 10 | 1.9 | 11 | 50 | 4 |
| HSXR2020R0.05L12 0450 | 2 | R0.05 | 1.6 | 12 | 1.9 | 11 | 50 | 4 |
| HSXR2020R0.05L16 0450 | 2 | R0.05 | 1.6 | 16 | 1.9 | 11 | 50 | 4 |
| HSXR2020R0.05L20 0460 | 2 | R0.05 | 1.6 | 20 | 1.9 | 11 | 60 | 4 |
| HSXR2020R0.05L25 0460 | 2 | R0.05 | 1.6 | 25 | 1.9 | 11 | 60 | 4 |
| HSXR2020R0.05L30 0475 | 2 | R0.05 | 1.6 | 30 | 1.9 | 11 | 75 | 4 |
| HSXR2020R0.1L6 0450 | 2 | R0.1 | 1.6 | 6 | 1.9 | 11 | 50 | 4 |
| HSXR2020R0.1L8 0450 | 2 | R0.1 | 1.6 | 8 | 1.9 | 11 | 50 | 4 |
| HSXR2020R0.1L10 0450 | 2 | R0.1 | 1.6 | 10 | 1.9 | 11 | 50 | 4 |
| HSXR2020R0.1L12 0450 | 2 | R0.1 | 1.6 | 12 | 1.9 | 11 | 50 | 4 |
| HSXR2020R0.1L16 0450 | 2 | R0.1 | 1.6 | 16 | 1.9 | 11 | 50 | 4 |
| HSXR2020R0.1L20 0460 | 2 | R0.1 | 1.6 | 20 | 1.9 | 11 | 60 | 4 |
| HSXR2020R0.1L25 0460 | 2 | R0.1 | 1.6 | 25 | 1.9 | 11 | 60 | 4 |
| HSXR2020R0.1L30 0475 | 2 | R0.1 | 1.6 | 30 | 1.9 | 11 | 75 | 4 |
| HSXR2020R0.2L4 0450 | 2 | R0.2 | 1.6 | 4 | 1.9 | 11 | 50 | 4 |
| HSXR2020R0.2L6 0450 | 2 | R0.2 | 1.6 | 6 | 1.9 | 11 | 50 | 4 |
| HSXR2020R0.2L8 0450 | 2 | R0.2 | 1.6 | 8 | 1.9 | 11 | 50 | 4 |
| HSXR2020R0.2L10 0450 | 2 | R0.2 | 1.6 | 10 | 1.9 | 11 | 50 | 4 |
| HSXR2020R0.2L12 0450 | 2 | R0.2 | 1.6 | 12 | 1.9 | 11 | 50 | 4 |
| HSXR2020R0.2L16 0450 | 2 | R0.2 | 1.6 | 16 | 1.9 | 11 | 50 | 4 |
| HSXR2020R0.2L20 0450 | 2 | R0.2 | 1.6 | 20 | 1.9 | 11 | 50 | 4 |
| HSXR2020R0.2L20 0460 | 2 | R0.2 | 1.6 | 20 | 1.9 | 11 | 60 | 4 |
| HSXR2020R0.2L25 0460 | 2 | R0.2 | 1.6 | 25 | 1.9 | 11 | 60 | 4 |
| HSXR2020R0.2L30 0475 | 2 | R0.2 | 1.6 | 30 | 1.9 | 11 | 75 | 4 |
| HSXR2020R0.3L6 0450 | 2 | R0.3 | 1.6 | 6 | 1.9 | 11 | 50 | 4 |
| HSXR2020R0.3L8 0450 | 2 | R0.3 | 1.6 | 8 | 1.9 | 11 | 50 | 4 |
| HSXR2020R0.3L10 0450 | 2 | R0.3 | 1.6 | 10 | 1.9 | 11 | 50 | 4 |
| HSXR2020R0.3L12 0450 | 2 | R0.3 | 1.6 | 12 | 1.9 | 11 | 50 | 4 |
| HSXR2020R0.3L16 0450 | 2 | R0.3 | 1.6 | 16 | 1.9 | 11 | 50 | 4 |
| HSXR2020R0.3L20 0460 | 2 | R0.3 | 1.6 | 20 | 1.9 | 11 | 60 | 4 |
| HSXR2020R0.3L25 0460 | 2 | R0.3 | 1.6 | 25 | 1.9 | 11 | 60 | 4 |

# HSXR2L 2-Flutes Long Neck Corner Radius End Mill

Unit:mm

| Type No. | Dia. | Radius | Length of Cut | Under Neck Length | Neck Dia. | Neck Taper Angle | Overall Length | Shank Dia. |
|---|---|---|---|---|---|---|---|---|
| | ϕD | CR | ℓ | $\ell_1$ | $\phi d_1$ | γ/° | L | ϕd |
| HSXR2020R0.3L30 0475 | 2 | R0.3 | 1.6 | 30 | 1.9 | 11 | 75 | 4 |
| HSXR2020R0.5L6 0450 | 2 | R0.5 | 1.6 | 6 | 1.9 | 11 | 50 | 4 |
| HSXR2020R0.5L8 0450 | 2 | R0.5 | 1.6 | 8 | 1.9 | 11 | 50 | 4 |
| HSXR2020R0.5L10 0450 | 2 | R0.5 | 1.6 | 10 | 1.9 | 11 | 50 | 4 |
| HSXR2020R0.5L12 0450 | 2 | R0.5 | 1.6 | 12 | 1.9 | 11 | 50 | 4 |
| HSXR2020R0.5L16 0450 | 2 | R0.5 | 1.6 | 16 | 1.9 | 11 | 50 | 4 |
| HSXR2020R0.5L20 0460 | 2 | R0.5 | 1.6 | 20 | 1.9 | 11 | 60 | 4 |
| HSXR2020R0.5L25 0460 | 2 | R0.5 | 1.6 | 25 | 1.9 | 11 | 60 | 4 |
| HSXR2020R0.5L30 0475 | 2 | R0.5 | 1.6 | 30 | 1.9 | 11 | 75 | 4 |
| HSXR2025R0.2L10 0450 | 2.5 | R0.2 | 2 | 10 | 2.4 | 11 | 50 | 4 |
| HSXR2025R0.2L20 0460 | 2.5 | R0.2 | 2 | 20 | 2.4 | 11 | 60 | 4 |
| HSXR2025R0.2L30 0475 | 2.5 | R0.2 | 2 | 30 | 2.4 | 11 | 75 | 4 |
| HSXR2025R0.5L10 0450 | 2.5 | R0.5 | 2 | 10 | 2.4 | 11 | 50 | 4 |
| HSXR2025R0.5L20 0460 | 2.5 | R0.5 | 2 | 20 | 2.4 | 11 | 60 | 4 |
| HSXR2025R0.5L30 0475 | 2.5 | R0.5 | 2 | 30 | 2.4 | 11 | 75 | 4 |
| HSXR2030R0.1L8 0660 | 3 | R0.1 | 2.4 | 8 | 2.9 | 11 | 60 | 6 |
| HSXR2030R0.1L10 0660 | 3 | R0.1 | 2.4 | 10 | 2.9 | 11 | 60 | 6 |
| HSXR2030R0.1L12 0660 | 3 | R0.1 | 2.4 | 12 | 2.9 | 11 | 60 | 6 |
| HSXR2030R0.1L16 0660 | 3 | R0.1 | 2.4 | 16 | 2.9 | 11 | 60 | 6 |
| HSXR2030R0.1L20 0660 | 3 | R0.1 | 2.4 | 20 | 2.9 | 11 | 60 | 6 |
| HSXR2030R0.1L25 0675 | 3 | R0.1 | 2.4 | 25 | 2.9 | 11 | 75 | 6 |
| HSXR2030R0.1L30 0675 | 3 | R0.1 | 2.4 | 30 | 2.9 | 11 | 75 | 6 |
| HSXR2030R0.1L35 0675 | 3 | R0.1 | 2.4 | 35 | 2.9 | 11 | 75 | 6 |
| HSXR2030R0.1L40 06100 | 3 | R0.1 | 2.4 | 40 | 2.9 | 11 | 100 | 6 |
| HSXR2030R0.2L8 0660 | 3 | R0.2 | 2.4 | 8 | 2.9 | 11 | 60 | 6 |
| HSXR2030R0.2L10 0660 | 3 | R0.2 | 2.4 | 10 | 2.9 | 11 | 60 | 6 |
| HSXR2030R0.2L12 0660 | 3 | R0.2 | 2.4 | 12 | 2.9 | 11 | 60 | 6 |
| HSXR2030R0.2L16 0660 | 3 | R0.2 | 2.4 | 16 | 2.9 | 11 | 60 | 6 |
| HSXR2030R0.2L20 0660 | 3 | R0.2 | 2.4 | 20 | 2.9 | 11 | 60 | 6 |
| HSXR2030R0.2L25 0675 | 3 | R0.2 | 2.4 | 25 | 2.9 | 11 | 75 | 6 |
| HSXR2030R0.2L30 0675 | 3 | R0.2 | 2.4 | 30 | 2.9 | 11 | 75 | 6 |
| HSXR2030R0.2L35 0675 | 3 | R0.2 | 2.4 | 35 | 2.9 | 11 | 75 | 6 |
| HSXR2030R0.2L40 06100 | 3 | R0.2 | 2.4 | 40 | 2.9 | 11 | 100 | 6 |
| HSXR2030R0.3L8 0660 | 3 | R0.3 | 2.4 | 8 | 2.9 | 11 | 60 | 6 |



HSXR2L 2-Flutes Long Neck Corner Radius End Mill

Unit:mm

| Type No. | Dia. | Radius | Length of Cut | Under Neck Length | Neck Dia. | Neck Taper Angle | Overall Length | Shank Dia. |
|---|---|---|---|---|---|---|---|---|
| | ϕD | CR | ℓ | $\ell_1$ | $\phi d_1$ | γ/° | L | ϕd |
| HSXR2030R0.3L10 0660 | 3 | R0.3 | 2.4 | 10 | 2.9 | 11 | 60 | 6 |
| HSXR2030R0.3L12 0660 | 3 | R0.3 | 2.4 | 12 | 2.9 | 11 | 60 | 6 |
| HSXR2030R0.3L16 0660 | 3 | R0.3 | 2.4 | 16 | 2.9 | 11 | 60 | 6 |
| HSXR2030R0.3L20 0660 | 3 | R0.3 | 2.4 | 20 | 2.9 | 11 | 60 | 6 |
| HSXR2030R0.3L25 0675 | 3 | R0.3 | 2.4 | 25 | 2.9 | 11 | 75 | 6 |
| HSXR2030R0.3L30 0675 | 3 | R0.3 | 2.4 | 30 | 2.9 | 11 | 75 | 6 |
| HSXR2030R0.3L35 0675 | 3 | R0.3 | 2.4 | 35 | 2.9 | 11 | 75 | 6 |
| HSXR2030R0.3L40 06100 | 3 | R0.3 | 2.4 | 40 | 2.9 | 11 | 100 | 6 |
| HSXR2030R0.5L8 0660 | 3 | R0.5 | 2.4 | 8 | 2.9 | 11 | 60 | 6 |
| HSXR2030R0.5L10 0660 | 3 | R0.5 | 2.4 | 10 | 2.9 | 11 | 60 | 6 |
| HSXR2030R0.5L12 0660 | 3 | R0.5 | 2.4 | 12 | 2.9 | 11 | 60 | 6 |
| HSXR2030R0.5L16 0660 | 3 | R0.5 | 2.4 | 16 | 2.9 | 11 | 60 | 6 |
| HSXR2030R0.5L20 0660 | 3 | R0.5 | 2.4 | 20 | 2.9 | 11 | 60 | 6 |
| HSXR2030R0.5L25 0675 | 3 | R0.5 | 2.4 | 25 | 2.9 | 11 | 75 | 6 |
| HSXR2030R0.5L30 0675 | 3 | R0.5 | 2.4 | 30 | 2.9 | 11 | 75 | 6 |
| HSXR2030R0.5L35 0675 | 3 | R0.5 | 2.4 | 35 | 2.9 | 11 | 75 | 6 |
| HSXR2030R0.5L40 06100 | 3 | R0.5 | 2.4 | 40 | 2.9 | 11 | 100 | 6 |
| HSXR2040R0.1L10 0660 | 4 | R0.1 | 3.2 | 10 | 3.9 | 11 | 60 | 6 |
| HSXR2040R0.1L12 0660 | 4 | R0.1 | 3.2 | 12 | 3.9 | 11 | 60 | 6 |
| HSXR2040R0.1L16 0660 | 4 | R0.1 | 3.2 | 16 | 3.9 | 11 | 60 | 6 |
| HSXR2040R0.1L20 0660 | 4 | R0.1 | 3.2 | 20 | 3.9 | 11 | 60 | 6 |
| HSXR2040R0.1L25 0675 | 4 | R0.1 | 3.2 | 25 | 3.9 | 11 | 75 | 6 |
| HSXR2040R0.1L30 0675 | 4 | R0.1 | 3.2 | 30 | 3.9 | 11 | 75 | 6 |
| HSXR2040R0.1L35 0675 | 4 | R0.1 | 3.2 | 35 | 3.9 | 11 | 75 | 6 |
| HSXR2040R0.1L40 06100 | 4 | R0.1 | 3.2 | 40 | 3.9 | 11 | 100 | 6 |
| HSXR2040R0.1L45 06100 | 4 | R0.1 | 3.2 | 45 | 3.9 | 11 | 100 | 6 |
| HSXR2040R0.1L50 06100 | 4 | R0.1 | 3.2 | 50 | 3.9 | 11 | 100 | 6 |
| HSXR2040R0.2L10 0660 | 4 | R0.2 | 3.2 | 10 | 3.9 | 11 | 60 | 6 |
| HSXR2040R0.2L12 0660 | 4 | R0.2 | 3.2 | 12 | 3.9 | 11 | 60 | 6 |
| HSXR2040R0.2L16 0660 | 4 | R0.2 | 3.2 | 16 | 3.9 | 11 | 60 | 6 |
| HSXR2040R0.2L20 0660 | 4 | R0.2 | 3.2 | 20 | 3.9 | 11 | 60 | 6 |
| HSXR2040R0.2L25 0675 | 4 | R0.2 | 3.2 | 25 | 3.9 | 11 | 75 | 6 |
| HSXR2040R0.2L30 0675 | 4 | R0.2 | 3.2 | 30 | 3.9 | 11 | 75 | 6 |
| HSXR2040R0.2L35 0675 | 4 | R0.2 | 3.2 | 35 | 3.9 | 11 | 75 | 6 |

# HSXR2L 2-Flutes Long Neck Corner Radius End Mill

Unit:mm

| Type No. | Dia. | Radius | Length of Cut | Under Neck Length | Neck Dia. | Neck Taper Angle | Overall Length | Shank Dia. |
|---|---|---|---|---|---|---|---|---|
| | ϕD | CR | ℓ | $\ell_1$ | $\phi d_1$ | γ/° | L | ϕd |
| HSXR2040R0.2L40 06100 | 4 | R0.2 | 3.2 | 40 | 3.9 | 11 | 100 | 6 |
| HSXR2040R0.2L45 06100 | 4 | R0.2 | 3.2 | 45 | 3.9 | 11 | 100 | 6 |
| HSXR2040R0.2L50 06100 | 4 | R0.2 | 3.2 | 50 | 3.9 | 11 | 100 | 6 |
| HSXR2040R0.3L10 0660 | 4 | R0.3 | 3.2 | 10 | 3.9 | 11 | 60 | 6 |
| HSXR2040R0.3L12 0660 | 4 | R0.3 | 3.2 | 12 | 3.9 | 11 | 60 | 6 |
| HSXR2040R0.3L16 0660 | 4 | R0.3 | 3.2 | 16 | 3.9 | 11 | 60 | 6 |
| HSXR2040R0.3L20 0660 | 4 | R0.3 | 3.2 | 20 | 3.9 | 11 | 60 | 6 |
| HSXR2040R0.3L25 0675 | 4 | R0.3 | 3.2 | 25 | 3.9 | 11 | 75 | 6 |
| HSXR2040R0.3L30 0675 | 4 | R0.3 | 3.2 | 30 | 3.9 | 11 | 75 | 6 |
| HSXR2040R0.3L35 0675 | 4 | R0.3 | 3.2 | 35 | 3.9 | 11 | 75 | 6 |
| HSXR2040R0.3L40 06100 | 4 | R0.3 | 3.2 | 40 | 3.9 | 11 | 100 | 6 |
| HSXR2040R0.3L45 06100 | 4 | R0.3 | 3.2 | 45 | 3.9 | 11 | 100 | 6 |
| HSXR2040R0.3L50 06100 | 4 | R0.3 | 3.2 | 50 | 3.9 | 11 | 100 | 6 |
| HSXR2040R0.5L10 0660 | 4 | R0.5 | 3.2 | 10 | 3.9 | 11 | 60 | 6 |
| HSXR2040R0.5L12 0660 | 4 | R0.5 | 3.2 | 12 | 3.9 | 11 | 60 | 6 |
| HSXR2040R0.5L16 0660 | 4 | R0.5 | 3.2 | 16 | 3.9 | 11 | 60 | 6 |
| HSXR2040R0.5L20 0660 | 4 | R0.5 | 3.2 | 20 | 3.9 | 11 | 60 | 6 |
| HSXR2040R0.5L25 0675 | 4 | R0.5 | 3.2 | 25 | 3.9 | 11 | 75 | 6 |
| HSXR2040R0.5L30 0675 | 4 | R0.5 | 3.2 | 30 | 3.9 | 11 | 75 | 6 |
| HSXR2040R0.5L35 0675 | 4 | R0.5 | 3.2 | 35 | 3.9 | 11 | 75 | 6 |
| HSXR2040R0.5L40 06100 | 4 | R0.5 | 3.2 | 40 | 3.9 | 11 | 100 | 6 |
| HSXR2040R0.5L45 06100 | 4 | R0.5 | 3.2 | 45 | 3.9 | 11 | 100 | 6 |
| HSXR2040R0.5L50 06100 | 4 | R0.5 | 3.2 | 50 | 3.9 | 11 | 100 | 6 |
| HSXR2040R1.0L10 0660 | 4 | R1 | 3.2 | 10 | 3.9 | 11 | 60 | 6 |
| HSXR2040R1.0L12 0660 | 4 | R1 | 3.2 | 12 | 3.9 | 11 | 60 | 6 |
| HSXR2040R1.0L16 0660 | 4 | R1 | 3.2 | 16 | 3.9 | 11 | 60 | 6 |
| HSXR2040R1.0L20 0660 | 4 | R1 | 3.2 | 20 | 3.9 | 11 | 60 | 6 |
| HSXR2040R1.0L25 0675 | 4 | R1 | 3.2 | 25 | 3.9 | 11 | 75 | 6 |
| HSXR2040R1.0L30 0675 | 4 | R1 | 3.2 | 30 | 3.9 | 11 | 75 | 6 |
| HSXR2040R1.0L35 0675 | 4 | R1 | 3.2 | 35 | 3.9 | 11 | 75 | 6 |
| HSXR2040R1.0L40 06100 | 4 | R1 | 3.2 | 40 | 3.9 | 11 | 100 | 6 |
| HSXR2040R1.0L45 06100 | 4 | R1 | 3.2 | 45 | 3.9 | 11 | 100 | 6 |
| HSXR2040R1.0L50 06100 | 4 | R1 | 3.2 | 50 | 3.9 | 11 | 100 | 6 |



BALL NOSE END MILL
HSX SERIES

# HSXR2L 2-Flutes Long Neck Corner Radius End Mill

Unit:mm

| Type No. | Dia. | Radius | Length of Cut | Under Neck Length | Neck Dia. | Neck Taper Angle | Overall Length | Shank Dia. |
|---|---|---|---|---|---|---|---|---|
| | ϕD | CR | ℓ | $\ell_1$ | $\phi d_1$ | γ/° | L | ϕd |
| HSXR2060R0.5L18 0660 | 6 | R0.5 | 4.8 | 18 | 5.85 | – | 60 | 6 |
| HSXR2060R0.5L24 0675 | 6 | R0.5 | 4.8 | 24 | 5.85 | – | 75 | 6 |
| HSXR2060R0.5L36 0675 | 6 | R0.5 | 4.8 | 36 | 5.85 | – | 75 | 6 |

TABLE OF RECOMMENDED MILLING MATERIALS

○Very suitable ○Suitable

| CARBON STEELS / PREHARDENED STEELS | ALLOY STEELS / TOOL STEELS | PREHARDENED STEELS | | HARDENED STEELS | | STANLESS STEELS | CASTIRON DUCTILE CAST IRON | COPPER ALLOYS | ALUMINUM ALLOY | GRAPHITE | TITANIUM ALLOY | HEAT RESISTANT ALLOYS | PLASTIC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~40HRC | | ~45HRC | ~55HRC | ~60HRC | ~65HRC | ~35HRC | ~350HB | | | | | | |
| ○ | | ○ | ◎ | ◎ | ○ | ○ | ○ | ○ | | | ○ | ○ | |

# Cutting Parameter

## HSXR2L 2-Flutes Long Neck Corner Radius End Mill Z-Level Milling

| Workpiece | | | Pre-Hardened Steels (30-45HRC) | | | | Hardened Steels (45-55HRC) | | | | Hardened Steels (55-65HRC) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Radius/mm | Radius/mm | Underneck/mm | n/min$^{-1}$ | Vf-mm/min | ap/mm | ae/mm | n/min$^{-1}$ | Vf-mm/min | ap/mm | ae/mm | n/min$^{-1}$ | Vf-mm/min | ap/mm | ae/mm |
| 0.2 | R0.02 | 0.5 | 36000 | 360 | 0.006 | 0.12 | 30000 | 300 | 0.005 | 0.12 | 24000 | 200 | 0.003 | 0.1 |
| | | 1 | 36000 | 300 | 0.006 | 0.12 | 30000 | 240 | 0.005 | 0.12 | 24000 | 150 | 0.003 | 0.1 |
| | | 1.5 | 36000 | 240 | 0.004 | 0.12 | 30000 | 180 | 0.003 | 0.12 | 24000 | 100 | 0.002 | 0.1 |
| | | 2 | 36000 | 180 | 0.004 | 0.12 | 30000 | 120 | 0.003 | 0.12 | 24000 | 50 | 0.002 | 0.1 |
| | R0.05 | 0.5 | 36000 | 440 | 0.006 | 0.12 | 30000 | 400 | 0.005 | 0.12 | 24000 | 300 | 0.003 | 0.1 |
| | | 1 | 36000 | 360 | 0.006 | 0.12 | 30000 | 300 | 0.005 | 0.12 | 24000 | 200 | 0.003 | 0.1 |
| | | 1.5 | 36000 | 240 | 0.004 | 0.12 | 30000 | 200 | 0.003 | 0.12 | 24000 | 150 | 0.002 | 0.1 |
| | | 2 | 36000 | 200 | 0.004 | 0.12 | 30000 | 150 | 0.003 | 0.12 | 24000 | 100 | 0.002 | 0.1 |
| 0.3 | R0.02 | 1 | 36000 | 350 | 0.006 | 0.18 | 30000 | 350 | 0.006 | 0.18 | 24000 | 300 | 0.003 | 0.15 |
| | | 1.5 | 36000 | 260 | 0.006 | 0.18 | 30000 | 260 | 0.006 | 0.18 | 24000 | 200 | 0.003 | 0.15 |
| | | 2 | 36000 | 180 | 0.004 | 0.18 | 30000 | 180 | 0.004 | 0.18 | 24000 | 150 | 0.003 | 0.15 |
| | | 2.5 | 36000 | 150 | 0.004 | 0.18 | 30000 | 150 | 0.004 | 0.18 | 24000 | 100 | 0.002 | 0.15 |
| | | 3 | 36000 | 70 | 0.004 | 0.18 | 30000 | 70 | 0.004 | 0.18 | 24000 | 50 | 0.002 | 0.15 |
| | R0.05 | 1 | 36000 | 450 | 0.008 | 0.18 | 30000 | 400 | 0.007 | 0.18 | 24000 | 350 | 0.003 | 0.15 |
| | | 1.5 | 36000 | 330 | 0.008 | 0.18 | 30000 | 300 | 0.007 | 0.18 | 24000 | 250 | 0.003 | 0.15 |
| | | 2 | 36000 | 280 | 0.006 | 0.18 | 30000 | 250 | 0.005 | 0.18 | 24000 | 200 | 0.003 | 0.15 |
| | | 2.5 | 36000 | 250 | 0.005 | 0.18 | 30000 | 200 | 0.004 | 0.18 | 24000 | 150 | 0.002 | 0.15 |
| | | 3 | 36000 | 150 | 0.005 | 0.18 | 30000 | 100 | 0.004 | 0.18 | 24000 | 80 | 0.002 | 0.15 |
| 0.4 | R0.02 | 1 | 36000 | 500 | 0.006 | 0.28 | 30000 | 450 | 0.006 | 0.24 | 24000 | 400 | 0.005 | 0.2 |
| | | 1.5 | 36000 | 440 | 0.006 | 0.28 | 30000 | 400 | 0.006 | 0.24 | 24000 | 360 | 0.005 | 0.2 |
| | | 2 | 36000 | 400 | 0.004 | 0.28 | 30000 | 360 | 0.004 | 0.24 | 24000 | 320 | 0.004 | 0.2 |
| | | 2.5 | 36000 | 370 | 0.004 | 0.28 | 30000 | 340 | 0.004 | 0.24 | 24000 | 280 | 0.004 | 0.2 |
| | | 3 | 36000 | 350 | 0.004 | 0.28 | 30000 | 320 | 0.004 | 0.24 | 24000 | 260 | 0.004 | 0.2 |
| | | 4 | 36000 | 275 | 0.004 | 0.28 | 30000 | 250 | 0.004 | 0.24 | 24000 | 200 | 0.003 | 0.2 |
| | R0.05 | 1 | 36000 | 600 | 0.012 | 0.28 | 30000 | 500 | 0.01 | 0.24 | 24000 | 400 | 0.005 | 0.2 |
| | | 1.5 | 36000 | 540 | 0.012 | 0.28 | 30000 | 450 | 0.01 | 0.24 | 24000 | 360 | 0.005 | 0.2 |
| | | 2 | 36000 | 490 | 0.012 | 0.28 | 30000 | 410 | 0.01 | 0.24 | 24000 | 328 | 0.005 | 0.2 |
| | | 2.5 | 36000 | 450 | 0.01 | 0.28 | 30000 | 380 | 0.008 | 0.24 | 24000 | 304 | 0.005 | 0.2 |
| | | 3 | 36000 | 430 | 0.01 | 0.28 | 30000 | 360 | 0.008 | 0.24 | 24000 | 288 | 0.004 | 0.2 |
| | | 4 | 36000 | 360 | 0.008 | 0.28 | 30000 | 300 | 0.006 | 0.24 | 24000 | 240 | 0.003 | 0.2 |
| | R0.1 | 1 | 36000 | 660 | 0.012 | 0.28 | 30000 | 550 | 0.01 | 0.24 | 24000 | 440 | 0.005 | 0.2 |
| | | 1.5 | 36000 | 600 | 0.012 | 0.28 | 30000 | 500 | 0.01 | 0.24 | 24000 | 400 | 0.005 | 0.2 |





# Cutting Parameter

## HSXR2L 2-Flutes Long Neck Corner Radius End Mill Z-Level Milling

| Workpiece | | | Pre-Hardened Steels (30-45HRC) | | | | Hardened Steels (45-55HRC) | | | | Hardened Steels (55-65HRC) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Radius/mm | Radius/mm | Underneck/mm | n/min$^{-1}$ | Vf-mm/min | ap/mm | ae/mm | n/min$^{-1}$ | Vf-mm/min | ap/mm | ae/mm | n/min$^{-1}$ | Vf-mm/min | ap/mm | ae/mm |
| 0.4 | R0.1 | 2 | 36000 | 550 | 0.012 | 0.28 | 30000 | 460 | 0.01 | 0.24 | 24000 | 360 | 0.005 | 0.2 |
| | | 2.5 | 36000 | 500 | 0.01 | 0.28 | 30000 | 420 | 0.008 | 0.24 | 24000 | 340 | 0.005 | 0.2 |
| | | 3 | 36000 | 450 | 0.01 | 0.28 | 30000 | 380 | 0.008 | 0.24 | 24000 | 300 | 0.004 | 0.2 |
| | | 4 | 36000 | 420 | 0.008 | 0.28 | 30000 | 350 | 0.006 | 0.24 | 24000 | 280 | 0.003 | 0.2 |
| 0.5 | R0.02 | 1 | 30000 | 600 | 0.006 | 0.14 | 25000 | 500 | 0.006 | 0.15 | 23000 | 400 | 0.006 | 0.1 |
| | | 1.5 | 30000 | 550 | 0.006 | 0.14 | 25000 | 460 | 0.006 | 0.15 | 23000 | 370 | 0.006 | 0.1 |
| | | 2 | 30000 | 500 | 0.005 | 0.14 | 25000 | 420 | 0.005 | 0.15 | 23000 | 340 | 0.005 | 0.1 |
| | | 2.5 | 30000 | 450 | 0.005 | 0.14 | 25000 | 380 | 0.005 | 0.15 | 23000 | 300 | 0.005 | 0.1 |
| | | 3 | 30000 | 420 | 0.004 | 0.14 | 25000 | 350 | 0.004 | 0.15 | 23000 | 280 | 0.004 | 0.1 |
| | | 4 | 25000 | 360 | 0.003 | 0.14 | 25000 | 300 | 0.003 | 0.15 | 23000 | 240 | 0.002 | 0.1 |
| | | 5 | 25000 | 240 | 0.003 | 0.14 | 20000 | 200 | 0.003 | 0.15 | 18000 | 160 | 0.002 | 0.1 |
| | | 6 | 25000 | 190 | 0.003 | 0.14 | 20000 | 160 | 0.003 | 0.15 | 18000 | 130 | 0.001 | 0.1 |
| | R0.05 R0.1 | 1 | 30000 | 720 | 0.03 | 0.14 | 25000 | 600 | 0.01 | 0.15 | 23000 | 480 | 0.007 | 0.1 |
| | | 1.5 | 30000 | 660 | 0.03 | 0.14 | 25000 | 550 | 0.01 | 0.15 | 23000 | 440 | 0.007 | 0.1 |
| | | 2 | 30000 | 576 | 0.025 | 0.14 | 25000 | 480 | 0.01 | 0.15 | 23000 | 384 | 0.007 | 0.1 |
| | | 2.5 | 30000 | 540 | 0.025 | 0.14 | 25000 | 450 | 0.01 | 0.15 | 23000 | 360 | 0.007 | 0.1 |
| | | 3 | 30000 | 480 | 0.02 | 0.14 | 25000 | 400 | 0.008 | 0.15 | 23000 | 320 | 0.005 | 0.1 |
| | | 4 | 25000 | 420 | 0.015 | 0.14 | 25000 | 350 | 0.005 | 0.15 | 23000 | 280 | 0.003 | 0.1 |
| | | 5 | 25000 | 300 | 0.01 | 0.14 | 20000 | 250 | 0.004 | 0.15 | 18000 | 200 | 0.003 | 0.1 |
| | | 6 | 25000 | 240 | 0.008 | 0.14 | 20000 | 200 | 0.003 | 0.15 | 18000 | 160 | 0.002 | 0.1 |
| 0.6 | R0.02 | 2 | 30000 | 600 | 0.006 | 0.2 | 25000 | 500 | 0.006 | 0.2 | 23000 | 400 | 0.006 | 0.15 |
| | | 3 | 28000 | 540 | 0.006 | 0.2 | 24000 | 450 | 0.006 | 0.2 | 21000 | 360 | 0.005 | 0.15 |
| | | 4 | 25000 | 480 | 0.005 | 0.2 | 23000 | 400 | 0.005 | 0.2 | 20000 | 320 | 0.004 | 0.15 |
| | | 6 | 23000 | 240 | 0.005 | 0.2 | 20000 | 200 | 0.004 | 0.2 | 18000 | 160 | 0.003 | 0.15 |
| | | 8 | 18000 | 180 | 0.004 | 0.2 | 16000 | 150 | 0.004 | 0.2 | 14000 | 120 | 0.001 | 0.15 |
| | | 10 | 16000 | 120 | 0.004 | 0.2 | 14000 | 100 | 0.003 | 0.2 | 12000 | 80 | 0.001 | 0.15 |
| | R0.05 R0.1 | 2 | 30000 | 720 | 0.035 | 0.2 | 25000 | 600 | 0.02 | 0.2 | 23000 | 480 | 0.01 | 0.15 |
| | | 3 | 28000 | 600 | 0.03 | 0.2 | 24000 | 500 | 0.02 | 0.2 | 21000 | 400 | 0.008 | 0.15 |
| | | 4 | 25000 | 480 | 0.025 | 0.2 | 23000 | 400 | 0.015 | 0.2 | 20000 | 320 | 0.007 | 0.15 |
| | | 6 | 23000 | 264 | 0.015 | 0.2 | 20000 | 220 | 0.008 | 0.2 | 18000 | 180 | 0.005 | 0.15 |
| | | 8 | 18000 | 216 | 0.01 | 0.2 | 16000 | 180 | 0.005 | 0.2 | 14000 | 140 | 0.002 | 0.15 |
| | | 10 | 16000 | 144 | 0.005 | 0.2 | 14000 | 120 | 0.002 | 0.2 | 12000 | 100 | 0.001 | 0.15 |

# Cutting Parameter

## HSXR2L 2-Flutes Long Neck Corner Radius End Mill Z-Level Milling

| Workpiece | | | Pre-Hardened Steels (30-45HRC) | | | | Hardened Steels (45-55HRC) | | | | Hardened Steels (55-65HRC) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Radius/mm | Radius/mm | Underneck/mm | n/min$^{-1}$ | Vf-mm/min | ap/mm | ae/mm | n/min$^{-1}$ | Vf-mm/min | ap/mm | ae/mm | n/min$^{-1}$ | Vf-mm/min | ap/mm | ae/mm |
| 0.7 | R0.02 | 2 | 30000 | 840 | 0.006 | 0.25 | 25000 | 700 | 0.006 | 0.25 | 23000 | 560 | 0.006 | 0.15 |
| | | 3 | 30000 | 840 | 0.006 | 0.25 | 25000 | 700 | 0.006 | 0.25 | 23000 | 560 | 0.006 | 0.15 |
| | | 4 | 28000 | 720 | 0.005 | 0.25 | 25000 | 600 | 0.005 | 0.25 | 23000 | 480 | 0.005 | 0.15 |
| | | 6 | 25000 | 480 | 0.005 | 0.25 | 20000 | 400 | 0.005 | 0.25 | 18000 | 320 | 0.005 | 0.15 |
| | | 8 | 18000 | 240 | 0.004 | 0.2 | 16000 | 200 | 0.004 | 0.2 | 14000 | 160 | 0.004 | 0.15 |
| | | 10 | 16000 | 216 | 0.003 | 0.2 | 14000 | 180 | 0.003 | 0.2 | 12000 | 140 | 0.003 | 0.15 |
| | R0.05 R0.1 | 2 | 30000 | 840 | 0.05 | 0.25 | 25000 | 700 | 0.03 | 0.25 | 23000 | 560 | 0.02 | 0.15 |
| | | 3 | 30000 | 780 | 0.04 | 0.25 | 25000 | 650 | 0.03 | 0.25 | 23000 | 520 | 0.015 | 0.15 |
| | | 4 | 28000 | 720 | 0.03 | 0.25 | 25000 | 600 | 0.02 | 0.25 | 23000 | 480 | 0.01 | 0.15 |
| | | 6 | 25000 | 480 | 0.02 | 0.25 | 20000 | 400 | 0.01 | 0.25 | 18000 | 320 | 0.01 | 0.15 |
| | | 8 | 18000 | 360 | 0.02 | 0.25 | 16000 | 300 | 0.01 | 0.25 | 14000 | 240 | 0.008 | 0.15 |
| | | 10 | 16000 | 240 | 0.015 | 0.25 | 14000 | 200 | 0.01 | 0.25 | 12000 | 160 | 0.006 | 0.15 |
| 0.8 | R0.02 | 2 | 28000 | 1020 | 0.006 | 0.3 | 25000 | 850 | 0.006 | 0.25 | 23000 | 680 | 0.006 | 0.16 |
| | | 3 | 28000 | 960 | 0.006 | 0.3 | 25000 | 800 | 0.006 | 0.25 | 23000 | 640 | 0.006 | 0.16 |
| | | 4 | 28000 | 840 | 0.005 | 0.3 | 25000 | 700 | 0.005 | 0.25 | 23000 | 560 | 0.005 | 0.16 |
| | | 6 | 23000 | 660 | 0.005 | 0.3 | 20000 | 550 | 0.005 | 0.25 | 18000 | 440 | 0.005 | 0.15 |
| | | 8 | 18000 | 480 | 0.004 | 0.3 | 16000 | 400 | 0.004 | 0.25 | 14000 | 320 | 0.004 | 0.15 |
| | | 10 | 16000 | 360 | 0.004 | 0.25 | 15000 | 300 | 0.004 | 0.20 | 13500 | 240 | 0.004 | 0.12 |
| | | 12 | 14000 | 240 | 0.003 | 0.2 | 13000 | 200 | 0.003 | 0.15 | 12000 | 160 | 0.003 | 0.12 |
| | R0.05 R0.1 | 2 | 28000 | 1200 | 0.02 | 0.3 | 25000 | 1000 | 0.014 | 0.25 | 23000 | 800 | 0.012 | 0.16 |
| | | 3 | 28000 | 1080 | 0.02 | 0.3 | 25000 | 900 | 0.014 | 0.25 | 23000 | 720 | 0.012 | 0.16 |
| | | 4 | 28000 | 960 | 0.015 | 0.3 | 25000 | 800 | 0.012 | 0.25 | 23000 | 640 | 0.01 | 0.16 |
| | | 6 | 23000 | 720 | 0.012 | 0.3 | 20000 | 600 | 0.01 | 0.25 | 18000 | 480 | 0.01 | 0.15 |
| | | 8 | 18000 | 600 | 0.012 | 0.3 | 16000 | 500 | 0.01 | 0.25 | 14000 | 400 | 0.008 | 0.15 |
| | | 10 | 16000 | 480 | 0.01 | 0.25 | 15000 | 400 | 0.008 | 0.20 | 13500 | 320 | 0.006 | 0.12 |
| | | 12 | 14000 | 360 | 0.01 | 0.2 | 13000 | 300 | 0.008 | 0.15 | 12000 | 240 | 0.006 | 0.12 |
| 0.9 | R0.1 | 4 | 25000 | 1200 | 0.05 | 0.3 | 25000 | 900 | 0.03 | 0.3 | 20000 | 800 | 0.02 | 0.2 |
| | | 8 | 18000 | 800 | 0.03 | 0.3 | 16000 | 500 | 0.01 | 0.3 | 14000 | 400 | 0.008 | 0.2 |
| 1 | R0.05 | 3 | 30000 | 1450 | 0.04 | 0.35 | 25000 | 1300 | 0.03 | 0.3 | 22000 | 1000 | 0.025 | 0.3 |
| | | 4 | 30000 | 1440 | 0.03 | 0.35 | 25000 | 1200 | 0.025 | 0.3 | 21000 | 960 | 0.02 | 0.25 |
| | | 5 | 28000 | 1200 | 0.03 | 0.35 | 23000 | 1000 | 0.025 | 0.3 | 20000 | 800 | 0.02 | 0.25 |
| | | 6 | 25000 | 1080 | 0.02 | 0.35 | 21000 | 900 | 0.02 | 0.3 | 18000 | 720 | 0.015 | 0.25 |





# Cutting Parameter

## HSXR2L 2-Flutes Long Neck Corner Radius End Mill

| Workpiece | | | Pre-Hardened Steels (30-45HRC) | | | | Hardened Steels (45-55HRC) | | | | Hardened Steels (55-65HRC) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Radius/mm | Radius/mm | Underneck/mm | n/min$^{-1}$ | Vf-mm/min | ap/mm | ae/mm | n/min$^{-1}$ | Vf-mm/min | ap/mm | ae/mm | n/min$^{-1}$ | Vf-mm/min | ap/mm | ae/mm |
| 0.8 | R0.05 | 8 | 23000 | 960 | 0.02 | 0.35 | 19000 | 800 | 0.02 | 0.3 | 16000 | 640 | 0.015 | 0.25 |
| | | 10 | 20000 | 840 | 0.02 | 0.35 | 16000 | 700 | 0.015 | 0.3 | 14000 | 560 | 0.010 | 0.25 |
| | | 12 | 18000 | 720 | 0.015 | 0.35 | 15000 | 600 | 0.015 | 0.3 | 13000 | 480 | 0.010 | 0.25 |
| | | 16 | 16000 | 480 | 0.015 | 0.35 | 13000 | 400 | 0.01 | 0.3 | 11000 | 320 | 0.008 | 0.25 |
| | | 20 | 14000 | 400 | 0.015 | 0.35 | 13000 | 300 | 0.01 | 0.3 | 11000 | 240 | 0.008 | 0.25 |
| | R0.1 R0.2 R0.3 | 3 | 30000 | 1500 | 0.04 | 0.35 | 25000 | 1350 | 0.03 | 0.3 | 22000 | 1080 | 0.025 | 0.3 |
| | | 4 | 30000 | 1440 | 0.07 | 0.35 | 25000 | 1200 | 0.05 | 0.3 | 21000 | 960 | 0.04 | 0.25 |
| | | 5 | 28000 | 1200 | 0.06 | 0.35 | 23000 | 1000 | 0.05 | 0.3 | 20000 | 800 | 0.04 | 0.25 |
| | | 6 | 25000 | 1080 | 0.055 | 0.35 | 21000 | 900 | 0.04 | 0.3 | 18000 | 720 | 0.03 | 0.25 |
| | | 8 | 23000 | 960 | 0.05 | 0.35 | 19000 | 800 | 0.03 | 0.3 | 16000 | 640 | 0.02 | 0.25 |
| | | 10 | 20000 | 840 | 0.045 | 0.35 | 16000 | 700 | 0.02 | 0.3 | 14000 | 560 | 0.01 | 0.25 |
| | | 12 | 18000 | 720 | 0.035 | 0.35 | 15000 | 600 | 0.015 | 0.3 | 13000 | 480 | 0.008 | 0.25 |
| | | 16 | 18000 | 480 | 0.035 | 0.35 | 15000 | 400 | 0.015 | 0.3 | 13000 | 320 | 0.008 | 0.25 |
| | | 20 | 14000 | 450 | 0.015 | 0.35 | 13000 | 350 | 0.01 | 0.3 | 11000 | 280 | 0.008 | 0.25 |
| 1.5 | R0.05 R0.1 R0.2 R0.3 | 4 | 28000 | 1500 | 0.1 | 0.55 | 24000 | 1250 | 0.05 | 0.5 | 22000 | 1000 | 0.04 | 0.4 |
| | | 6 | 28000 | 1440 | 0.1 | 0.55 | 23000 | 1200 | 0.05 | 0.5 | 20000 | 960 | 0.04 | 0.4 |
| | | 8 | 25000 | 1200 | 0.08 | 0.55 | 21000 | 1000 | 0.05 | 0.5 | 18000 | 800 | 0.04 | 0.4 |
| | | 10 | 23000 | 1080 | 0.08 | 0.55 | 19000 | 900 | 0.045 | 0.5 | 16000 | 720 | 0.03 | 0.4 |
| | | 12 | 20000 | 960 | 0.06 | 0.55 | 16000 | 800 | 0.04 | 0.5 | 14000 | 640 | 0.025 | 0.4 |
| | | 16 | 16000 | 720 | 0.06 | 0.55 | 13000 | 600 | 0.03 | 0.5 | 11000 | 480 | 0.02 | 0.4 |
| | | 20 | 12000 | 480 | 0.03 | 0.55 | 11000 | 400 | 0.02 | 0.5 | 9000 | 320 | 0.007 | 0.4 |
| 2 | R0.05 R0.1 R0.2 R0.3 R0.5 | 6 | 24000 | 1320 | 0.13 | 0.7 | 20000 | 1100 | 0.06 | 0.6 | 17000 | 880 | 0.05 | 0.5 |
| | | 8 | 24000 | 1320 | 0.13 | 0.7 | 20000 | 1100 | 0.06 | 0.6 | 17000 | 880 | 0.05 | 0.5 |
| | | 10 | 22000 | 1200 | 0.12 | 0.7 | 18000 | 1000 | 0.06 | 0.6 | 15000 | 800 | 0.05 | 0.5 |
| | | 12 | 20000 | 1080 | 0.11 | 0.7 | 16000 | 900 | 0.05 | 0.6 | 14000 | 720 | 0.04 | 0.5 |
| | | 16 | 16000 | 840 | 0.09 | 0.7 | 13000 | 700 | 0.04 | 0.6 | 11000 | 560 | 0.03 | 0.5 |
| | | 20 | 14000 | 720 | 0.07 | 0.7 | 11000 | 600 | 0.03 | 0.6 | 9500 | 480 | 0.02 | 0.5 |
| | | 25 | 12000 | 600 | 0.06 | 0.7 | 9000 | 500 | 0.03 | 0.6 | 8000 | 400 | 0.02 | 0.5 |
| | | 30 | 10000 | 480 | 0.05 | 0.7 | 8000 | 400 | 0.02 | 0.6 | 7000 | 320 | 0.01 | 0.5 |
| 3 | R0.1 R0.2 R0.3 R0.5 | 8 | 18000 | 1440 | 0.18 | 1 | 15000 | 1200 | 0.1 | 0.8 | 13000 | 960 | 0.07 | 0.7 |
| | | 10 | 18000 | 1440 | 0.18 | 1 | 15000 | 1200 | 0.1 | 0.8 | 13000 | 960 | 0.07 | 0.7 |
| | | 12 | 16000 | 1320 | 0.17 | 1 | 13000 | 1100 | 0.1 | 0.8 | 11000 | 880 | 0.07 | 0.7 |

# Cutting Parameter

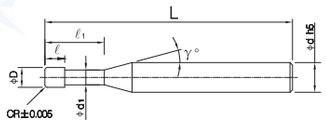
## HSXR2L 2-Flutes Long Neck Corner Radius End Mill Z-Level Milling

| Workpiece | | | Pre-Hardened Steels (30-45HRC) | | | | Hardened Steels (45-55HRC) | | | | Hardened Steels (55-65HRC) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Radius/mm | Radius/mm | Underneck/mm | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm |
| 3 | R0.1<br>R0.2<br>R0.3<br>R0.5 | 16 | 14000 | 1200 | 0.16 | 1 | 11000 | 1000 | 0.1 | 0.8 | 9500 | 800 | 0.07 | 0.07 |
| | | 20 | 13500 | 1080 | 0.16 | 1 | 11000 | 900 | 0.08 | 0.8 | 9500 | 720 | 0.06 | 0.06 |
| | | 25 | 12000 | 900 | 0.14 | 1 | 10000 | 750 | 0.07 | 0.8 | 8500 | 600 | 0.05 | 0.05 |
| | | 30 | 10000 | 780 | 0.12 | 1 | 8000 | 650 | 0.05 | 0.8 | 7000 | 520 | 0.04 | 0.04 |
| | | 35 | 9000 | 600 | 0.08 | 1 | 7500 | 500 | 0.04 | 0.8 | 6500 | 400 | 0.02 | 0.02 |
| | | 40 | 8000 | 480 | 0.06 | 1 | 6500 | 400 | 0.03 | 0.8 | 5500 | 320 | 0.02 | 0.02 |
| 4 | R0.1<br>R0.2<br>R0.3<br>R0.5<br>R1 | 10 | 14000 | 1800 | 0.3 | 2.5 | 13000 | 1500 | 0.15 | 2 | 12000 | 1200 | 0.12 | 0.12 |
| | | 12 | 13000 | 1500 | 0.3 | 2.5 | 12000 | 1300 | 0.15 | 2 | 10000 | 1000 | 0.12 | 0.12 |
| | | 16 | 12000 | 1300 | 0.25 | 1.4 | 10000 | 1100 | 0.15 | 1.2 | 8500 | 900 | 0.1 | 0.1 |
| | | 20 | 12000 | 1300 | 0.25 | 1.4 | 10000 | 1000 | 0.15 | 1.2 | 8500 | 900 | 0.1 | 0.1 |
| | | 25 | 10000 | 1100 | 0.17 | 1.4 | 8000 | 900 | 0.1 | 1.2 | 7000 | 800 | 0.08 | 0.08 |
| | | 30 | 8000 | 800 | 0.14 | 1.4 | 6500 | 800 | 0.08 | 1.2 | 5500 | 660 | 0.08 | 0.08 |
| | | 35 | 6500 | 700 | 0.08 | 1.4 | 5500 | 700 | 0.06 | 1.2 | 4500 | 540 | 0.05 | 0.05 |
| | | 40 | 5800 | 660 | 0.06 | 1.2 | 5200 | 600 | 0.05 | 1 | 4000 | 480 | 0.05 | 0.05 |
| | | 45 | 5200 | 550 | 0.05 | 1.2 | 4800 | 500 | 0.04 | 1 | 3800 | 420 | 0.04 | 0.04 |
| | | 50 | 4800 | 450 | 0.04 | 1.2 | 4500 | 400 | 0.03 | 1 | 3200 | 360 | 0.04 | 0.04 |





# HSXR4L 4-Flutes Long Neck Corner Radius End Mill




UMG AHX 4 30° Spiral Angle Straight Back Angle R <65 HRC

| ⌀D | D Tol. [mm] |
|---|---|
| D<3 | 0~-0.010 |
| 3<D<6 | 0~-0.012 |

Unit:mm

| Type No. | Dia. | Radius | Length of Cut | Under Neck Length | Neck Dia. | Neck Taper Angle | Overall Length | Shank Dia. |
|---|---|---|---|---|---|---|---|---|
| | ϕD | CR | ℓ | ℓ1 | ϕd1 | γ/° | L | ϕd |
| HSXR4008R0.05L2 0450 | 0.8 | R0.05 | 0.6 | 3 | 0.76 | 12 | 50 | 4 |
| HSXR4008R0.05L4 0450 | 0.8 | R0.05 | 0.6 | 4 | 0.76 | 12 | 50 | 4 |
| HSXR4008R0.05L6 0450 | 0.8 | R0.05 | 0.6 | 6 | 0.76 | 12 | 50 | 4 |
| HSXR4008R0.05L8 0450 | 0.8 | R0.05 | 0.6 | 8 | 0.76 | 12 | 50 | 4 |
| HSXR4008R0.05L10 0450 | 0.8 | R0.05 | 0.6 | 10 | 0.76 | 12 | 50 | 4 |
| HSXR4008R0.05L12 0450 | 0.8 | R0.05 | 0.6 | 12 | 0.76 | 12 | 50 | 4 |
| HSXR4008R0.1L2 0450 | 0.8 | R0.1 | 0.6 | 2 | 0.76 | 12 | 50 | 4 |
| HSXR4008R0.1L4 0450 | 0.8 | R0.1 | 0.6 | 4 | 0.76 | 12 | 50 | 4 |
| HSXR4008R0.1L6 0450 | 0.8 | R0.1 | 0.6 | 6 | 0.76 | 12 | 50 | 4 |
| HSXR4008R0.1L8 0450 | 0.8 | R0.1 | 0.6 | 8 | 0.76 | 12 | 50 | 4 |
| HSXR4008R0.1L10 0450 | 0.8 | R0.1 | 0.6 | 10 | 0.76 | 12 | 50 | 4 |
| HSXR4008R0.1L12 0450 | 0.8 | R0.1 | 0.6 | 12 | 0.76 | 12 | 50 | 4 |
| HSXR4010R0.05L4 0450 | 1 | R0.05 | 0.75 | 4 | 0.95 | 12 | 50 | 4 |
| HSXR4010R0.05L6 0450 | 1 | R0.05 | 0.75 | 6 | 0.95 | 12 | 50 | 4 |
| HSXR4010R0.05L8 0450 | 1 | R0.05 | 0.75 | 8 | 0.95 | 12 | 50 | 4 |
| HSXR4010R0.05L10 0450 | 1 | R0.05 | 0.75 | 10 | 0.95 | 12 | 50 | 4 |
| HSXR4010R0.05L12 0450 | 1 | R0.05 | 0.75 | 12 | 0.95 | 12 | 50 | 4 |
| HSXR4010R0.05L16 0450 | 1 | R0.05 | 0.75 | 16 | 0.95 | 12 | 50 | 4 |
| HSXR4010R0.05L20 0460 | 1 | R0.05 | 0.75 | 20 | 0.95 | 12 | 60 | 4 |
| HSXR4010R0.1L4 0450 | 1 | R0.1 | 0.75 | 4 | 0.95 | 12 | 50 | 4 |
| HSXR4010R0.1L6 0450 | 1 | R0.1 | 0.75 | 6 | 0.95 | 12 | 50 | 4 |
| HSXR4010R0.1L8 0450 | 1 | R0.1 | 0.75 | 8 | 0.95 | 12 | 50 | 4 |
| HSXR4010R0.1L10 0450 | 1 | R0.1 | 0.75 | 10 | 0.95 | 12 | 50 | 4 |
| HSXR4010R0.1L12 0450 | 1 | R0.1 | 0.75 | 12 | 0.95 | 12 | 50 | 4 |
| HSXR4010R0.1L16 0450 | 1 | R0.1 | 0.75 | 16 | 0.95 | 12 | 50 | 4 |
| HSXR4010R0.1L20 0460 | 1 | R0.1 | 0.75 | 20 | 0.95 | 12 | 60 | 4 |

# HSXR4L 4-Flutes Long Neck Corner Radius End Mill

Unit:mm

| Type No. | Dia. | Radius | Length of Cut | Under Neck Length | Neck Dia. | Neck Taper Angle | Overall Length | Shank Dia. |
|---|---|---|---|---|---|---|---|---|
| | ϕD | CR | ℓ | $\ell_1$ | $\phi d_1$ | γ/° | L | ϕd |
| HSXR4010R0.2L4 0450 | 1 | R0.2 | 0.75 | 4 | 0.95 | 12 | 50 | 4 |
| HSXR4010R0.2L6 0450 | 1 | R0.2 | 0.75 | 6 | 0.95 | 12 | 50 | 4 |
| HSXR4010R0.2L8 0450 | 1 | R0.2 | 0.75 | 8 | 0.95 | 12 | 50 | 4 |
| HSXR4010R0.2L10 0450 | 1 | R0.2 | 0.75 | 10 | 0.95 | 12 | 50 | 4 |
| HSXR4010R0.2L12 0450 | 1 | R0.2 | 0.75 | 12 | 0.95 | 12 | 50 | 4 |
| HSXR4010R0.2L16 0450 | 1 | R0.2 | 0.75 | 16 | 0.95 | 12 | 50 | 4 |
| HSXR4010R0.2L20 0460 | 1 | R0.2 | 0.75 | 20 | 0.95 | 12 | 60 | 4 |
| HSXR4010R0.3L4 0450 | 1 | R0.3 | 0.75 | 4 | 0.95 | 12 | 50 | 4 |
| HSXR4010R0.3L6 0450 | 1 | R0.3 | 0.75 | 6 | 0.95 | 12 | 50 | 4 |
| HSXR4010R0.3L8 0450 | 1 | R0.3 | 0.75 | 8 | 0.95 | 12 | 50 | 4 |
| HSXR4010R0.3L10 0450 | 1 | R0.3 | 0.75 | 10 | 0.95 | 12 | 50 | 4 |
| HSXR4010R0.3L12 0450 | 1 | R0.3 | 0.75 | 12 | 0.95 | 12 | 50 | 4 |
| HSXR4010R0.3L16 0450 | 1 | R0.3 | 0.75 | 16 | 0.95 | 12 | 50 | 4 |
| HSXR4010R0.3L20 0460 | 1 | R0.3 | 0.75 | 20 | 0.95 | 12 | 60 | 4 |
| HSXR4012R0.05L5 0450 | 1.2 | R0.05 | 1 | 5 | 1.14 | 11 | 50 | 4 |
| HSXR4012R0.05L10 0450 | 1.2 | R0.05 | 1 | 10 | 1.14 | 11 | 50 | 4 |
| HSXR4012R0.1L5 0450 | 1.2 | R0.1 | 1 | 5 | 1.14 | 11 | 50 | 4 |
| HSXR4012R0.1L10 0450 | 1.2 | R0.1 | 1 | 10 | 1.14 | 11 | 50 | 4 |
| HSXR4012R0.2L5 0450 | 1.2 | R0.2 | 1 | 5 | 1.14 | 11 | 50 | 4 |
| HSXR4012R0.2L10 0450 | 1.2 | R0.2 | 1 | 10 | 1.14 | 11 | 50 | 4 |
| HSXR4012R0.3L5 0450 | 1.2 | R0.3 | 1 | 5 | 1.14 | 11 | 50 | 4 |
| HSXR4012R0.3L10 0450 | 1.2 | R0.3 | 1 | 10 | 1.14 | 11 | 50 | 4 |
| HSXR4015R0.05L6 0450 | 1.5 | R0.05 | 1.2 | 6 | 1.42 | 11 | 50 | 4 |
| HSXR4015R0.05L8 0450 | 1.5 | R0.05 | 1.2 | 8 | 1.42 | 11 | 50 | 4 |
| HSXR4015R0.05L10 0450 | 1.5 | R0.05 | 1.2 | 10 | 1.42 | 11 | 50 | 4 |
| HSXR4015R0.05L12 0450 | 1.5 | R0.05 | 1.2 | 12 | 1.42 | 11 | 50 | 4 |
| HSXR4015R0.05L16 0450 | 1.5 | R0.05 | 1.2 | 16 | 1.42 | 11 | 50 | 4 |
| HSXR4015R0.05L20 0460 | 1.5 | R0.05 | 1.2 | 20 | 1.42 | 11 | 60 | 4 |
| HSXR4015R0.1L4 0450 | 1.5 | R0.1 | 1.2 | 4 | 1.42 | 11 | 50 | 4 |
| HSXR4015R0.1L6 0450 | 1.5 | R0.1 | 1.2 | 6 | 1.42 | 11 | 50 | 4 |
| HSXR4015R0.1L8 0450 | 1.5 | R0.1 | 1.2 | 8 | 1.42 | 11 | 50 | 4 |
| HSXR4015R0.1L10 0450 | 1.5 | R0.1 | 1.2 | 10 | 1.42 | 11 | 50 | 4 |
| HSXR4015R0.1L12 0450 | 1.5 | R0.1 | 1.2 | 12 | 1.42 | 11 | 50 | 4 |
| HSXR4015R0.1L16 0450 | 1.5 | R0.1 | 1.2 | 16 | 1.42 | 11 | 50 | 4 |



BALL NOSE END MILL
HSX SERIES

# HSXR4L 4-Flutes Long Neck Corner Radius End Mill

Unit:mm

| Type No. | Dia. | Radius | Length of Cut | Under Neck Length | Neck Dia. | Neck Taper Angle | Overall Length | Shank Dia. |
|---|---|---|---|---|---|---|---|---|
| | ϕD | CR | ℓ | $\ell_1$ | $\phi d_1$ | γ/° | L | ϕd |
| HSXR4015R0.1L20 0460 | 1.5 | R0.1 | 1.2 | 20 | 1.42 | 11 | 60 | 4 |
| HSXR4015R0.2L4 0450 | 1.5 | R0.2 | 1.2 | 4 | 1.42 | 11 | 50 | 4 |
| HSXR4015R0.2L6 0450 | 1.5 | R0.2 | 1.2 | 6 | 1.42 | 11 | 50 | 4 |
| HSXR4015R0.2L8 0450 | 1.5 | R0.2 | 1.2 | 8 | 1.42 | 11 | 50 | 4 |
| HSXR4015R0.2L10 0450 | 1.5 | R0.2 | 1.2 | 10 | 1.42 | 11 | 50 | 4 |
| HSXR4015R0.2L12 0450 | 1.5 | R0.2 | 1.2 | 12 | 1.42 | 11 | 50 | 4 |
| HSXR4015R0.2L16 0450 | 1.5 | R0.2 | 1.2 | 16 | 1.42 | 11 | 50 | 4 |
| HSXR4015R0.2L20 0460 | 1.5 | R0.2 | 1.2 | 20 | 1.42 | 11 | 60 | 4 |
| HSXR4015R0.3L4 0450 | 1.5 | R0.3 | 1.2 | 4 | 1.42 | 11 | 50 | 4 |
| HSXR4015R0.3L6 0450 | 1.5 | R0.3 | 1.2 | 6 | 1.42 | 11 | 50 | 4 |
| HSXR4015R0.3L8 0450 | 1.5 | R0.3 | 1.2 | 8 | 1.42 | 11 | 50 | 4 |
| HSXR4015R0.3L10 0450 | 1.5 | R0.3 | 1.2 | 10 | 1.42 | 11 | 50 | 4 |
| HSXR4015R0.3L12 0450 | 1.5 | R0.3 | 1.2 | 12 | 1.42 | 11 | 50 | 4 |
| HSXR4015R0.3L16 0450 | 1.5 | R0.3 | 1.2 | 16 | 1.42 | 11 | 50 | 4 |
| HSXR4015R0.3L20 0460 | 1.5 | R0.3 | 1.2 | 20 | 1.42 | 11 | 60 | 4 |
| HSXR4020R0.05L8 0450 | 2 | R0.05 | 1.6 | 8 | 1.9 | 11 | 50 | 4 |
| HSXR4020R0.05L10 0450 | 2 | R0.05 | 1.6 | 10 | 1.9 | 11 | 50 | 4 |
| HSXR4020R0.05L12 0450 | 2 | R0.05 | 1.6 | 12 | 1.9 | 11 | 50 | 4 |
| HSXR4020R0.05L16 0450 | 2 | R0.05 | 1.6 | 16 | 1.9 | 11 | 50 | 4 |
| HSXR4020R0.05L20 0460 | 2 | R0.05 | 1.6 | 20 | 1.9 | 11 | 60 | 4 |
| HSXR4020R0.05L25 0460 | 2 | R0.05 | 1.6 | 25 | 1.9 | 11 | 60 | 4 |
| HSXR4020R0.05L30 0475 | 2 | R0.05 | 1.6 | 30 | 1.9 | 11 | 75 | 4 |
| HSXR4020R0.1L4 0450 | 2 | R0.1 | 1.6 | 4 | 1.9 | 11 | 50 | 4 |
| HSXR4020R0.1L6 0450 | 2 | R0.1 | 1.6 | 6 | 1.9 | 11 | 50 | 4 |
| HSXR4020R0.1L8 0450 | 2 | R0.1 | 1.6 | 8 | 1.9 | 11 | 50 | 4 |
| HSXR4020R0.1L10 0450 | 2 | R0.1 | 1.6 | 10 | 1.9 | 11 | 50 | 4 |
| HSXR4020R0.1L12 0450 | 2 | R0.1 | 1.6 | 12 | 1.9 | 11 | 50 | 4 |
| HSXR4020R0.1L16 0450 | 2 | R0.1 | 1.6 | 16 | 1.9 | 11 | 50 | 4 |
| HSXR4020R0.1L20 0460 | 2 | R0.1 | 1.6 | 20 | 1.9 | 11 | 60 | 4 |
| HSXR4020R0.1L25 0460 | 2 | R0.1 | 1.6 | 25 | 1.9 | 11 | 60 | 4 |
| HSXR4020R0.1L30 0475 | 2 | R0.1 | 1.6 | 30 | 1.9 | 11 | 75 | 4 |
| HSXR4020R0.2L4 0450 | 2 | R0.2 | 1.6 | 4 | 1.9 | 11 | 50 | 4 |
| HSXR4020R0.2L6 0450 | 2 | R0.2 | 1.6 | 6 | 1.9 | 11 | 50 | 4 |
| HSXR4020R0.2L8 0450 | 2 | R0.2 | 1.6 | 8 | 1.9 | 11 | 50 | 4 |

# HSXR4L 4-Flutes Long Neck Corner Radius End Mill

Unit:mm

| Type No. | Dia. | Radius | Length of Cut | Under Neck Length | Neck Dia. | Neck Taper Angle | Overall Length | Shank Dia. |
|---|---|---|---|---|---|---|---|---|
| | ϕD | CR | ℓ | $\ell_1$ | ϕd1 | γ/° | L | ϕd |
| HSXR4010R0.2L4 0450 | 2 | R0.2 | 1.6 | 10 | 1.9 | 11 | 50 | 4 |
| HSXR4010R0.2L6 0450 | 2 | R0.2 | 1.6 | 12 | 1.9 | 11 | 50 | 4 |
| HSXR4010R0.2L8 0450 | 2 | R0.2 | 1.6 | 16 | 1.9 | 11 | 50 | 4 |
| HSXR4010R0.2L10 0450 | 2 | R0.2 | 1.6 | 20 | 1.9 | 11 | 60 | 4 |
| HSXR4010R0.2L12 0450 | 2 | R0.2 | 1.6 | 25 | 1.9 | 11 | 60 | 4 |
| HSXR4010R0.2L16 0450 | 2 | R0.2 | 1.6 | 30 | 1.9 | 11 | 75 | 4 |
| HSXR4010R0.2L20 0460 | 2 | R0.3 | 1.6 | 6 | 1.9 | 11 | 50 | 4 |
| HSXR4010R0.3L4 0450 | 2 | R0.3 | 1.6 | 8 | 1.9 | 11 | 50 | 4 |
| HSXR4010R0.3L6 0450 | 2 | R0.3 | 1.6 | 10 | 1.9 | 11 | 50 | 4 |
| HSXR4010R0.3L8 0450 | 2 | R0.3 | 1.6 | 12 | 1.9 | 11 | 50 | 4 |
| HSXR4010R0.3L10 0450 | 2 | R0.3 | 1.6 | 16 | 1.9 | 11 | 50 | 4 |
| HSXR4010R0.3L12 0450 | 2 | R0.3 | 1.6 | 20 | 1.9 | 11 | 60 | 4 |
| HSXR4010R0.3L16 0450 | 2 | R0.3 | 1.6 | 25 | 1.9 | 11 | 60 | 4 |
| HSXR4010R0.3L20 0460 | 2 | R0.3 | 1.6 | 30 | 1.9 | 11 | 75 | 4 |
| HSXR4012R0.05L5 0450 | 2 | R0.5 | 1.6 | 6 | 1.9 | 11 | 50 | 4 |
| HSXR4012R0.05L10 0450 | 2 | R0.5 | 1.6 | 8 | 1.9 | 11 | 50 | 4 |
| HSXR4012R0.1L5 0450 | 2 | R0.5 | 1.6 | 10 | 1.9 | 11 | 50 | 4 |
| HSXR4012R0.1L10 0450 | 2 | R0.5 | 1.6 | 12 | 1.9 | 11 | 50 | 4 |
| HSXR4012R0.2L5 0450 | 2 | R0.5 | 1.6 | 16 | 1.9 | 11 | 50 | 4 |
| HSXR4012R0.2L10 0450 | 2 | R0.5 | 1.6 | 20 | 1.9 | 11 | 60 | 4 |
| HSXR4012R0.3L5 0450 | 2 | R0.5 | 1.6 | 25 | 1.9 | 11 | 60 | 4 |
| HSXR4012R0.3L10 0450 | 2 | R0.5 | 1.6 | 30 | 1.9 | 11 | 75 | 4 |
| HSXR4015R0.05L6 0450 | 2.5 | R0.1 | 2 | 10 | 2.4 | 11 | 50 | 4 |
| HSXR4015R0.05L8 0450 | 2.5 | R0.1 | 2 | 20 | 2.4 | 11 | 60 | 4 |
| HSXR4015R0.05L10 0450 | 2.5 | R0.1 | 2 | 30 | 2.4 | 11 | 75 | 4 |
| HSXR4015R0.05L12 0450 | 2.5 | R0.2 | 3 | 10 | 2.4 | 11 | 50 | 4 |
| HSXR4015R0.05L16 0450 | 2.5 | R0.2 | 3 | 20 | 2.4 | 11 | 60 | 4 |
| HSXR4015R0.05L20 0460 | 2.5 | R0.2 | 2 | 30 | 2.4 | 11 | 75 | 4 |
| HSXR4015R0.1L4 0450 | 2.5 | R0.3 | 2 | 10 | 2.4 | 11 | 50 | 4 |
| HSXR4015R0.1L6 0450 | 2.5 | R0.3 | 2 | 20 | 2.4 | 11 | 60 | 4 |
| HSXR4015R0.1L8 0450 | 2.5 | R0.3 | 2 | 30 | 2.4 | 11 | 75 | 4 |
| HSXR4015R0.1L10 0450 | 2.5 | R0.5 | 2 | 10 | 2.4 | 11 | 50 | 4 |
| HSXR4015R0.1L12 0450 | 2.5 | R0.5 | 2 | 20 | 2.4 | 11 | 60 | 4 |
| HSXR4015R0.1L16 0450 | 2.5 | R0.5 | 2 | 30 | 2.4 | 11 | 75 | 4 |



BALL NOSE END MILL
HSX SERIES

# HSXR4L 4-Flutes Long Neck Corner Radius End Mill

Unit:mm

| Type No. | Dia. | Radius | Length of Cut | Under Neck Length | Neck Dia. | Neck Taper Angle | Overall Length | Shank Dia. |
|---|---|---|---|---|---|---|---|---|
| | ϕD | CR | ℓ | $\ell_1$ | ϕd1 | γ/° | L | ϕd |
| HSXR4030R0.1L10 0450 | 3 | R0.1 | 2.4 | 10 | 2.9 | 11 | 50 | 4 |
| HSXR4030R0.1L10 0660 | 3 | R0.1 | 2.4 | 10 | 2.9 | 11 | 60 | 6 |
| HSXR4030R0.1L12 0450 | 3 | R0.1 | 2.4 | 12 | 2.9 | 11 | 50 | 4 |
| HSXR4030R0.1L12 0660 | 3 | R0.1 | 2.4 | 12 | 2.9 | 11 | 60 | 6 |
| HSXR4030R0.1L16 0450 | 3 | R0.1 | 2.4 | 16 | 2.9 | 11 | 50 | 4 |
| HSXR4030R0.1L16 0660 | 3 | R0.1 | 2.4 | 16 | 2.9 | 11 | 60 | 6 |
| HSXR4030R0.1L20 0660 | 3 | R0.1 | 2.4 | 20 | 2.9 | 11 | 60 | 6 |
| HSXR4030R0.1L25 0675 | 3 | R0.1 | 2.4 | 25 | 2.9 | 11 | 75 | 6 |
| HSXR4030R0.1L30 0675 | 3 | R0.1 | 2.4 | 30 | 2.9 | 11 | 75 | 6 |
| HSXR4030R0.1L35 0675 | 3 | R0.1 | 2.4 | 35 | 2.9 | 11 | 75 | 6 |
| HSXR4030R0.1L40 06100 | 3 | R0.1 | 2.4 | 40 | 2.9 | 11 | 100 | 6 |
| HSXR4030R0.2L8 0450 | 3 | R0.2 | 2.4 | 8 | 2.9 | 11 | 50 | 4 |
| HSXR4030R0.2L10 0450 | 3 | R0.2 | 2.4 | 10 | 2.9 | 11 | 50 | 4 |
| HSXR4030R0.2L10 0660 | 3 | R0.2 | 2.4 | 10 | 2.9 | 11 | 60 | 6 |
| HSXR4030R0.2L12 0450 | 3 | R0.2 | 2.4 | 12 | 2.9 | 11 | 50 | 4 |
| HSXR4030R0.2L12 0660 | 3 | R0.2 | 2.4 | 12 | 2.9 | 11 | 60 | 6 |
| HSXR4030R0.2L16 0450 | 3 | R0.2 | 2.4 | 16 | 2.9 | 11 | 50 | 4 |
| HSXR4030R0.2L16 0660 | 3 | R0.2 | 2.4 | 16 | 2.9 | 11 | 60 | 6 |
| HSXR4030R0.2L20 0660 | 3 | R0.2 | 2.4 | 20 | 2.9 | 11 | 60 | 6 |
| HSXR4030R0.2L25 0675 | 3 | R0.2 | 2.4 | 25 | 2.9 | 11 | 75 | 6 |
| HSXR4030R0.2L300675 | 3 | R0.2 | 2.4 | 30 | 2.9 | 11 | 75 | 6 |
| HSXR4030R0.2L35 0675 | 3 | R0.2 | 2.4 | 35 | 2.9 | 11 | 75 | 6 |
| HSXR4030R0.2L40 06100 | 3 | R0.2 | 2.4 | 40 | 2.9 | 11 | 100 | 6 |
| HSXR4030R0.3L10 0450 | 3 | R0.3 | 2.4 | 10 | 2.9 | 11 | 50 | 4 |
| HSXR4030R0.3L10 0660 | 3 | R0.3 | 2.4 | 10 | 2.9 | 11 | 60 | 6 |
| HSXR4030R0.3L12 0450 | 3 | R0.3 | 2.4 | 12 | 2.9 | 11 | 50 | 4 |
| HSXR4030R0.3L12 0660 | 3 | R0.3 | 2.4 | 12 | 2.9 | 11 | 60 | 6 |
| HSXR4030R0.3L16 0450 | 3 | R0.3 | 2.4 | 16 | 2.9 | 11 | 50 | 4 |
| HSXR4030R0.3L16 0660 | 3 | R0.3 | 2.4 | 16 | 2.9 | 11 | 60 | 6 |
| HSXR4030R0.3L20 0660 | 3 | R0.3 | 2.4 | 20 | 2.9 | 11 | 60 | 6 |
| HSXR4030R0.3L25 0675 | 3 | R0.3 | 2.4 | 25 | 2.9 | 11 | 75 | 6 |
| HSXR4030R0.3L30 0675 | 3 | R0.3 | 2.4 | 30 | 2.9 | 11 | 75 | 6 |
| HSXR4030R0.3L35 0675 | 3 | R0.3 | 2.4 | 35 | 2.9 | 11 | 75 | 6 |
| HSXR4030R0.3L40 06100 | 3 | R0.3 | 2.4 | 40 | 2.9 | 11 | 100 | 6 |

# HSXR4L 4-Flutes Long Neck Corner Radius End Mill

Unit:mm

| Type No. | Dia. | Radius | Length of Cut | Under Neck Length | Neck Dia. | Neck Taper Angle | Overall Length | Shank Dia. |
|---|---|---|---|---|---|---|---|---|
| | ϕD | CR | $\ell$ | $\ell_1$ | ϕd1 | γ/° | L | ϕd |
| HSXR4010R0.2L4 0450 | 3 | R0.5 | 2.4 | 8 | 2.9 | 2.9 | 50 | 4 |
| HSXR4010R0.2L6 0450 | 3 | R0.5 | 2.4 | 10 | 2.9 | 2.9 | 50 | 4 |
| HSXR4010R0.2L8 0450 | 3 | R0.5 | 2.4 | 10 | 2.9 | 2.9 | 60 | 6 |
| HSXR4010R0.2L10 0450 | 3 | R0.5 | 2.4 | 12 | 2.9 | 2.9 | 50 | 4 |
| HSXR4010R0.2L12 0450 | 3 | R0.5 | 2.4 | 12 | 2.9 | 2.9 | 60 | 6 |
| HSXR4010R0.2L16 0450 | 3 | R0.5 | 2.4 | 16 | 2.9 | 2.9 | 50 | 4 |
| HSXR4010R0.2L20 0460 | 3 | R0.5 | 2.4 | 16 | 2.9 | 2.9 | 60 | 6 |
| HSXR4010R0.3L4 0450 | 3 | R0.5 | 2.4 | 20 | 2.9 | 2.9 | 60 | 6 |
| HSXR4010R0.3L6 0450 | 3 | R0.5 | 2.4 | 25 | 2.9 | 2.9 | 75 | 6 |
| HSXR4010R0.3L8 0450 | 3 | R0.5 | 2.4 | 30 | 2.9 | 2.9 | 75 | 6 |
| HSXR4010R0.3L10 0450 | 3 | R0.5 | 2.4 | 35 | 2.9 | 2.9 | 75 | 6 |
| HSXR4010R0.3L12 0450 | 3 | R0.5 | 2.4 | 40 | 2.9 | 2.9 | 100 | 6 |
| HSXR4010R0.3L16 0450 | 4 | R0.1 | 3.2 | 12 | 3.9 | 3.9 | 60 | 6 |
| HSXR4010R0.3L20 0460 | 4 | R0.1 | 3.2 | 16 | 3.9 | 3.9 | 60 | 6 |
| HSXR4012R0.05L5 0450 | 4 | R0.1 | 3.2 | 20 | 3.9 | 3.9 | 60 | 6 |
| HSXR4012R0.05L10 0450 | 4 | R0.1 | 3.2 | 25 | 3.9 | 3.9 | 75 | 6 |
| HSXR4012R0.1L5 0450 | 4 | R0.1 | 3.2 | 30 | 3.9 | 3.9 | 75 | 6 |
| HSXR4012R0.1L10 0450 | 4 | R0.1 | 3.2 | 35 | 3.9 | 3.9 | 75 | 6 |
| HSXR4012R0.2L5 0450 | 4 | R0.1 | 3.2 | 40 | 3.9 | 3.9 | 100 | 6 |
| HSXR4012R0.2L10 0450 | 4 | R0.1 | 3.2 | 45 | 3.9 | 3.9 | 100 | 6 |
| HSXR4012R0.3L5 0450 | 4 | R0.1 | 3.2 | 50 | 3.9 | 3.9 | 100 | 6 |
| HSXR4012R0.3L10 0450 | 4 | R0.2 | 3.2 | 12 | 3.9 | 3.9 | 60 | 6 |
| HSXR4015R0.05L6 0450 | 4 | R0.2 | 3.2 | 16 | 3.9 | 3.9 | 60 | 6 |
| HSXR4015R0.05L8 0450 | 4 | R0.2 | 3.2 | 20 | 3.9 | 3.9 | 60 | 6 |
| HSXR4015R0.05L10 0450 | 4 | R0.2 | 3.2 | 25 | 3.9 | 3.9 | 75 | 6 |
| HSXR4015R0.05L12 0450 | 4 | R0.2 | 3.2 | 30 | 3.9 | 3.9 | 75 | 6 |
| HSXR4015R0.05L16 0450 | 4 | R0.2 | 3.2 | 35 | 3.9 | 3.9 | 75 | 6 |
| HSXR4015R0.05L20 0460 | 4 | R0.2 | 3.2 | 40 | 3.9 | 3.9 | 100 | 6 |
| HSXR4015R0.1L4 0450 | 4 | R0.2 | 3.2 | 45 | 3.9 | 3.9 | 100 | 6 |
| HSXR4015R0.1L6 0450 | 4 | R0.2 | 3.2 | 50 | 3.9 | 3.9 | 100 | 6 |
| HSXR4015R0.1L8 0450 | 4 | R0.3 | 3.2 | 12 | 3.9 | 3.9 | 60 | 6 |
| HSXR4015R0.1L10 0450 | 4 | R0.3 | 3.2 | 16 | 3.9 | 3.9 | 60 | 6 |
| HSXR4015R0.1L12 0450 | 4 | R0.3 | 3.2 | 20 | 3.9 | 3.9 | 60 | 6 |
| HSXR4015R0.1L16 0450 | 4 | R0.3 | 3.2 | 25 | 3.9 | 3.9 | 75 | 6 |





# HSXR4L 4-Flutes Long Neck Corner Radius End Mill

Unit:mm

| Type No. | Dia. | Radius | Length of Cut | Under Neck Length | Neck Dia. | Neck Taper Angle | Overall Length | Shank Dia. |
|---|---|---|---|---|---|---|---|---|
| | ϕD | CR | $\ell$ | $\ell_1$ | ϕd1 | γ/° | L | ϕd |
| HSXR4040R0.3L30 0675 | 4 | R0.3 | 3.2 | 30 | 3.9 | 11 | 75 | 6 |
| HSXR4040R0.3L35 0675 | 4 | R0.3 | 3.2 | 35 | 3.9 | 11 | 75 | 6 |
| HSXR4040R0.3L40 06100 | 4 | R0.3 | 3.2 | 40 | 3.9 | 11 | 100 | 6 |
| HSXR4040R0.3L45 06100 | 4 | R0.3 | 3.2 | 45 | 3.9 | 11 | 100 | 6 |
| HSXR4040R0.3L50 06100 | 4 | R0.3 | 3.2 | 50 | 3.9 | 11 | 100 | 6 |
| HSXR4040R0.5L12 0660 | 4 | R0.5 | 3.2 | 12 | 3.9 | 11 | 60 | 6 |
| HSXR4040R0.5L16 0660 | 4 | R0.5 | 3.2 | 16 | 3.9 | 11 | 60 | 6 |
| HSXR4040R0.5L20 0660 | 4 | R0.5 | 3.2 | 20 | 3.9 | 11 | 60 | 6 |
| HSXR4040R0.5L25 0675 | 4 | R0.5 | 3.2 | 25 | 3.9 | 11 | 75 | 6 |
| HSXR4040R0.5L30 0675 | 4 | R0.5 | 3.2 | 30 | 3.9 | 11 | 75 | 6 |
| HSXR4040R0.5L35 0675 | 4 | R0.5 | 3.2 | 35 | 3.9 | 11 | 75 | 6 |
| HSXR4040R0.5L40 06100 | 4 | R0.5 | 3.2 | 40 | 3.9 | 11 | 100 | 6 |
| HSXR4040R0.5L45 06100 | 4 | R0.5 | 3.2 | 45 | 3.9 | 11 | 100 | 6 |
| HSXR4040R0.5L50 06100 | 4 | R0.5 | 3.2 | 50 | 3.9 | 11 | 100 | 6 |
| HSXR4040R1.0L12 0660 | 4 | R1 | 3.2 | 12 | 3.9 | 11 | 60 | 6 |
| HSXR4040R1.0L16 0660 | 4 | R1 | 3.2 | 16 | 3.9 | 11 | 60 | 6 |
| HSXR4040R1.0L20 0660 | 4 | R1 | 3.2 | 20 | 3.9 | 11 | 60 | 6 |
| HSXR4040R1.0L25 0675 | 4 | R1 | 3.2 | 25 | 3.9 | 11 | 75 | 6 |
| HSXR4040R1.0L30 0675 | 4 | R1 | 3.2 | 30 | 3.9 | 11 | 75 | 6 |
| HSXR4040R1.0L35 0675 | 4 | R1 | 3.2 | 35 | 3.9 | 11 | 75 | 6 |
| HSXR4040R1.0L40 06100 | 4 | R1 | 3.2 | 40 | 3.9 | 11 | 100 | 6 |
| HSXR4040R1.0L45 06100 | 4 | R1 | 3.2 | 45 | 3.9 | 11 | 100 | 6 |
| HSXR4040R1.0L50 06100 | 4 | R1 | 3.2 | 50 | 3.9 | 11 | 100 | 6 |

TABLE OF RECOMMENDED MILLING MATERIALS

◎ Very suitable ○ Suitable

| CARBON STEELS PREHARDENED STEELS / ALLOY STEELS TOOL STEELS | PREHARDENED STEELS | | HARDENED STEELS | | STANLESS STEELS | CASTIRON DUCTILE CAST IRON | COPPER ALLOYS | ALUMINUM ALLOY | GRAPHITE | TITANIUM ALLOY | HEAT RESISTANT ALLOYS | PLASTIC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~40HRC | ~45HRC | ~55HRC | ~60HRC | ~65HRC | ~35HRC | ~350HB | | | | | | |
| ○ | ○ | ◎ | ◎ | ○ | ○ | ○ | ○ | | | ○ | ○ | |

# Cutting Parameter

## HSXR4L 4-Flutes Long Neck Corner Radius End Mill Z-Level Milling

| Workpiece | | | Pre-Hardened Steels (30-45HRC) | | | | Hardened Steels (45-55HRC) | | | | Hardened Steels (55-65HRC) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Radius/mm | Radius/mm | Underneck/mm | n/min$^{-1}$ | Vf-mm/min | ap/mm | ae/mm | n/min$^{-1}$ | Vf-mm/min | ap/mm | ae/mm | n/min$^{-1}$ | Vf-mm/min | ap/mm | ae/mm |
| 0.5 | R0.02 | 1 | 30000 | 1200 | 0.006 | 0.14 | 25000 | 1000 | 0.006 | 0.15 | 23000 | 800 | 0.006 | 0.1 |
| | | 1.5 | 30000 | 1100 | 0.006 | 0.14 | 25000 | 920 | 0.006 | 0.15 | 23000 | 740 | 0.006 | 0.1 |
| | | 2 | 30000 | 1000 | 0.005 | 0.14 | 25000 | 840 | 0.005 | 0.15 | 23000 | 670 | 0.005 | 0.1 |
| | | 2.5 | 30000 | 910 | 0.005 | 0.14 | 25000 | 760 | 0.005 | 0.15 | 23000 | 610 | 0.005 | 0.1 |
| | | 3 | 30000 | 840 | 0.004 | 0.14 | 25000 | 700 | 0.004 | 0.15 | 23000 | 560 | 0.004 | 0.1 |
| | | 4 | 25000 | 720 | 0.003 | 0.14 | 25000 | 600 | 0.003 | 0.15 | 23000 | 480 | 0.002 | 0.1 |
| | | 5 | 25000 | 480 | 0.003 | 0.14 | 20000 | 400 | 0.003 | 0.15 | 18000 | 320 | 0.002 | 0.1 |
| | | 6 | 25000 | 280 | 0.003 | 0.14 | 20000 | 230 | 0.003 | 0.15 | 18000 | 180 | 0.001 | 0.1 |
| | R0.05 R0.1 | 1 | 30000 | 1440 | 0.03 | 0.14 | 25000 | 1200 | 0.01 | 0.15 | 23000 | 960 | 0.007 | 0.1 |
| | | 1.5 | 30000 | 1300 | 0.03 | 0.14 | 25000 | 1100 | 0.01 | 0.15 | 23000 | 880 | 0.007 | 0.1 |
| | | 2 | 30000 | 1150 | 0.025 | 0.14 | 25000 | 960 | 0.01 | 0.15 | 23000 | 770 | 0.007 | 0.1 |
| | | 2.5 | 30000 | 1100 | 0.025 | 0.14 | 25000 | 900 | 0.01 | 0.15 | 23000 | 720 | 0.007 | 0.1 |
| | | 3 | 30000 | 960 | 0.02 | 0.14 | 25000 | 800 | 0.008 | 0.15 | 23000 | 640 | 0.005 | 0.1 |
| | | 4 | 25000 | 840 | 0.015 | 0.14 | 25000 | 700 | 0.005 | 0.15 | 23000 | 560 | 0.003 | 0.1 |
| | | 5 | 25000 | 600 | 0.01 | 0.14 | 20000 | 500 | 0.004 | 0.15 | 18000 | 400 | 0.003 | 0.1 |
| | | 6 | 25000 | 480 | 0.008 | 0.14 | 20000 | 400 | 0.003 | 0.15 | 18000 | 320 | 0.002 | 0.1 |
| 0.5 | R0.02 | 2 | 30000 | 1200 | 0.006 | 0.2 | 25000 | 1000 | 0.006 | 0.2 | 23000 | 800 | 0.006 | 0.15 |
| | | 3 | 28000 | 1080 | 0.006 | 0.2 | 24000 | 900 | 0.006 | 0.2 | 21000 | 720 | 0.005 | 0.15 |
| | | 4 | 25000 | 960 | 0.005 | 0.2 | 23000 | 800 | 0.005 | 0.2 | 20000 | 640 | 0.004 | 0.15 |
| | | 6 | 23000 | 480 | 0.005 | 0.2 | 20000 | 400 | 0.004 | 0.2 | 18000 | 320 | 0.003 | 0.15 |
| | | 8 | 18000 | 360 | 0.004 | 0.2 | 16000 | 300 | 0.004 | 0.2 | 14000 | 240 | 0.001 | 0.15 |
| | | 10 | 16000 | 240 | 0.004 | 0.2 | 14000 | 200 | 0.003 | 0.2 | 12000 | 160 | 0.001 | 0.15 |
| | R0.05 R0.1 | 2 | 30000 | 1440 | 0.035 | 0.2 | 25000 | 1200 | 0.02 | 0.2 | 23000 | 960 | 0.01 | 0.15 |
| | | 3 | 28000 | 1200 | 0.030 | 0.2 | 24000 | 1000 | 0.02 | 0.2 | 21000 | 800 | 0.008 | 0.15 |
| | | 4 | 25000 | 960 | 0.025 | 0.2 | 23000 | 800 | 0.015 | 0.2 | 20000 | 640 | 0.007 | 0.15 |
| | | 6 | 23000 | 530 | 0.015 | 0.2 | 20000 | 440 | 0.008 | 0.2 | 18000 | 350 | 0.005 | 0.15 |
| | | 8 | 18000 | 430 | 0.01 | 0.2 | 16000 | 360 | 0.005 | 0.2 | 14000 | 290 | 0.002 | 0.15 |
| | | 10 | 16000 | 290 | 0.005 | 0.2 | 14000 | 240 | 0.002 | 0.2 | 12000 | 190 | 0.001 | 0.15 |
| 0.7 | R0.05 R0.1 | 2 | 30000 | 1680 | 0.006 | 0.25 | 25000 | 1400 | 0.006 | 0.25 | 23000 | 1120 | 0.006 | 0.15 |
| | | 3 | 30000 | 1680 | 0.006 | 0.25 | 25000 | 1400 | 0.006 | 0.25 | 23000 | 1120 | 0.006 | 0.15 |
| | | 4 | 28000 | 1440 | 0.005 | 0.25 | 25000 | 1200 | 0.005 | 0.25 | 23000 | 960 | 0.005 | 0.15 |
| | | 6 | 25000 | 960 | 0.005 | 0.25 | 20000 | 800 | 0.005 | 0.25 | 18000 | 640 | 0.005 | 0.15 |



BALL NOSE END MILL
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# Cutting Parameter

## HSXR4L 4-Flutes Long Neck Corner Radius End Mill Z-Level Milling

| Workpiece | | | Pre-Hardened Steels (30-45HRC) | | | | Hardened Steels (45-55HRC) | | | | Hardened Steels (55-65HRC) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Radius/mm | Radius/mm | Underneck/mm | n/min$^{-1}$ | Vf-mm/min | ap/mm | ae/mm | n/min$^{-1}$ | Vf-mm/min | ap/mm | ae/mm | n/min$^{-1}$ | Vf-mm/min | ap/mm | ae/mm |
| 0.7 | R0.02 | 8 | 18000 | 480 | 0.004 | 0.2 | 16000 | 400 | 0.004 | 0.2 | 14000 | 320 | 0.004 | 0.15 |
| | | 10 | 16000 | 430 | 0.003 | 0.2 | 14000 | 360 | 0.003 | 0.2 | 12000 | 290 | 0.003 | 0.15 |
| | R0.05 R0.1 | 2 | 30000 | 1680 | 0.05 | 0.25 | 25000 | 1400 | 0.03 | 0.25 | 23000 | 1120 | 0.02 | 0.15 |
| | | 3 | 30000 | 1560 | 0.04 | 0.25 | 25000 | 1300 | 0.03 | 0.25 | 23000 | 1040 | 0.015 | 0.15 |
| | | 4 | 28000 | 1440 | 0.03 | 0.25 | 25000 | 1200 | 0.02 | 0.25 | 23000 | 960 | 0.01 | 0.15 |
| | | 6 | 25000 | 960 | 0.02 | 0.25 | 20000 | 800 | 0.01 | 0.25 | 18000 | 640 | 0.01 | 0.15 |
| | | 8 | 18000 | 720 | 0.02 | 0.25 | 16000 | 600 | 0.01 | 0.25 | 14000 | 480 | 0.008 | 0.15 |
| | | 10 | 16000 | 480 | 0.02 | 0.25 | 14000 | 400 | 0.01 | 0.25 | 12000 | 320 | 0.006 | 0.15 |
| 0.8 | R0.02 | 2 | 28000 | 2040 | 0.006 | 0.3 | 25000 | 1700 | 0.006 | 0.25 | 23000 | 1360 | 0.006 | 0.16 |
| | | 4 | 28000 | 1680 | 0.005 | 0.3 | 25000 | 1400 | 0.005 | 0.25 | 23000 | 1120 | 0.005 | 0.16 |
| | | 6 | 23000 | 1320 | 0.005 | 0.3 | 20000 | 1100 | 0.005 | 0.25 | 18000 | 880 | 0.005 | 0.15 |
| | | 8 | 18000 | 960 | 0.004 | 0.3 | 16000 | 800 | 0.004 | 0.25 | 14000 | 640 | 0.004 | 0.15 |
| | | 10 | 16000 | 720 | 0.004 | 0.25 | 15000 | 600 | 0.004 | 0.20 | 13500 | 480 | 0.004 | 0.12 |
| | | 12 | 14000 | 480 | 0.003 | 0.2 | 13000 | 400 | 0.003 | 0.15 | 12000 | 320 | 0.003 | 0.12 |
| | R0.05 R0.1 R0.2 | 2 | 28000 | 2400 | 0.020 | 0.3 | 25000 | 2000 | 0.014 | 0.25 | 23000 | 1600 | 0.012 | 0.16 |
| | | 4 | 28000 | 1920 | 0.015 | 0.3 | 25000 | 1600 | 0.012 | 0.25 | 23000 | 1280 | 0.01 | 0.16 |
| | | 6 | 23000 | 1440 | 0.012 | 0.3 | 20000 | 1200 | 0.01 | 0.25 | 18000 | 960 | 0.01 | 0.15 |
| | | 8 | 18000 | 1200 | 0.012 | 0.3 | 16000 | 1000 | 0.01 | 0.25 | 14000 | 800 | 0.008 | 0.15 |
| | | 10 | 16000 | 960 | 0.010 | 0.25 | 15000 | 800 | 0.008 | 0.20 | 13500 | 640 | 0.006 | 0.12 |
| | | 12 | 14000 | 720 | 0.010 | 0.2 | 13000 | 600 | 0.008 | 0.15 | 12000 | 480 | 0.006 | 0.12 |
| 0.9 | R0.1 | 4 | 25000 | 2200 | 0.05 | 0.3 | 25000 | 1700 | 0.03 | 0.3 | 20000 | 1400 | 0.02 | 0.2 |
| | | 8 | 18000 | 1000 | 0.03 | 0.3 | 16000 | 800 | 0.01 | 0.3 | 14000 | 700 | 0.008 | 0.2 |
| 1 | R0.02 | 4 | 30000 | 2880 | 0.030 | 0.35 | 25000 | 2400 | 0.025 | 0.3 | 21000 | 1920 | 0.02 | 0.25 |
| | | 5 | 28000 | 2400 | 0.030 | 0.35 | 23000 | 2000 | 0.025 | 0.3 | 20000 | 1600 | 0.02 | 0.25 |
| | | 6 | 25000 | 2160 | 0.020 | 0.35 | 21000 | 1800 | 0.02 | 0.3 | 18000 | 1440 | 0.015 | 0.25 |
| | | 8 | 23000 | 1920 | 0.020 | 0.35 | 19000 | 1600 | 0.020 | 0.3 | 16000 | 1280 | 0.015 | 0.25 |
| | | 10 | 20000 | 1680 | 0.02 | 0.35 | 16000 | 1400 | 0.015 | 0.3 | 14000 | 1120 | 0.010 | 0.25 |
| | | 12 | 18000 | 1440 | 0.015 | 0.35 | 15000 | 1200 | 0.015 | 0.3 | 13000 | 960 | 0.010 | 0.25 |
| | | 16 | 16000 | 960 | 0.015 | 0.35 | 13000 | 800 | 0.010 | 0.3 | 11000 | 640 | 0.008 | 0.25 |
| | | 20 | 14000 | 720 | 0.015 | 0.35 | 13000 | 600 | 0.010 | 0.3 | 11000 | 480 | 0.008 | 0.25 |
| | R0.05 R0.1 R0.2 R0.3 | 4 | 30000 | 2880 | 0.065 | 0.35 | 25000 | 2400 | 0.05 | 0.3 | 21000 | 1920 | 0.04 | 0.25 |
| | | 5 | 28000 | 2400 | 0.06 | 0.35 | 23000 | 2000 | 0.05 | 0.3 | 20000 | 1600 | 0.04 | 0.25 |

# Cutting Parameter

## HSXR4L 4-Flutes Long Neck Corner Radius End Mill Z-Level Milling

| Workpiece | | | Pre-Hardened Steels (30-45HRC) | | | | Hardened Steels (45-55HRC) | | | | Hardened Steels (55-65HRC) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Radius/mm | Radius/mm | Underneck/mm | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm |
| 1 | R0.05 | 6 | 25000 | 2160 | 0.055 | 0.35 | 21000 | 1800 | 0.04 | 0.3 | 18000 | 1440 | 0.03 | 0.25 |
| | R0.1 | 8 | 23000 | 1920 | 0.05 | 0.35 | 19000 | 1600 | 0.03 | 0.3 | 16000 | 1280 | 0.02 | 0.25 |
| | R0.2 | 10 | 20000 | 1680 | 0.045 | 0.35 | 16000 | 1400 | 0.02 | 0.3 | 14000 | 1120 | 0.01 | 0.25 |
| | R0.3 | 12 | 18000 | 1440 | 0.035 | 0.35 | 15000 | 1200 | 0.015 | 0.3 | 13000 | 960 | 0.008 | 0.25 |
| | | 16 | 18000 | 960 | 0.035 | 0.35 | 15000 | 800 | 0.015 | 0.3 | 13000 | 640 | 0.008 | 0.25 |
| | | 20 | 14000 | 840 | 0.015 | 0.35 | 13000 | 700 | 0.010 | 0.3 | 11000 | 560 | 0.008 | 0.25 |
| 1.2 | R0.05 R0.1 R0.2 R0.3 | 5 | 24000 | 2200 | 0.06 | 0.45 | 20000 | 1800 | 0.045 | 0.4 | 17000 | 1500 | 0.03 | 0.3 |
| | | 10 | 16000 | 1400 | 0.04 | 0.45 | 13000 | 1100 | 0.03 | 0.4 | 11000 | 950 | 0.01 | 0.3 |
| 1.5 | R0.02 | 6 | 28000 | 2800 | 0.016 | 0.55 | 23000 | 2300 | 0.012 | 0.5 | 20000 | 2000 | 0.01 | 0.4 |
| | | 8 | 25000 | 2400 | 0.016 | 0.55 | 21000 | 2000 | 0.012 | 0.5 | 18000 | 1700 | 0.01 | 0.4 |
| | | 10 | 23000 | 2200 | 0.014 | 0.55 | 19000 | 1800 | 0.01 | 0.5 | 16000 | 1500 | 0.008 | 0.4 |
| | | 12 | 20000 | 1800 | 0.014 | 0.55 | 16000 | 1500 | 0.01 | 0.5 | 14000 | 1300 | 0.008 | 0.4 |
| | | 16 | 16000 | 1400 | 0.012 | 0.55 | 13000 | 1100 | 0.008 | 0.5 | 11000 | 950 | 0.005 | 0.4 |
| | | 20 | 14000 | 1000 | 0.008 | 0.55 | 11000 | 800 | 0.005 | 0.5 | 9000 | 700 | 0.003 | 0.4 |
| | R0.1 R0.2 R0.3 R0.5 | 6 | 28000 | 2800 | 0.1 | 0.55 | 23000 | 2300 | 0.05 | 0.5 | 20000 | 2000 | 0.04 | 0.4 |
| | | 8 | 25000 | 2400 | 0.08 | 0.55 | 21000 | 2000 | 0.05 | 0.5 | 18000 | 1700 | 0.04 | 0.4 |
| | | 10 | 23000 | 2200 | 0.08 | 0.55 | 19000 | 1800 | 0.045 | 0.5 | 16000 | 1500 | 0.03 | 0.4 |
| | | 12 | 20000 | 1800 | 0.06 | 0.55 | 16000 | 1500 | 0.04 | 0.5 | 14000 | 1300 | 0.025 | 0.4 |
| | | 16 | 16000 | 1400 | 0.06 | 0.55 | 13000 | 1100 | 0.03 | 0.5 | 11000 | 950 | 0.02 | 0.4 |
| | | 20 | 14000 | 1000 | 0.03 | 0.55 | 11000 | 800 | 0.02 | 0.5 | 9000 | 700 | 0.007 | 0.4 |
| 2 | R0.02 | 8 | 24000 | 2800 | 0.02 | 0.7 | 20000 | 2300 | 0.015 | 0.6 | 17000 | 2000 | 0.012 | 0.5 |
| | | 10 | 22000 | 2500 | 0.018 | 0.7 | 18000 | 2100 | 0.015 | 0.6 | 15000 | 1800 | 0.012 | 0.5 |
| | | 12 | 20000 | 2200 | 0.016 | 0.7 | 16000 | 1800 | 0.012 | 0.6 | 14000 | 1500 | 0.01 | 0.5 |
| | | 16 | 16000 | 1700 | 0.014 | 0.7 | 13000 | 1400 | 0.01 | 0.6 | 11000 | 1200 | 0.008 | 0.5 |
| | | 20 | 14000 | 1400 | 0.012 | 0.7 | 11000 | 1100 | 0.008 | 0.6 | 9500 | 950 | 0.005 | 0.5 |
| | | 25 | 10000 | 800 | 0.01 | 0.7 | 8000 | 650 | 0.005 | 0.6 | 7000 | 550 | 0.003 | 0.5 |
| | | 30 | 10000 | 480 | 0.005 | 0.7 | 8000 | 400 | 0.002 | 0.6 | 7000 | 320 | 0.002 | 0.5 |
| | R0.05 | 8 | 24000 | 2800 | 0.13 | 0.7 | 20000 | 2300 | 0.06 | 0.6 | 17000 | 2000 | 0.05 | 0.5 |
| | R0.1 | 10 | 22000 | 2500 | 0.12 | 0.7 | 18000 | 2100 | 0.06 | 0.6 | 15000 | 1800 | 0.05 | 0.5 |
| | R0.2 | 12 | 20000 | 2200 | 0.11 | 0.7 | 16000 | 1800 | 0.05 | 0.6 | 14000 | 1500 | 0.04 | 0.5 |
| | R0.3 | 16 | 16000 | 1700 | 0.09 | 0.7 | 13000 | 1400 | 0.04 | 0.6 | 11000 | 1200 | 0.03 | 0.5 |
| | R0.5 | 20 | 14000 | 1400 | 0.07 | 0.7 | 11000 | 1100 | 0.03 | 0.6 | 9500 | 950 | 0.02 | 0.5 |



BALL NOSE END MILL
HSX SERIES

# Cutting Parameter

## HSXR4L 4-Flutes Long Neck Corner Radius End Mill Z-Level Milling

| Workpiece | | | Pre-Hardened Steels (30-45HRC) | | | | Hardened Steels (45-55HRC) | | | | Hardened Steels (55-65HRC) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Radius/mm | Radius/mm | Underneck/mm | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm |
| 2 | R0.05 R0.1 R0.2 R0.3 R0.5 | 25 | 12000 | 960 | 0.06 | 0.7 | 9000 | 800 | 0.03 | 0.6 | 8000 | 640 | 0.02 | 0.5 |
| | | 30 | 10000 | 800 | 0.05 | 0.7 | 8000 | 650 | 0.02 | 0.6 | 7000 | 550 | 0.01 | 0.5 |
| 2.5 | R0.05 R0.1 R0.2 R0.3 R0.5 | 10 | 16000 | 2200 | 0.14 | 0.85 | 13000 | 1800 | 0.07 | 0.7 | 11000 | 1500 | 0.05 | 0.5 |
| | | 20 | 11000 | 1400 | 0.08 | 0.85 | 9000 | 1100 | 0.04 | 0.7 | 7500 | 950 | 0.02 | 0.5 |
| | | 30 | 7000 | 800 | 0.03 | 0.85 | 5500 | 650 | 0.01 | 0.7 | 4500 | 550 | 0.01 | 0.5 |
| 3 | R0.05 | 10 | 18000 | 2800 | 0.18 | 1 | 15000 | 2300 | 0.1 | 0.8 | 13000 | 2000 | 0.07 | 0.7 |
| | | 12 | 16000 | 2500 | 0.17 | 1 | 13000 | 2100 | 0.1 | 0.8 | 11000 | 1800 | 0.07 | 0.7 |
| | | 16 | 14000 | 2200 | 0.16 | 1 | 11000 | 1800 | 0.1 | 0.8 | 9500 | 1500 | 0.07 | 0.7 |
| | | 20 | 13500 | 2000 | 0.16 | 1 | 11000 | 1600 | 0.08 | 0.8 | 9500 | 1400 | 0.06 | 0.7 |
| | | 25 | 12000 | 1800 | 0.14 | 1 | 10000 | 1500 | 0.07 | 0.8 | 8500 | 1300 | 0.05 | 0.7 |
| | | 30 | 10000 | 1400 | 0.12 | 1 | 8000 | 1100 | 0.05 | 0.8 | 7000 | 950 | 0.04 | 0.7 |
| | | 35 | 9000 | 1200 | 0.08 | 1 | 7500 | 1000 | 0.04 | 0.8 | 6500 | 800 | 0.02 | 0.7 |
| | | 40 | 8000 | 960 | 0.06 | 1 | 6500 | 800 | 0.03 | 0.8 | 5500 | 640 | 0.02 | 0.7 |
| | R0.1 R0.2 R0.3 R0.5 | 10 | 18000 | 2800 | 0.18 | 1 | 15000 | 2300 | 0.1 | 0.8 | 13000 | 2000 | 0.07 | 0.7 |
| | | 12 | 16000 | 2500 | 0.17 | 1 | 13000 | 2100 | 0.1 | 0.8 | 11000 | 1800 | 0.07 | 0.7 |
| | | 16 | 14000 | 2200 | 0.16 | 1 | 11000 | 1800 | 0.1 | 0.8 | 9500 | 1500 | 0.07 | 0.7 |
| | | 20 | 13500 | 2000 | 0.16 | 1 | 11000 | 1600 | 0.08 | 0.8 | 9500 | 1400 | 0.06 | 0.7 |
| | | 25 | 12000 | 1800 | 0.14 | 1 | 10000 | 1500 | 0.07 | 0.8 | 8500 | 1300 | 0.05 | 0.7 |
| | | 30 | 10000 | 1400 | 0.12 | 1 | 8000 | 1100 | 0.05 | 0.8 | 7000 | 950 | 0.04 | 0.7 |
| | | 35 | 9000 | 1200 | 0.08 | 1 | 7500 | 1050 | 0.04 | 0.8 | 6500 | 850 | 0.02 | 0.7 |
| | | 40 | 8000 | 1000 | 0.06 | 1 | 6500 | 800 | 0.03 | 0.8 | 5500 | 700 | 0.02 | 0.7 |
| | R1 | 10 | 14000 | 2200 | 0.16 | 1 | 11000 | 1800 | 0.1 | 0.8 | 9500 | 1500 | 0.07 | 0.7 |
| | | 12 | 13500 | 2000 | 0.16 | 1 | 11000 | 1600 | 0.08 | 0.8 | 9500 | 1400 | 0.06 | 0.7 |
| | | 16 | 12000 | 1800 | 0.14 | 1 | 10000 | 1500 | 0.07 | 0.8 | 8500 | 1300 | 0.05 | 0.7 |
| | | 20 | 10000 | 1400 | 0.12 | 1 | 8000 | 1100 | 0.05 | 0.8 | 7000 | 950 | 0.04 | 0.7 |
| | | 25 | 9000 | 1200 | 0.08 | 1 | 7500 | 1100 | 0.04 | 0.8 | 6500 | 850 | 0.02 | 0.7 |
| | | 30 | 9000 | 1200 | 0.08 | 1 | 7500 | 1100 | 0.04 | 0.8 | 6500 | 800 | 0.02 | 0.7 |
| | | 35 | 9000 | 1200 | 0.08 | 1 | 7500 | 1050 | 0.04 | 0.8 | 6500 | 750 | 0.02 | 0.7 |
| | | 40 | 8000 | 1000 | 0.06 | 1 | 6500 | 800 | 0.03 | 0.8 | 5500 | 700 | 0.02 | 0.7 |
| 4 | R0.1 R0.2 R0.3 R0.5 R1 | 16 | 12000 | 2650 | 0.25 | 1.4 | 10000 | 2200 | 0.15 | 1.2 | 8500 | 1760 | 0.1 | 1 |
| | | 20 | 12000 | 2400 | 0.25 | 1.4 | 10000 | 2000 | 0.15 | 1.2 | 8500 | 1600 | 0.1 | 1 |
| | | 25 | 10000 | 2160 | 0.17 | 1.4 | 8000 | 1800 | 0.1 | 1.2 | 7000 | 1440 | 0.08 | 1 |

# Cutting Parameter

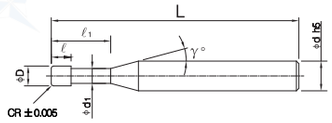
## HSXR4L 4-Flutes Long Neck Corner Radius End Mill Z-Level Milling

| Workpiece | | Pre-Hardened Steels (30-45HRC) | | | | | Hardened Steels (45-55HRC) | | | | Hardened Steels (55-65HRC) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Radius/mm | Radius/mm | Underneck/mm | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm |
| 4 | R0.1<br>R0.2<br>R0.3<br>R0.5<br>R1 | 30 | 8000 | 1900 | 0.14 | 1.4 | 6500 | 1600 | 0.08 | 1.2 | 5500 | 1280 | 0.08 | 1 |
| | | 35 | 6500 | 1680 | 0.08 | 1.4 | 5500 | 1400 | 0.06 | 1.2 | 4500 | 1100 | 0.05 | 1 |
| | | 40 | 5800 | 1440 | 0.06 | 1.2 | 5200 | 1200 | 0.05 | 1 | 4000 | 960 | 0.05 | 0.8 |
| | | 45 | 5200 | 1200 | 0.05 | 1.2 | 4800 | 1000 | 0.04 | 1 | 3800 | 800 | 0.04 | 0.8 |
| | | 50 | 4800 | 960 | 0.04 | 1.2 | 4500 | 800 | 0.03 | 1 | 3200 | 640 | 0.04 | 0.8 |
| 5 | R0.1<br>R0.2<br>R0.3<br>R0.5<br>R1 | 16 | 9500 | 2400 | 0.25 | 2.2 | 8000 | 2000 | 0.15 | 2 | 7000 | 1700 | 0.08 | 1.6 |
| | | 20 | 8000 | 2000 | 0.18 | 2.2 | 6500 | 1600 | 0.1 | 2 | 5500 | 1400 | 0.07 | 1.6 |
| | | 40 | 5000 | 1200 | 0.09 | 2.2 | 4000 | 1000 | 0.05 | 2 | 3500 | 850 | 0.02 | 1.6 |

● For Z-level and face milling, the recommended axial depth of cut (ap) is 0.3 x CR.



# HSXRP 4-Flutes Short Corner Radius End Mill




UMG AHX 4 30° Spiral Angle Arc Back Angle R <65 HRC

| ⌀D | D Tol. [ mm ] |
|---|---|
| D<3 | 0~-0.010 |
| 3≤D<6 | 0~-0.012 |
| 6≤D<10 | 0~-0.015 |
| 10≤D<12 | 0~-0.018 |

Unit:mm

| Type No. | Dia. | Radius | Length of Cut | Under Neck Length | Neck Dia. | Neck Taper Angle | Overall Length | Shank Dia. |
|---|---|---|---|---|---|---|---|---|
| | ϕD | CR | ℓ | ℓ1 | ϕd1 | γ/° | L | ϕd |
| HSXRP4008R0.05 0450 | 0.8 | R0.05 | 0.8 | 2.4 | 0.76 | 12 | 50 | 4 |
| HSXRP4008R0.1 0450 | 0.8 | R0.1 | 0.8 | 2.4 | 0.76 | 12 | 50 | 4 |
| HSXRP4010R0.05 0450 | 1 | R0.05 | 1 | 3 | 0.95 | 12 | 50 | 4 |
| HSXRP4010R0.1 0450 | 1 | R0.1 | 1 | 3 | 0.95 | 12 | 50 | 4 |
| HSXRP4010R0.2 0450 | 1 | R0.2 | 1 | 3 | 0.95 | 12 | 50 | 4 |
| HSXRP4010R0.3 0450 | 1 | R0.3 | 1 | 3 | 0.95 | 12 | 50 | 4 |
| HSXRP4015R0.05 0450 | 1.5 | R0.05 | 1.5 | 4.5 | 1.42 | 11 | 50 | 4 |
| HSXRP4015R0.1 0450 | 1.5 | R0.1 | 1.5 | 4.5 | 1.42 | 11 | 50 | 4 |
| HSXRP4015R0.2 0450 | 1.5 | R0.2 | 1.5 | 4.5 | 1.42 | 11 | 50 | 4 |
| HSXRP4015R0.3 0450 | 1.5 | R0.3 | 1.5 | 4.5 | 1.42 | 11 | 50 | 4 |
| HSXRP4020R0.05 0450 | 2 | R0.05 | 2 | 6 | 1.9 | 11 | 50 | 4 |
| HSXRP4020R0.1 0450 | 2 | R0.1 | 2 | 6 | 1.9 | 11 | 50 | 4 |
| HSXRP4020R0.2 0450 | 2 | R0.2 | 2 | 6 | 1.9 | 11 | 50 | 4 |
| HSXRP4020R0.3 0450 | 2 | R0.3 | 2 | 6 | 1.9 | 11 | 50 | 4 |
| HSXRP4020R0.5 0450 | 2 | R0.5 | 2 | 6 | 1.9 | 11 | 50 | 4 |
| HSXRP4030R0.1 0450 | 3 | R0.1 | 3 | 0 | 2.9 | 11 | 50 | 4 |
| HSXRP4030R0.1 0660 | 3 | R0.1 | 3 | 0 | 2.9 | 11 | 60 | 6 |
| HSXRP4030R0.1 0675 | 3 | R0.1 | 3 | 3 | 2.9 | 11 | 75 | 6 |
| HSXRP4030R0.2 0450 | 3 | R0.2 | 3 | 9 | 2.9 | 11 | 50 | 4 |
| HSXRP4030R0.2 0650 | 3 | R0.2 | 3 | 3 | 2.9 | 11 | 50 | 6 |
| HSXRP4030R0.2 0660 | 3 | R0.2 | 3 | 0 | 2.9 | 11 | 60 | 6 |
| HSXRP4030R0.2 0675 | 3 | R0.2 | 3 | 9 | 2.9 | 11 | 75 | 6 |
| HSXRP4030R0.3 0450 | 3 | R0.3 | 3 | 3 | 2.9 | 11 | 50 | 4 |
| HSXRP4030R0.3 0660 | 3 | R0.3 | 3 | 3 | 2.9 | 11 | 60 | 6 |
| HSXRP4030R0.3 0675 | 3 | R0.3 | 3 | 9 | 2.9 | 11 | 75 | 6 |
| HSXRP4030R0.5 0450 | 3 | R0.5 | 3 | 3 | 2.9 | 11 | 50 | 4 |
| HSXRP4030R0.5 0650 | 3 | R0.5 | 3 | 9 | 2.9 | 11 | 50 | 6 |

# HSXRP 4-Flutes Short Corner Radius End Mill

Unit:mm

| Type No. | Dia. | Radius | Length of Cut | Under Neck Length | Neck Dia. | Neck Taper Angle | Overall Length | Shank Dia. |
|---|---|---|---|---|---|---|---|---|
| | ϕD | CR | ℓ | $\ell_1$ | $\phi d_1$ | γ/° | L | ϕd |
| HSXRP4030R0.5 0660 | 3 | R0.5 | 3 | 9 | 2.9 | 11 | 60 | 6 |
| HSXRP4030R0.5 0675 | 3 | R0.5 | 3 | 9 | 2.9 | 11 | 75 | 6 |
| HSXRP4040R0.1 0450 | 4 | R0.1 | 4 | 12 | 3.9 | - | 50 | 4 |
| HSXRP4040R0.1 0660 | 4 | R0.1 | 4 | 12 | 3.9 | 11 | 60 | 6 |
| HSXRP4040R0.1 0675 | 4 | R0.1 | 4 | 12 | 3.9 | 11 | 75 | 6 |
| HSXRP4040R0.2 0450 | 4 | R0.2 | 4 | 12 | 3.9 | - | 50 | 4 |
| HSXRP4040R0.2 0650 | 4 | R0.2 | 4 | 12 | 3.9 | 11 | 50 | 6 |
| HSXRP4040R0.2 0660 | 4 | R0.2 | 4 | 12 | 3.9 | 11 | 60 | 6 |
| HSXRP4040R0.2 0675 | 4 | R0.2 | 4 | 12 | 3.9 | 11 | 75 | 6 |
| HSXRP4040R0.3 0450 | 4 | R0.3 | 4 | 12 | 3.9 | - | 50 | 4 |
| HSXRP4040R0.3 0660 | 4 | R0.3 | 4 | 12 | 3.9 | 11 | 60 | 6 |
| HSXRP4040R0.3 0675 | 4 | R0.3 | 4 | 12 | 3.9 | 11 | 75 | 6 |
| HSXRP4040R0.5 0450 | 4 | R0.5 | 4 | 12 | 3.9 | - | 50 | 4 |
| HSXRP4040R0.5 0650 | 4 | R0.5 | 4 | 12 | 3.9 | 11 | 50 | 6 |
| HSXRP4040R0.5 0660 | 4 | R0.5 | 4 | 12 | 3.9 | 11 | 60 | 6 |
| HSXRP4040R0.5 0675 | 4 | R0.5 | 4 | 12 | 3.9 | 11 | 75 | 6 |
| HSXRP4040R1.0 0450 | 4 | R1 | 4 | 12 | 3.9 | - | 50 | 4 |
| HSXRP4040R1.0 0660 | 4 | R1 | 4 | 12 | 3.9 | 11 | 60 | 6 |
| HSXRP4040R1.0 0675 | 4 | R1 | 4 | 12 | 3.9 | 11 | 75 | 6 |
| HSXRP4060R0.1 0650 | 6 | R0.1 | 6 | 18 | 5.85 | – | 50 | 6 |
| HSXRP4060R0.1 0660 | 6 | R0.1 | 6 | 18 | 5.85 | – | 60 | 6 |
| HSXRP4060R0.1 0675 | 6 | R0.1 | 6 | 18 | 5.85 | – | 75 | 6 |
| HSXRP4060R0.2 0650 | 6 | R0.2 | 6 | 18 | 5.85 | – | 50 | 6 |
| HSXRP4060R0.2 0660 | 6 | R0.2 | 6 | 18 | 5.85 | – | 60 | 6 |
| HSXRP4060R0.2 0675 | 6 | RO.2 | 6 | 18 | 5.85 | – | 75 | 6 |
| HSXRP4060R0.2 06100 | 6 | R0.2 | 6 | 18 | 5.85 | – | 100 | 6 |
| HSXRP4060R0.3 0650 | 6 | R0.3 | 6 | 18 | 5.85 | – | 50 | 6 |
| HSXRP4060R0.3 0660 | 6 | R0.3 | 6 | 18 | 5.85 | – | 60 | 6 |
| HSXRP4060R0.3 0675 | 6 | R0.3 | 6 | 18 | 5.85 | – | 75 | 6 |
| HSXRP4060R0.3 06100 | 6 | R0.3 | 6 | 18 | 5.85 | – | 100 | 6 |
| HSXRP4060R0.5 0650 | 6 | R0.5 | 6 | 18 | 5.85 | – | 50 | 6 |
| HSXRP4060R0.5 0660 | 6 | R0.5 | 6 | 18 | 5.85 | – | 60 | 6 |
| HSXRP4060R0.5 0675 | 6 | R0.5 | 6 | 18 | 5.85 | – | 75 | 6 |



BALL NOSE END MILL
HSX SERIES

# HSXRP 4-Flutes Short Corner Radius End Mill

Unit:mm

| Type No. | Dia. | Radius | Length of Cut | Under Neck Length | Neck Dia. | Neck Taper Angle | Overall Length | Shank Dia. |
|---|---|---|---|---|---|---|---|---|
| | ϕD | CR | ℓ | $\ell_1$ | $\phi d_1$ | γ/° | L | ϕd |
| HSXRP4060R0.5 06100 | 6 | RO.5 | 6 | 18 | 5.85 | – | 100 | 6 |
| HSXRP4060R1.0 0650 | 6 | R1 | 6 | 18 | 5.85 | – | 50 | 6 |
| HSXRP4060R1.0 0660 | 6 | R1 | 6 | 18 | 5.85 | – | 60 | 6 |
| HSXRP4060R1.0 0675 | 6 | R1 | 6 | 18 | 5.85 | – | 75 | 6 |
| HSXRP4060R1.0 06100 | 6 | R1 | 6 | 18 | 5.85 | – | 100 | 6 |
| HSXRP4080R0.1 0860 | 8 | R0.1 | 8 | 24 | 7.8 | – | 60 | 8 |
| HSXRP4080R0.1 0875 | 8 | R0.1 | 8 | 24 | 7.8 | – | 75 | 8 |
| HSXRP4080R0.1 08100 | 8 | R0.1 | 8 | 24 | 7.8 | – | 100 | 8 |
| HSXRP4080R0.2 0860 | 8 | R0.2 | 8 | 24 | 7.8 | – | 60 | 8 |
| HSXRP4080R0.2 0875 | 8 | R0.2 | 8 | 24 | 7.8 | – | 75 | 8 |
| HSXRP4080R0.2 08100 | 8 | R0.2 | 8 | 24 | 7.8 | – | 100 | 8 |
| HSXRP4080R0.3 0860 | 8 | R0.3 | 8 | 24 | 7.8 | – | 60 | 8 |
| HSXRP4080R0.3 0875 | 8 | R0.3 | 8 | 24 | 7.8 | – | 75 | 8 |
| HSXRP4080R0.3 08100 | 8 | R0.3 | 8 | 24 | 7.8 | – | 100 | 8 |
| HSXRP4080R0.5 0860 | 8 | R0.5 | 8 | 24 | 7.8 | – | 60 | 8 |
| HSXRP4080R0.5 0875 | 8 | R0.5 | 8 | 24 | 7.8 | – | 75 | 8 |
| HSXRP4080R0.5 08100 | 8 | R0.5 | 8 | 24 | 7.8 | – | 100 | 8 |
| HSXRP4080R0.5 08125 | 8 | R0.5 | 8 | 24 | 7.8 | – | 125 | 8 |
| HSXRP4080R1.0 0860 | 8 | R1 | 8 | 24 | 7.8 | – | 60 | 8 |
| HSXRP4080R1.0 0875 | 8 | R1 | 8 | 24 | 7.8 | – | 75 | 8 |
| HSXRP4080R1.0 08100 | 8 | R1 | 8 | 24 | 7.8 | – | 100 | 8 |
| HSXRP4080R1.0 08125 | 8 | R1 | 8 | 24 | 7.8 | – | 125 | 8 |
| HSXRP4100R0.2 1075 | 10 | R0.2 | 10 | 30 | 9.8 | – | 75 | 10 |
| HSXRP4100R0.2 10100 | 10 | R0.2 | 10 | 30 | 9.8 | – | 100 | 10 |
| HSXRP4100R0.5 1075 | 10 | R0.5 | 10 | 30 | 9.8 | – | 75 | 10 |
| HSXRP4100R0.5 10100 | 10 | R0.5 | 10 | 30 | 9.8 | – | 100 | 10 |
| HSXRP4100R0.5 10125 | 10 | R0.5 | 10 | 30 | 9.8 | – | 125 | 10 |
| HSXRP4100R1.0 1075 | 10 | R1 | 10 | 30 | 9.8 | – | 75 | 10 |
| HSXRP4100R1.0 10100 | 10 | R1 | 10 | 30 | 9.8 | – | 100 | 10 |
| HSXRP4100R1.0 10125 | 10 | R1 | 10 | 30 | 9.8 | – | 125 | 10 |
| HSXRP4100R2.0 1075 | 10 | R2 | 10 | 30 | 9.8 | – | 75 | 10 |
| HSXRP4120R0.5 1275 | 12 | R0.5 | 12 | 36 | 11.7 | – | 75 | 12 |
| HSXRP4120R0.5 12100 | 12 | R0.5 | 12 | 36 | 11.7 | – | 100 | 12 |

# HSXRP 4-Flutes Short Corner Radius End Mill

Unit:mm

| Type No. | Dia. | Radius | Length of Cut | Under Neck Length | Neck Dia. | Neck Taper Angle | Overall Length | Shank Dia. |
|---|---|---|---|---|---|---|---|---|
| | ϕD | CR | ℓ | $\ell_1$ | ϕd1 | γ/° | L | ϕd |
| HSXRP4120R0.5 12125 | 12 | RO.5 | 12 | 36 | 11.7 | – | 125 | 12 |
| HSXRP4120R1.0 1275 | 12 | R1 | 12 | 36 | 11.7 | – | 75 | 12 |
| HSXRP4120R1.0 12100 | 12 | R1 | 12 | 36 | 11.7 | – | 100 | 12 |
| HSXRP4120R1.0 12125 | 12 | R1 | 12 | 36 | 11.7 | – | 125 | 12 |
| HSXRP4120R2.0 1275 | 12 | R2 | 12 | 36 | 11.7 | – | 75 | 12 |
| HSXRP4120R2.0 12100 | 12 | R2 | 12 | 36 | 11.7 | – | 100 | 12 |
| HSXRP4120R2.0 12125 | 12 | R2 | 12 | 36 | 11.7 | – | 125 | 12 |

TABLE OF RECOMMENDED MILLING MATERIALS

◎Very suitable ○Suitable

| CARBON STEELS ALLOY STEELS PREHARDENED STEELS TOOL STEELS | PREHARDENED STEELS | | HARDENED STEELS | | STANLESS STEELS | CASTIRON DUCTILE CAST IRON | COPPER ALLOYS | ALUMINUM ALLOY | GRAPHITE | TITANIUM ALLOY | HEAT RESISTANT ALLOYS | PLASTIC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~40HRC | ~45HRC | ~55HRC | ~60HRC | ~65HRC | ~35HRC | ~350HB | | | | | | |
| ○ | ○ | ◎ | ◎ | ○ | ○ | ○ | ○ | | | ○ | ○ | |



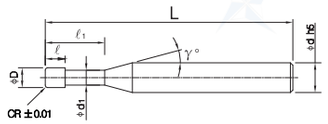
# Cutting Parameter

## HSXRP 4-Flutes Short Corner Radius End Mill Z-Level Milling

| Workpiece | Pre-Hardened Steels (35-45HRC) | | | | Hardened Steels (45-55HRC) | | | | Hardened Steels (55-65HRC) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Type No. | n/min-1 | Vf-mm/min | ap/mm | ae/mm | n/min-1 | Vf-mm/min | ap/mm | ae/mm | n/min-1 | Vf-mm/min | ap/mm | ae/mm |
| HSXRP4008R_ | 28000 | 1450 | 0.03 | 0.05 | 25000 | 1305 | 0.03 | 0.03 | 23000 | 420 | 0.03 | 0.02 |
| HSXRP4009R_ | 25000 | 1500 | 0.05 | 0.05 | 25000 | 1350 | 0.05 | 0.03 | 20000 | 450 | 0.05 | 0.02 |
| HSXRP4010R_ | 18000 | 1500 | 0.05 | 0.05 | 16000 | 1350 | 0.05 | 0.05 | 15000 | 500 | 0.05 | 0.02 |
| HSXRP4015R_ | 16155 | 1700 | 0.05 | 0.05 | 14360 | 1530 | 0.05 | 0.05 | 13500 | 600 | 0.05 | 0.02 |
| HSXRP4025R_ | 15200 | 1880 | 0.05 | 0.1 | 13500 | 1680 | 0.05 | 0.08 | 12000 | 700 | 0.05 | 0.02 |
| HSXRP4020R_ | 14301 | 2000 | 0.1 | 0.1 | 12712 | 1800 | 0.1 | 0.08 | 10000 | 800 | 0.1 | 0.03 |
| HSXRP4030R_ | 11056 | 2200 | 0.1 | 0.1 | 9828 | 1980 | 0.1 | 0.08 | 7200 | 800 | 0.1 | 0.03 |
| HSXRP4040R_ | 8712 | 2500 | 0.2 | 0.1 | 7744 | 2250 | 0.2 | 0.1 | 6000 | 1000 | 0.2 | 0.05 |
| HSXRP4060R_ | 6543 | 2800 | 0.2 | 0.2 | 5808 | 2520 | 0.2 | 0.1 | 4500 | 1200 | 0.2 | 0.05 |
| HSXRP4080R_ | 5445 | 3000 | 0.2 | 0.2 | 4840 | 2700 | 0.2 | 0.1 | 4000 | 1500 | 0.2 | 0.05 |
| HSXRP4100R_ | 4900 | 3600 | 0.2 | 0.2 | 4356 | 3200 | 0.2 | 0.1 | 3500 | 1800 | 0.2 | 0.05 |
| HSXRP4120R_ | 4356 | 3600 | 0.2 | 0.2 | 3872 | 3200 | 0.2 | 0.1 | 3200 | 2000 | 0.2 | 0.05 |

- **For Z-level and face milling, the recommended axial depth of cut (ap) is 0.3 x CR.**
- **This item can be used for side milling and slotting applicaitons.**

# HSXRT 4 Flutes Power Corner Radius End Mill




UMG AHX 4 ~9° Spiral Angle Straight Back Angle R <65 HRC

| ⌀D | D Tol. [mm] |
|---|---|
| 2<D<8 | 0~-0.02 |
| 8<D<12 | 0~-0.022 |

Unit:mm

| Type No. | Dia. | Radius | Length of Cut | Under Neck Length | Neck Dia. | Neck Taper Angle | Overall Length | Shank Dia. |
|---|---|---|---|---|---|---|---|---|
| | ϕD | CR | ℓ | ℓ1 | ϕd1 | γ/° | L | ϕd |
| HSXRT4020R0.5 0650 | 2 | R0.5 | 0.8 | 6 | 1.9 | 20 | 50 | 6 |
| HSXRT4020R0.5-10 0650 | 2 | R0.5 | 0.8 | 10 | 1.9 | 20 | 50 | 6 |
| HSXRT4030R0.5 0650 | 3 | R0.5 | 1.2 | 9 | 2.9 | 20 | 50 | 6 |
| HSXRT4030R1.0 0650 | 3 | R1.0 | 1.2 | 9 | 2.9 | 20 | 50 | 6 |
| HSXRT4030R1.0-15 0660 | 3 | R1.0 | 1.2 | 15 | 2.9 | 20 | 60 | 6 |
| HSXRT4040R0.5 0650 | 4 | R0.5 | 1.6 | 12 | 3.8 | 20 | 50 | 6 |
| HSXRT4040R1.0 0650 | 4 | R1.0 | 1.6 | 12 | 3.8 | 20 | 50 | 6 |
| HSXRT4040R1.0-20 0660 | 4 | R1.0 | 1.6 | 20 | 3.8 | 20 | 60 | 6 |
| HSXRT4050R1.0 0660 | 5 | R1.0 | 2 | 15 | 4.7 | 20 | 60 | 6 |
| HSXRT4050R1.0-25 0675 | 5 | R1.0 | 2 | 25 | 4.7 | 20 | 75 | 6 |
| HSXRT4060R1.0 0660 | 6 | R1.0 | 2.5 | 18 | 5.6 | – | 60 | 6 |
| HSXRT4060R1.5 0660 | 6 | R1.5 | 2.5 | 18 | 5.6 | – | 60 | 6 |
| HSXRT4060R1.5-30 0675 | 6 | R1.5 | 2.5 | 30 | 5.6 | – | 75 | 6 |
| HSXRT4080R1.0 0875 | 8 | R1.0 | 3.5 | 24 | 7.6 | – | 75 | 8 |
| HSXRT4080R1.0 08100 | 8 | R1.0 | 3.5 | 24 | 7.6 | – | 100 | 8 |
| HSXRT4080R2.0 0875 | 8 | R2.0 | 3.5 | 24 | 7.6 | – | 75 | 8 |
| HSXRT4080R2.0 08100 | 8 | R2.0 | 3.5 | 24 | 7.6 | – | 100 | 8 |
| HSXRT4080R2.0-40 08100 | 8 | R2.0 | 3.5 | 40 | 7.6 | – | 100 | 8 |
| HSXRT4100R1.0 1075 | 10 | R1.0 | 4 | 30 | 9.5 | – | 75 | 10 |
| HSXRT4100R1.0 10100 | 10 | R1.0 | 4 | 30 | 9.5 | – | 100 | 10 |
| HSXRT4100R2.0 1075 | 10 | R2.0 | 4 | 30 | 9.5 | – | 75 | 10 |
| HSXRT4100R2.0 10100 | 10 | R2.0 | 4 | 30 | 9.5 | – | 100 | 10 |
| HSXRT4100R2.0-50 10100 | 10 | R2.0 | 4 | 50 | 9.5 | – | 100 | 10 |
| HSXRT4120R2.0 12100 | 12 | R2.0 | 5 | 36 | 11.5 | – | 100 | 12 |
| HSXRT4120R3.0 12100 | 12 | R3.0 | 5 | 36 | 11.5 | – | 100 | 12 |
| HSXRT4120R2.0-60 12125 | 12 | R2.0 | 5 | 60 | 11.5 | – | 125 | 12 |





# Cutting Parameter

## HSXRT 4 Flutes Power Corner Radius End Mill Z-Level Milling

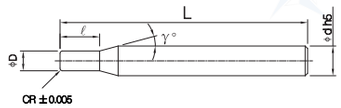
| Workpiece | Pre-Hardened Steels (35-45HRC) | | | | Hardened Steels (45-55HRC) | | | | Hardened Steels (55-65HRC) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Type No. | n/min-1 | Vf-mm/min | ap/mm | ae/mm | n/min-1 | Vf-mm/min | ap/mm | ae/mm | n/min-1 | Vf-mm/min | ap/mm | ae/mm |
| HSXRT4020R0.5 0650 | 12600 | 2200 | 0.1 | 0.5 | 11520 | 2000 | 0.08 | 0.5 | 8000 | 1000 | 0.05 | 0.5 |
| HSXRT4030R1.0 0650 | 11056 | 2500 | 0.1 | 0.8 | 9828 | 2500 | 0.1 | 0.8 | 7200 | 1200 | 0.1 | 0.8 |
| HSXRT4040R1.0 0650 | 8712 | 2800 | 0.15 | 1.5 | 7744 | 2800 | 0.1 | 1.5 | 6000 | 1400 | 0.1 | 1.5 |
| HSXRT4050R1.0 0660 | 7200 | 3500 | 0.2 | 2 | 6400 | 3000 | 0.1 | 2 | 5600 | 1500 | 0.1 | 2 |
| HSXRT4060R1.5 0660 | 6543 | 4000 | 0.2 | 2 | 5808 | 3200 | 0.2 | 2 | 4500 | 1800 | 0.1 | 2 |
| HSXRT4080R2.0 0875 | 5445 | 4500 | 0.2 | 2.7 | 5000 | 3500 | 0.2 | 2.7 | 3500 | 1600 | 0.1 | 2.7 |
| HSXRT4100R2.0 1075 | 4900 | 4200 | 0.3 | 4 | 4500 | 3500 | 0.2 | 4 | 2860 | 1600 | 0.1 | 4 |
| HSXRT4120R2.0 12100 | 4356 | 4000 | 0.3 | 5 | 4000 | 3200 | 0.2 | 5 | 2200 | 1500 | 0.1 | 5 |

● For Z-level and face milling, the recommended axial depth of cut (ap) is 0.3 x CR.

TABLE OF RECOMMENDED MILLING MATERIALS ◯Very suitable ○Suitable

| CARBON STEELS | ALLOY STEELS | PREHARDENED STEELS | HARDENED STEELS | | | | CASTIRON | COPPER ALLOYS | ALUMINUM ALLOY | GRAPHITE | TITANIUM ALLOY | HEAT RESISTANT ALLOYS | PLASTIC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | ~55HRC | ~60HRC | ~65HRC | ~70HRC | DUCTILE CAST IRON | | | | | | |
| | | ○ | ◯ | ◯ | ◯ | ◯ | ○ | | | | | | |

# HSXEF-CR 4-Flutes Power Corner Radius End Mill




UMG AHX 4 45° Spiral Angle Arc Back Angle R <65 HRC

| ⌀D | D Tol. ( mm ) |
|---|---|
| 3<D<4 | 0~-0.012 |
| 4<D<8 | 0~-0.015 |
| 8<D<12 | 0~-0.018 |

Unit:mm

| Type No. | Dia. | Corner Radius | Length of Cut | Neck Taper Angle | Overall Length | Shank Dia. |
|---|---|---|---|---|---|---|
| | ϕD | CR | ℓ | γ/° | L | ϕd |
| HSXEF4030R0.2 0650 | 3 | R0.2 | 8 | 20 | 50 | 6 |
| HSXEF4030R0.5 0650 | 3 | R0.5 | 8 | 20 | 50 | 6 |
| HSXEF4040R0.2 0660 | 4 | R0.2 | 11 | 20 | 50 | 6 |
| HSXEF4040R0.5 0660 | 4 | R0.5 | 11 | 20 | 50 | 6 |
| HSXEF4050R0.2 0660 | 5 | R0.5 | 13 | 20 | 60 | 6 |
| HSXEF4060R0.3 0660 | 6 | R0.3 | 16 | – | 60 | 6 |
| HSXEF4060R0.5 0660 | 6 | R0.5 | 16 | – | 60 | 6 |
| HSXEF4060R1.0 0660 | 6 | R1 | 16 | – | 60 | 6 |
| HSXEF4080R0.3 0875 | 8 | R0.3 | 20 | – | 75 | 8 |
| HSXEF4080R0.5 0875 | 8 | R0.5 | 20 | – | 75 | 8 |
| HSXEF4080R1.0 0875 | 8 | R1 | 20 | – | 75 | 8 |
| HSXEF4100R0.5 1075 | 10 | R0.5 | 25 | – | 75 | 10 |
| HSXEF4100R1.0 1075 | 10 | R1 | 25 | – | 75 | 10 |
| HSXEF4100R2.0 1075 | 10 | R2 | 25 | – | 75 | 10 |
| HSXEF4120R0.5 12100 | 12 | R0.5 | 35 | – | 100 | 12 |
| HSXEF4120R1.0 12100 | 12 | R1 | 35 | – | 100 | 12 |
| HSXEF4120R2.0 12100 | 12 | R2 | 35 | – | 100 | 12 |

TABLE OF RECOMMENDED MILLING MATERIALS

○Very suitable ○Suitable

| CARBON STEELS PREHARDENED STEELS / ALLOY STEELS TOOL STEELS | PREHARDENED STEELS | | HARDENED STEELS | | STANLESS STEELS | CASTIRON DUCTILE CAST IRON | COPPER ALLOYS | ALUMINUM ALLOY | GRAPHITE | TITANIUM ALLOY | HEAT RESISTANT ALLOYS | PLASTIC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~40HRC | ~45HRC | ~55HRC | ~60HRC | ~65HRC | ~35HRC | ~350HB | | | | | | |
| ○ | ○ | ◎ | ◎ | ○ | ○ | ○ | ○ | | | ○ | ○ | |





# Cutting Parameter

## HSXEF-CR 4-Flutes Power Corner Radius End Mill Side Milling

| Workpiece | Pre-Hardened Steels (35-45HRC) | | | | Hardened Steels (45-55HRC) | | | | Hardened Steels (55-65HRC) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Type No. | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm |
| HSXEF4030R_ | 7500 | 900 | 6 | 0.05 | 6000 | 720 | 6 | 0.03 | 5250 | 400 | 3 | 0.03 |
| HSXEF4040R_ | 6800 | 1000 | 8 | 0.1 | 5440 | 800 | 8 | 0.03 | 4760 | 440 | 4 | 0.03 |
| HSXEF4050R_ | 6000 | 1200 | 10 | 0.1 | 4800 | 960 | 10 | 0.05 | 4200 | 500 | 5 | 0.05 |
| HSXEF4060R_ | 5000 | 1500 | 12 | 0.1 | 4000 | 1200 | 12 | 0.05 | 3500 | 550 | 6 | 0.05 |
| HSXEF4080R_ | 4200 | 2000 | 16 | 0.1 | 3360 | 1600 | 16 | 0.05 | 2940 | 600 | 8 | 0.05 |
| HSXEF4100R_ | 4000 | 2500 | 20 | 0.1 | 3200 | 2000 | 20 | 0.05 | 2800 | 600 | 10 | 0.05 |
| HSXEF4120R_ | 3800 | 3000 | 24 | 0.2 | 3040 | 2400 | 24 | 0.1 | 2660 | 500 | 12 | 0.05 |

● For Z-level and face milling, the recommended axial depth of cut (ap) is 0.3 x CR.

## HSXEF-CR 4-Flute Power Corner Radius End Mill Face Milling

| Workpiece | Pre-Hardened Steels (35-45HRC) | | | | Hardened Steels (45-55HRC) | | | | Hardened Steels (55-65HRC) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Type No. | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm |
| HSXEF4030R_ | 9000 | 480 | 0.03 | 1.5 | 8000 | 400 | 0.03 | 1.5 | 7200 | 300 | 0.02 | 1.5 |
| HSXEF4040R_ | 7500 | 600 | 0.05 | 2 | 7000 | 500 | 0.05 | 2 | 6000 | 400 | 0.03 | 2 |
| HSXEF4050R_ | 7000 | 600 | 0.06 | 2.5 | 6500 | 550 | 0.05 | 2.5 | 5200 | 500 | 0.03 | 2.5 |
| HSXEF4060R_ | 6600 | 660 | 0.08 | 3.5 | 6000 | 600 | 0.05 | 3.5 | 4500 | 500 | 0.04 | 3.5 |
| HSXEF4080R_ | 5500 | 880 | 0.08 | 4.5 | 5000 | 800 | 0.05 | 4.5 | 4200 | 600 | 0.04 | 4.5 |
| HSXEF4100R_ | 4950 | 1100 | 0.08 | 6 | 4500 | 1000 | 0.06 | 6 | 2800 | 700 | 0.05 | 6 |
| HSXEF4120R_ | 4400 | 1320 | 0.08 | 8 | 4000 | 1200 | 0.06 | 8 | 2400 | 800 | 0.05 | 8 |

● For Z-level and face millirig, the recommended axial depth of cut (ap) is 0.3 x CR.

# Cutting Parameter

## HSXHE-CR 6-Flutes Hard Milling Corner Radius End Mill Side Milling

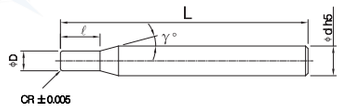
| Workpiece | Hardened Steels (45-55HRC) | | | | Hardened Steels (55-65HRC) | | | | Hardened Steels (55-65HRC) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Type No. | n/min$^{-1}$ | Vf-mm/min | ap/mm | ae/mm | n/min$^{-1}$ | Vf-mm/min | ap/mm | ae/mm | n/min$^{-1}$ | Vf-mm/min | ap/mm | ae/mm |
| HSXHE4010 0650 | 15000 | 600 | 2 | 0.05 | 12000 | 480 | 2 | 0.03 | 10500 | 200 | 1 | 0.01 |
| HSXHE4015 0650 | 12000 | 720 | 3 | 0.05 | 9600 | 576 | 3 | 0.03 | 8400 | 220 | 1.5 | 0.01 |
| HSXHE4020 0650 | 10000 | 800 | 4 | 0.05 | 8000 | 640 | 4 | 0.03 | 7000 | 240 | 2 | 0.02 |
| HSXHE4025 0650 | 8500 | 850 | 5 | 0.05 | 6800 | 680 | 5 | 0.03 | 5950 | 240 | 2.5 | 0.02 |
| HSXHE4030 0650 | 7500 | 900 | 6 | 0.05 | 6000 | 720 | 6 | 0.03 | 5250 | 240 | 3 | 0.03 |
| IHSXHE4040 0660 | 6800 | 1000 | 8 | 0.1 | 5440 | 800 | 8 | 0.03 | 4760 | 280 | 4 | 0.03 |
| HSXHE4050 0660 | 6000 | 1200 | 10 | 0.1 | 4800 | 960 | 10 | 0.05 | 4200 | 300 | 5 | 0.03 |

| Workpiece | Hardened Steels (45-55HRC) | | | | Hardened Steels (55-65HRC) | | | | Hardened Steels (65-70HRC) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Type No. | n/min$^{-1}$ | Vf-mm/min | ap/mm | ae/mm | n/min$^{-1}$ | Vf-mm/min | ap/mm | ae/mm | n/min$^{-1}$ | Vf-mm/min | ap/mm | ae/mm |
| HSXHE6060 0660 | 4000 | 870 | 15 | 0.1 | 3200 | 700 | 15 | 0.05 | 2100 | 360 | 15 | 0.03 |
| HSXHE6080 0875 | 3500 | 900 | 18 | 0.1 | 2800 | 700 | 18 | 0.05 | 1600 | 360 | 18 | 0.03 |
| HSXHE6100 1075 | 2800 | 850 | 25 | 0.1 | 2240 | 680 | 25 | 0.05 | 1500 | 340 | 25 | 0.03 |
| HSXHE6120 12100 | 2500 | 800 | 30 | 0.1 | 2000 | 650 | 30 | 0.05 | 1200 | 325 | 30 | 0.03 |
| HSXHE6160 16100 | 2200 | 750 | 35 | 0.1 | 1760 | 650 | 35 | 0.05 | 1000 | 325 | 35 | 0.03 |
| HSXHE6200 20100 | 2000 | 700 | 40 | 0.1 | 1600 | 600 | 40 | 0.05 | 800 | 300 | 40 | 0.03 |





# HSXR 4-Flutes Corner Radius End Mill




UMG AHX 4 30° Spiral Angle Arc Back Angle R <65 HRC

| ⌀D | D Tol. ( mm ) |
|---|---|
| D≤3 | 0~-0.010 |
| 3<D≤6 | 0~-0.012 |
| 6<D≤10 | 0~-0.015 |
| 10<D≤12 | 0~-0.018 |

Unit:mm

| Type No. | Dia. | Corner Radius | Length of Cut | Neck Taper Angle | Overall Length | Shank Dia. |
|---|---|---|---|---|---|---|
| | ϕD | CR | ℓ | γ/° | L | ϕd |
| HSXR4008R0.05 0450 | 0.8 | R0.05 | 1.6 | 12 | 50 | 4 |
| HSXR4008R0.1 0450 | 0.8 | R0.1 | 1.6 | 12 | 50 | 4 |
| HSXR4010R0.05 0450 | 1 | R0.05 | 2 | 12 | 50 | 4 |
| HSXR4010R0.1 0450 | 1 | R0.1 | 2 | 12 | 50 | 4 |
| HSXR4010R0.2 0450 | 1 | R0.2 | 2 | 12 | 50 | 4 |
| HSXR4010R0.3 0450 | 1 | R0.3 | 2 | 12 | 50 | 4 |
| HSXR4015R0.05 0450 | 1.5 | R0.05 | 3 | 11 | 50 | 4 |
| HSXR4015R0.1 0450 | 1.5 | R0.1 | 3 | 11 | 50 | 4 |
| HSXR4015R0.2 0450 | 1.5 | R0.2 | 3 | 11 | 50 | 4 |
| HSXR4015R0.3 0450 | 1.5 | R0.3 | 3 | 11 | 50 | 4 |
| HSXR4020R0.05 0450 | 2 | R0.05 | 4 | 11 | 50 | 4 |
| HSXR4020R0.1 0450 | 2 | R0.1 | 4 | 11 | 50 | 4 |
| HSXR4020R0.2 0450 | 2 | R0.2 | 4 | 11 | 50 | 4 |
| HSXR4020R0.3 0450 | 2 | R0.3 | 4 | 11 | 50 | 4 |
| HSXR4020R0.5 0450 | 2 | R0.5 | 4 | 11 | 50 | 4 |
| HSXR4025R0.1 0450 | 2.5 | R0.1 | 5 | 11 | 50 | 4 |
| HSXR4025R0.2 0450 | 2.5 | R0.2 | 5 | 11 | 50 | 4 |
| HSXR4025R0.3 0450 | 2.5 | R0.3 | 5 | 11 | 50 | 4 |
| HSXR4025R0.5 0450 | 2.5 | R0.5 | 5 | 11 | 50 | 4 |
| HSXR4030R0.1 0450 | 3 | R0.1 | 6 | 11 | 50 | 4 |
| HSXR4030R0.1 0660 | 3 | R0.1 | 6 | 11 | 60 | 6 |
| HSXR4030R0.1 0675 | 3 | R0.1 | 6 | 11 | 75 | 6 |
| HSXR4030R0.2 0450 | 3 | R0.2 | 6 | 11 | 50 | 4 |
| HSXR4030R0.2 0660 | 3 | R0.2 | 6 | 11 | 60 | 6 |
| HSXR4030R0.2 0675 | 3 | R0.2 | 6 | 11 | 75 | 6 |
| HSXR4030R0.3 0450 | 3 | R0.3 | 6 | 11 | 50 | 4 |
| HSXR4030R0.3 0660 | 3 | R0.3 | 6 | 11 | 60 | 6 |
| HSXR4030R0.3 0675 | 3 | R0.3 | 6 | 11 | 75 | 6 |

# HSXR 4-Flutes Corner Radius End Mill

Unit:mm

| Type No. | Dia. | Corner Radius | Length of Cut | Neck Taper Angle | Overall Length | Shank Dia. |
|---|---|---|---|---|---|---|
| | ϕD | CR | ℓ | γ/° | L | ϕd |
| HSXR4030R0.5 0450 | 3 | R0.5 | 6 | 11 | 50 | 4 |
| HSXR4030R0.5 0660 | 3 | R0.5 | 6 | 11 | 60 | 6 |
| HSXR4030R0.5 0675 | 3 | R0.5 | 6 | 11 | 75 | 6 |
| HSXR4040R0.1 0450 | 4 | R0.1 | 8 | - | 50 | 4 |
| HSXR4040R0.1 0475 | 4 | R0.1 | 8 | - | 75 | 4 |
| HSXR4040R0.1 0660 | 4 | R0.1 | 8 | 11 | 60 | 6 |
| HSXR4040R0.1 0675 | 4 | R0.1 | 8 | 11 | 75 | 6 |
| HSXR4040R0.2 0450 | 4 | R0.2 | 8 | - | 50 | 4 |
| HSXR4040R0.2 0475 | 4 | R0.2 | 8 | - | 75 | 4 |
| HSXR4040R0.2 0660 | 4 | R0.2 | 8 | 11 | 60 | 6 |
| HSXR4040R0.2 0675 | 4 | R0.2 | 8 | 11 | 75 | 6 |
| HSXR4040R0.3 0450 | 4 | R0.3 | 8 | - | 50 | 4 |
| HSXR4040R0.3 0475 | 4 | R0.3 | 8 | - | 75 | 4 |
| HSXR4040R0.3 0660 | 4 | R0.3 | 8 | 11 | 60 | 6 |
| HSXR4040R0.3 0675 | 4 | R0.3 | 8 | 11 | 75 | 6 |
| HSXR4040R0.5 0450 | 4 | R0.5 | 8 | - | 50 | 4 |
| HSXR4040R0.5 0475 | 4 | R0.5 | 8 | - | 75 | 4 |
| HSXR4040R0.5 0660 | 4 | R0.5 | 8 | 11 | 60 | 6 |
| HSXR4040R0.5 0675 | 4 | R0.5 | 8 | 11 | 75 | 6 |
| HSXR4040R1.0 0450 | 4 | R1 | 8 | - | 50 | 4 |
| HSXR4040R1.0 0475 | 4 | R1 | 8 | - | 75 | 4 |
| HSXR4040R1.0 0660 | 4 | R1 | 8 | 11 | 60 | 6 |
| HSXR4040R1.0 0675 | 4 | R1 | 8 | 11 | 75 | 6 |
| HSXR4060R0.1 0650 | 6 | R0.1 | 12 | – | 50 | 6 |
| HSXR4060R0.1 0660 | 6 | R0.1 | 12 | – | 60 | 6 |
| HSXR4060R0.1 0675 | 6 | R0.1 | 12 | – | 75 | 6 |
| HSXR4060R0.1 06100 | 6 | R0.1 | 12 | – | 100 | 6 |
| HSXR4060R0.2 0650 | 6 | R0.2 | 12 | – | 50 | 6 |
| HSXR4060R0.2 0660 | 6 | R0.2 | 12 | – | 60 | 6 |
| HSXR4060R0.2 0675 | 6 | R0.2 | 12 | – | 75 | 6 |
| HSXR4060R0.2 06100 | 6 | R0.2 | 12 | – | 100 | 6 |
| HSXR4060R0.3 0650 | 6 | R0.3 | 12 | – | 50 | 6 |
| HSXR4060R0.3 0660 | 6 | R0.3 | 12 | – | 60 | 6 |
| HSXR4060R0.3 0675 | 6 | R0.3 | 12 | – | 75 | 6 |



BALL NOSE END MILL
HSX SERIES

# HSXR 4-Flutes Corner Radius End Mill

Unit:mm

| Type No. | Dia. | Corner Radius | Length of Cut | Neck Taper Angle | Overall Length | Shank Dia. |
|---|---|---|---|---|---|---|
| | ϕD | CR | ℓ | γ/° | L | ϕd |
| HSXR4060R0.3 06100 | 6 | R0.3 | 12 | – | 100 | 6 |
| HSXR4060R0.5 0650 | 6 | R0.5 | 12 | – | 50 | 6 |
| HSXR4060R0.5 0660 | 6 | R0.5 | 12 | – | 60 | 6 |
| HSXR4060R0.5 0675 | 6 | R0.5 | 12 | – | 75 | 6 |
| HSXR4060R0.5 06100 | 6 | R0.5 | 12 | – | 100 | 6 |
| HSXR4060R1.0 0650 | 6 | R1 | 12 | – | 50 | 6 |
| HSXR4060R1.0 0660 | 6 | R1 | 12 | – | 60 | 6 |
| HSXR4060R1.0 0675 | 6 | R1 | 12 | – | 75 | 6 |
| HSXR4060R1.0 06100 | 6 | R1 | 12 | – | 100 | 6 |
| HSXR4080R0.1 0860 | 8 | R0.1 | 16 | – | 60 | 8 |
| HSXR4080R0.1 0875 | 8 | R0.1 | 16 | – | 75 | 8 |
| HSXR4080R0.1 08100 | 8 | R0.1 | 16 | – | 100 | 8 |
| HSXR4080R0.2 0860 | 8 | R0.2 | 16 | – | 60 | 8 |
| HSXR4080R0.2 0875 | 8 | R0.2 | 16 | – | 75 | 8 |
| HSXR4080R0.2 08100 | 8 | R0.2 | 16 | – | 100 | 8 |
| HSXR4080R0.3 0860 | 8 | R0.3 | 16 | – | 60 | 8 |
| HSXR4080R0.3 0875 | 8 | R0.3 | 16 | – | 75 | 8 |
| HSXR4080R0.3 08100 | 8 | R0.3 | 16 | – | 100 | 8 |
| HSXR4080R0.5 0860 | 8 | R0.5 | 16 | – | 60 | 8 |
| HSXR4080R0.5 0875 | 8 | R0.5 | 16 | – | 75 | 8 |
| HSXR4080R0.5 08100 | 8 | R0.5 | 16 | – | 100 | 8 |
| HSXR4080R0.5 08125 | 8 | R0.5 | 20 | – | 125 | 8 |
| HSXR4080R0.5 08150 | 8 | R0.5 | 20 | – | 150 | 8 |
| HSXR4080R1.0 0860 | 8 | R1 | 16 | – | 60 | 8 |
| HSXR4080R1.0 0875 | 8 | R1 | 16 | – | 75 | 8 |
| HSXR4080R1.0 08100 | 8 | R1 | 16 | – | 100 | 8 |
| HSXR4080R1.0 08125 | 8 | R1 | 20 | – | 125 | 8 |
| HSXR4080R1.0 08150 | 8 | R1 | 20 | – | 150 | 8 |
| HSXR4100R0.2 1075 | 10 | R0.2 | 20 | – | 75 | 10 |
| HSXR4100R0.2 10100 | 10 | R0.2 | 20 | – | 100 | 10 |
| HSXR4100R0.5 1075 | 10 | R0.5 | 20 | – | 75 | 10 |
| HSXR4100R0.5 10100 | 10 | R0.5 | 20 | – | 100 | 10 |
| HSXR4100R0.5 10125 | 10 | R0.5 | 25 | – | 125 | 10 |
| HSXR4100R0.5 10150 | 10 | R0.5 | 25 | – | 150 | 10 |

# HSXR 4-Flutes Corner Radius End Mill

Unit:mm

| Type No. | Dia. | Corner Radius | Length of Cut | Neck Taper Angle | Overall Length | Shank Dia. |
|---|---|---|---|---|---|---|
| | ϕD | CR | ℓ | γ/° | L | ϕd |
| HSXR4100R1.0 1075 | 10 | R1 | 20 | – | 75 | 10 |
| HSXR4100R1.0 10100 | 10 | R1 | 20 | – | 100 | 10 |
| HSXR4100R1.0 10125 | 10 | R1 | 25 | – | 125 | 10 |
| HSXR4100R1.0 10150 | 10 | R1 | 25 | – | 150 | 10 |
| HSXR4120R0.5 1275 | 12 | R0.5 | 24 | – | 75 | 12 |
| HSXR4120R0.5 12100 | 12 | R0.5 | 24 | – | 100 | 12 |
| HSXR4120R0.5 12125 | 12 | R0.5 | 30 | – | 125 | 12 |
| HSXR4120R0.5 12150 | 12 | R0.5 | 30 | – | 150 | 12 |
| HSXR4120R1.0 1275 | 12 | R1 | 24 | – | 75 | 12 |
| HSXR4120R1.0 12100 | 12 | R1 | 24 | – | 100 | 12 |
| HSXR4120R1.0 12125 | 12 | R1 | 30 | – | 125 | 12 |
| HSXR4120R1.0 12150 | 12 | R1 | 30 | – | 150 | 12 |
| HSXR4120R2.0 1275 | 12 | R2 | 24 | – | 75 | 12 |
| HSXR4120R2.0 12100 | 12 | R2 | 24 | – | 100 | 12 |
| HSXR4120R2.0 12125 | 12 | R2 | 30 | – | 125 | 12 |
| HSXR4120R2.0 12150 | 12 | R2 | 30 | – | 150 | 12 |
| HSXR4160R0.5 16100 | 16 | R0.5 | 32 | – | 100 | 16 |
| HSXR4160R1.0 16100 | 16 | R1 | 32 | – | 100 | 16 |
| HSXR4160R2.0 16100 | 16 | R2 | 32 | – | 100 | 16 |
| HSXR4160R0.5 16150 | 16 | R0.5 | 40 | – | 150 | 16 |
| HSXR4160R1.0 16150 | 16 | R1 | 40 | – | 150 | 16 |
| HSXR4160R2.0 16150 | 16 | R2 | 40 | – | 150 | 16 |



# Cutting Parameter

## HSXR 4-Flutes Corner Radius End Mill Face Milling Roughing

| Workpiece | Pre-Hardened Steels (35-45HRC) | | | | Hardened Steels (45-55HRC) | | | | Hardened Steels (55-65HRC) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Type No. | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm |
| HSXR4008R_ | 28000 | 1450 | 0.02 | 0.56 | 25000 | 1305 | 0.014 | 0.48 | 23000 | 420 | 0.012 | 0.4 |
| HSXR4009R_ | 25000 | 1500 | 0.05 | 0.63 | 25000 | 1350 | 0.03 | 0.54 | 20000 | 450 | 0.02 | 0.45 |
| HSXR4010R_ | 18000 | 1500 | 0.05 | 0.7 | 16000 | 1350 | 0.05 | 0.6 | 15000 | 500 | 0.03 | 0.5 |
| HSXR4015R_ | 16155 | 1700 | 0.05 | 1.05 | 14360 | 1530 | 0.05 | 0.9 | 13500 | 600 | 0.03 | 0.75 |
| HSXR4020R_ | 14301 | 2000 | 0.1 | 1.4 | 12712 | 1800 | 0.1 | 1.2 | 10000 | 800 | 0.05 | 1 |
| HSXR4030R_ | 11056 | 2200 | 0.1 | 2.1 | 9828 | 1980 | 0.1 | 1.8 | 7200 | 800 | 0.05 | 1.5 |
| HSXR4040R_ | 8712 | 2500 | 0.2 | 2.8 | 7744 | 2250 | 0.2 | 2.4 | 6000 | 1000 | 0.08 | 2 |
| HSXR4060R_ | 6543 | 2800 | 0.2 | 4.2 | 5808 | 2520 | 0.2 | 3.6 | 4500 | 1200 | 0.08 | 3 |
| HSXR4080R_ | 5445 | 3000 | 0.2 | 5.6 | 4840 | 2700 | 0.2 | 4.8 | 4000 | 1500 | 0.1 | 4 |
| HSXR4100R_ | 4900 | 3600 | 0.2 | 7 | 4356 | 3200 | 0.2 | 6 | 3500 | 1800 | 0.1 | 5 |
| HSXR4120R_ | 4356 | 3600 | 0.2 | 8.4 | 3872 | 3200 | 0.2 | 7.2 | 3200 | 2000 | 0.15 | 6 |

- For Z-level and face milling, the recommended axial depth of cut (ap) is 0.3 x CR.
- This item can be used for side milling and slotting applicaitons.

## HSXR 4-Flutes Corner Radius End Mill Face Milling Finishing

| Workpiece | Pre-Hardened Steels (35-45HRC) | | | | Hardened Steels (45-55HRC) | | | | Hardened Steels (55-65HRC) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Type No. | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm |
| HSXR4020R_ | 12000 | 360 | 0.03 | 1 | 10000 | 300 | 0.03 | 1 | 8800 | 200 | 0.02 | 1 |
| HSXR4030R_ | 9000 | 480 | 0.03 | 1.5 | 8000 | 400 | 0.03 | 1.5 | 7200 | 300 | 0.02 | 1.5 |
| HSXR4040R_ | 7500 | 600 | 0.05 | 2 | 7000 | 500 | 0.05 | 2 | 6000 | 400 | 0.03 | 2 |
| HSXR4060R_ | 6600 | 660 | 0.08 | 3.5 | 6000 | 600 | 0.05 | 3.5 | 4500 | 500 | 0.04 | 3.5 |
| HSXR4080R_ | 5500 | 880 | 0.08 | 4.5 | 5000 | 800 | 0.05 | 4.5 | 4200 | 600 | 0.04 | 4.5 |
| HSXR4100R_ | 4950 | 1100 | 0.08 | 6 | 4500 | 1000 | 0.06 | 6 | 2800 | 700 | 0.05 | 6 |
| HSXR4120R_ | 4400 | 1320 | 0.08 | 8 | 4000 | 1200 | 0.06 | 8 | 2400 | 800 | 0.05 | 8 |

- For Z-level and face milling, the recommended axial depth of cut (ap) is 0.3 x CR.
- This item can be used for side milling and slotting applicaitons.

# Cutting Parameter

## HSXR 4-Flutes Corner Radius End Mill Z-Level Milling

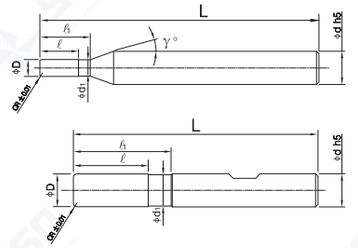
| Workpiece | Pre-Hardened Steels (35-45HRC) | | | | Hardened Steels (45-55HRC) | | | | Hardened Steels (55-65HRC) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Type No. | n/min$^{-1}$ | Vf-mm/min | ap/mm | ae/mm | n/min$^{-1}$ | Vf-mm/min | ap/mm | ae/mm | n/min$^{-1}$ | Vf-mm/min | ap/mm | ae/mm |
| HSXR4008R_ | 28000 | 1450 | 0.03 | 0.05 | 25000 | 1305 | 0.03 | 0.03 | 23000 | 420 | 0.03 | 0.02 |
| HSXR4009R_ | 25000 | 1500 | 0.05 | 0.05 | 25000 | 1350 | 0.05 | 0.03 | 20000 | 450 | 0.05 | 0.02 |
| HSXR4010R_ | 18000 | 1500 | 0.05 | 0.05 | 16000 | 1350 | 0.05 | 0.05 | 15000 | 500 | 0.05 | 0.02 |
| HSXR4015R_ | 16155 | 1700 | 0.05 | 0.05 | 14360 | 1530 | 0.05 | 0.05 | 13500 | 600 | 0.05 | 0.02 |
| HSXR4025R_ | 15200 | 1880 | 0.05 | 0.1 | 13500 | 1680 | 0.05 | 0.08 | 12000 | 700 | 0.05 | 0.02 |
| HSXR4020R_ | 14301 | 2000 | 0.1 | 0.1 | 12712 | 1800 | 0.1 | 0.08 | 10000 | 800 | 0.1 | 0.03 |
| HSXR4030R_ | 11056 | 2200 | 0.1 | 0.1 | 9828 | 1980 | 0.1 | 0.08 | 7200 | 800 | 0.1 | 0.03 |
| HSXR4040R_ | 8712 | 2500 | 0.2 | 0.1 | 7744 | 2250 | 0.2 | 0.1 | 6000 | 1000 | 0.2 | 0.05 |
| HSXR4060R_ | 6543 | 2800 | 0.2 | 0.2 | 5808 | 2520 | 0.2 | 0.1 | 4500 | 1200 | 0.2 | 0.05 |
| HSXR4080R_ | 5445 | 3000 | 0.2 | 0.2 | 4840 | 2700 | 0.2 | 0.1 | 4000 | 1500 | 0.2 | 0.05 |
| HSXR4100R_ | 4900 | 3600 | 0.2 | 0.2 | 4356 | 3200 | 0.2 | 0.1 | 3500 | 1800 | 0.2 | 0.05 |
| HSXR4120R_ | 4356 | 3600 | 0.2 | 0.2 | 3872 | 3200 | 0.2 | 0.1 | 3200 | 2000 | 0.2 | 0.05 |

- For Z-level and face milling, the recommended axial depth of cut (ap) is 0.3 x CR.
- This item can be used for side milling and slotting applicaitons.





# HGHFE 4-Flutes HPC Corner Radius 3D End Mill



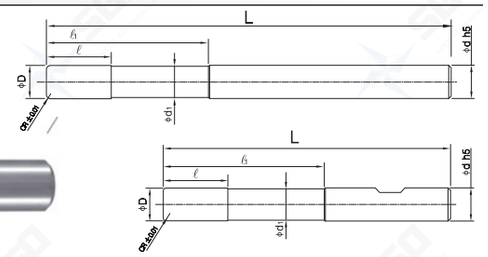

MG ATX 4 42° Spiral Angle Arc Back Angle <45 HRC

| ⌀D | D Tol. [mm] |
|---|---|
| 1<D≤6 | 0~-0.015 |
| 6<D≤20 | 0~-0.02 |

Unit:mm

| Type No. | Dia. | Radius | Length of Cut | Under Neck Length | Neck Dia. | Neck Taper Angle | Overall Length | Shank Dia. | Shank |
|---|---|---|---|---|---|---|---|---|---|
| | ϕD | R | ℓ | $\ell_1$ | $\phi d_1$ | γ/° | L | ϕd | |
| HGHFE4010R0.2-3 0650 | 1 | R0.2 | 2.3 | 3 | 0.95 | 20 | 50 | 6 | Cylinder Shank |
| HGHFE4020R0.2-6 0650 | 2 | R0.2 | 4.6 | 6 | 1.9 | 20 | 50 | 6 | Cylinder Shank |
| HGHFE4030R0.2-9 0650 | 3 | R0.2 | 6.9 | 9 | 2.9 | 20 | 50 | 6 | Cylinder Shank |
| HGHFE4040R0.2-12 0650 | 4 | R0.2 | 9.2 | 12 | 3.8 | 20 | 50 | 6 | Cylinder Shank |
| HGHFE4040R0.5-12 0650 | 4 | R0.5 | 9.2 | 12 | 3.8 | 20 | 50 | 6 | Cylinder Shank |
| HGHFE4050R0.5-15 0656-W | 5 | R0.5 | 11.5 | 15 | 4.7 | 20 | 56 | 6 | Weldon Shank |
| HGHFE4060R0.5-18 0656-W | 6 | R0.5 | 13.8 | 18 | 5.6 | – | 56 | 6 | Weldon Shank |
| HGHFE4060R1-18 0656-W | 6 | R1 | 13.8 | 18 | 5.6 | – | 56 | 6 | Weldon Shank |
| HGHFE4080R0.5-24 0862-W | 8 | R0.5 | 18.4 | 24 | 7.6 | – | 62 | 8 | Weldon Shank |
| HGHFE4080R1-24 0862-W | 8 | R1 | 18.4 | 24 | 7.6 | – | 62 | 8 | Weldon Shank |
| HGHFE4080R2-24 0862-W | 8 | R2 | 18.4 | 24 | 7.6 | – | 62 | 8 | Weldon Shank |
| HGHFE4100R0.5-30 1072-W | 10 | R0.5 | 23.0 | 30 | 9.5 | – | 72 | 10 | Weldon Shank |
| HGHFE4100R1-30 1072-W | 10 | R1 | 23.0 | 30 | 9.5 | – | 72 | 10 | Weldon Shank |
| HGHFE4100R2-30 1072-W | 10 | R2 | 23.0 | 30 | 9.5 | – | 72 | 10 | Weldon Shank |
| HGHFE4120R0.5-3 6 1283-W | 12 | R0.5 | 27.6 | 36 | 11.5 | – | 83 | 12 | Weldon Shank |
| HGHFE4120R1-36 1283-W | 12 | R1 | 27.6 | 36 | 11.5 | – | 83 | 12 | Weldon Shank |
| HGHFE4120R2-36 1283-W | 12 | R2 | 27.6 | 36 | 11.5 | – | 83 | 12 | Weldon Shank |
| HGHFE4160R1-48 1698-W | 16 | R1 | 36.8 | 48 | 15.5 | – | 98 | 16 | Weldon Shank |
| HGHFE4200R1-60 20112-W | 20 | R1 | 46.0 | 60 | 19.5 | – | 112 | 20 | Weldon Shank |

# HGHFE 4-Flutes HPC Corner Radius 5D End Mill




MG ATX 4 42° Spiral Angle Axi/Back Angle <45 HRC

| ØD | D Tol. [mm] |
|---|---|
| 1<D≤6 | 0~-0.015 |
| 6≤D≤20 | 0~-0.02 |

Unit:mm

| Type No. | Dia. | Radius | Length of Cut | Under Neck Length | Neck Dia. | Neck Taper Angle | Overall Length | Shank Dia. | Shank |
|---|---|---|---|---|---|---|---|---|---|
| | ϕD | R | $\ell$ | $\ell_1$ | ϕ$d_1$ | $\gamma$/° | L | ϕd | |
| HGHFE4010R0.2-5 0650 | 1 | R0.2 | 1.8 | 5 | 0.95 | 20 | 50 | 6 | Cylinder Shank |
| HGHFE4020R0.2-10 0650 | 2 | R0.2 | 3.6 | 10 | 1.9 | 20 | 50 | 6 | Cylinder Shank |
| HGHFE4030R0.2-15 0660 | 3 | R0.2 | 5.4 | 15 | 2.9 | 20 | 60 | 6 | Cylinder Shank |
| HGHFE4040R0.2-20 0660 | 4 | R0.2 | 7.2 | 20 | 3.8 | 20 | 60 | 6 | Cylinder Shank |
| HGHFE4040R0.5-20 0660 | 4 | R0.5 | 7.2 | 20 | 3.8 | 20 | 60 | 6 | Cylinder Shank |
| HGHFE4050R0.5-25 0675 | 5 | R0.5 | 9 | 25 | 4.7 | 20 | 75 | 6 | Cylinder Shank |
| HGHFE4060R0.5-30 0675 | 6 | R0.5 | 10.8 | 30 | 5.6 | – | 75 | 6 | Cylinder Shank |
| HGHFE4060R1-30 0675 | o | R1 | 10.8 | 30 | 5.6 | – | 75 | 6 | Cylinder Shank |
| HGHFE4080R0.5-40 08100 | 8 | R0.5 | 14.4 | 40 | 7.6 | – | 100 | 8 | Cylinder Shank |
| HGHFE4080R1-40 08100 | 8 | R1 | 14.4 | 40 | 7.6 | – | 100 | 8 | Cylinder Shank |
| HGHFE4100R0.5-50 10100 | 10 | R0.5 | 18 | 50 | 9.5 | – | 100 | 10 | Cylinder Shank |
| HGHFE4100R1-50 10100 | 10 | R1 | 18 | 50 | 9.5 | – | 100 | 10 | Cylinder Shank |
| HGHFE4100R2-50 10100 | 10 | R2 | 18 | 50 | 9.5 | – | 100 | 10 | Cylinder Shank |
| HGHFE4120R0.5-60 12107-W | 12 | R0.5 | 21.6 | 60 | 11.5 | – | 107 | 12 | Weldon Shank |
| HGHFE4120R1-60 12107-W | 12 | R1 | 21.6 | 60 | 11.5 | – | 107 | 12 | Weldon Shank |
| HGHFE4120R2-60 12107-W | 12 | R2 | 21.6 | 60 | 11.5 | – | 107 | 12 | Weldon Shank |
| HGHFE4160R1-80 16130-W | 16 | R1 | 28.8 | 80 | 15.5 | – | 130 | 16 | Weldon Shank |
| HGHFE4200R1-100 20152-W | 20 | R1 | 36 | 100 | 19.5 | – | 152 | 20 | Weldon Shank |



# Cutting Parameter

## HGHFE 4-Flutes HPC Corner Radius End Mill Slot Milling

| Workpiece | Pre-Hardened Steels (~30HRC) | | | | Hardened Steels (30-40HRC) | | | |
|---|---|---|---|---|---|---|---|---|
| Type No. | n/min$^{-1}$ | Vf-mm/min | ap/mm | ae/mm | n/min$^{-1}$ | Vf-mm/min | ap/mm | ae/mm |
| HGHFE4010 | 36000 | 300 | 1 | 1 | 31800 | 200 | 1 | 1 |
| HGHFE4020 | 18000 | 400 | 2 | 2 | 15200 | 240 | 2 | 2 |
| HGHFE4030 | 12000 | 500 | 3 | 3 | 10600 | 320 | 3 | 3 |
| HGHFE4040 | 9000 | 600 | 4 | 4 | 7960 | 540 | 4 | 4 |
| HGHFE4050 | 7200 | 700 | 5 | 5 | 6360 | 600 | 5 | 5 |
| HGHFE4060 | 6000 | 800 | 6 | 6 | 5300 | 650 | 6 | 6 |
| HGHFE4080 | 4450 | 1000 | 8 | 8 | 3980 | 800 | 8 | 8 |
| HGHFE4100 | 3600 | 1200 | 10 | 10 | 3185 | 900 | 10 | 10 |
| HGHFE4120 | 3000 | 1200 | 12 | 12 | 2750 | 1000 | 12 | 12 |
| HGHFE4160 | 2250 | 1000 | 16 | 16 | 2050 | 800 | 16 | 16 |
| HGHFE4200 | 1800 | 800 | 20 | 20 | 1640 | 600 | 20 | 20 |

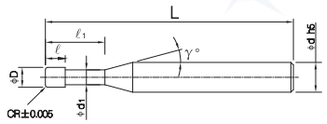
● For Z-level and face milling, the recommended axial depth of cut (ap) is 0.3 x CR.

## HGHFE 4-Flutes HPC Corner Radius End Mill Trochodial Milling

| Workpiece | Pre-Hardened Steels (~30HRC) | | | | Hardened Steels (35-45HRC) | | | |
|---|---|---|---|---|---|---|---|---|
| Type No. | n/min$^{-1}$ | Vf-mm/min | ap/mm | ae/mm | n/min$^{-1}$ | Vf-mm/min | ap/mm | ae/mm |
| HGHFE4010 | 40000 | 300 | 2 | 0.2 | 36000 | 270 | 1 | 0.18 |
| HGHFE4020 | 20000 | 400 | 4 | 0.4 | 18000 | 360 | 2 | 0.36 |
| HGHFE4030 | 13500 | 600 | 6 | 0.6 | 12150 | 540 | 3 | 0.54 |
| HGHFE4040 | 10000 | 1000 | 8 | 0.8 | 9000 | 900 | 4 | 0.72 |
| HGHFE4050 | 8000 | 1500 | 10 | 1 | 7200 | 1350 | 5 | 0.9 |
| HGHFE4060 | 6500 | 2000 | 12 | 1.2 | 5850 | 1800 | 6 | 1.08 |
| HGHFE4080 | 5000 | 2000 | 16 | 1.6 | 4500 | 1800 | 8 | 1.44 |
| HGHFE4100 | 4000 | 2500 | 20 | 2 | 3600 | 2250 | 10 | 1.8 |
| HGHFE4120 | 3350 | 3000 | 24 | 2.4 | 3015 | 2700 | 12 | 2.16 |
| HGHFE4160 | 2500 | 2500 | 32 | 2 | 2250 | 2250 | 16 | 1.8 |
| HGHFE4200 | 2000 | 2000 | 40 | 2 | 1800 | 1800 | 20 | 1.8 |

● For Z-level and face milling, the recommended axial depth of cut (ap) is 0.3 x CR.

# HGXRP 4-Flutes Short Corner Radius End Mill




UMG ATX 4 30° Spiral Angle Straight Back Angle R <55 HRC

| Ne | Ø D | D Tol. [mm] |
|---|---|---|
| | D≤3 | 0~-0.010 |
| | 3<D≤6 | 0~-0.012 |
| | 6<D≤10 | 0~-0.015 |
| | 10<D≤12 | 0~-0.018 |

Unit:mm

| Type No. | Dia. | Corner Radius | Length of Cut | Under Neck Length | Neck Dia. | Neck Taper Angle | Overall Length | Shank Dia. |
|---|---|---|---|---|---|---|---|---|
| | ϕD | CR | ℓ | ℓ1 | ϕd1 | γ/° | L | ϕd |
| HGXRP4010R0.05 0450 | 1 | R0.05 | 1 | 3 | 0.95 | 12 | 50 | 4 |
| HGXRP4010R0.1 0450 | 1 | R0.1 | 1 | 3 | 0.95 | 12 | 50 | 4 |
| HGXRP4010R0.2 0450 | 1 | R0.2 | 1 | 3 | 0.95 | 12 | 50 | 4 |
| HGXRP4010R0.3 0450 | 1 | R0.3 | 1 | 3 | 0.95 | 12 | 50 | 4 |
| HGXRP4015R0.1 0450 | 1.5 | R0.1 | 1.5 | 4.5 | 1.42 | 11 | 50 | 4 |
| HGXRP4015R0.2 0450 | 1.5 | R0.2 | 1.5 | 4.5 | 1.42 | 11 | 50 | 4 |
| HGXRP4015R0.3 0450 | 1.5 | R0.3 | 1.5 | 4.5 | 1.42 | 11 | 50 | 4 |
| HGXRP4020R0.05 0450 | 2 | R0.05 | 2 | 6 | 1.9 | 11 | 50 | 4 |
| HGXRP4020R0.1 0450 | 2 | R0.1 | 2 | 6 | 1.9 | 11 | 50 | 4 |
| HGXRP4020R0.2 0450 | 2 | R0.2 | 2 | 6 | 1.9 | 11 | 50 | 4 |
| HGXRP4020R0.3 0450 | 2 | R0.3 | 2 | 6 | 1.9 | 11 | 50 | 4 |
| HGXRP4020R0.5 0450 | 2 | R0.5 | 2 | 6 | 1.9 | 11 | 50 | 4 |
| HGXRP4030R0.1 0450 | 3 | R0.1 | 3 | 9 | 2.9 | 11 | 50 | 4 |
| HGXRP4030R0.1 0660 | 3 | R0.1 | 3 | 9 | 2.9 | 11 | 60 | 6 |
| HGXRP4030R0.1 0675 | 3 | R0.1 | 3 | 9 | 2.9 | 11 | 75 | 6 |
| HGXRP4030R0.2 0450 | 3 | R0.2 | 3 | 9 | 2.9 | 11 | 50 | 4 |
| HGXRP4030R0.2 0650 | 3 | R0.2 | 3 | 9 | 2.9 | 11 | 50 | 6 |
| HGXRP4030R0.2 0660 | 3 | R0.2 | 3 | 9 | 2.9 | 11 | 60 | 6 |
| HGXRP4030R0.2 0675 | 3 | R0.2 | 3 | 9 | 2.9 | 11 | 75 | 6 |
| HGXRP4030R0.3 0450 | 3 | R0.3 | 3 | 9 | 2.9 | 11 | 50 | 4 |
| HGXRP4030R0.3 0660 | 3 | R0.3 | 3 | 9 | 2.9 | 11 | 60 | 6 |
| HGXRP4030R0.3 0675 | 3 | R0.3 | 3 | 9 | 2.9 | 11 | 75 | 6 |
| HGXRP4030R0.5 0450 | 3 | R0.5 | 3 | 9 | 2.9 | 11 | 50 | 4 |
| HGXRP4030R0.5 0650 | 3 | R0.5 | 3 | 9 | 2.9 | 11 | 50 | 6 |
| HGXRP4030R0.5 0660 | 3 | R0.5 | 3 | 9 | 2.9 | 11 | 60 | 6 |
| HGXRP4030R0.5 0675 | 3 | R0.5 | 3 | 9 | 2.9 | 11 | 75 | 6 |



BALL NOSE END MILL
HSX SERIES

# HGXRP 4-Flutes Short Corner Radius End Mill

Unit:mm

| Type No. | Dia. | Corner Radius | Length of Cut | Under Neck Length | Neck Dia. | Neck Taper Angle | Overall Length | Shank Dia. |
|---|---|---|---|---|---|---|---|---|
| | ϕD | CR | ℓ | ℓ1 | ϕd1 | γ/° | L | ϕd |
| HGXRP4040R0.1 0450 | 4 | R0.1 | 4 | 12 | 3.9 | - | 50 | 4 |
| HGXRP4040R0.1 0660 | 4 | R0.1 | 4 | 12 | 3.9 | 11 | 60 | 6 |
| HGXRP4040R0.1 0675 | 4 | R0.1 | 4 | 12 | 3.9 | 11 | 75 | 6 |
| HGXRP4040R0.2 0450 | 4 | R0.2 | 4 | 12 | 3.9 | - | 50 | 4 |
| HGXRP4040R0.2 0650 | 4 | R0.2 | 4 | 12 | 3.9 | 11 | 50 | 6 |
| HGXRP4040R0.2 0660 | 4 | R0.2 | 4 | 12 | 3.9 | 11 | 60 | 6 |
| HGXRP4040R0.2 0675 | 4 | R0.2 | 4 | 12 | 3.9 | 11 | 75 | 6 |
| HGXRP4040R0.3 0450 | 4 | R0.3 | 4 | 12 | 3.9 | - | 50 | 4 |
| HGXRP4040R0.3 0660 | 4 | R0.3 | 4 | 12 | 3.9 | 11 | 60 | 6 |
| HGXRP4040R0.3 0675 | 4 | R0.3 | 4 | 12 | 3.9 | 11 | 75 | 6 |
| HGXRP4040R0.5 0450 | 4 | R0.5 | 4 | 12 | 3.9 | - | 50 | 4 |
| HGXRP4040R0.5 0660 | 4 | R0.5 | 4 | 12 | 3.9 | 11 | 60 | 6 |
| HGXRP4040R0.5 0675 | 4 | R0.5 | 4 | 12 | 3.9 | 11 | 75 | 6 |
| HGXRP4040R1.0 0450 | 4 | R1 | 4 | 12 | 3.9 | - | 50 | 4 |
| HGXRP4040R1.0 0660 | 4 | R1 | 4 | 12 | 3.9 | 11 | 60 | 6 |
| HGXRP4040R1.0 0675 | 4 | R1 | 4 | 12 | 3.9 | 11 | 75 | 6 |
| HGXRP4060R0.1 0650 | 6 | R0.1 | 6 | 18 | 5.85 | – | 50 | 6 |
| HGXRP4060R0.1 0660 | 6 | R0.1 | 6 | 18 | 5.85 | – | 60 | 6 |
| HGXRP4060R0.1 0675 | 6 | R0.1 | 6 | 18 | 5.85 | – | 75 | 6 |
| HGXRP4060R0.2 0650 | 6 | R0.2 | 6 | 18 | 5.85 | – | 50 | 6 |
| HGXRP4060R0.2 0660 | 6 | R0.2 | 6 | 18 | 5.85 | – | 60 | 6 |
| HGXRP4060R0.2 0675 | 6 | R0.2 | 6 | 18 | 5.85 | – | 75 | 6 |
| HGXRP4060R0.2 06100 | 6 | R0.2 | 6 | 18 | 5.85 | – | 100 | 6 |
| HGXRP4060R0.3 0650 | 6 | R0.3 | 6 | 18 | 5.85 | – | 50 | 6 |
| HGXRP4060R0.3 0660 | 6 | R0.3 | 6 | 18 | 5.85 | – | 60 | 6 |
| HGXRP4060R0.3 0675 | 6 | R0.3 | 6 | 18 | 5.85 | – | 75 | 6 |
| HGXRP4060R0.3 06100 | 6 | R0.3 | 6 | 18 | 5.85 | – | 100 | 6 |
| HGXRP4060R0.5 0650 | 6 | R0.5 | 6 | 18 | 5.85 | – | 50 | 6 |
| HGXRP4060R0.5 0660 | 6 | R0.5 | 6 | 18 | 5.85 | – | 60 | 6 |
| HGXRP4060R0.5 0675 | 6 | R0.5 | 6 | 18 | 5.85 | – | 75 | 6 |
| HGXRP4060R0.5 06100 | 6 | R0.5 | 6 | 18 | 5.85 | – | 100 | 6 |
| HGXRP4060R1.0 0650 | 6 | R1 | 6 | 18 | 5.85 | – | 50 | 6 |

# HGXRP 4-Flutes Short Corner Radius End Mill

Unit:mm

| Type No. | Dia. | Corner Radius | Length of Cut | Under Neck Length | Neck Dia. | Neck Taper Angle | Overall Length | Shank Dia. |
|---|---|---|---|---|---|---|---|---|
| | ϕD | CR | ℓ | $\ell_1$ | ϕ$d_1$ | γ/° | L | ϕd |
| HGXRP4060R1.0 0660 | 6 | R1 | 6 | 18 | 5.85 | – | 60 | 6 |
| HGXRP4060R1.0 0675 | 6 | R1 | 6 | 18 | 5.85 | – | 75 | 6 |
| HGXRP4060R1.0 06100 | 6 | R1 | 6 | 18 | 5.85 | – | 100 | 6 |
| HGXRP4080R0.1 0860 | 8 | R0.1 | 8 | 24 | 7.8 | – | 60 | 8 |
| HGXRP4080R0.1 0875 | 8 | R0.1 | 8 | 24 | 7.8 | – | 75 | 8 |
| HGXRP4080R0.1 08100 | 8 | R0.1 | 8 | 24 | 7.8 | – | 100 | 8 |
| HGXRP4080R0.2 0860 | 8 | R0.2 | 8 | 24 | 7.8 | – | 60 | 8 |
| HGXRP4080R0.2 0875 | 8 | R0.2 | 8 | 24 | 7.8 | – | 75 | 8 |
| HGXRP4080R0.2 08100 | 8 | R0.2 | 8 | 24 | 7.8 | – | 100 | 8 |
| HGXRP4080R0.3 0860 | 8 | R0.3 | 8 | 24 | 7.8 | – | 60 | 8 |
| HGXRP4080R0.3 0875 | 8 | R0.3 | 8 | 24 | 7.8 | – | 75 | 8 |
| HGXRP4080R0.3 08100 | 8 | R0.3 | 8 | 24 | 7.8 | – | 100 | 8 |
| HGXRP4080R0.5 0860 | 8 | R0.5 | 8 | 24 | 7.8 | – | 60 | 8 |
| HGXRP4080R0.5 0875 | 8 | R0.5 | 8 | 24 | 7.8 | – | 75 | 8 |
| HGXRP4080R0.5 08100 | 8 | R0.5 | 8 | 24 | 7.8 | – | 100 | 8 |
| HGXRP4080R1.0 0860 | 8 | R1 | 8 | 24 | 7.8 | – | 60 | 8 |
| HGXRP4080R1.0 0875 | 8 | R1 | 8 | 24 | 7.8 | – | 75 | 8 |
| HGXRP4080R1.0 08100 | 8 | R1 | 8 | 24 | 7.8 | – | 100 | 8 |
| HGXRP4100R0.2 1075 | 10 | R0.2 | 10 | 30 | 9.8 | – | 75 | 10 |
| HGXRP4100R0.2 10100 | 10 | R0.2 | 10 | 30 | 9.8 | – | 100 | 10 |
| HGXRP4100R0.5 1075 | 10 | R0.5 | 10 | 30 | 9.8 | – | 75 | 10 |
| HGXRP4100R0.5 10100 | 10 | R0.5 | 10 | 30 | 9.8 | – | 100 | 10 |
| HGXRP4100R1.0 1075 | 10 | R1 | 10 | 30 | 9.8 | – | 75 | 10 |
| HGXRP4100R1.0 10100 | 10 | R1 | 10 | 30 | 9.8 | – | 100 | 10 |
| HGXRP4100R2.0 1075 | 10 | R2 | 10 | 30 | 9.8 | – | 75 | 10 |
| HGXRP4120R0.5 1275 | 12 | R0.5 | 12 | 36 | 11.7 | – | 75 | 12 |
| HGXRP4120R0.5 12100 | 12 | R0.5 | 12 | 36 | 11.7 | – | 100 | 12 |



BALL NOSE END MILL
HSX SERIES

# HGXRP 4-Flutes Short Corner Radius End Mill

Unit:mm

| Type No. | Dia. | Corner Radius | Length of Cut | Under Neck Length | Neck Dia. | Neck Taper Angle | Overall Length | Shank Dia. |
|---|---|---|---|---|---|---|---|---|
| | ϕD | CR | ℓ | $\ell_1$ | ϕ$d_1$ | γ/° | L | ϕd |
| HGXRP4120R1.0 1275 | 12 | R1 | 12 | 36 | 11.7 | – | 75 | 12 |
| HGXRP4120R1.0 12100 | 12 | R1 | 12 | 36 | 11.7 | – | 100 | 12 |
| HGXRP4120R2.0 1275 | 12 | R2 | 12 | 36 | 11.7 | – | 75 | 12 |
| HGXRP4120R2.0 12100 | 12 | R2 | 12 | 36 | 11.7 | – | 100 | 12 |

TABLE OF RECOMMENDED MILLING MATERIALS

◎Very suitable ○Suitable

| CARBON STEELS / PREHARDENED STEELS | ALLOY STEELS / TOOL STEELS | PREHARDENED STEELS | | HARDENED STEELS | | STANLESS STEELS | CASTIRON / DUCTILE CAST IRON | COPPER ALLOYS | ALUMINUM ALLOY | GRAPHITE | TITANIUM ALLOY | HEAT RESISTANT ALLOYS | PLASTIC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~40HRC | | ~45HRC | ~55HRC | ~60HRC | ~65HRC | ~35HRC | ~350HB | | | | | | |
| ◎ | | ◎ | ○ | | | ◎ | ○ | ○ | ○ | | ◎ | ◎ | |

# Cutting Parameter

## HGXRP 4-Flutes Short Corner Radius End Mill Face Milling

| Workpiece | Carbon Steels、Alloy Steels (≤35HRC) | | | | Pre-Hardened Steels (35~45HRC) | | | | Hardened Steels (45~55HRC) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Type No. | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm |
| HGXRP4010R_ | 20000 | 1800 | 0.05 | 0.5 | 18000 | 1620 | 0.05 | 0.4 | 16000 | 1440 | 0.05 | 0.02 |
| HGXRP4015R_ | 17950 | 2000 | 0.05 | 0.65 | 16155 | 1800 | 0.05 | 0.52 | 14360 | 1600 | 0.05 | 0.02 |
| HGXRP4020R_ | 15890 | 2200 | 0.1 | 1 | 14301 | 1980 | 0.1 | 0.8 | 12712 | 1760 | 0.1 | 0.03 |
| HGXRP4030R_ | 12285 | 2400 | 0.1 | 1.5 | 11056.5 | 2160 | 0.1 | 1.2 | 9828 | 1920 | 0.1 | 0.03 |
| HGXRP4040R_ | 9680 | 2800 | 0.2 | 2 | 8712 | 2520 | 0.2 | 1.6 | 7744 | 2240 | 0.2 | 0.05 |
| HGXRP4060R_ | 7260 | 3000 | 0.2 | 3 | 6534 | 2700 | 0.2 | 2.4 | 5808 | 2400 | 0.2 | 0.05 |
| IHGXRP4080R_ | 6050 | 3500 | 0.2 | 4 | 5445 | 3150 | 0.2 | 3.2 | 4840 | 2800 | 0.2 | 0.05 |
| HGXRP4100R_ | 5445 | 3500 | 0.2 | L | 4900.5 | 3150 | 0.2 | 4 | 4356 | 2800 | 0.2 | 0.05 |
| HGXRP4120R_ | 4840 | 3600 | 0.2 | 6 | 4356 | 3240 | 0.2 | 4.8 | 3872 | 2880 | 0.2 | 0.05 |

## HGXRP 4-Flutes Short Corner Radius End Mill Z-Level Milling

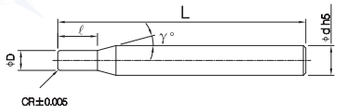
| Workpiece | Carbon Steels、Alloy Steels (≤35HRC) | | | | Pre-Hardened Steels (35~45HRC) | | | | Hardened Steels (45~55HRC) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Type No. | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm |
| HGXRP4010R_ | 20000 | 1800 | 0.05 | 0.03 | 18000 | 1620 | 0.05 | 0.03 | 16000 | 1440 | 0.05 | 0.02 |
| HGXRP4015R_ | 17950 | 2000 | 0.05 | 0.05 | 16155 | 1800 | 0.05 | 0.05 | 14360 | 1600 | 0.05 | 0.02 |
| HGXRP4020R_ | 15890 | 2200 | 0.1 | 0.05 | 14301 | 1980 | 0.1 | 0.05 | 12712 | 1760 | 0.1 | 0.03 |
| HGXRP4030R_ | 12285 | 2400 | 0.1 | 0.05 | 11056.5 | 2160 | 0.1 | 0.05 | 9828 | 1920 | 0.1 | 0.03 |
| HGXRP4040R_ | 9680 | 2800 | 0.2 | 0.05 | 8712 | 2520 | 0.2 | 0.05 | 7744 | 2240 | 0.2 | 0.05 |
| HGXRP4060R_ | 7260 | 3000 | 0.2 | 0.08 | 6534 | 2700 | 0.2 | 0.08 | 5808 | 2400 | 0.2 | 0.05 |
| HGXRP4080R_ | 6050 | 3500 | 0.2 | 0.08 | 5445 | 3150 | 0.2 | 0.08 | 4840 | 2800 | 0.2 | 0.05 |
| HGXRP4100R_ | 5445 | 3500 | 0.2 | 0.1 | 4900.5 | 3150 | 0.2 | 0.1 | 4356 | 2800 | 0.2 | 0.05 |
| HGXRP4120R_ | 4840 | 3600 | 0.2 | 0.1 | 4356 | 3240 | 0.2 | 0.1 | 3872 | 2880 | 0.2 | 0.05 |

- For Z-level and face milling, the recommended axial depth of cut (ap) is 0.3 x CR.
- This item can be used for side milling and slotting applicaitons.





# HGXR 2-Flutes General Purpose Radius End Mill



| ⌀D | D Tol. [ mm ] |
|---|---|
| D<3 | 0~-0.010 |
| 3<D<6 | 0~-0.012 |
| 6<D<10 | 0~-0.015 |
| 10<D<12 | 0~-0.018 |

Unit:mm

| Type No. | Dia. | Corner Radius | Length of Cut | Neck Taper Angle | Overall Length | Shank Dia. |
|---|---|---|---|---|---|---|
| | ϕD | CR | ℓ | γ/° | L | ϕd |
| HGXR2002R0.05 0450 | 0.2 | R0.05 | 0.4 | 12 | 50 | 4 |
| HGXR2003R0.05 0450 | 0.3 | R0.05 | 0.6 | 12 | 50 | 4 |
| HGXR2004R0.05 0450 | 0.4 | R0.05 | 0.8 | 12 | 50 | 4 |
| HGXR2004R0.1 0450 | 0.4 | R0.1 | 0.8 | 12 | 50 | 4 |
| HGXR2005R0.05 0450 | 0.5 | R0.05 | 1 | 12 | 50 | 4 |
| HGXR2005R0.1 0450 | 0.5 | R0.1 | 1 | 12 | 50 | 4 |
| HGXR2006R0.05 0450 | 0.6 | R0.05 | 1.2 | 12 | 50 | 4 |
| HGXR2006R0.1 0450 | 0.6 | R0.1 | 1.2 | 12 | 50 | 4 |
| HGXR2007R0.05 0450 | 0.7 | R0.05 | 1.4 | 12 | 50 | 4 |
| HGXR2007R0.1 0450 | 0.7 | R0.1 | 1.4 | 12 | 50 | 4 |
| HGXR2008R0.05 0450 | 0.8 | R0.05 | 1.6 | 12 | 50 | 4 |
| HGXR2008R0.1 0450 | 0.8 | R0.1 | 1.6 | 12 | 50 | 4 |
| HGXR2009R0.1 0450 | 0.9 | R0.1 | 1.8 | 12 | 50 | 4 |
| HGXR2010R0.05 0450 | 1 | R0.05 | 2 | 12 | 50 | 4 |
| HGXR2010R0.1 0450 | 1 | R0.1 | 2 | 12 | 50 | 4 |
| HGXR2010R0.2 0450 | 1 | R0.2 | 2 | 12 | 50 | 4 |
| HGXR2010R0.3 0450 | 1 | R0.3 | 3 | 12 | 50 | 4 |
| HGXR2015R0.05 0450 | 1.5 | R0.05 | 3 | 11 | 50 | 4 |
| HGXR2015R0.1 0450 | 1.5 | R0.1 | 3 | 11 | 50 | 4 |
| HGXR2015R0.2 0450 | 1.5 | R0.2 | 3 | 11 | 50 | 4 |
| HGXR2015R0.3 0450 | 1.5 | R0.3 | 3 | 11 | 50 | 4 |
| HGXR2020R0.05 0450 | 2 | R0.05 | 4 | 11 | 50 | 4 |
| HGXR2020R0.1 0450 | 2 | R0.1 | 4 | 11 | 50 | 4 |
| HGXR2020R0.2 0450 | 2 | R0.2 | 4 | 11 | 50 | 4 |
| HGXR2020R0.3 0450 | 2 | R0.3 | 4 | 11 | 50 | 4 |
| HGXR2020R0.5 0450 | 2 | R0.5 | 4 | 11 | 50 | 4 |

# HGXR 2-Flutes General Purpose Radius End Mill

Unit:mm

| Type No. | Dia. | Corner Radius | Length of Cut | Neck Taper Angle | Overall Length | Shank Dia. |
|---|---|---|---|---|---|---|
| | ϕD | CR | ℓ | γ/° | L | ϕd |
| HGXR2030R0.2 0450 | 3 | R0.2 | 6 | 11 | 50 | 4 |
| HGXR2030R0.2 0660 | 3 | R0.2 | 6 | 11 | 60 | 6 |
| HGXR2030R0.5 0450 | 3 | R0.5 | 6 | 11 | 50 | 4 |
| HGXR2030R0.5 0660 | 3 | R0.5 | 6 | 11 | 60 | 6 |
| HGXR2040R0.2 0450 | 4 | R0.2 | 8 | - | 50 | 4 |
| HGXR2040R0.2 0660 | 4 | R0.2 | 8 | 11 | 60 | 6 |
| HGXR2040R0.5 0450 | 4 | R0.5 | 8 | - | 50 | 4 |
| HGXR2040R0.5 0660 | 4 | R0.5 | 8 | 11 | 60 | 6 |
| HGXR2040R1.0 0450 | 4 | R1 | 8 | - | 50 | 4 |
| HGXR2040R1.0 0660 | 4 | R1 | 8 | 11 | 60 | 6 |
| HGXR2060R0.5 0650 | 6 | R0.5 | 12 | _ | 50 | 6 |
| HGXR2060R0.5 0675 | 6 | R0.5 | 12 | _ | 75 | 6 |
| HGXR2060R0.5 06100 | 6 | R0.5 | 12 | _ | 100 | 6 |
| HGXR2060R1.0 0650 | 6 | R1 | 12 | _ | 50 | 6 |
| HGXR2060R1.0 0660 | 6 | R1 | 12 | _ | 60 | 6 |
| HGXR2060R1.0 0675 | 6 | R1 | 12 | _ | 75 | 6 |
| HGXR2060R1.0 06100 | 6 | R1 | 12 | _ | 100 | 6 |
| HGXR2080R0.5 0860 | 8 | R0.5 | 16 | _ | 60 | 8 |
| HGXR2080R0.5 0875 | 8 | R0.5 | 16 | _ | 75 | 8 |
| HGXR2080R0.5 08100 | 8 | R0.5 | 16 | _ | 100 | 8 |
| HGXR2080R1.0 0860 | 8 | R1 | 16 | _ | 60 | 8 |
| HGXR2080R1.0 0875 | 8 | R1 | 16 | _ | 75 | 8 |
| HGXR2080R1.0 08100 | 8 | R1 | 16 | _ | 100 | 8 |
| HGXR2100R0.5 1075 | 10 | R0.5 | 20 | _ | 75 | 10 |
| HGXR2100R0.5 10100 | 10 | R0.5 | 20 | _ | 100 | 10 |



RADIUS END MILL
HGX SERIES

# HGXR 2-Flutes General Purpose Radius End Mill

Unit:mm

| Type No. | Dia. | Corner Radius | Length of Cut | Neck Taper Angle | Overall Length | Shank Dia. |
|---|---|---|---|---|---|---|
| | ϕD | CR | ℓ | γ/° | L | ϕd |
| HGXR2100R1.0 1075 | 10 | R1 | 20 | _ | 75 | 10 |
| HGXR2100R1.0 10100 | 10 | R1 | 20 | _ | 100 | 10 |
| HGXR2120R0.5 1275 | 12 | R0.5 | 24 | _ | 75 | 12 |
| HGXR2120R0.5 12100 | 12 | R0.5 | 24 | _ | 100 | 12 |
| HGXR2120R1.0 1275 | 12 | R1 | 24 | _ | 75 | 12 |
| HGXR2120R1.0 12100 | 12 | R1 | 24 | _ | 100 | 12 |
| HGXR2120R2.0 1275 | 12 | R2 | 24 | _ | 75 | 12 |
| HGXR2120R2.0 12100 | 12 | R2 | 24 | _ | 100 | 12 |

TABLE OF RECOMMENDED MILLING MATERIALS

○Very suitable ○Suitable

| CARBON STEELS PREHARDENED STEELS / ALLOY STEELS TOOL STEELS | PREHARDENED STEELS | | HARDENED STEELS | | STANLESS STEELS | CASTIRON DUCTILE CAST IRON | COPPER ALLOYS | ALUMINUM ALLOY | GRAPHITE | TITANIUM ALLOY | HEAT RESISTANT ALLOYS | PLASTIC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~40HRC | ~45HRC | ~55HRC | ~60HRC | ~65HRC | ~35HRC | ~350HB | | | | | | |
| ○ | ○ | ○ | | | ○ | ○ | ○ | | | ○ | ○ | |

# Cutting Parameter

## HGXR 2-Flutes General Purpose Radius End Mill Face Milling

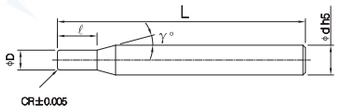
| Workpiece | Carbon Steels、Alloy Steels (≤35HRC) | | | | Pre-Hardened Steels (35~45HRC) | | | | Hardened Steels (45-55HRC) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Type No. | n/min$^{-1}$ | Vf-mm/min | ap/mm | ae/mm | n/min$^{-1}$ | Vf-mm/min | ap/mm | ae/mm | n/min$^{-1}$ | Vf-mm/min | ap/mm | ae/mm |
| HGXR2002R_ | 36000 | 360 | 0.006 | 0.12 | 30000 | 300 | 0.005 | 0.12 | 23000 | 200 | 0.003 | 0.1 |
| HGXR2003R_ | 36000 | 350 | 0.008 | 0.18 | 30000 | 350 | 0.007 | 0.18 | 22000 | 300 | 0.003 | 0.15 |
| HGXR2004R_ | 36000 | 500 | 0.012 | 0.28 | 30000 | 450 | 0.01 | 0.24 | 20000 | 400 | 0.005 | 0.2 |
| HGXR2005R_ | 30000 | 600 | 0.016 | 0.14 | 25000 | 500 | 0.008 | 0.15 | 18500 | 400 | 0.006 | 0.1 |
| HGXR2006R_ | 30000 | 600 | 0.016 | 0.2 | 25000 | 480 | 0.01 | 0.15 | 18000 | 384 | 0.007 | 0.1 |
| HGXR2007R_ | 30000 | 840 | 0.016 | 0.25 | 25000 | 700 | 0.012 | 0.25 | 16800 | 560 | 0.01 | 0.15 |
| HGXR2008R_ | 28000 | 1020 | 0.02 | 0.3 | 25000 | 850 | 0.014 | 0.25 | 15280 | 680 | 0.012 | 0.16 |
| HGXR2009R_ | 25000 | 1200 | 0.05 | 0.3 | 25000 | 900 | 0.03 | 0.3 | 14000 | 800 | 0.02 | 0.2 |
| HGXR2010R_ | 20000 | 1400 | 0.05 | 0.5 | 18000 | 1260 | 0.05 | 0.4 | 13600 | 1120 | 0.05 | 0.32 |
| HGXR2015R_ | 17950 | 1500 | 0.05 | 0.65 | 16155 | 1350 | 0.05 | 0.52 | 13000 | 1200 | 0.05 | 0.4 |
| HGXR2020R | 15890 | 1600 | 0.1 | 1 | 14301 | 1440 | 0.1 | 0.8 | 12712 | 1280 | 0.1 | 0.64 |
| HGXR2030R_ | 12285 | 1800 | 0.1 | 1.5 | 11056 | 1620 | 0.1 | 1.2 | 9828 | 1440 | 0.1 | 0.96 |
| HGXR2040R_ | 9680 | 2000 | 0.2 | 2 | 8712 | 1800 | 0.2 | 1.6 | 7744 | 1600 | 0.2 | 1.08 |
| HGXR2060R_ | 7260 | 2500 | 0.2 | 3 | 6534 | 2250 | 0.2 | 2.4 | 5808 | 2000 | 0.2 | 1.96 |
| HGXR2080R_ | 6050 | 2500 | 0.2 | 4 | 5445 | 2250 | 0.2 | 3.2 | 4840 | 2000 | 0.2 | 2.52 |
| HGXR2100R_ | 5445 | 3000 | 0.2 | 5 | 4900 | 2700 | 0.2 | 4 | 4356 | 2400 | 0.2 | 3.2 |
| HGXR2120R_ | 4840 | 3200 | 0.2 | 6 | 4356 | 2880 | 0.2 | 4.8 | 3872 | 2560 | 0.2 | 3.84 |

- For Z-level and face milling, the recommended axial depth of cut (ap) is 0.3 x CR.
- This item can be used for side milling and slotting applicaitons.





# HGXR 4-Flutes General Purpose Radius End Mill




| Ø D | D Tol. [ mm ] |
|---|---|
| D<3 | 0~-0.010 |
| 3<D<6 | 0~-0.012 |
| 6<D<10 | 0~-0.015 |
| 10<D≤18 | 0~-0.018 |

UMG ATX 4 30° Spiral Angle Straight Back Angle R <55 HRC

Unit:mm

| Type No. | Dia. | Corner Radius | Length of Cut | Neck Taper Angle | Overall Length | Shank Dia. |
|---|---|---|---|---|---|---|
| | ϕD | CR | ℓ | γ/° | L | ϕd |
| HGXR4008R0.05 0450 | 0.8 | R0.05 | 1.6 | 12 | 50 | 4 |
| HGXR4008R0.1 0450 | 0.8 | R0.1 | 1.6 | 12 | 50 | 4 |
| HGXR4010R0.05 0450 | 1 | R0.05 | 2 | 12 | 50 | 4 |
| HGXR4010R0.1 0450 | 1 | R0.1 | 2 | 12 | 50 | 4 |
| HGXR4010R0.2 0450 | 1 | R0.2 | 2 | 12 | 50 | 4 |
| HGXR4010R0.3 0450 | 1 | R0.3 | 2 | 12 | 50 | 4 |
| HGXR4015R0.05 0450 | 1.5 | R0.05 | 3 | 11 | 50 | 4 |
| HGXR4015R0.1 0450 | 1.5 | R0.1 | 3 | 11 | 50 | 4 |
| HGXR4015R0.2 0450 | 1.5 | R0.2 | 3 | 11 | 50 | 4 |
| HGXR4015R0.3 0450 | 1.5 | R0.3 | 3 | 11 | 50 | 4 |
| HGXR4020R0.05 0450 | 2 | R0.05 | 4 | 11 | 50 | 4 |
| HGXR4020R0.1 0450 | 2 | R0.1 | 4 | 11 | 50 | 4 |
| HGXR4020R0.2 0450 | 2 | R0.2 | 4 | 11 | 50 | 4 |
| HGXR4020R0.3 0450 | 2 | R0.3 | 4 | 11 | 50 | 4 |
| HGXR4020R0.5 0450 | 2 | R0.5 | 4 | 11 | 50 | 4 |
| HGXR4025R0.1 0450 | 2.5 | R0.1 | 5 | 11 | 50 | 4 |
| HGXR4025R0.2 0450 | 2.5 | R0.2 | 5 | 11 | 50 | 4 |
| HGXR4025R0.3 0450 | 2.5 | R0.3 | 5 | 11 | 50 | 4 |
| HGXR4025R0.5 0450 | 2.5 | R0.5 | 5 | 11 | 50 | 4 |
| HGXR4030R0.1 0450 | 3 | R0.1 | 6 | 11 | 50 | 4 |
| HGXR4030R0.1 0660 | 3 | R0.1 | 6 | 11 | 60 | 6 |
| HGXR4030R0.1 0675 | 3 | R0.1 | 6 | 11 | 75 | 6 |
| HGXR4030R0.2 0450 | 3 | R0.2 | 6 | 11 | 50 | 4 |
| HGXR4030R0.2 0660 | 3 | R0.2 | 6 | 11 | 60 | 6 |
| HGXR4030R0.2 0675 | 3 | R0.2 | 6 | 11 | 75 | 6 |
| HGXR4030R0.3 0450 | 3 | R0.3 | 6 | 11 | 50 | 4 |

# HGXR 4-Flutes General Purpose Radius End Mill

Unit:mm

| Type No. | Dia. | Corner Radius | Length of Cut | Neck Taper Angle | Overall Length | Shank Dia. |
|---|---|---|---|---|---|---|
| | ϕD | CR | ℓ | γ/° | L | ϕd |
| HGXR4030R0.3 0660 | 3 | R0.3 | 6 | 11 | 60 | 6 |
| HGXR4030R0.3 0675 | 3 | R0.3 | 6 | 11 | 75 | 6 |
| HGXR4030R0.5 0450 | 3 | R0.5 | 6 | 11 | 50 | 4 |
| HGXR4030R0.5 0660 | 3 | R0.5 | 6 | 11 | 60 | 6 |
| HGXR4030R0.5 0675 | 3 | R0.5 | 6 | 11 | 75 | 6 |
| HGXR4040R0.1 0450 | 4 | R0.1 | 8 | - | 50 | 4 |
| HGXR4040R0.1 0475 | 4 | R0.1 | 8 | - | 75 | 4 |
| HGXR4040R0.1 0660 | 4 | R0.1 | 8 | 11 | 60 | 6 |
| HGXR4040R0.1 0675 | 4 | R0.1 | 8 | 11 | 75 | 6 |
| HGXR4040R0.2 0450 | 4 | R0.2 | 8 | - | 50 | 4 |
| HGXR4040R0.2 0475 | 4 | R0.2 | 8 | - | 75 | 4 |
| HGXR4040R0.2 0650 | 4 | R0.2 | 8 | 11 | 50 | 6 |
| HGXR4040R0.2 0660 | 4 | R0.2 | 8 | 11 | 60 | 6 |
| HGXR4040R0.2 0675 | 4 | R0.2 | 8 | 11 | 75 | 6 |
| HGXR4040R0.3 0450 | 4 | R0.3 | 8 | - | 50 | 4 |
| HGXR4040R0.3 0475 | 4 | R0.3 | 8 | - | 75 | 4 |
| HGXR4040R0.3 0660 | 4 | R0.3 | 8 | 11 | 60 | 6 |
| HGXR4040R0.3 0675 | 4 | R0.3 | 8 | 11 | 75 | 6 |
| HGXR4040R0.5 0450 | 4 | R0.5 | 8 | - | 50 | 4 |
| HGXR4040R0.5 0475 | 4 | R0.5 | 8 | - | 75 | 4 |
| HGXR4040R0.5 0650 | 4 | R0.5 | 8 | 11 | 50 | 6 |
| HGXR4040R0.5 0660 | 4 | R0.5 | 8 | 11 | 60 | 6 |
| HGXR4040R0.5 0675 | 4 | R0.5 | 8 | 11 | 75 | 6 |
| HGXR4040R1.0 0450 | 4 | R1 | 8 | - | 50 | 4 |
| HGXR4040R1.0 0475 | 4 | R1 | 8 | 11 | 75 | 4 |
| HGXR4040R1.0 0660 | 4 | R1 | 8 | 11 | 60 | 6 |
| HGXR4040R1.0 0675 | 4 | R1 | 8 | - | 75 | 6 |
| HGXR4060R0.1 0650 | 6 | R0.1 | 12 | - | 50 | 6 |
| HGXR4060R0.1 0660 | 6 | R0.1 | 12 | - | 60 | 6 |
| HGXR4060R0.1 0675 | 6 | R0.1 | 12 | - | 75 | 6 |
| HGXR4060R0.1 06100 | 6 | R0.1 | 12 | - | 100 | 6 |
| HGXR4060R0.2 0650 | 6 | R0.2 | 12 | - | 50 | 6 |



RADIUS END MILL
HGX SERIES

# HGXR 4-Flutes General Purpose Radius End Mill

Unit:mm

| Type No. | Dia. | Corner Radius | Length of Cut | Neck Taper Angle | Overall Length | Shank Dia. |
|---|---|---|---|---|---|---|
| | ϕD | CR | ℓ | γ/° | L | ϕd |
| HGXR4060R0.2 0660 | 6 | R0.2 | 12 | – | 60 | 6 |
| HGXR4060R0.2 0675 | 6 | R0.2 | 12 | – | 75 | 6 |
| HGXR4060R0.2 06100 | 6 | R0.2 | 12 | – | 100 | 6 |
| HGXR4060R0.3 0650 | 6 | R0.3 | 12 | – | 50 | 6 |
| HGXR4060R0.3 0660 | 6 | R0.3 | 12 | – | 60 | 6 |
| HGXR4060R0.3 0675 | 6 | R0.3 | 12 | – | 75 | 6 |
| HGXR4060R0.3 06100 | 6 | R0.3 | 12 | – | 100 | 6 |
| HGXR4060R0.5 0650 | 6 | R0.5 | 12 | – | 50 | 6 |
| HGXR4060R0.5 0660 | 6 | R0.5 | 12 | – | 60 | 6 |
| HGXR4060R0.5 0675 | 6 | R0.5 | 12 | – | 75 | 6 |
| HGXR4060R0.5 06100 | 6 | R0.5 | 12 | – | 100 | 6 |
| HGXR4060R1.0 0650 | 6 | R1 | 12 | – | 50 | 6 |
| HGXR4060R1.0 0660 | 6 | R1 | 12 | – | 60 | 6 |
| HGXR4060R1.0 0675 | 6 | R1 | 12 | – | 75 | 6 |
| HGXR4060R1.0 06100 | 6 | R1 | 12 | – | 100 | 6 |
| HGXR4080R0.1 0860 | 8 | R0.1 | 16 | – | 60 | 8 |
| HGXR4080R0.1 0875 | 8 | R0.1 | 16 | – | 75 | 8 |
| HGXR4080R0.1 08100 | 8 | R0.1 | 16 | – | 100 | 8 |
| HGXR4080R0.2 0860 | 8 | R0.2 | 16 | – | 60 | 8 |
| HGXR4080R0.2 0875 | 8 | R0.2 | 16 | – | 75 | 8 |
| HGXR4080R0.2 08100 | 8 | R0.2 | 16 | – | 100 | 8 |
| HGXR4080R0.3 0860 | 8 | R0.3 | 16 | – | 60 | 8 |
| HGXR4080R0.3 0875 | 8 | R0.3 | 16 | – | 75 | 8 |
| HGXR4080R0.3 08100 | 8 | R0.3 | 16 | – | 100 | 8 |
| HGXR4080R0.5 0860 | 8 | R0.5 | 16 | – | 60 | 8 |
| HGXR4080R0.5 0875 | 8 | R0.5 | 16 | – | 75 | 8 |
| HGXR4080R0.5 08100 | 8 | R0.5 | 16 | – | 100 | 8 |
| HGXR4080R1.0 0860 | 8 | R1 | 16 | – | 60 | 8 |
| HGXR4080R1.0 0875 | 8 | R1 | 16 | – | 75 | 8 |
| HGXR4080R1.0 08100 | 8 | R1 | 16 | – | 100 | 8 |

# HGXR 4-Flutes General Purpose Radius End Mill

Unit:mm

| Type No. | Dia. | Corner Radius | Length of Cut | Neck Taper Angle | Overall Length | Shank Dia. |
|---|---|---|---|---|---|---|
| | ϕD | CR | ℓ | γ/° | L | ϕd |
| HGXR4100R0.2 1075 | 10 | R0.2 | 20 | – | 75 | 10 |
| HGXR4100R0.2 10100 | 10 | R0.2 | 20 | – | 100 | 10 |
| HGXR4100R0.5 1075 | 10 | R0.5 | 20 | – | 75 | 10 |
| HGXR4100R0.5 10100 | 10 | R0.5 | 20 | – | 100 | 10 |
| HGXR4100R1.0 1075 | 10 | R1 | 20 | – | 75 | 10 |
| HGXR4100R1.0 10100 | 10 | R1 | 20 | – | 100 | 10 |
| HGXR4120R0.5 1275 | 12 | R0.5 | 24 | – | 75 | 12 |
| HGXR4120R0.5 12100 | 12 | R0.5 | 24 | – | 100 | 12 |
| HGXR4120R1.0 1275 | 12 | R1 | 24 | – | 75 | 12 |
| HGXR4120R1.0 12100 | 12 | R1 | 24 | – | 100 | 12 |
| HGXR4120R2.0 1275 | 12 | R2 | 24 | – | 75 | 12 |
| HGXR4120R2.0 12100 | 12 | R2 | 24 | – | 100 | 12 |
| HGXR4160R0.5 16100 | 16 | R0.5 | 32 | – | 100 | 16 |
| HGXR4160R1.0 16100 | 16 | R1 | 32 | – | 100 | 16 |
| HGXR4160R2.0 16100 | 16 | R2 | 32 | – | 100 | 16 |

TABLE OF RECOMMENDED MILLING MATERIALS

○Very suitable ○Suitable

| CARBON STEELS ALLOY STEELS PREHARDENED STEELS TOOL STEELS | PREHARDENED STEELS | | HARDENED STEELS | | STANLESS STEELS | CASTIRON DUCTILE CAST IRON | COPPER ALLOYS | ALUMINUM ALLOY | GRAPHITE | TITANIUM ALLOY | HEAT RESISTANT ALLOYS | PLASTIC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~40HRC | ~45HRC | ~55HRC | ~60HRC | ~65HRC | ~35HRC | ~350HB | | | | | | |
| ○ | ○ | ○ | | | ○ | ○ | ○ | ○ | | ○ | ○ | |





# Cutting Parameter

## HGXR 4-Flutes General Purpose Radius End Mill Face Milling

| Workpiece | Carbon Steels、Alloy Steels (≤35HRC) | | | | Pre-Hardened Steels (35~45HRC) | | | | Hardened Steels (45-55HRC) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Type No. | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm |
| HGXR4008R_ | 28000 | 1500 | 0.02 | 0.3 | 25000 | 850 | 0.014 | 0.25 | 23000 | 680 | 0.012 | 0.16 |
| HGXR4009R_ | 25000 | 1600 | 0.05 | 0.3 | 25000 | 900 | 0.03 | 0.3 | 20000 | 800 | 0.02 | 0.2 |
| HGXR4010R_ | 20000 | 1800 | 0.05 | 0.5 | 18000 | 1620 | 0.05 | 0.4 | 16000 | 1440 | 0.05 | 0.32 |
| HGXR4015R_ | 17950 | 2000 | 0.05 | 0.65 | 16155 | 1800 | 0.05 | 0.52 | 14360 | 1600 | 0.05 | 0.4 |
| HGXR4020R_ | 15890 | 2200 | 0.1 | 1 | 14301 | 1980 | 0.1 | 0.8 | 12712 | 1760 | 0.1 | 0.64 |
| HGXR4025R_ | 13500 | 2300 | 0.1 | 1.25 | 12080 | 2040 | 0.1 | 1 | 10080 | 1820 | 0.1 | 0.82 |
| HGXR4030R_ | 12285 | 2400 | 0.1 | 1.5 | 11056 | 2160 | 0.1 | 1.2 | 9828 | 1920 | 0.1 | 0.96 |
| HGXR4040R_ | 9680 | 2800 | 0.2 | 2 | 8712 | 2520 | 0.2 | 1.6 | 7744 | 2240 | 0.2 | 1.08 |
| HGXR4060R_ | 7260 | 3000 | 0.2 | 3 | 6534 | 2700 | 0.2 | 2.4 | 5808 | 2400 | 0.2 | 1.96 |
| HGXR4080R_ | 6050 | 3500 | 0.2 | 4 | 5445 | 3150 | 0.2 | 3.2 | 4840 | 2800 | 0.2 | 2.52 |
| HGXR4100R_ | 5445 | 3500 | 0.2 | 5 | 4900 | 3150 | 0.2 | 4 | 4356 | 2800 | 0.2 | 3.2 |
| HGXR4120R_ | 4840 | 3600 | 0.2vv | 6 | 4356 | 3240 | 0.2 | 4.8 | 3872 | 2880 | 0.2 | 3.84 |

# Cutting Parameter

## HGXR 4-Flutes General Purpose Radius End Mill Z-Level Milling

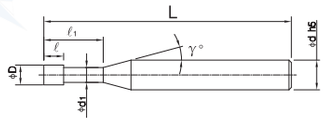
| Workpiece | Carbon Steels、Alloy Steels (≤35HRC) | | | | Pre-Hardened Steels (35~45HRC) | | | | Hardened Steels (45~55HRC) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Type No. | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm |
| HGXR4008R_ | 28000 | 1500 | 0.02 | 0.02 | 25000 | 850 | 0.014 | 0.02 | 23000 | 680 | 0.012 | 0.015 |
| HGXR4009R_ | 25000 | 1600 | 0.02 | 0.03 | 25000 | 900 | 0.03 | 0.03 | 20000 | 800 | 0.02 | 0.015 |
| HGXR4010R_ | 20000 | 1800 | 0.05 | 0.03 | 18000 | 1620 | 0.05 | 0.03 | 16000 | 1440 | 0.05 | 0.02 |
| HGXR4015R_ | 17950 | 2000 | 0.05 | 0.05 | 16155 | 1800 | 0.05 | 0.05 | 14360 | 1600 | 0.05 | 0.02 |
| HGXR4020R_ | 15890 | 2200 | 0.1 | 0.05 | 14301 | 1980 | 0.1 | 0.05 | 12712 | 1760 | 0.1 | 0.03 |
| HGXR4025R_ | 13520 | 2300 | 0.1 | 0.05 | 12080 | 2040 | 0.1 | 0.05 | 10080 | 1840 | 0.1 | 0.03 |
| HGXR4030R_ | 12285 | 2400 | 0.1 | 0.05 | 11056 | 2160 | 0.1 | 0.05 | 9828 | 1920 | 0.1 | 0.03 |
| HGXR4040R_ | 9680 | 2800 | 0.2 | 0.05 | 8712 | 2520 | 0.2 | 0.05 | 7744 | 2240 | 0.2 | 0.05 |
| HGXR4060R_ | 7260 | 3000 | 0.2 | 0.08 | 6534 | 2700 | 0.2 | 0.08 | 5808 | 2400 | 0.2 | 0.05 |
| HGXR4080R_ | 6050 | 3500 | 0.2 | 0.08 | 5445 | 3150 | 0.2 | 0.08 | 4840 | 2800 | 0.2 | 0.05 |
| HGXR4100R_ | 5445 | 3500 | 0.2 | 0.1 | 4900 | 3150 | 0.2 | 0.1 | 4356 | 2800 | 0.2 | 0.05 |
| HGXR4120R_ | 4840 | 3600 | 0.2 | 0.1 | 4356 | 3240 | 0.2 | 0.1 | 3872 | 2880 | 0.2 | 0.05 |

- For Z-level and face milling, the recommended axial depth of cut (ap) is 0.3 x CR.
- This item can be used for side milling and slotting applicaitons.





# HSXE2L 2-Flutes Long Neck End Mill




UMG AHX 2 30° Spiral Angle Arc Back Angle <65 HRC

| Ø D | D Tol. [mm] |
|---|---|
| D<3 | 0~-0.010 |
| 3<D<6 | 0~-0.012 |

Unit:mm

| Type No. | Dia. | Length of Cut | Under Neck Length | Neck Dia. | Neck Taper Angle | Overall Length | Shank Dia. |
|---|---|---|---|---|---|---|---|
| | ϕD | ℓ | ℓ1 | ϕd1 | γ/° | L | ϕd |
| HSXE2001L0.3 0450 | 0.1 | 0.07 | 0.3 | 0.085 | 12 | 50 | 4 |
| HSXE2001L0.5 0450 | 0.1 | 0.07 | 0.5 | 0.085 | 12 | 50 | 4 |
| HSXE2001L0.75 0450 | 0.1 | 0.07 | 0.75 | 0.085 | 12 | 50 | 4 |
| HSXE2001L1 0450 | 0.1 | 0.07 | 1 | 0.085 | 12 | 50 | 4 |
| HSXE20015L0.3 0450 | 0.15 | 0.1 | 0.3 | 0.13 | 12 | 50 | 4 |
| HSXE20015L0.5 0450 | 0.15 | 0.1 | 0.5 | 0.13 | 12 | 50 | 4 |
| HSXE20015L0.75 0450 | 0.15 | 0.1 | 0.75 | 0.13 | 12 | 50 | 4 |
| HSXE20015L1 0450 | 0.15 | 0.1 | 1 | 0.13 | 12 | 50 | 4 |
| HSXE20015L1.5 0450 | 0.15 | 0.1 | 1.5 | 0.13 | 12 | 50 | 4 |
| HSXE2002L0.5 0450 | 0.2 | 0.15 | 0.5 | 0.18 | 12 | 50 | 4 |
| HSXE2002L1 0450 | 0.2 | 0.15 | 1 | 0.18 | 12 | 50 | 4 |
| HSXE2002L1.5 0450 | 0.2 | 0.15 | 1.5 | 0.18 | 12 | 50 | 4 |
| HSXE2002L2 0450 | 0.2 | 0.15 | 2 | 0.18 | 12 | 50 | 4 |
| HSXE2002L2.5 0450 | 0.2 | 0.15 | 2.5 | 0.18 | 12 | 50 | 4 |
| HSXE2002L3 0450 | 0.2 | 0.15 | 3 | 0.18 | 12 | 50 | 4 |
| HSXE2003L1 0450 | 0.3 | 0.2 | 1 | 0.28 | 12 | 50 | 4 |
| HSXE2003L1.5 0450 | 0.3 | 0.2 | 1.5 | 0.28 | 12 | 50 | 4 |
| HSXE2003L2 0450 | 0.3 | 0.2 | 2 | 0.28 | 12 | 50 | 4 |
| HSXE2003L2.5 0450 | 0.3 | 0.2 | 2.5 | 0.28 | 12 | 50 | 4 |
| HSXE2003L3 0450 | 0.3 | 0.2 | 3 | 0.28 | 12 | 50 | 4 |
| HSXE2003L3.5 0450 | 0.3 | 0.2 | 3.5 | 0.28 | 12 | 50 | 4 |
| HSXE2003L4 0450 | 0.3 | 0.2 | 4 | 0.28 | 12 | 50 | 4 |
| HSXE2004L1 0450 | 0.4 | 0.3 | 1 | 0.37 | 12 | 50 | 4 |
| HSXE2004L1.5 0450 | 0.4 | 0.3 | 1.5 | 0.37 | 12 | 50 | 4 |
| HSXE2004L2 0450 | 0.4 | 0.3 | 2 | 0.37 | 12 | 50 | 4 |
| HSXE2004L2.5 0450 | 0.4 | 0.3 | 2.5 | 0.37 | 12 | 50 | 4 |
| HSXE2004L3 0450 | 0.4 | 0.3 | 3 | 0.37 | 12 | 50 | 4 |
| HSXE2004L3.5 0450 | 0.4 | 0.3 | 3.5 | 0.37 | 12 | 50 | 4 |

# HSXE2L 2-Flutes Long Neck End Mill

Unit:mm

| Type No. | Dia. | Length of Cut | Under Neck Length | Neck Dia. | Neck Taper Angle | Overall Length | Shank Dia. |
|---|---|---|---|---|---|---|---|
| | ϕD | $\ell$ | $\ell_1$ | ϕd1 | γ/° | L | ϕd |
| HSXE2004L4 0450 | 0.4 | 0.3 | 4 | 0.37 | 12 | 50 | 4 |
| HSXE2004L5 0450 | 0.4 | 0.3 | 5 | 0.37 | 12 | 50 | 4 |
| HSXE2004L6 0450 | 0.4 | 0.3 | 6 | 0.37 | 12 | 50 | 4 |
| HSXE2004L8 0450 | 0.4 | 0.3 | 8 | 0.37 | 12 | 50 | 4 |
| HSXE2004L10 0450 | 0.4 | 0.3 | 10 | 0.37 | 12 | 50 | 4 |
| HSXE2005L1 0450 | 0.5 | 0.35 | 1 | 0.46 | 12 | 50 | 4 |
| HSXE2005L1.5 0450 | 0.5 | 0.35 | 1.5 | 0.46 | 12 | 50 | 4 |
| HSXE2005L2 0450 | 0.5 | 0.35 | 2 | 0.46 | 12 | 50 | 4 |
| HSXE2005L2.5 0450 | 0.5 | 0.35 | 2.5 | 0.46 | 12 | 50 | 4 |
| HSXE2005L3 0450 | 0.5 | 0.35 | 3 | 0.46 | 12 | 50 | 4 |
| HSXE2005L3.5 0450 | 0.5 | 0.35 | 3.5 | 0.46 | 12 | 50 | 4 |
| HSXE2005L4 0450 | 0.5 | 0.35 | 4 | 0.46 | 12 | 50 | 4 |
| HSXE2005L4.5 0450 | 0.5 | 0.35 | 4.5 | 0.46 | 12 | 50 | 4 |
| HSXE2005L5 0450 | 0.5 | 0.35 | 5 | 0.46 | 12 | 50 | 4 |
| HSXE2005L6 0450 | 0.5 | 0.35 | 6 | 0.46 | 12 | 50 | 4 |
| HSXE2005L7 0450 | 0.5 | 0.35 | 7 | 0.46 | 12 | 50 | 4 |
| HSXE2005L8 0450 | 0.5 | 0.35 | 8 | 0.46 | 12 | 50 | 4 |
| HSXE2005L9 0450 | 0.5 | 0.35 | 9 | 0.46 | 12 | 50 | 4 |
| HSXE2005L10 0450 | 0.5 | 0.35 | 10 | 0.46 | 12 | 50 | 4 |
| HSXE2006L1.5 0450 | 0.6 | 0.45 | 1.5 | 0.56 | 12 | 50 | 4 |
| HSXE2006L2 0450 | 0.6 | 0.45 | 2 | 0.56 | 12 | 50 | 4 |
| HSXE2006L2.5 0450 | 0.6 | 0.45 | 2.5 | 0.56 | 12 | 50 | 4 |
| HSXE2006L3 0450 | 0.6 | 0.45 | 3 | 0.56 | 12 | 50 | 4 |
| HSXE2006L3.5 0450 | 0.6 | 0.45 | 3.5 | 0.56 | 12 | 50 | 4 |
| HSXE2006L4 0450 | 0.6 | 0.45 | 4 | 0.56 | 12 | 50 | 4 |
| HSXE2006L4.5 0450 | 0.6 | 0.45 | 4.5 | 0.56 | 12 | 50 | 4 |
| HSXE2006L5 0450 | 0.6 | 0.45 | 5 | 0.56 | 12 | 50 | 4 |
| HSXE2006L6 0450 | 0.6 | 0.45 | 6 | 0.56 | 12 | 50 | 4 |
| HSXE2006L7 0450 | 0.6 | 0.45 | 7 | 0.56 | 12 | 50 | 4 |
| HSXE2006L8 0450 | 0.6 | 0.45 | 8 | 0.56 | 12 | 50 | 4 |
| HSXE2006L9 0450 | 0.6 | 0.45 | 9 | 0.56 | 12 | 50 | 4 |
| HSXE2006L10 0450 | 0.6 | 0.45 | 10 | 0.56 | 12 | 50 | 4 |
| HSXE2006L12 0450 | 0.6 | 0.45 | 12 | 0.56 | 12 | 50 | 4 |
| HSXE2007L2 0450 | 0.7 | 0.5 | 2 | 0.66 | 12 | 50 | 4 |



SQUARE END MILL
HSX SERIES

# HSXE2L 2-Flutes Long Neck End Mill

Unit:mm

| Type No. | Dia. | Length of Cut | Under Neck Length | Neck Dia. | Neck Taper Angle | Overall Length | Shank Dia. |
|---|---|---|---|---|---|---|---|
| | ϕD | $\ell$ | $\ell_1$ | ϕd1 | γ/° | L | ϕd |
| HSXE2007L4 0450 | 0.7 | 0.5 | 4 | 0.66 | 12 | 50 | 4 |
| HSXE2007L6 0450 | 0.7 | 0.5 | 6 | 0.66 | 12 | 50 | 4 |
| HSXE2007L8 0450 | 0.7 | 0.5 | 8 | 0.66 | 12 | 50 | 4 |
| HSXE2007L10 0450 | 0.7 | 0.5 | 10 | 0.66 | 12 | 50 | 4 |
| HSXE2008L2 0450 | 0.8 | 0.6 | 2 | 0.76 | 12 | 50 | 4 |
| HSXE2008L3 0450 | 0.8 | 0.6 | 3 | 0.76 | 12 | 50 | 4 |
| HSXE2008L4 0450 | 0.8 | 0.6 | 4 | 0.76 | 12 | 50 | 4 |
| HSXE2008L5 0450 | 0.8 | 0.6 | 5 | 0.76 | 12 | 50 | 4 |
| HSXE2008L6 0450 | 0.8 | 0.6 | 6 | 0.76 | 12 | 50 | 4 |
| HSXE2008L7 0450 | 0.8 | 0.6 | 7 | 0.76 | 12 | 50 | 4 |
| HSXE2008L8 0450 | 0.8 | 0.6 | 8 | 0.76 | 12 | 50 | 4 |
| HSXE2008L10 0450 | 0.8 | 0.6 | 10 | 0.76 | 12 | 50 | 4 |
| HSXE2008L12 0450 | 0.8 | 0.6 | 12 | 0.76 | 12 | 50 | 4 |
| HSXE2008L16 0450 | 0.8 | 0.6 | 16 | 0.76 | 12 | 50 | 4 |
| HSXE2009L6 0450 | 0.9 | 0.65 | 6 | 0.86 | 12 | 50 | 4 |
| HSXE2009L8 0450 | 0.9 | 0.65 | 8 | 0.86 | 12 | 50 | 4 |
| HSXE2009L10 0450 | 0.9 | 0.65 | 10 | 0.86 | 12 | 50 | 4 |
| HSXE2010L3 0450 | 1 | 0.75 | 3 | 0.95 | 12 | 50 | 4 |
| HSXE2010L4 0450 | 1 | 0.75 | 4 | 0.95 | 12 | 50 | 4 |
| HSXE2010L5 0450 | 1 | 0.75 | 5 | 0.95 | 12 | 50 | 4 |
| HSXE2010L6 0450 | 1 | 0.75 | 6 | 0.95 | 12 | 50 | 4 |
| HSXE2010L7 0450 | 1 | 0.75 | 7 | 0.95 | 12 | 50 | 4 |
| HSXE2010L8 0450 | 1 | 0.75 | 8 | 0.95 | 12 | 50 | 4 |
| HSXE2010L9 0450 | 1 | 0.75 | 9 | 0.95 | 12 | 50 | 4 |
| HSXE2010L10 0450 | 1 | 0.75 | 10 | 0.95 | 12 | 50 | 4 |
| HSXE2010L12 0450 | 1 | 0.75 | 12 | 0.95 | 12 | 50 | 4 |
| HSXE2010L14 0450 | 1 | 0.75 | 14 | 0.95 | 12 | 50 | 4 |
| HSXE2010L16 0450 | 1 | 0.75 | 16 | 0.95 | 12 | 50 | 4 |
| HSXE2010L18 0460 | 1 | 0.75 | 18 | 0.95 | 12 | 60 | 4 |
| HSXE2010L20 0460 | 1 | 0.75 | 20 | 0.95 | 12 | 60 | 4 |
| HSXE2010L22 0460 | 1 | 0.75 | 22 | 0.95 | 12 | 60 | 4 |
| HSXE2012L6 0450 | 1.2 | 1 | 6 | 1.14 | 11 | 50 | 4 |
| HSXE2012L8 0450 | 1.2 | 1 | 8 | 1.14 | 11 | 50 | 4 |
| HSXE2012L10 0450 | 1.2 | 1 | 10 | 1.14 | 11 | 50 | 4 |

# HSXE2L 2-Flutes Long Neck End Mill

Unit:mm

| Type No. | Dia. | Length of Cut | Under Neck Length | Neck Dia. | Neck Taper Angle | Overall Length | Shank Dia. |
|---|---|---|---|---|---|---|---|
| | ϕD | $\ell$ | $\ell_1$ | ϕd1 | γ/° | L | ϕd |
| HSXE2012L12 0450 | 1.2 | 1 | 12 | 1.14 | 11 | 50 | 4 |
| HSXE2012L16 0450 | 1.2 | 1 | 16 | 1.14 | 11 | 50 | 4 |
| HSXE2014L6 0450 | 1.4 | 1.1 | 6 | 1.34 | 11 | 50 | 4 |
| HSXE2014L12 0450 | 1.4 | 1.1 | 12 | 1.34 | 11 | 50 | 4 |
| HSXE2014L16 0450 | 1.4 | 1.1 | 16 | 1.34 | 11 | 50 | 4 |
| HSXE2015L4 0450 | 1.5 | 1.2 | 4 | 1.42 | 11 | 50 | 4 |
| HSXE2015L6 0450 | 1.5 | 1.2 | 6 | 1.42 | 11 | 50 | 4 |
| HSXE2015L8 0450 | 1.5 | 1.2 | 8 | 1.42 | 11 | 50 | 4 |
| HSXE2015L10 0450 | 1.5 | 1.2 | 10 | 1.42 | 11 | 50 | 4 |
| HSXE2015L12 0450 | 1.5 | 1.2 | 12 | 1.42 | 11 | 50 | 4 |
| HSXE2015L14 0450 | 1.5 | 1.2 | 14 | 1.42 | 11 | 50 | 4 |
| HSXE2015L16 0450 | 1.5 | 1.2 | 16 | 1.42 | 11 | 50 | 4 |
| HSXE2015L18 0460 | 1.5 | 1.2 | 18 | 1.42 | 11 | 60 | 4 |
| HSXE2015L20 0460 | 1.5 | 1.2 | 20 | 1.42 | 11 | 60 | 4 |
| HSXE2015L25 0460 | 1.5 | 1.2 | 25 | 1.42 | 11 | 60 | 4 |
| HSXE2015L30 0475 | 1.5 | 1.2 | 30 | 1.42 | 11 | 75 | 4 |
| HSXE2015L35 0475 | 1.5 | 1.2 | 35 | 1.42 | 11 | 75 | 4 |
| HSXE2016L6 0450 | 1.6 | 1.3 | 6 | 1.52 | 11 | 50 | 4 |
| HSXE2016L8 0450 | 1.6 | 1.3 | 8 | 1.52 | 11 | 50 | 4 |
| HSXE2016L12 0450 | 1.6 | 1.3 | 12 | 1.52 | 11 | 50 | 4 |
| HSXE2016L16 0450 | 1.6 | 1.3 | 16 | 1.52 | 11 | 50 | 4 |
| HSXE2018L6 0450 | 1.8 | 1.4 | 6 | 1.72 | 11 | 50 | 4 |
| HSXE2018L8 0450 | 1.8 | 1.4 | 8 | 1.72 | 11 | 50 | 4 |
| HSXE2020L4 0450 | 2 | 1.6 | 4 | 1.9 | 11 | 50 | 4 |
| HSXE2020L6 0450 | 2 | 1.6 | 6 | 1.9 | 11 | 50 | 4 |
| HSXE2020L8 0450 | 2 | 1.6 | 8 | 1.9 | 11 | 50 | 4 |
| HSXE2020L10 0450 | 2 | 1.6 | 10 | 1.9 | 11 | 50 | 4 |
| HSXE2020L12 0450 | 2 | 1.6 | 12 | 1.9 | 11 | 50 | 4 |
| HSXE2020L14 0450 | 2 | 1.6 | 14 | 1.9 | 11 | 50 | 4 |
| HSXE2020L16 0450 | 2 | 1.6 | 16 | 1.9 | 11 | 50 | 4 |
| HSXE2020L18 0460 | 2 | 1.6 | 18 | 1.9 | 11 | 60 | 4 |
| HSXE2020L20 0460 | 2 | 1.6 | 20 | 1.9 | 11 | 60 | 4 |
| HSXE2020L25 0460 | 2 | 1.6 | 25 | 1.9 | 11 | 60 | 4 |
| HSXE2020L30 0475 | 2 | 1.6 | 30 | 1.9 | 11 | 75 | 4 |



SQUARE END MILL
HSX SERIES

# HSXE2L 2-Flutes Long Neck End Mill

Unit:mm

| Type No. | Dia. | Length of Cut | Under Neck Length | Neck Dia. | Neck Taper Angle | Overall Length | Shank Dia. |
|---|---|---|---|---|---|---|---|
| | ϕD | $\ell$ | $\ell_1$ | ϕd1 | γ/° | L | ϕd |
| HSXE2020L35 0475 | 2 | 1.6 | 35 | 1.9 | 11 | 75 | 4 |
| HSXE2020L40 0475 | 2 | 1.6 | 40 | 1.9 | 11 | 75 | 4 |
| HSXE2025L8 0450 | 2.5 | 2 | 8 | 2.4 | 11 | 50 | 4 |
| HSXE2025L10 0450 | 2.5 | 2 | 10 | 2.4 | 11 | 50 | 4 |
| HSXE2025L12 0450 | 2.5 | 2 | 12 | 2.4 | 11 | 50 | 4 |
| HSXE2025L16 0450 | 2.5 | 2 | 16 | 2.4 | 11 | 50 | 4 |
| HSXE2025L20 0460 | 2.5 | 2 | 20 | 2.4 | 11 | 60 | 4 |
| HSXE2025L25 0460 | 2.5 | 2 | 25 | 2.4 | 11 | 60 | 4 |
| HSXE2025L30 0475 | 2.5 | 2 | 30 | 2.4 | 11 | 75 | 4 |
| HSXE2025L35 0475 | 2.5 | 2 | 35 | 2.4 | 11 | 75 | 4 |
| HSXE2025L40 0475 | 2.5 | 2 | 40 | 2.4 | 11 | 75 | 4 |
| HSXE2030L8 0660 | 3 | 2.4 | 8 | 2.9 | 11 | 60 | 6 |
| HSXE2030L10 0660 | 3 | 2.4 | 10 | 2.9 | 11 | 60 | 6 |
| HSXE2030L12 0660 | 3 | 2.4 | 12 | 2.9 | 11 | 60 | 6 |
| HSXE2030L16 0660 | 3 | 2.4 | 16 | 2.9 | 11 | 60 | 6 |
| HSXE2030L20 0660 | 3 | 2.4 | 20 | 2.9 | 11 | 60 | 6 |
| HSXE2030L25 0675 | 3 | 2.4 | 25 | 2.9 | 11 | 75 | 6 |
| HSXE2030L30 0675 | 3 | 2.4 | 30 | 2.9 | 11 | 75 | 6 |
| HSXE2030L35 0675 | 3 | 2.4 | 35 | 2.9 | 11 | 75 | 6 |
| HSXE2030L40 06100 | 3 | 2.4 | 40 | 2.9 | 11 | 100 | 6 |
| HSXE2030L50 06100 | 3 | 2.4 | 50 | 2.9 | 11 | 100 | 6 |
| HSXE2040L12 0660 | 4 | 3.2 | 12 | 3.9 | 11 | 60 | 6 |
| HSXE2040L16 0660 | 4 | 3.2 | 16 | 3.9 | 11 | 60 | 6 |
| HSXE2040L20 0660 | 4 | 3.2 | 20 | 3.9 | 11 | 60 | 6 |
| HSXE2040L25 0675 | 4 | 3.2 | 25 | 3.9 | 11 | 75 | 6 |
| HSXE2040L30 0675 | 4 | 3.2 | 30 | 3.9 | 11 | 75 | 6 |
| HSXE2040L35 0675 | 4 | 3.2 | 35 | 3.9 | 11 | 75 | 6 |
| HSXE2040L40 06100 | 4 | 3.2 | 40 | 3.9 | 11 | 100 | 6 |
| HSXE2040L50 06100 | 4 | 3.2 | 50 | 3.9 | 11 | 100 | 6 |
| HSXE2050L20 0660 | 5 | 4 | 20 | 4.85 | 11 | 60 | 6 |
| HSXE2050L25 0675 | 5 | 4 | 25 | 4.85 | 11 | 75 | 6 |
| HSXE2050L30 0675 | 5 | 4 | 30 | 4.85 | 11 | 75 | 6 |
| HSXE2050L40 06100 | 5 | 4 | 40 | 4.85 | 11 | 100 | 6 |
| HSXE2050L50 06100 | 5 | 4 | 50 | 4.85 | 11 | 100 | 6 |

# HSXE2L 2-Flutes Long Neck End Mill

Unit:mm

| Type No. | Dia. | Length of Cut | Under Neck Length | Neck Dia. | Neck Taper Angle | Overall Length | Shank Dia. |
|---|---|---|---|---|---|---|---|
| | ϕD | ℓ | $\ell_1$ | $\phi d_1$ | γ/° | L | ϕd |
| HSXE2060L20 0660 | 6 | 4.8 | 20 | 5.85 | - | 60 | 6 |
| HSXE2060L30 0675 | 6 | 4.8 | 30 | 5.85 | - | 75 | 6 |
| HSXE2060L40 06100 | 6 | 4.8 | 40 | 5.85 | - | 100 | 6 |
| HSXE2060L50 06100 | 6 | 4.8 | 50 | 5.85 | - | 100 | 6 |

TABLE OF RECOMMENDED MILLING MATERIALS

Very suitable Suitable

| CARBON STEELS ALLOY STEELS PREHARDENED STEELS TOOL STEELS | PREHARDENED STEELS | | HARDENED STEELS | | STANLESS STEELS | CASTIRON DUCTILE CAST IRON | COPPER ALLOYS | ALUMINUM ALLOY | GRAPHITE | TITANIUM ALLOY | HEAT RESISTANT ALLOYS | PLASTIC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~40HRC | ~45HRC | ~55HRC | ~60HRC | ~65HRC | ~35HRC | ~350HB | | | | | | |
| ○ | ○ | ◎ | ◎ | ○ | ○ | ○ | ○ | | | ○ | ○ | |



# Cutting Parameter

## HSXE2L 2-Flutes Long Neck End Mill Face Milling

| Workpiece | | Pre-Hardened Steels (30-45HRC) | | | | Hardened Steels (45-55HRC) | | | | Hardened Steels (55-65HRC) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Diameter/mm | Underneck/mm | n/min$^{-1}$ | Vf-mm/min | ap/mm | ae/mm | n/min$^{-1}$ | Vf-mm/min | ap/mm | ae/mm | n/min$^{-1}$ | Vf-mm/min | ap/mm | ae/mm |
| 0.1 | 0.3 | 40000 | 150 | 0.006 | 0.06 | 40000 | 150 | 0.005 | 0.06 | 32000 | 120 | 0.003 | 0.05 |
| | 0.5 | 40000 | 100 | 0.006 | 0.06 | 40000 | 100 | 0.005 | 0.06 | 32000 | 80 | 0.003 | 0.05 |
| | 0.75 | 40000 | 80 | 0.004 | 0.06 | 40000 | 80 | 0.003 | 0.06 | 32000 | 70 | 0.002 | 0.05 |
| | 1 | 40000 | 60 | 0.002 | 0.06 | 40000 | 60 | 0.002 | 0.06 | 32000 | 50 | 0.001 | 0.05 |
| 0.15 | 0.3 | 40000 | 180 | 0.006 | 0.09 | 40000 | 180 | 0.005 | 0.09 | 32000 | 150 | 0.003 | 0.07 |
| | 0.5 | 40000 | 150 | 0.006 | 0.09 | 40000 | 150 | 0.005 | 0.09 | 32000 | 120 | 0.003 | 0.07 |
| | 0.75 | 40000 | 120 | 0.004 | 0.09 | 40000 | 120 | 0.003 | 0.09 | 32000 | 100 | 0.002 | 0.07 |
| | 1 | 40000 | 100 | 0.002 | 0.09 | 40000 | 100 | 0.002 | 0.09 | 32000 | 80 | 0.001 | 0.07 |
| | 1.5 | 40000 | 80 | 0.002 | 0.09 | 40000 | 80 | 0.002 | 0.09 | 32000 | 60 | 0.001 | 0.07 |
| 0.2 | 0.5 | 36000 | 240 | 0.006 | 0.12 | 30000 | 240 | 0.005 | 0.12 | 24000 | 200 | 0.003 | 0.1 |
| | 0.75 | 36000 | 200 | 0.006 | 0.12 | 30000 | 200 | 0.005 | 0.12 | 24000 | 180 | 0.003 | 0.1 |
| | 1 | 36000 | 180 | 0.006 | 0.12 | 30000 | 180 | 0.005 | 0.12 | 24000 | 150 | 0.003 | 0.1 |
| | 1.5 | 36000 | 120 | 0.004 | 0.12 | 30000 | 120 | 0.003 | 0.12 | 24000 | 100 | 0.002 | 0.1 |
| | 2 | 36000 | 80 | 0.004 | 0.12 | 30000 | 80 | 0.003 | 0.12 | 24000 | 50 | 0.002 | 0.1 |
| | 2.5 | 36000 | 60 | 0.002 | 0.12 | 30000 | 60 | 0.002 | 0.12 | 24000 | 50 | 0.001 | 0.1 |
| | 3 | 36000 | 40 | 0.002 | 0.12 | 30000 | 40 | 0.002 | 0.12 | 24000 | 40 | 0.001 | 0.1 |
| 0.3 | 1 | 36000 | 350 | 0.008 | 0.18 | 30000 | 350 | 0.007 | 0.18 | 24000 | 300 | 0.003 | 0.15 |
| | 1.5 | 36000 | 260 | 0.008 | 0.18 | 30000 | 260 | 0.007 | 0.18 | 24000 | 200 | 0.003 | 0.15 |
| | 2 | 36000 | 180 | 0.006 | 0.18 | 30000 | 180 | 0.005 | 0.18 | 24000 | 150 | 0.003 | 0.15 |
| | 2.5 | 36000 | 150 | 0.005 | 0.18 | 30000 | 150 | 0.004 | 0.18 | 24000 | 100 | 0.002 | 0.15 |
| | 3 | 36000 | 70 | 0.005 | 0.18 | 30000 | 70 | 0.004 | 0.18 | 24000 | 50 | 0.002 | 0.15 |
| | 3.5 | 30000 | 70 | 0.005 | 0.18 | 25000 | 70 | 0.004 | 0.18 | 20000 | 50 | 0.002 | 0.15 |
| | 4 | 28800 | 70 | 0.005 | 0.18 | 24000 | 70 | 0.004 | 0.18 | 19200 | 50 | 0.002 | 0.15 |
| 0.4 | 1 | 36000 | 495 | 0.012 | 0.28 | 30000 | 450 | 0.01 | 0.24 | 24000 | 400 | 0.005 | 0.2 |
| | 1.5 | 36000 | 440 | 0.012 | 0.28 | 30000 | 400 | 0.01 | 0.24 | 24000 | 360 | 0.005 | 0.2 |
| | 2 | 36000 | 400 | 0.012 | 0.28 | 30000 | 360 | 0.01 | 0.24 | 24000 | 320 | 0.005 | 0.2 |
| | 2.5 | 36000 | 370 | 0.01 | 0.28 | 30000 | 340 | 0.008 | 0.24 | 24000 | 280 | 0.005 | 0.2 |
| | 3 | 36000 | 350 | 0.01 | 0.28 | 30000 | 320 | 0.008 | 0.24 | 24000 | 260 | 0.004 | 0.2 |
| | 3.5 | 36000 | 300 | 0.008 | 0.28 | 30000 | 280 | 0.007 | 0.24 | 24000 | 220 | 0.004 | 0.2 |
| | 4 | 36000 | 275 | 0.008 | 0.28 | 30000 | 250 | 0.006 | 0.24 | 24000 | 200 | 0.003 | 0.2 |
| | 5 | 30000 | 275 | 0.006 | 0.28 | 25000 | 250 | 0.005 | 0.24 | 20000 | 180 | 0.003 | 0.2 |
| | 6 | 30000 | 220 | 0.005 | 0.28 | 25000 | 200 | 0.004 | 0.24 | 20000 | 150 | 0.002 | 0.2 |

# Cutting Parameter

## HSXE2L 2-Flutes Long Neck End Mill Face Milling

| Workpiece | | Pre-Hardened Steels (30-45HRC) | | | | Hardened Steels (45-55HRC) | | | | Hardened Steels (55-65HRC) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Diameter/mm | Underneck/mm | n/min$^{-1}$ | Vf-mm/min | ap/mm | ae/mm | n/min$^{-1}$ | Vf-mm/min | ap/mm | ae/mm | n/min$^{-1}$ | Vf-mm/min | ap/mm | ae/mm |
| 0.4 | 8 | 24000 | 165 | 0.003 | 0.28 | 20000 | 150 | 0.002 | 0.24 | 16000 | 120 | 0.001 | 0.2 |
| | 10 | 19200 | 110 | 0.003 | 0.28 | 16000 | 100 | 0.002 | 0.24 | 12800 | 80 | 0.001 | 0.2 |
| 0.5 | 1 | 36000 | 605 | 0.025 | 0.36 | 30000 | 550 | 0.02 | 0.3 | 24000 | 500 | 0.01 | 0.25 |
| | 1.5 | 36000 | 570 | 0.025 | 0.36 | 30000 | 520 | 0.02 | 0.3 | 24000 | 450 | 0.01 | 0.25 |
| | 2 | 36000 | 550 | 0.025 | 0.36 | 30000 | 500 | 0.02 | 0.3 | 24000 | 420 | 0.01 | 0.25 |
| | 2.5 | 36000 | 530 | 0.020 | 0.36 | 30000 | 480 | 0.015 | 0.3 | 24000 | 400 | 0.008 | 0.25 |
| | 3 | 36000 | 460 | 0.020 | 0.36 | 30000 | 420 | 0.015 | 0.3 | 24000 | 350 | 0.007 | 0.25 |
| | 3.5 | 30000 | 440 | 0.015 | 0.36 | 25000 | 400 | 0.012 | 0.3 | 20000 | 320 | 0.006 | 0.25 |
| | 4 | 30000 | 420 | 0.012 | 0.36 | 25000 | 380 | 0.01 | 0.3 | 20000 | 280 | 0.005 | 0.25 |
| | 4.5 | 30000 | 385 | 0.01 | 0.36 | 25000 | 350 | 0.008 | 0.3 | 20000 | 230 | 0.004 | 0.25 |
| | 5 | 30000 | 350 | 0.008 | 0.36 | 25000 | 320 | 0.007 | 0.3 | 20000 | 200 | 0.003 | 0.25 |
| | 6 | 30000 | 330 | 0.006 | 0.36 | 25000 | 300 | 0.005 | 0.3 | 20000 | 200 | 0.003 | 0.25 |
| | 7 | 24000 | 275 | 0.006 | 0.36 | 20000 | 250 | 0.005 | 0.3 | 16000 | 180 | 0.003 | 0.25 |
| | 8 | 24000 | 220 | 0.006 | 0.36 | 20000 | 200 | 0.005 | 0.3 | 16000 | 160 | 0.002 | 0.25 |
| | 9 | 24000 | 220 | 0.004 | 0.36 | 20000 | 200 | 0.003 | 0.3 | 16000 | 150 | 0.002 | 0.25 |
| | 10 | 19200 | 190 | 0.004 | 0.36 | 16000 | 170 | 0.003 | 0.3 | 12800 | 130 | 0.002 | 0.25 |
| 0.6 | 1.5 | 36000 | 720 | 0.025 | 0.42 | 30000 | 650 | 0.02 | 0.35 | 24000 | 550 | 0.01 | 0.3 |
| | 2 | 36000 | 605 | 0.025 | 0.42 | 30000 | 550 | 0.02 | 0.35 | 24000 | 500 | 0.01 | 0.3 |
| | 2.5 | 36000 | 605 | 0.025 | 0.42 | 30000 | 550 | 0.02 | 0.35 | 24000 | 500 | 0.01 | 0.3 |
| | 3 | 36000 | 550 | 0.020 | 0.42 | 30000 | 500 | 0.015 | 0.35 | 24000 | 450 | 0.007 | 0.3 |
| | 3.5 | 36000 | 550 | 0.020 | 0.42 | 30000 | 500 | 0.015 | 0.35 | 24000 | 450 | 0.007 | 0.3 |
| | 4 | 30000 | 495 | 0.012 | 0.42 | 25000 | 450 | 0.01 | 0.35 | 20000 | 400 | 0.005 | 0.3 |
| | 4.5 | 30000 | 495 | 0.012 | 0.42 | 25000 | 450 | 0.01 | 0.35 | 20000 | 400 | 0.005 | 0.3 |
| | 5 | 30000 | 440 | 0.010 | 0.42 | 25000 | 400 | 0.007 | 0.35 | 20000 | 350 | 0.003 | 0.3 |
| | 6 | 30000 | 385 | 0.006 | 0.42 | 25000 | 350 | 0.005 | 0.35 | 20000 | 300 | 0.002 | 0.3 |
| | 7 | 23760 | 340 | 0.003 | 0.24 | 19800 | 308 | 0.002 | 0.2 | 18000 | 280 | 0.002 | 0.2 |
| | 8 | 21120 | 300 | 0.003 | 0.24 | 17600 | 275 | 0.002 | 0.2 | 16000 | 250 | 0.002 | 0.2 |
| | 9 | 18480 | 260 | 0.003 | 0.18 | 15400 | 242 | 0.002 | 0.15 | 14000 | 220 | 0.002 | 0.15 |
| | 10 | 15840 | 240 | 0.003 | 0.18 | 13200 | 220 | 0.002 | 0.15 | 12000 | 200 | 0.002 | 0.15 |
| | 12 | 13200 | 180 | 0.003 | 0.12 | 11000 | 165 | 0.002 | 0.1 | 10000 | 150 | 0.002 | 0.1 |
| 0.7 | 2 | 36000 | 820 | 0.05 | 0.48 | 30000 | 750 | 0.04 | 0.4 | 24000 | 600 | 0.03 | 0.35 |
| | 4 | 30000 | 760 | 0.038 | 0.48 | 25000 | 690 | 0.03 | 0.4 | 20000 | 560 | 0.02 | 0.35 |



Cutting Parameter

## HSXE2L 2-Flutes Long Neck End Mill Face Milling

| Workpiece | | Pre-Hardened Steels (30-45HRC) | | | | Hardened Steels (45-55HRC) | | | | Hardened Steels (55-65HRC) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Diameter/mm | Underneck/mm | n/min$^{-1}$ | Vf-mm/min | ap/mm | ae/mm | n/min$^{-1}$ | Vf-mm/min | ap/mm | ae/mm | n/min$^{-1}$ | Vf-mm/min | ap/mm | ae/mm |
| 0.7 | 6 | 30000 | 600 | 0.025 | 0.48 | 25000 | 550 | 0.02 | 0.4 | 20000 | 410 | 0.015 | 0.35 |
| | 8 | 24000 | 470 | 0.015 | 0.48 | 20000 | 430 | 0.012 | 0.4 | 16000 | 330 | 0.01 | 0.35 |
| | 10 | 19200 | 330 | 0.01 | 0.48 | 16000 | 300 | 0.008 | 0.4 | 12800 | 200 | 0.005 | 0.35 |
| 0.8 | 2 | 30000 | 940 | 0.05 | 0.54 | 25000 | 850 | 0.04 | 0.45 | 20000 | 780 | 0.03 | 0.4 |
| | 3 | 30000 | 940 | 0.05 | 0.54 | 25000 | 850 | 0.04 | 0.45 | 20000 | 780 | 0.03 | 0.4 |
| | 4 | 30000 | 880 | 0.04 | 0.54 | 25000 | 800 | 0.03 | 0.45 | 20000 | 700 | 0.025 | 0.4 |
| | 5 | 30000 | 770 | 0.04 | 0.54 | 25000 | 700 | 0.03 | 0.45 | 20000 | 630 | 0.02 | 0.4 |
| | 6 | 24000 | 680 | 0.03 | 0.54 | 20000 | 620 | 0.025 | 0.45 | 16000 | 550 | 0.02 | 0.4 |
| | 7 | 21600 | 605 | 0.25 | 0.54 | 18000 | 550 | 0.2 | 0.45 | 14400 | 500 | 0.01 | 0.4 |
| | 8 | 19200 | 550 | 0.02 | 0.54 | 16000 | 500 | 0.015 | 0.45 | 12800 | 400 | 0.007 | 0.4 |
| | 10 | 19200 | 440 | 0.015 | 0.54 | 16000 | 400 | 0.012 | 0.45 | 12800 | 350 | 0.007 | 0.4 |
| | 12 | 19200 | 330 | 0.008 | 0.54 | 16000 | 300 | 0.007 | 0.45 | 12800 | 220 | 0.005 | 0.4 |
| | 16 | 18000 | 220 | 0.006 | 0.5 | 15000 | 200 | 0.005 | 0.40 | 12000 | 150 | 0.005 | 0.4 |
| 0.9 | 2 | 30000 | 1320 | 0.08 | 0.6 | 25000 | 1200 | 0.07 | 0.5 | 20000 | 1000 | 0.06 | 0.45 |
| | 4 | 30000 | 1100 | 0.06 | 0.6 | 25000 | 1000 | 0.05 | 0.5 | 20000 | 900 | 0.04 | 0.45 |
| | 6 | 24000 | 990 | 0.04 | 0.6 | 20000 | 900 | 0.03 | 0.5 | 16000 | 700 | 0.02 | 0.45 |
| | 8 | 21600 | 880 | 0.04 | 0.6 | 18000 | 800 | 0.03 | 0.5 | 14400 | 600 | 0.02 | 0.45 |
| | 10 | 19200 | 660 | 0.025 | 0.6 | 16000 | 600 | 0.02 | 0.5 | 12800 | 500 | 0.01 | 0.45 |
| 1 | 3 | 30000 | 1320 | 0.075 | 0.7 | 25000 | 1200 | 0.06 | 0.6 | 20000 | 1000 | 0.05 | 0.5 |
| | 4 | 30000 | 1100 | 0.06 | 0.7 | 25000 | 1000 | 0.05 | 0.6 | 20000 | 900 | 0.04 | 0.5 |
| | 5 | 24000 | 1100 | 0.05 | 0.7 | 20000 | 1000 | 0.04 | 0.6 | 16000 | 800 | 0.03 | 0.5 |
| | 6 | 24000 | 990 | 0.04 | 0.7 | 20000 | 900 | 0.03 | 0.6 | 16000 | 700 | 0.02 | 0.5 |
| | 7 | 24000 | 990 | 0.04 | 0.7 | 20000 | 900 | 0.03 | 0.6 | 16000 | 650 | 0.02 | 0.5 |
| | 8 | 21600 | 880 | 0.04 | 0.7 | 18000 | 800 | 0.03 | 0.6 | 14400 | 600 | 0.02 | 0.5 |
| | 9 | 21600 | 770 | 0.025 | 0.7 | 18000 | 700 | 0.02 | 0.6 | 14400 | 550 | 0.015 | 0.5 |
| | 10 | 19200 | 660 | 0.025 | 0.7 | 16000 | 600 | 0.02 | 0.6 | 12800 | 500 | 0.01 | 0.5 |
| | 12 | 19200 | 550 | 0.025 | 0.7 | 16000 | 500 | 0.02 | 0.6 | 12800 | 400 | 0.01 | 0.5 |
| | 14 | 19200 | 495 | 0.02 | 0.7 | 16000 | 450 | 0.015 | 0.6 | 12800 | 360 | 0.008 | 0.5 |
| | 16 | 16800 | 440 | 0.015 | 0.7 | 14000 | 400 | 0.012 | 0.6 | 11200 | 320 | 0.006 | 0.5 |
| | 18 | 16800 | 330 | 0.012 | 0.7 | 14000 | 300 | 0.01 | 0.6 | 11200 | 240 | 0.006 | 0.5 |
| | 20 | 14400 | 220 | 0.008 | 0.7 | 12000 | 200 | 0.007 | 0.6 | 9600 | 160 | 0.005 | 0.5 |
| | 22 | 14400 | 198 | 0.006 | 0.7 | 12000 | 180 | 0.005 | 0.6 | 9600 | 150 | 0.003 | 0.5 |

# Cutting Parameter

## HSXE2L 2-Flutes Long Neck End Mill Face Milling

| Workpiece | | Pre-Hardened Steels (30-45HRC) | | | | Hardened Steels (45-55HRC) | | | | Hardened Steels (55-65HRC) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Diameter/mm | Underneck/mm | n/min$^{-1}$ | Vf-mm/min | ap/mm | ae/mm | n/min$^{-1}$ | Vf-mm/min | ap/mm | ae/mm | n/min$^{-1}$ | Vf-mm/min | ap/mm | ae/mm |
| 1.2 | 6 | 24000 | 990 | 0.05 | 0.8 | 20000 | 900 | 0.04 | 0.7 | 16000 | 0.03 | 0.03 | 0.6 |
| | 8 | 21600 | 880 | 0.05 | 0.8 | 18000 | 800 | 0.04 | 0.7 | 14400 | 0.02 | 0.02 | 0.6 |
| | 10 | 19200 | 660 | 0.04 | 0.8 | 16000 | 600 | 0.03 | 0.7 | 12800 | 0.02 | 0.02 | 0.6 |
| | 12 | 16800 | 660 | 0.025 | 0.8 | 14000 | 600 | 0.02 | 0.7 | 11200 | 0.01 | 0.01 | 0.6 |
| | 16 | 14400 | 440 | 0.02 | 0.8 | 12000 | 400 | 0.018 | 0.7 | 9600 | 0.01 | 0.01 | 0.6 |
| 1.4 | 6 | 26400 | 1100 | 0.075 | 1 | 22000 | 1000 | 0.06 | 0.8 | 17600 | 0.04 | 0.04 | 0.7 |
| | 12 | 19200 | 770 | 0.04 | 1 | 16000 | 700 | 0.03 | 0.8 | 12800 | 0.01 | 0.01 | 0.7 |
| | 16 | 14400 | 440 | 0.02 | 0.8 | 12000 | 400 | 0.018 | 0.7 | 9600 | 0.01 | 0.01 | 0.6 |
| 1.5 | 4 | 27600 | 1320 | 0.08 | 1.1 | 23000 | 1200 | 0.07 | 0.9 | 18400 | 0.05 | 0.05 | 0.75 |
| | 6 | 27600 | 1100 | 0.075 | 1.1 | 23000 | 1000 | 0.06 | 0.9 | 18400 | 0.04 | 0.04 | 0.75 |
| | 8 | 24000 | 990 | 0.075 | 1.1 | 20000 | 900 | 0.06 | 0.9 | 16000 | 0.03 | 0.03 | 0.75 |
| | 10 | 24000 | 880 | 0.05 | 1.1 | 20000 | 800 | 0.04 | 0.9 | 16000 | 0.03 | 0.03 | 0.75 |
| | 12 | 19200 | 770 | 0.05 | 1.1 | 16000 | 700 | 0.04 | 0.9 | 12800 | 0.02 | 0.02 | 0.75 |
| | 14 | 16800 | 660 | 0.04 | 1.1 | 14000 | 600 | 0.03 | 0.9 | 11200 | 0.02 | 0.02 | 0.75 |
| | 16 | 14400 | 550 | 0.025 | 1.1 | 12000 | 500 | 0.02 | 0.9 | 9600 | 0.01 | 0.01 | 0.75 |
| | 18 | 12000 | 440 | 0.025 | 1.1 | 10000 | 400 | 0.02 | 0.9 | 8000 | 0.008 | 0.008 | 0.75 |
| | 20 | 10800 | 352 | 0.02 | 1.1 | g00 | 320 | 0.015 | 0.9 | 7200 | 0.005 | 0.005 | 0.75 |
| | 25 | 9600 | 275 | 0.012 | 1.1 | 8000 | 250 | 0.01 | 0.9 | 6400 | 0.004 | 0.004 | 0.75 |
| | 30 | 8400 | 220 | 0.006 | 1.1 | 7000 | 200 | 0.005 | 0.9 | 5600 | 0.003 | 0.003 | 0.75 |
| | 35 | 7200 | 165 | 0.004 | 1.1 | 6000 | 150 | 0.003 | 0.9 | 4800 | 0.002 | 0.002 | 0.75 |
| 1.6 | 6 | 26400 | 1100 | 0.075 | 12 | 22000 | 1000 | 0.06 | 0.96 | 17600 | 0.04 | 0.04 | 0.8 |
| | 8 | 24000 | 990 | 0.075 | 12 | 20000 | 900 | 0.06 | 0.96 | 16000 | 0.03 | 0.03 | 0.8 |
| | 12 | 19200 | 770 | 0.05 | 1 | 16000 | 700 | 0.04 | 0.9 | 12800 | 0.02 | 0.02 | 0.75 |
| | 16 | 14400 | 550 | 0.025 | 1 | 12000 | 500 | 0.02 | 0.9 | 9600 | 0.01 | 0.01 | 0.75 |
| 1.8 | 6 | 24000 | 1100 | 0.08 | 12 | 20000 | 1000 | 0.07 | 1 | 16000 | 0.05 | 0.05 | 0.9 |
| | 8 | 21600 | 990 | 0.075 | 12 | 18000 | 900 | 0.06 | 1 | 14400 | 0.04 | 0.04 | 0.9 |
| | 10 | 19200 | 880 | 0.075 | 12 | 16000 | 800 | 0.06 | 1 | 12800 | 0.04 | 0.04 | 0.9 |
| | 12 | 16800 | 770 | 0.06 | 12 | 14000 | 700 | 0.05 | 1 | 11200 | 0.03 | 0.03 | 0.9 |
| | 14 | 16800 | 770 | 0.06 | 12 | 14000 | 700 | 0.05 | 1 | 11200 | 0.03 | 0.03 | 0.9 |
| | 16 | 14400 | 660 | 0.05 | 12 | 12000 | 600 | 0.04 | 1 | 9600 | 0.02 | 0.02 | 0.9 |
| | 18 | 12000 | 550 | 0.05 | 12 | 10000 | 500 | 0.04 | 1 | 8000 | 0.02 | 0.02 | 0.9 |
| 2 | 6 | 24000 | 1100 | 0.1 | 1.4 | 20000 | 1000 | 0.08 | 12 | 16000 | 0.06 | 0.06 | 1 |



SQUARE END MILL
HSX SERIES

# Cutting Parameter

## HSXE2L 2-Flutes Long Neck End Mill Face Milling

| Workpiece | | Pre-Hardened Steels (30-45HRC) | | | | Hardened Steels (45-55HRC) | | | | Hardened Steels (55-65HRC) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Diameter/mm | Underneck/mm | n/min$^{-1}$ | Vf-mm/min | ap/mm | ae/mm | n/min$^{-1}$ | Vf-mm/min | ap/mm | ae/mm | n/min$^{-1}$ | Vf-mm/min | ap/mm | ae/mm |
| 2 | 8 | 21600 | 990 | 0.08 | 1.4 | 18000 | 900 | 0.07 | 1.2 | 14400 | 800 | 0.05 | 1 |
| | 10 | 19200 | 880 | 0.075 | 1.4 | 16000 | 800 | 0.06 | 1.2 | 12800 | 700 | 0.05 | 1 |
| | 12 | 16800 | 770 | 0.06 | 1.4 | 14000 | 700 | 0.05 | 1.2 | 11200 | 600 | 0.04 | 1 |
| | 14 | 16800 | 770 | 0.05 | 1.4 | 14000 | 700 | 0.04 | 1.2 | 11200 | 600 | 0.03 | 1 |
| | 16 | 14400 | 660 | 0.05 | 1.4 | 12000 | 600 | 0.04 | 1.2 | 9600 | 500 | 0.03 | 1 |
| | 18 | 12000 | 550 | 0.04 | 1.4 | 10000 | 500 | 0.03 | 1.2 | 8000 | 410 | 0.02 | 1 |
| | 20 | 12000 | 440 | 0.04 | 1.4 | 10000 | 400 | 0.03 | 1.2 | 8000 | 380 | 0.02 | 1 |
| | 25 | 10800 | 385 | 0.025 | 1.4 | 9000 | 350 | 0.02 | 1.2 | 7200 | 330 | 0.015 | 1 |
| | 30 | 9600 | 330 | 0.02 | 1.4 | 8000 | 300 | 0.015 | 1.2 | 6400 | 280 | 0.01 | 1 |
| | 35 | 8400 | 275 | 0.015 | 1.4 | 7000 | 250 | 0.012 | 1.2 | 5600 | 230 | 0.008 | 1 |
| | 40 | 7200 | 220 | 0.01 | 1.4 | 6000 | 200 | 0.008 | 1.2 | 4800 | 180 | 0.005 | 1 |
| | 50 | 6000 | 132 | 0.006 | 1.4 | 5000 | 120 | 0.005 | 1.2 | 4000 | 100 | 0.004 | 1 |
| 2.5 | 8 | 19200 | 1100 | 0.1 | 1.8 | 16000 | 1000 | 0.08 | 1.5 | 12800 | 800 | 0.07 | 1.25 |
| | 10 | 19200 | 880 | 0.075 | 1.8 | 16000 | 800 | 0.06 | 1.5 | 12800 | 700 | 0.05 | 1.25 |
| | 12 | 16800 | 880 | 0.08 | 1.8 | 14000 | 800 | 0.07 | 1.5 | 11200 | 700 | 0.06 | 1.25 |
| | 16 | 14400 | 770 | 0.075 | 1.8 | 12000 | 700 | 0.06 | 1.5 | 9600 | 600 | 0.05 | 1.25 |
| | 20 | 12000 | 660 | 0.075 | 1.8 | 10000 | 600 | 0.06 | 1.5 | 8000 | 500 | 0.05 | 1.25 |
| | 25 | 10800 | 600 | 0.025 | 1.8 | 9000 | 500 | 0.02 | 1.5 | 7200 | 400 | 0.015 | 1.25 |
| | 30 | 9600 | 440 | 0.04 | 1.8 | 8000 | 400 | 0.03 | 1.5 | 6400 | 300 | 0.025 | 1.25 |
| | 35 | 8400 | 330 | 0.02 | 1.4 | 7000 | 300 | 0.015 | 1.2 | 5600 | 280 | 0.01 | 1.25 |
| | 40 | 7200 | 275 | 0.02 | 1.8 | 6000 | 250 | 0.015 | 1.5 | 4800 | 200 | 0.012 | 1.25 |
| | 50 | 6000 | 165 | 0.012 | 1.8 | 5000 | 150 | 0.01 | 1.5 | 4000 | 120 | 0.008 | 1.25 |
| 3 | 10 | 18000 | 880 | 0.15 | 2 | 15000 | 800 | 0.12 | 1.8 | 12000 | 700 | 0.09 | 1.5 |
| | 12 | 16800 | 990 | 0.125 | 2 | 14000 | 900 | 0.1 | 1.8 | 11200 | 800 | 0.08 | 1.5 |
| | 16 | 14400 | 880 | 0.1 | 2 | 12000 | 800 | 0.08 | 1.8 | 9600 | 700 | 0.07 | 1.5 |
| | 20 | 12000 | 880 | 0.1 | 2 | 10000 | 800 | 0.08 | 1.8 | 8000 | 700 | 0.07 | 1.5 |
| | 25 | 10800 | 770 | 0.08 | 2 | 9000 | 700 | 0.07 | 1.8 | 7200 | 600 | 0.06 | 1.5 |
| | 30 | 9600 | 770 | 0.06 | 2 | 8000 | 700 | 0.05 | 1.8 | 6400 | 600 | 0.03 | 1.5 |
| | 35 | 8400 | 330 | 0.02 | 1.8 | 7000 | 300 | 0.015 | 1.5 | 5600 | 280 | 0.02 | 1.25 |
| | 40 | 7200 | 275 | 0.02 | 1.4 | 6000 | 250 | 0.015 | 1.2 | 4800 | 200 | 0.012 | 1 |

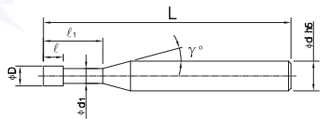
# Cutting Parameter

## HSXE2L 2-Flutes Long Neck End Mill Face Milling

| Workpiece | | Pre-Hardened Steels (30-45HRC) | | | | Hardened Steels (45-55HRC) | | | | Hardened Steels (55-65HRC) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Diameter/mm | Underneck/mm | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm |
| 4 | 12 | 14400 | 990 | 0.125 | 2.4 | 12000 | 900 | 0.1 | 2.0 | 9600 | 720 | 0.1 | 1.5 |
| | 16 | 12000 | 880 | 0.1 | 2.4 | 10000 | 800 | 0.08 | 2.0 | 8000 | 640 | 0.09 | 1.5 |
| | 20 | 10800 | 880 | 0.1 | 2.4 | 9000 | 800 | 0.08 | 2.0 | 7200 | 640 | 0.08 | 1.5 |
| | 25 | 9600 | 770 | 0.08 | 2.4 | 8000 | 700 | 0.07 | 2.0 | 6400 | 560 | 0.07 | 1.5 |
| | 30 | 8400 | 770 | 0.06 | 2.4 | 7000 | 700 | 0.05 | 2.0 | 5600 | 560 | 0.07 | 1.5 |
| | 35 | 7200 | 330 | 0.02 | 2.4 | 6000 | 300 | 0.015 | 2.0 | 4800 | 240 | 0.06 | 1.5 |
| | 40 | 6000 | 275 | 0.02 | 1.8 | 5000 | 250 | 0.015 | 1.5 | 4000 | 200 | 0.03 | 1.5 |
| | 45 | 4800 | 220 | 0.012 | 1.8 | 4000 | 200 | 0.01 | 1.5 | 3200 | 160 | 0.02 | 1.25 |
| | 50 | 3600 | 165 | 0.012 | 1.8 | 3000 | 150 | 0.01 | 1.5 | 2400 | 120 | 0.012 | 1 |



# HSXE4L 4-Flutes Long Neck End Mill




UMG AHX 4 30° Spiral Angle Arc Back Angle <65 HRC

| Ø D | D Tol. [ mm ] |
|---|---|
| D<3 | 0~-0.010 |
| 3<D<6 | 0~-0.012 |

Unit:mm

| Type No. | Dia. | Length of Cut | Under Neck Length | Neck Dia. | Neck Taper Angle | Overall Length | Shank Dia. |
|---|---|---|---|---|---|---|---|
| | ϕD | ℓ | ℓ1 | ϕd1 | γ/° | L | ϕd |
| HSXE4008L2 0450 | 0.8 | 0.6 | 2 | 0.76 | 12 | 50 | 4 |
| HSXE4008L3 0450 | 0.8 | 0.6 | 3 | 0.76 | 12 | 50 | 4 |
| HSXE4008L4 0450 | 0.8 | 0.6 | 4 | 0.76 | 12 | 50 | 4 |
| HSXE4008L5 0450 | 0.8 | 0.6 | 5 | 0.76 | 12 | 50 | 4 |
| HSXE4008L6 0450 | 0.8 | 0.6 | 6 | 0.76 | 12 | 50 | 4 |
| HSXE4008L7 0450 | 0.8 | 0.6 | 7 | 0.76 | 12 | 50 | 4 |
| HSXE4008L8 0450 | 0.8 | 0.6 | 8 | 0.76 | 12 | 50 | 4 |
| HSXE4008L10 0450 | 0.8 | 0.6 | 10 | 0.76 | 12 | 50 | 4 |
| HSXE4008L12 0450 | 0.8 | 0.6 | 12 | 0.76 | 12 | 50 | 4 |
| HSXE4008L16 0450 | 0.8 | 0.6 | 16 | 0.76 | 12 | 50 | 4 |
| HSXE4010L3 0450 | 1 | 0.75 | 3 | 0.95 | 12 | 50 | 4 |
| HSXE4010L4 0450 | 1 | 0.75 | 4 | 0.95 | 12 | 50 | 4 |
| HSXE4010L5 0450 | 1 | 0.75 | 5 | 0.95 | 12 | 50 | 4 |
| HSXE4010L6 0450 | 1 | 0.75 | 6 | 0.95 | 12 | 50 | 4 |
| HSXE4010L7 0450 | 1 | 0.75 | 7 | 0.95 | 12 | 50 | 4 |
| HSXE4010L8 0450 | 1 | 0.75 | 8 | 0.95 | 12 | 50 | 4 |
| HSXE4010L9 0450 | 1 | 0.75 | 9 | 0.95 | 12 | 50 | 4 |
| HSXE4010L10 0450 | 1 | 0.75 | 10 | 0.95 | 12 | 50 | 4 |
| HSXE4010L12 0450 | 1 | 0.75 | 12 | 0.95 | 12 | 50 | 4 |
| HSXE4010L14 0450 | 1 | 0.75 | 14 | 0.95 | 12 | 50 | 4 |
| HSXE4010L16 0450 | 1 | 0.75 | 16 | 0.95 | 12 | 50 | 4 |
| HSXE4010L18 0460 | 1 | 0.75 | 18 | 0.95 | 12 | 60 | 4 |
| HSXE4010L20 0460 | 1 | 0.75 | 20 | 0.95 | 12 | 60 | 4 |
| HSXE4010L22 0460 | 1 | 0.75 | 22 | 0.95 | 12 | 60 | 4 |
| HSXE4012L6 0450 | 1.2 | 1 | 6 | 1.14 | 11 | 50 | 4 |
| HSXE4012L8 0450 | 1.2 | 1 | 8 | 1.14 | 11 | 50 | 4 |

# HSXE4L 4-Flutes Long Neck End Mill

Unit:mm

| Type No. | Dia. | Length of Cut | Under Neck Length | Neck Dia. | Neck Taper Angle | Overall Length | Shank Dia. |
|---|---|---|---|---|---|---|---|
| | ϕD | $\ell$ | $\ell_1$ | ϕd1 | γ/° | L | ϕd |
| HSXE4012L10 0450 | 1.2 | 1 | 10 | 1.14 | 11 | 50 | 4 |
| HSXE4012L12 0450 | 1.2 | 1 | 12 | 1.14 | 11 | 50 | 4 |
| HSXE4014L6 0450 | 1.4 | 1.1 | 6 | 1.34 | 11 | 50 | 4 |
| HSXE4014L12 0450 | 1.4 | 1.1 | 12 | 1.34 | 11 | 50 | 4 |
| HSXE4014L16 0450 | 1.4 | 1.1 | 16 | 1.34 | 11 | 50 | 4 |
| HSXE4015L4 0450 | 1.5 | 1.2 | 4 | 1.42 | 11 | 50 | 4 |
| HSXE4015L6 0450 | 1.5 | 1.2 | 6 | 1.42 | 11 | 50 | 4 |
| HSXE4015L8 0450 | 1.5 | 1.2 | 8 | 1.42 | 11 | 50 | 4 |
| HSXE4015L10 0450 | 1.5 | 1.2 | 10 | 1.42 | 11 | 50 | 4 |
| HSXE4015L12 0450 | 1.5 | 1.2 | 12 | 1.42 | 11 | 50 | 4 |
| HSXE4015L14 0450 | 1.5 | 1.2 | 14 | 1.42 | 11 | 50 | 4 |
| HSXE4015L16 0450 | 1.5 | 1.2 | 16 | 1.42 | 11 | 50 | 4 |
| HSXE4015L18 0460 | 1.5 | 1.2 | 18 | 1.42 | 11 | 60 | 4 |
| HSXE4015L20 0460 | 1.5 | 1.2 | 20 | 1.42 | 11 | 60 | 4 |
| HSXE4015L25 0460 | 1.5 | 1.2 | 25 | 1.42 | 11 | 60 | 4 |
| HSXE4016L8 0450 | 1.6 | 1.3 | 8 | 1.52 | 11 | 50 | 4 |
| HSXE4016L12 0450 | 1.6 | 1.3 | 12 | 1.52 | 11 | 50 | 4 |
| HSXE4016L16 0450 | 1.6 | 1.3 | 16 | 1.52 | 11 | 50 | 4 |
| HSXE4020L6 0450 | 2 | 1.6 | 6 | 1.9 | 11 | 50 | 4 |
| HSXE4020L8 0450 | 2 | 1.6 | 8 | 1.9 | 11 | 50 | 4 |
| HSXE4020L10 0450 | 2 | 1.6 | 10 | 1.9 | 11 | 50 | 4 |
| HSXE4020L12 0450 | 2 | 1.6 | 12 | 1.9 | 11 | 50 | 4 |
| HSXE4020L14 0450 | 2 | 1.6 | 14 | 1.9 | 11 | 50 | 4 |
| HSXE4020L16 0450 | 2 | 1.6 | 16 | 1.9 | 11 | 50 | 4 |
| HSXE4020L18 0460 | 2 | 1.6 | 18 | 1.9 | 11 | 60 | 4 |
| HSXE4020L20 0460 | 2 | 1.6 | 20 | 1.9 | 11 | 60 | 4 |
| HSXE4020L25 0460 | 2 | 1.6 | 25 | 1.9 | 11 | 60 | 4 |
| HSXE4020L30 0475 | 2 | 1.6 | 30 | 1.9 | 11 | 75 | 4 |
| HSXE4020L35 0475 | 2 | 1.6 | 35 | 1.9 | 11 | 75 | 4 |
| HSXE4025L8 0450 | 2.5 | 2 | 8 | 2.4 | 11 | 50 | 4 |
| HSXE4025L10 0450 | 2.5 | 2 | 10 | 2.4 | 11 | 50 | 4 |
| HSXE4025L12 0450 | 2.5 | 2 | 12 | 2.4 | 11 | 50 | 4 |
| HSXE4025L16 0450 | 2.5 | 2 | 16 | 2.4 | 11 | 50 | 4 |
| HSXE4025L20 0460 | 2.5 | 2 | 20 | 2.4 | 11 | 60 | 4 |



SQUARE END MILL
HSX SERIES

# HSXE4L 4-Flutes Long Neck End Mill

Unit:mm

| Type No. | Dia. | Length of Cut | Under Neck Length | Neck Dia. | Neck Taper Angle | Overall Length | Shank Dia. |
|---|---|---|---|---|---|---|---|
| | ϕD | $\ell$ | $\ell_1$ | ϕd1 | γ/° | L | ϕd |
| HSXE4025L25 0460 | 2.5 | 3 | 25 | 2.4 | 11 | 60 | 4 |
| HSXE4025L300475 | 2.5 | 2 | 30 | 2.4 | 11 | 75 | 4 |
| HSXE4025L35 0475 | 2.5 | 2 | 35 | 2.4 | 11 | 75 | 4 |
| HSXE4030L10 0450 | 3 | 2.4 | 10 | 2.9 | 11 | 50 | 4 |
| HSXE4030L10 0660 | 3 | 2.4 | 10 | 2.9 | 11 | 60 | 6 |
| HSXE4030L12 0450 | 3 | 2.4 | 12 | 2.9 | 11 | 50 | 4 |
| HSXE4030L12 0660 | 3 | 2.4 | 12 | 2.9 | 11 | 60 | 6 |
| HSXE4030L16 0450 | 3 | 2.4 | 16 | 2.9 | 11 | 50 | 4 |
| HSXE4030L16 0660 | 3 | 2.4 | 16 | 2.9 | 11 | 60 | 6 |
| HSXE4030L20 0660 | 3 | 2.4 | 20 | 2.9 | 11 | 60 | 6 |
| HSXE4030L25 0675 | 3 | 2.4 | 25 | 2.9 | 11 | 75 | 6 |
| HSXE4030L30 0675 | 3 | 2.4 | 30 | 2.9 | 11 | 75 | 6 |
| HSXE4030L35 0675 | 3 | 2.4 | 35 | 2.9 | 11 | 75 | 6 |
| HSXE4030L40 06100 | 3 | 2.4 | 40 | 2.9 | 11 | 100 | 6 |
| HSXE4040L12 0660 | 4 | 3.2 | 12 | 3.9 | 11 | 60 | 6 |
| HSXE4040L16 0660 | 4 | 3.2 | 16 | 3.9 | 11 | 60 | 6 |
| HSXE4040L20 0660 | 4 | 3.2 | 20 | 3.9 | 11 | 60 | 6 |
| HSXE4040L25 0675 | 4 | 3.2 | 25 | 3.9 | 11 | 75 | 6 |
| HSXE4040L30 0675 | 4 | 3.2 | 30 | 3.9 | 11 | 75 | 6 |
| HSXE4040L35 0675 | 4 | 3.2 | 35 | 3.9 | 11 | 75 | 6 |
| HSXE4040L40 06100 | 4 | 3.2 | 40 | 3.9 | 11 | 100 | 6 |
| HSXE4040L50 06100 | 4 | 3.2 | 50 | 3.9 | 11 | 100 | 6 |

TABLE OF RECOMMENDED MILLING MATERIALS

◎Very suitable ○Suitable

| CARBON STEELS / PREHARDENED STEELS | ALLOY STEELS / TOOL STEELS | PREHARDENED STEELS | | HARDENED STEELS | | STANLESS STEELS | CASTIRON DUCTILE CAST IRON | COPPER ALLOYS | ALUMINUM ALLOY | GRAPHITE | TITANIUM ALLOY | HEAT RESISTANT ALLOYS | PLASTIC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~40HRC | | ~45HRC | ~55HRC | ~60HRC | ~65HRC | ~35HRC | ~350HB | | | | | | |
| ○ | | ○ | ◎ | ◎ | ○ | ○ | ○ | ○ | | | ○ | ○ | |

# Cutting Parameter

## HSXE4L 4-Flutes Long Neck End Mill Face Milling

| Workpiece | | Pre-Hardened Steels (30-45HRC) | | | | Hardened Steels (45-55HRC) | | | | Hardened Steels (55-65HRC) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Diameter/mm | Underneck/mm | n/min$^{-1}$ | Vf-mm/min | ap/mm | ae/mm | n/min$^{-1}$ | Vf-mm/min | ap/mm | ae/mm | n/min$^{-1}$ | Vf-mm/min | ap/mm | ae/mm |
| 0.8 | 2 | 30000 | 1870 | 0.05 | 0.54 | 25000 | 1700 | 0.04 | 0.45 | 20000 | 1560 | 0.03 | 0.4 |
| | 3 | 30000 | 1870 | 0.05 | 0.54 | 25000 | 1700 | 0.04 | 0.45 | 20000 | 1560 | 0.03 | 0.4 |
| | 4 | 30000 | 1760 | 0.04 | 0.54 | 25000 | 1600 | 0.03 | 0.45 | 20000 | 1468 | 0.025 | 0.4 |
| | 5 | 30000 | 1540 | 0.04 | 0.54 | 25000 | 1400 | 0.03 | 0.45 | 20000 | 1285 | 0.02 | 0.4 |
| | 6 | 24000 | 1360 | 0.04 | 0.54 | 20000 | 1240 | 0.025 | 0.45 | 16000 | 1138 | 0.02 | 0.4 |
| | 7 | 21600 | 1200 | 0.25 | 0.54 | 18000 | 1100 | 0.2 | 0.45 | 14400 | 1009 | 0.01 | 0.4 |
| | 8 | 19200 | 1100 | 0.018 | 0.54 | 16000 | 1000 | 0.015 | 0.45 | 12800 | 920 | 0.007 | 0.4 |
| | 10 | 19200 | 880 | 0.015 | 0.54 | 16000 | 800 | 0.012 | 0.45 | 12800 | 730 | 0.007 | 0.4 |
| | 12 | 19200 | 660 | 0.008 | 0.54 | 16000 | 600 | 0.007 | 0.45 | 12800 | 550 | 0.005 | 0.4 |
| | 16 | 18000 | 880 | 0.006 | 0.48 | 15000 | 800 | 0.005 | 0.40 | 12000 | 730 | 0.005 | 0.4 |
| 1 | 3 | 30000 | 2650 | 0.075 | 0.72 | 25000 | 2400 | 0.06 | 0.6 | 20000 | 2200 | 0.05 | 0.5 |
| | 4 | 30000 | 2200 | 0.06 | 0.72 | 25000 | 2000 | 0.05 | 0.6 | 20000 | 1800 | 0.04 | 0.5 |
| | 5 | 24000 | 2200 | 0.05 | 0.72 | 20000 | 2000 | 0.04 | 0.6 | 16000 | 1800 | 0.03 | 0.5 |
| | 6 | 24000 | 2000 | 0.04 | 0.72 | 20000 | 1800 | 0.03 | 0.6 | 16000 | 1650 | 0.02 | 0.5 |
| | 7 | 24000 | 2000 | 0.04 | 0.72 | 20000 | 1800 | 0.03 | 0.6 | 16000 | 1650 | 0.02 | 0.5 |
| | 8 | 21600 | 1750 | 0.04 | 0.72 | 18000 | 1600 | 0.03 | 0.6 | 14400 | 1450 | 0.02 | 0.5 |
| | 9 | 21600 | 1540 | 0.025 | 0.72 | 18000 | 1400 | 0.02 | 0.6 | 14400 | 1300 | 0.015 | 0.5 |
| | 10 | 19200 | 1320 | 0.025 | 0.72 | 16000 | 1200 | 0.02 | 0.6 | 12800 | 1100 | 0.01 | 0.5 |
| | 12 | 19200 | 1100 | 0.025 | 0.72 | 16000 | 1000 | 0.02 | 0.6 | 12800 | 920 | 0.01 | 0.5 |
| | 14 | 19200 | 990 | 0.02 | 0.72 | 16000 | 900 | 0.015 | 0.6 | 12800 | 820 | 0.008 | 0.5 |
| | 16 | 16800 | 880 | 0.015 | 0.72 | 14000 | 800 | 0.012 | 0.6 | 11200 | 730 | 0.006 | 0.5 |
| | 18 | 16800 | 660 | 0.012 | 0.72 | 14000 | 600 | 0.01 | 0.6 | 11200 | 550 | 0.006 | 0.5 |
| | 20 | 14400 | 440 | 0.008 | 0.72 | 12000 | 400 | 0.007 | 0.6 | 9600 | 370 | 0.005 | 0.5 |
| | 22 | 14400 | 396 | 0.006 | 0.72 | 12000 | 360 | 0.005 | 0.6 | 9600 | 330 | 0.003 | 0.5 |
| 1.2 | 6 | 24000 | 2000 | 0.05 | 0.84 | 20000 | 1800 | 0.04 | 0.7 | 16000 | 1400 | 0.03 | 0.6 |
| | 8 | 21600 | 1760 | 0.05 | 0.84 | 18000 | 1600 | 0.04 | 0.7 | 14400 | 1200 | 0.02 | 0.6 |
| | 10 | 19200 | 1300 | 0.04 | 0.84 | 16000 | 1200 | 0.03 | 0.7 | 12800 | 1000 | 0.02 | 0.6 |
| | 12 | 16800 | 1300 | 0.025 | 0.84 | 14000 | 1200 | 0.02 | 0.7 | 11200 | 1000 | 0.01 | 0.6 |
| 1.4 | 6 | 26400 | 2200 | 0.075 | 0.96 | 22000 | 2000 | 0.06 | 0.8 | 17600 | 1600 | 0.04 | 0.7 |
| | 12 | 19200 | 1540 | 0.04 | 0.96 | 16000 | 1400 | 0.03 | 0.8 | 12800 | 1000 | 0.01 | 0.7 |
| | 16 | 14400 | 880 | 0.02 | 0.84 | 12000 | 800 | 0.018 | 0.7 | 9600 | 600 | 0.01 | 0.6 |
| 1.5 | 4 | 27600 | 2640 | 0.08 | 1.08 | 23000 | 2400 | 0.07 | 0.9 | 18400 | 1800 | 0.05 | 0.75 |



Cutting Parameter

HSXE4L 4-Flutes Long Neck End Mill Face Milling

| Workpiece | | Pre-Hardened Steels (30-45HRC) | | | | Hardened Steels (45-55HRC) | | | | Hardened Steels (55-65HRC) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Diameter/mm | Underneck/mm | n/min$^{-1}$ | Vf-mm/min | ap/mm | ae/mm | n/min$^{-1}$ | Vf-mm/min | ap/mm | ae/mm | n/min$^{-1}$ | Vf-mm/min | ap/mm | ae/mm |
| 1.5 | 6 | 27600 | 2200 | 0.075 | 1.08 | 23000 | 2000 | 0.06 | 0.9 | 18400 | 1600 | 0.04 | 0.75 |
| | 8 | 24000 | 1980 | 0.075 | 1.08 | 20000 | 1800 | 0.06 | 0.9 | 16000 | 1200 | 0.03 | 0.75 |
| | 10 | 24000 | 1760 | 0.05 | 1.08 | 20000 | 1600 | 0.04 | 0.9 | 16000 | 1000 | 0.03 | 0.75 |
| | 12 | 19200 | 1540 | 0.05 | 1.08 | 16000 | 1400 | 0.04 | 0.9 | 12800 | 1000 | 0.02 | 0.75 |
| | 14 | 16800 | 1320 | 0.04 | 1.08 | 14000 | 1200 | 0.03 | 0.9 | 11200 | 800 | 0.02 | 0.75 |
| | 16 | 14400 | 1100 | 0.025 | 1.08 | 12000 | 1000 | 0.02 | 0.9 | 9600 | 720 | 0.015 | 0.75 |
| | 18 | 12000 | 880 | 0.025 | 1.08 | 10000 | 800 | 0.02 | 0.9 | 8000 | 660 | 0.015 | 0.75 |
| | 20 | 10800 | 700 | 0.018 | 1.08 | 9000 | 640 | 0.014 | 0.9 | 7200 | 560 | 0.01 | 0.75 |
| | 25 | 9600 | 550 | 0.012 | 1.08 | 8000 | 500 | 0.01 | 0.9 | 6400 | 400 | 0.008 | 0.75 |
| 1.6 | 8 | 24000 | 1980 | 0.075 | 1.15 | 20000 | 1800 | 0.06 | 0.96 | 16000 | 1500 | 0.03 | 0.8 |
| | 12 | 19200 | 1540 | 0.05 | 1.1 | 16000 | 1400 | 0.04 | 0.9 | 12800 | 1000 | 0.02 | 0.75 |
| | 16 | 14400 | 1100 | 0.025 | 1.1 | 12000 | 1000 | 0.02 | 0.9 | 9600 | 720 | 0.01 | 0.75 |
| 1.8 | 6 | 24000 | 2200 | 0.08 | 1.2 | 20000 | 2000 | 0.07 | 1 | 16000 | 1800 | 0.05 | 0.9 |
| | 8 | 21600 | 1980 | 0.075 | 1.2 | 18000 | 1800 | 0.06 | 1 | 14400 | 1600 | 0.04 | 0.9 |
| | 10 | 19200 | 1760 | 0.075 | 1.2 | 16000 | 1600 | 0.06 | 1 | 12800 | 1400 | 0.04 | 0.9 |
| | 12 | 16800 | 1540 | 0.06 | 1.2 | 14000 | 1400 | 0.05 | 1 | 11200 | 1200 | 0.03 | 0.9 |
| | 14 | 16800 | 1540 | 0.06 | 1.2 | 14000 | 1400 | 0.05 | 1 | 11200 | 1200 | 0.03 | 0.9 |
| | 16 | 14400 | 1320 | 0.05 | 1.2 | 12000 | 1200 | 0.04 | 1 | 9600 | 1000 | 0.02 | 0.9 |
| | 18 | 12000 | 1100 | 0.05 | 1.2 | 10000 | 1000 | 0.04 | 1 | 8000 | 820 | 0.02 | 0.9 |
| 2 | 6 | 24000 | 2200 | 0.1 | 1.4 | 20000 | 2000 | 0.08 | 1.2 | 16000 | 1800 | 0.06 | 1 |
| | 8 | 21600 | 1980 | 0.08 | 1.4 | 18000 | 1800 | 0.07 | 1.2 | 14400 | 1650 | 0.05 | 1 |
| | 10 | 19200 | 1760 | 0.075 | 1.4 | 16000 | 1600 | 0.06 | 1.2 | 12800 | 1500 | 0.05 | 1 |
| | 12 | 16800 | 1540 | 0.06 | 1.4 | 14000 | 1400 | 0.05 | 1.2 | 11200 | 1300 | 0.04 | 1 |
| | 14 | 16800 | 1540 | 0.05 | 1.4 | 14000 | 1400 | 0.04 | 1.2 | 11200 | 1300 | 0.03 | 1 |
| | 16 | 14400 | 1300 | 0.05 | 1.4 | 12000 | 1200 | 0.04 | 1.2 | 9600 | 1100 | 0.03 | 1 |
| | 18 | 12000 | 1100 | 0.04 | 1.4 | 10000 | 1000 | 0.03 | 1.2 | 8000 | 920 | 0.02 | 1 |
| | 20 | 12000 | 880 | 0.04 | 1.4 | 10000 | 800 | 0.03 | 1.2 | 8000 | 730 | 0.02 | 1 |
| | 25 | 10800 | 770 | 0.025 | 1.4 | 9000 | 700 | 0.02 | 1.2 | 7200 | 640 | 0.015 | 1 |
| | 30 | 9600 | 660 | 0.018 | 1.4 | 8000 | 600 | 0.015 | 1.2 | 6400 | 550 | 0.01 | 1 |
| | 35 | 8400 | 550 | 0.015 | 1.4 | 7000 | 500 | 0.012 | 1.2 | 5600 | 460 | 0.008 | 1 |
| 2.5 | 8 | 19200 | 2200 | 0.1 | 1.8 | 16000 | 2000 | 0.08 | 1.5 | 12800 | 1830 | 0.07 | 1.25 |
| | 10 | 18000 | 2000 | 0.1 | 1.8 | 15000 | 1800 | 0.08 | 1.5 | 11800 | 1550 | 0.07 | 1.25 |

# Cutting Parameter

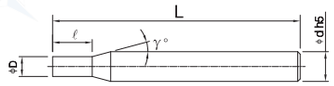
## HSXE4L 4-Flutes Long Neck End Mill Face Milling

| Workpiece | | Pre-Hardened Steels (30-45HRC) | | | | Hardened Steels (45-55HRC) | | | | Hardened Steels (55-65HRC) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Diameter/mm | Underneck/mm | n/min$^{-1}$ | Vf-mm/min | ap/mm | ae/mm | n/min$^{-1}$ | Vf-mm/min | ap/mm | ae/mm | n/min$^{-1}$ | Vf-mm/min | ap/mm | ae/mm |
| 2.5 | 12 | 16800 | 1760 | 0.08 | 1.8 | 14000 | 1600 | 0.07 | 1.5 | 11200 | 1450 | 0.06 | 1.25 |
| | 16 | 14400 | 1540 | 0.075 | 1.8 | 12000 | 1400 | 0.06 | 1.5 | 9600 | 1280 | 0.05 | 1.25 |
| | 20 | 12000 | 1300 | 0.075 | 1.8 | 10000 | 1200 | 0.06 | 1.5 | 8000 | 1100 | 0.05 | 1.25 |
| | 25 | 10800 | 990 | 0.025 | 1.8 | 9000 | 900 | 0.02 | 1.5 | 7200 | 830 | 0.015 | 1.25 |
| | 30 | 9600 | 880 | 0.04 | 1.8 | 8000 | 800 | 0.03 | 1.5 | 6400 | 734 | 0.025 | 1.25 |
| | 35 | 8400 | 660 | 0.018 | 1.44 | 7000 | 600 | 0.015 | 1.2 | 5600 | 550 | 0.01 | 1 |
| 3 | 10 | 19200 | 2200 | 0.18 | 2.16 | 16000 | 2000 | 0.15 | 1.8 | 12800 | 1800 | 0.1 | 1.5 |
| | 12 | 16800 | 2000 | 0.12 | 2.16 | 14000 | 1800 | 0.1 | 1.8 | 11200 | 1650 | 0.08 | 1.5 |
| | 16 | 14400 | 1500 | 0.1 | 2.16 | 12000 | 1400 | 0.08 | 1.8 | 9600 | 1280 | 0.07 | 1.5 |
| | 20 | 12000 | 1300 | 0.1 | 2.16 | 10000 | 1200 | 0.08 | 1.8 | 8000 | 1100 | 0.07 | 1.5 |
| | 25 | 10800 | 1100 | 0.08 | 2.16 | 9000 | 1000 | 0.07 | 1.8 | 7200 | 920 | 0.06 | 1.5 |
| | 30 | 9600 | 880 | 0.06 | 2.16 | 8000 | 800 | 0.05 | 1.8 | 6400 | 730 | 0.03 | 1.5 |
| | 35 | 8400 | 660 | 0.018 | 1.44 | 7000 | 600 | 0.015 | 1.2 | 5600 | 550 | 0.02 | 1.2 |
| | 40 | 7200 | 600 | 0.018 | 1.2 | 6000 | 550 | 0.015 | 1.0 | 4800 | 500 | 0.012 | 1 |
| 4 | 12 | 12000 | 2000 | 0.2 | 2.5 | 9500 | 2000 | 0.15 | 2 | 8000 | 1600 | 0.08 | 1.6 |
| | 16 | 10000 | 2000 | 0.15 | 2.5 | 8000 | 1800 | 0.1 | 2 | 7000 | 1400 | 0.06 | 1.6 |
| | 20 | 8500 | 1800 | 0.12 | 2.5 | 7000 | 1600 | 0.08 | 2 | 6500 | 1200 | 0.05 | 1.6 |
| | 25 | 8000 | 1600 | 0.1 | 2.5 | 6000 | 1400 | 0.07 | 2 | 5200 | 1200 | 0.04 | 1.6 |
| | 30 | 6800 | 1400 | 0.08 | 2.5 | 4800 | 1000 | 0.05 | 2 | 4200 | 850 | 0.03 | 1.6 |
| | 35 | 5500 | 1000 | 0.07 | 2.5 | 4200 | 880 | 0.04 | 2 | 3800 | 720 | 0.02 | 1.6 |
| | 40 | 4000 | 860 | 0.05 | 2.5 | 3600 | 720 | 0.03 | 2 | 3000 | 600 | 0.01 | 1.6 |
| | 45 | 3600 | 600 | 0.04 | 2.5 | 3200 | 500 | 0.03 | 2 | 2850 | 400 | 0.01 | 1.6 |
| | 50 | 3200 | 380 | 0.02 | 2.5 | 3000 | 300 | 0.03 | 2 | 2600 | 220 | 0.01 | 1.6 |
| 5 | 16 | 10000 | 2000 | 0.2 | 3 | 7000 | 1800 | 0.12 | 2.5 | 5500 | 1600 | 0.08 | 2 |
| | 25 | 8000 | 1600 | 0.15 | 3 | 5800 | 1400 | 0.07 | 2.5 | 4200 | 1200 | 0.05 | 2 |
| | 35 | 6000 | 1200 | 0.1 | 3 | 4200 | 900 | 0.05 | 2.5 | 3500 | 800 | 0.03 | 2 |
| | 50 | 3500 | 750 | 0.07 | 3 | 2800 | 620 | 0.03 | 2.5 | 2500 | 500 | 0.02 | 2 |





# HSXEF 4-Flutes Power End Mill




UMG AHX 4 45° Spiral Angle Arc Back Angle <65 HRC

| ⌀D | D Tol. [ mm ] |
|---|---|
| D≤3 | 0~-0.010 |
| 3<D≤6 | 0~-0.012 |
| 6<D≤10 | 0~-0.015 |
| 10<D≤18 | 0~-0.018 |
| D>18 | 0~-0.020 |

Unit:mm

| Type No. | Dia. | Length of Cut | Neck Taper Angle | Overall Length | Shank Dia. |
|---|---|---|---|---|---|
| | ϕD | ℓ | γ/° | L | ϕd |
| HSXEF4010 0450 | 1 | 3 | 12 | 50 | 4 |
| HSXEF4010 0650 | 1 | 3 | 12 | 50 | 6 |
| HSXEF4012 0450 | 1.2 | 3.5 | 11 | 50 | 4 |
| HSXEF4014 0450 | 1.4 | 4 | 11 | 50 | 4 |
| HSXEF4015 0450 | 1.5 | 4 | 11 | 50 | 4 |
| HSXEF4015 0650 | 1.5 | 4 | 11 | 50 | 6 |
| HSXEF4016 0450 | 1.6 | 5 | 11 | 50 | 4 |
| HSXEF4020 0450 | 2 | 6 | 11 | 50 | 4 |
| HSXEF4020 0650 | 2 | 6 | 11 | 50 | 6 |
| HSXEF4025 0450 | 2.5 | 8 | 11 | 50 | 4 |
| HSXEF4025 0650 | 2.5 | 8 | 11 | 50 | 6 |
| HSXEF4030 0450 | 3 | 8 | 11 | 50 | 4 |
| HSXEF4030 0650 | 3 | 8 | 11 | 50 | 6 |
| HSXEF4030 0675 | 3 | 12 | 11 | 75 | 6 |
| HSXEF4040 0450 | 4 | 11 | - | 50 | 4 |
| HSXEF4040 0475 | 4 | 15 | - | 75 | 4 |
| HSXEF4040 0650 | 4 | 11 | 11 | 50 | 6 |
| HSXEF4040 0675 | 4 | 15 | 11 | 75 | 6 |
| HSXEF4050 0650 | 5 | 13 | 11 | 50 | 6 |
| HSXEF4050 0675 | 5 | 18 | 11 | 75 | 6 |
| HSXEF4060 0650 | 6 | 16 | – | 50 | 6 |
| HSXEF4060 0660 | 6 | 16 | – | 60 | 6 |
| HSXEF4060 0675 | 6 | 20 | – | 75 | 6 |
| HSXEF4060 06100 | 6 | 20 | – | 100 | 6 |
| HSXEF4080 0860 | 8 | 20 | – | 60 | 8 |
| HSXEF4080 0875 | 8 | 20 | – | 75 | 8 |
| HSXEF4080 08100 | 8 | 25 | – | 100 | 8 |
| HSXEF4080 08125 | 8 | 28 | – | 125 | 8 |

# HSXEF 4-Flutes Power End Mill

Unit:mm

| Type No. | Dia. | Length of Cut | Neck Taper Angle | Overall Length | Shank Dia. |
|---|---|---|---|---|---|
| | ϕD | ℓ | γ/° | L | ϕd |
| HSXEF4100 1075 | 10 | 25 | – | 75 | 10 |
| HSXEF4100 10100 | 10 | 30 | – | 100 | 10 |
| HSXEF4100 10125 | 10 | 35 | – | 125 | 10 |
| HSXEF4120 1275 | 12 | 30 | – | 75 | 12 |
| HSXEF4120 12100 | 12 | 35 | – | 100 | 12 |
| HSXEF4120 12125 | 12 | 42 | – | 125 | 12 |
| HSXEF4160 16100 | 16 | 45 | – | 100 | 16 |
| HSXEF4160 16150 | 16 | 50 | – | 150 | 16 |
| HSXEF4200 20100 | 20 | 45 | – | 100 | 20 |
| HSXEF4200 20150 | 20 | 55 | – | 150 | 20 |

TABLE OF RECOMMENDED MILLING MATERIALS

○Very suitable ○Suitable

| CARBON STEELS / PREHARDENED STEELS | ALLOY STEELS / TOOL STEELS | PREHARDENED STEELS | | HARDENED STEELS | | STANLESS STEELS | CASTIRON DUCTILE CAST IRON | COPPER ALLOYS | ALUMINUM ALLOY | GRAPHITE | TITANIUM ALLOY | HEAT RESISTANT ALLOYS | PLASTIC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~40HRC | | ~45HRC | ~55HRC | ~60HRC | ~65HRC | ~35HRC | ~350HB | | | | | | |
| ○ | | ○ | ◎ | ◎ | ○ | ○ | ○ | ○ | | | ○ | ○ | |

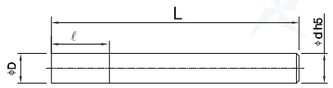


# Cutting Parameter

## HSXEF 4-Flutes Power End Mill Side Milling

| Workpiece | Pre-Hardened Steels (30-45HRC) | | | | Hardened Steels (45-55HRC) | | | | Hardened Steels (55-65HRC) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Type No. | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm |
| HSXEF4010 | 15000 | 600 | 2 | 0.05 | 12000 | 480 | 2 | 0.03 | 10500 | 200 | 1 | 0.02 |
| HSXEF4012 | 13500 | 660 | 2.4 | 0.05 | 10800 | 528 | 2.4 | 0.03 | 9450 | 200 | 1.2 | 0.02 |
| HSXEF4015 | 12000 | 720 | 3 | 0.05 | 9600 | 576 | 3 | 0.03 | 8400 | 250 | 1.5 | 0.02 |
| HSXEF4016 | 11800 | 750 | 3.2 | 0.05 | 9440 | 600 | 3.2 | 0.03 | 8260 | 250 | 1.6 | 0.02 |
| HSXEF4020 | 10000 | 800 | 4 | 0.05 | 8000 | 640 | 4 | 0.03 | 7000 | 300 | 2 | 0.03 |
| HSXEF4025 | 8500 | 850 | 5 | 0.05 | 6800 | 680 | 5 | 0.03 | 5950 | 350 | 2.5 | 0.03 |
| HSXEF4030 | 7500 | 900 | 6 | 0.05 | 6000 | 720 | 6 | 0.03 | 5250 | 400 | 3 | 0.03 |
| HSXEF4040 | 6800 | 1000 | 8 | 0.1 | 5440 | 800 | 8 | 0.03 | 4760 | 440 | 4 | 0.03 |
| HSXEF4050 | 6000 | 1200 | 10 | 0.1 | 4800 | 960 | 10 | 0.05 | 4200 | 500 | 5 | 0.05 |
| HSXEF4060 | 5000 | 1500 | 12 | 0.1 | 4000 | 1200 | 12 | 0.05 | 3500 | 550 | 6 | 0.05 |
| HSXEF4080 | 4200 | 2000 | 16 | 0.1 | 3360 | 1600 | 16 | 0.05 | 2940 | 600 | 8 | 0.05 |
| HSXEF4100 | 4000 | 2500 | 20 | 0.1 | 3200 | 2000 | 20 | 0.05 | 2800 | 600 | 10 | 0.06 |
| HSXEF4120 | 3800 | 3000 | 24 | 0.1 | 3040 | 2400 | 24 | 0.1 | 2660 | 500 | 12 | 0.1 |
| HSXEF4140 | 3500 | 2600 | 28 | 0.1 | 2800 | 2080 | 28 | 0.1 | 2450 | 500 | 14 | 0.1 |
| HSXEF4160 | 3200 | 2500 | 32 | 0.1 | 2560 | 2000 | 32 | 0.1 | 2240 | 500 | 16 | 0.1 |
| HSXEF4200 | 3000 | 2000 | 40 | 0.1 | 2400 | 1600 | 40 | 0.1 | 2100 | 500 | 20 | 0.1 |

# HSXHE 4/6 Flutes Hard Milling End Mill




UMG AHX 4 6 45° Spiral Angle Arc Back Angle <65 HRC

| ⌀D | D Tol. [mm] |
|---|---|
| 1<D≤5 | 0~-0.012 |
| 6<D≤8 | 0~-0.015 |
| 8<D≤12 | 0~-0.018 |
| 12<D≤20 | 0~-0.02 |

Unit:mm

| Type No. | Dia. | Length of Cut | Neck Taper Angle | Flute No. | Overall Length | Shank Dia. |
|---|---|---|---|---|---|---|
| | ϕD | ℓ | γ/° | | L | ϕd |
| HSXHE4010 0650 | 1 | 3 | 20 | 4 | 50 | 6 |
| HSXHE4015 0650 | 1.5 | 4 | 20 | 4 | 50 | 6 |
| HSXHE4020 0650 | 2 | 6 | 20 | 4 | 50 | 6 |
| HSXHE4025 0650 | 2.5 | 8 | 20 | 4 | 50 | 6 |
| HSXHE4030 0650 | 3 | 8 | 20 | 4 | 50 | 6 |
| HSXHE4040 0660 | 4 | 11 | 20 | 4 | 50 | 6 |
| HSXHE4050 0660 | 5 | 13 | 20 | 4 | 60 | 6 |
| HSXHE6060 0660 | 6 | 16 | - | 6 | 60 | 6 |
| HSXHE6080 0875 | 8 | 20 | - | 6 | 75 | 8 |
| HSXHE6100 1075 | 10 | 25 | - | 6 | 75 | 10 |
| HSXHE6120 12100 | 12 | 35 | - | 6 | 100 | 12 |
| HSXHE6160 16100 | 16 | 40 | - | 6 | 100 | 16 |
| HSXHE6200 20100 | 20 | 45 | - | 6 | 100 | 20 |

TABLE OF RECOMMENDED MILLING MATERIALS

○Very suitable ○Suitable

| CARBON STEELS ALLOY STEELS PREHARDENED STEELS TOOL STEELS | PREHARDENED STEELS | | HARDENED STEELS | | STANLESS STEELS | CASTIRON DUCTILE CAST IRON | COPPER ALLOYS | ALUMINUM ALLOY | GRAPHITE | TITANIUM ALLOY | HEAT RESISTANT ALLOYS | PLASTIC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~40HRC | ~45HRC | ~55HRC | ~60HRC | ~65HRC | ~35HRC | ~350HB | | | | | | |
| ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | | | ○ | ○ | |



# Cutting Parameter

## HSXHE 4/6-Flutes Hard Milling End Mill Face Milling

| Workpiece | Hardened Steels (45-55HRC) | | | | Hardened Steels (55-65HRC) | | | | Hardened Steels (65-70HRC) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Type No. | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm |
| HSXHE4010 0650 | 15000 | 600 | 2 | 0.05 | 12000 | 480 | 2 | 0.03 | 10500 | 200 | 1 | 0.01 |
| HSXHE4015 0650 | 12000 | 720 | 3 | 0.05 | 9600 | 576 | 3 | 0.03 | 8400 | 220 | 1.5 | 0.01 |
| HSXHE4020 0650 | 10000 | 800 | 4 | 0.05 | 8000 | 640 | 4 | 0.03 | 7000 | 240 | 2 | 0.02 |
| HSXHE4025 0650 | 8500 | 850 | 5 | 0.05 | 6800 | 680 | 5 | 0.03 | 5950 | 240 | 2.5 | 0.02 |
| HSXHE4030 0650 | 7500 | 900 | 6 | 0.05 | 6000 | 720 | 6 | 0.03 | 5250 | 240 | 3 | 0.03 |
| HSXHE4040 0660 | 6800 | 1000 | 8 | 0.1 | 5440 | 800 | 8 | 0.03 | 4760 | 280 | 4 | 0.03 |
| HSXHE4050 0660 | 6000 | 1200 | 10 | 0.1 | 4800 | 960 | 10 | 0.05 | 4200 | 300 | 5 | 0.03 |
| HSXHE6060 0660 | 4000 | 870 | 15 | 0.1 | 3200 | 700 | 15 | 0.05 | 2100 | 360 | 15 | 0.03 |
| HSXHE6080 0875 | 3500 | 900 | 18 | 0.1 | 2800 | 700 | 18 | 0.05 | 1600 | 360 | 18 | 0.03 |
| HSXHE6100 1075 | 2800 | 850 | 25 | 0.1 | 2240 | 680 | 25 | 0.05 | 1500 | 340 | 25 | 0.03 |
| HSXHE6120 12100 | 2500 | 800 | 30 | 0.1 | 2000 | 650 | 30 | 0.05 | 1200 | 325 | 30 | 0.03 |
| HSXHE6160 16100 | 2200 | 750 | 35 | 0.1 | 1760 | 650 | 35 | 0.05 | 1000 | 325 | 35 | 0.03 |
| HSXHE6200 20100 | 2000 | 700 | 40 | 0.1 | 1600 | 600 | 40 | 0.05 | 800 | 300 | 40 | 0.03 |

# HSXEG 6-Flutes Hard Milling End Mill

UMG AHX 6 52° Spiral Angle Arc Back Angle <65 HRC

| ⌀D | D Tol. ( mm ) |
|---|---|
| 6<D< 10 | 0~-0.015 |
| 10<D<18 | 0~-0.018 |
| D>18 | 0~-0.020 |

Unit:mm

| Type No. | Dia. | Length of Cut | Overall Length | Shank Dia. |
|---|---|---|---|---|
| | ϕD | ℓ | L | ϕd |
| HSXEG6060 0660 | 6 | 18 | 60 | 6 |
| HSXEG6060 0675 | 6 | 24 | 75 | 6 |
| HSXEG6080 0860 | 8 | 20 | 60 | 8 |
| HSXEG6080 0875 | 8 | 32 | 75 | 8 |
| HSXEG6100 1075 | 10 | 30 | 75 | 10 |
| HSXEG6100 10100 | 10 | 40 | 100 | 10 |
| HSXEG6120 1275 | 12 | 32 | 75 | 12 |
| HSXEG6120 12100 | 12 | 45 | 100 | 12 |
| HSXEG6160 16100 | 16 | 40 | 100 | 16 |
| HSXEG6160 16150 | 16 | 64 | 150 | 16 |
| HSXEG6200 20100 | 20 | 45 | 100 | 20 |
| HSXEG6200 20150 | 20 | 75 | 150 | 20 |

TABLE OF RECOMMENDED MILLING MATERIALS

○Very suitable ○Suitable

| CARBON STEELS PREHARDENED STEELS / ALLOY STEELS TOOL STEELS | PREHARDENED STEELS | | HARDENED STEELS | | STANLESS STEELS | CASTIRON DUCTILE CAST IRON | COPPER ALLOYS | ALUMINUM ALLOY | GRAPHITE | TITANIUM ALLOY | HEAT RESISTANT ALLOYS | PLASTIC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~40HRC | ~45HRC | ~55HRC | ~60HRC | ~65HRC | ~35HRC | ~350HB | | | | | | |
| ○ | ○ | ◎ | ◎ | ○ | ○ | ○ | ○ | | | ○ | ○ | |



# Cutting Parameter

## HSXEG 6-Flutes Hard Milling End Mill Face Milling

| Workpiece | Pre-Hardened Steels (35-45HRC) | | | | Hardened Steels (45-55HRC) | | | | Hardened Steels (55-65HRC) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Type No. | n/min$^{-1}$ | Vf-mm/min | ap/mm | ae/mm | n/min$^{-1}$ | Vf-mm/min | ap/mm | ae/mm | n/min$^{-1}$ | Vf-mm/min | ap/mm | ae/mm |
| HSXEG6060 | 4500 | 2420 | 15 | 0.2 | 4000 | 870 | 15 | 0.1 | 3200 | 700 | 15 | 0.05 |
| HSXEG6080 | 4000 | 2400 | 18 | 0.2 | 3500 | 900 | 18 | 0.1 | 2800 | 700 | 18 | 0.05 |
| HSXEG6100 | 3500 | 2300 | 25 | 0.2 | 2800 | 850 | 25 | 0.1 | 2240 | 680 | 25 | 0.05 |
| HSXEG6120 | 3000 | 2000 | 30 | 0.2 | 2500 | 800 | 30 | 0.1 | 2000 | 650 | 30 | 0.05 |
| HSXEG6160 | 2400 | 2000 | 35 | 0.2 | 2200 | 750 | 35 | 0.1 | 1760 | 650 | 35 | 0.05 |
| HSXEG6200 | 2200 | 1800 | 40 | 0.2 | 200O | 700 | 40 | 0.1 | 1600 | 600 | 40 | 0.05 |

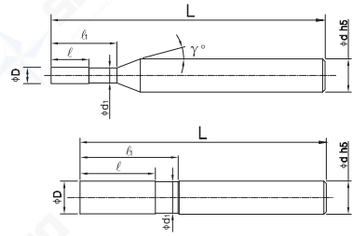
# HGHFE SERIES

## Suitable for dynamic trochoidal roughing and slotting

- Use of carbide rods specially designed for roughing increases mill, s resistance in high efficiency machining.
- Unequal teeth space and variable spiral design reduce the cutting vibration, making the cutting process more smoother.
- Use of the U-shaped gash provides enough space for chip pocket, which in return increases the ability of chip removal during the side high efficiency roughing and grooving.
- Adopting 42 degree helix angle to reduce cutting resistance and make cutting more eficient.
- The AlCr/TiSi-based wear-resistant coating ensures the tool perfor-mance in general steel and stainless steel machining.

**≤45HRC**

# HGHFE 4-Flutes HPC 3D End Mill




MG ATX 4 42° Spiral Angle Arc Back Angle <45 HRC

| ⌀D | D Tol. [mm] |
|---|---|
| 1≤D<6 | 0~-0.015 |
| 6≤D≤20 | 0~-0.02 |

Unit:mm

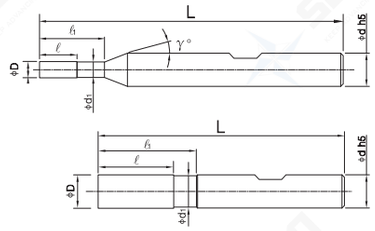
| Type No. | Dia. | Length of Cut | Neck Taper Angle | Neck Dia. | Neck Taper Angle | Overall Length | Shank Dia. | Shank |
|---|---|---|---|---|---|---|---|---|
| | ϕD | ℓ | ℓ1 | ϕd1 | γ/° | L | ϕd | |
| HGHFE4010-3 0650 | 1 | 2.3 | 3 | 0.95 | 20 | 50 | 6 | Cylinder Shank |
| HGHFE4020-6 0650 | 2 | 4.6 | 6 | 1.9 | 20 | 50 | 6 | Cylinder Shank |
| HGHFE4030-9 0650 | 3 | 6.9 | 9 | 2.9 | 20 | 50 | 6 | Cylinder Shank |
| HGHFE4040-12 0650 | 4 | 9.2 | 12 | 3.8 | 20 | 50 | 6 | Cylinder Shank |
| HGHFE4050-15 0660 | 5 | 11.5 | 15 | 4.7 | 20 | 60 | 6 | Cylinder Shank |
| HGHFE4060-18 0660 | 6 | 13.8 | 18 | 5.6 | – | 60 | 6 | Cylinder Shank |
| HGHFE4080-24 0860 | 8 | 18.4 | 24 | 7.6 | – | 60 | 8 | Cylinder Shank |
| HGHFE4100-30 1075 | 10 | 23.0 | 30 | 9.5 | – | 75 | 10 | Cylinder Shank |
| HGHFE4120-36 1275 | 12 | 27.6 | 36 | 11.5 | – | 75 | 12 | Cylinder Shank |
| HGHFE4120-36 12100 | 12 | 27.6 | 36 | 11.5 | – | 100 | 12 | Cylinder Shank |
| HGHFE4160-48 16100 | 16 | 36.8 | 48 | 15.5 | – | 100 | 16 | Cylinder Shank |
| HGHFE4200-60 20120 | 20 | 46.0 | 60 | 19.5 | – | 120 | 20 | Cylinder Shank |

### TABLE OF RECOMMENDED MILLING MATERIALS

○ Very suitable ○ Suitable

| CARBON STEELS PREHARDENED STEELS | ALLOY STEELS TOOL STEELS | PREHARDENED STEELS | | HARDENED STEELS | | STANLESS STEELS | CASTIRON DUCTILE CAST IRON | COPPER ALLOYS | ALUMINUM ALLOY | GRAPHITE | TITANIUM ALLOY | HEAT RESISTANT ALLOYS | PLASTIC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~40HRC | | ~50HRC | ~55HRC | ~60HRC | ~65HRC | ~35HRC | ~350HB | | | | | | |
| ○ | | ○ | ○ | | | ○ | ○ | ○ | ○ | | ○ | ○ | |

# HGHFE 4-Flutes HPC 3D End Mill Weldon Shank




MG ATX 4 42° Spiral Angle Arc Back Angle <45 HRC

| Ø D | D Tol. [ mm ] |
|---|---|
| 1<D<6 | 0~-0.015 |
| 6<D<20 | 0~-0.02 |

Unit:mm

| Type No. | Dia. | Length of Cut | Neck Taper Angle | Neck Dia. | Neck Taper Angle | Overall Length | Shank Dia. | Shank |
|---|---|---|---|---|---|---|---|---|
| | ϕD | ℓ | ℓ1 | ϕd1 | γ/° | L | ϕd | |
| HGHFE4010-3 0656-W | 1 | 2.3 | 3 | 0.95 | 20 | 56 | 6 | Weldon Shank |
| HGHFE4020-6 0656-W | 2 | 4.6 | 6 | 1.9 | 20 | 56 | 6 | Weldon Shank |
| HGHFE4030-9 0656-W | 3 | 6.9 | 3 | 2.9 | 20 | 56 | 6 | Weldon Shank |
| HGHFE4040-12 0656-W | 4 | 9.2 | 12 | 3.8 | 20 | 56 | 6 | Weldon Shank |
| HGHFE4050-15 0656-W | 5 | 11.5 | 15 | 4.7 | 20 | 56 | 6 | Weldon Shank |
| HGHFE4060-18 0656-W | 6 | 13.8 | 18 | 5.6 | – | 56 | 6 | Weldon Shank |
| HGHFE4080-24 0862-W | 8 | 18.4 | 24 | 7.6 | – | 62 | 8 | Weldon Shank |
| HGHFE4100-30 1072-W | 10 | 23.0 | 30 | 9.5 | – | 72 | 10 | Weldon Shank |
| HGHFE4120-36 1283-W | 12 | 27.6 | 36 | 11.5 | – | 83 | 12 | Weldon Shank |
| HGHFE4160-48 1698-W | 16 | 36.8 | 48 | 15.5 | – | 98 | 16 | Weldon Shank |
| HGHFE4200-60 20112-W | 20 | 46.0 | 60 | 19.5 | – | 112 | 20 | Weldon Shank |

TABLE OF RECOMMENDED MILLING MATERIALS

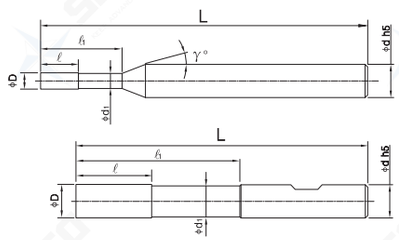
○Very suitable ○Suitable

| CARBON STEELS PREHARDENED STEELS | ALLOY STEELS TOOL STEELS | PREHARDENED STEELS | | HARDENED STEELS | | STANLESS STEELS | CASTIRON DUCTILE CAST IRON | COPPER ALLOYS | ALUMINUM ALLOY | GRAPHITE | TITANIUM ALLOY | HEAT RESISTANT ALLOYS | PLASTIC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~40HRC | | ~50HRC | ~55HRC | ~60HRC | ~65HRC | ~35HRC | ~350HB | | | | | | |
| ○ | | ○ | ○ | | | ○ | ○ | ○ | ○ | | ○ | ○ | |





# HGHFE 4-Flutes HPC 5D End Mill




MG ATX 4 42° Spiral Angle Arc Back Angle <45 HRC

| Ø D | D Tol. [ mm ] |
|---|---|
| 1<D<6 | 0~-0.015 |
| 6<D<20 | 0~-0.02 |

Unit:mm

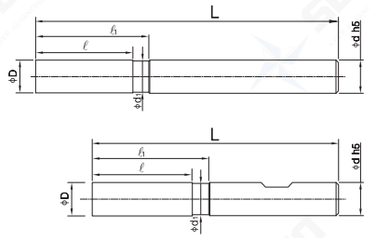
| Type No. | Dia. | Length of Cut | Neck Taper Angle | Neck Dia. | Neck Taper Angle | Overall Length | Shank Dia. | Shank |
|---|---|---|---|---|---|---|---|---|
| | ϕD | ℓ | ℓ1 | ϕd1 | γ/° | L | ϕd | |
| HGHFE4010-5 0650 | 1 | 1.8 | 5 | 0.95 | 20 | 50 | 6 | Cylinder Shank |
| HGHFE4020-10 0650 | 2 | 3.6 | 10 | 1.9 | 20 | 50 | 6 | Cylinder Shank |
| HGHFE4030-15 0660 | 3 | 5.4 | 15 | 2.9 | 20 | 60 | 6 | Cylinder Shank |
| HGHFE4040-20 0660 | 4 | 7.2 | 20 | 3.8 | 20 | 60 | 6 | Cylinder Shank |
| HGHFE4050-25 0675 | 5 | 9.0 | 25 | 4.7 | 20 | 75 | 6 | Cylinder Shank |
| HGHFE4060-30 0675 | 6 | 10.8 | 30 | 5.6 | – | 75 | 6 | Cylinder Shank |
| HGHFE4080-40 08100 | 8 | 14.4 | 40 | 7.6 | – | 100 | 8 | Cylinder Shank |
| HGHFE4100-50 10100 | 10 | 18.0 | 50 | 9.5 | – | 100 | 10 | Cylinder Shank |
| HGHFE4120-60 12107-W | 12 | 21.6 | 60 | 11.5 | – | 107 | 12 | Weldon Shank |
| HGHFE4160-80 16130-W | 16 | 28.8 | 80 | 15.5 | – | 130 | 16 | Weldon Shank |
| HGHFE4200-100 20152-W | 20 | 36.0 | 100 | 19.5 | – | 152 | 20 | Weldon Shank |

TABLE OF RECOMMENDED MILLING MATERIALS

○Very suitable ○Suitable

| CARBON STEELS PREHARDENED STEELS | ALLOY STEELS TOOL STEELS | PREHARDENED STEELS | | HARDENED STEELS | | STANLESS STEELS | CASTIRON DUCTILE CAST IRON | COPPER ALLOYS | ALUMINUM ALLOY | GRAPHITE | TITANIUM ALLOY | HEAT RESISTANT ALLOYS | PLASTIC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~40HRC | | ~50HRC | ~55HRC | ~60HRC | ~65HRC | ~35HRC | ~350HB | | | | | | |
| ○ | | ○ | ○ | | | ○ | ○ | ○ | ○ | | ○ | ○ | |

# HGHFE 5-Flutes HPC 3.5D End Mill Weldon Shank




MG ATX 5 42° Spiral Angle Arc Back Angle <45 HRC

| ⌀D | D Tol. [mm] |
|---|---|
| 1≤D≤6 | 0~-0.015 |
| 6<D≤20 | 0~-0.02 |

Unit:mm

| Type No. | Dia. | Length of Cut | Under Neck Length | Neck Dia. | Overall Length | Shank Dia. | Shank |
|---|---|---|---|---|---|---|---|
| | ϕD | ℓ | ℓ1 | ϕd1 | L | ϕd | |
| HGHFE5060-21 0660 | 6 | 18 | 21 | 5.6 | 60 | 6 | Cylinder Shank |
| HGHFE5080-28 0875 | 8 | 24 | 28 | 7.6 | 75 | 8 | Cylinder Shank |
| HGHFE5100-35 1075 | 10 | 30 | 35 | 9.5 | 75 | 10 | Cylinder Shank |
| HGHFE5120-42 1289-W | 12 | 36 | 42 | 11.5 | 89 | 12 | Weldon Shank |
| HGHFE5160-56 16106-W | 16 | 48 | 56 | 15.5 | 106 | 16 | Weldon Shank |
| HGHFE5200-70 20122-W | 20 | 60 | 70 | 19.5 | 122 | 20 | Weldon Shank |

TABLE OF RECOMMENDED MILLING MATERIALS

○Very suitable ○Suitable

| CARBON STEELS PREHARDENED STEELS / ALLOY STEELS TOOL STEELS | PREHARDENED STEELS | | HARDENED STEELS | | STANLESS STEELS | CASTIRON DUCTILE CAST IRON | COPPER ALLOYS | ALUMINUM ALLOY | GRAPHITE | TITANIUM ALLOY | HEAT RESISTANT ALLOYS | PLASTIC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~40HRC | ~50HRC | ~55HRC | ~60HRC | ~65HRC | ~35HRC | ~350HB | | | | | | |
| ○ | ○ | ○ | | | ○ | ○ | ○ | ○ | | ○ | ○ | |



# Cutting Parameter

## HGHFE HPC End Mill Face Milling

| Workpiece | Pre-Hardened Steels (~30HRC) | | | | Hardened Steels (30-40HRC) | | | |
|---|---|---|---|---|---|---|---|---|
| Type No. | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm |
| HGHFE4010 | 36000 | 300 | 1 | 1 | 31800 | 200 | 1 | 1 |
| HGHFE4020 | 18000 | 400 | 2 | 2 | 15200 | 240 | 2 | 2 |
| HGHFE4030 | 12000 | 500 | 3 | 3 | 10600 | 320 | 3 | 3 |
| HGHFE4040 | 9000 | 600 | 4 | 4 | 7960 | 540 | 4 | 4 |
| HGHFE4050 | 7200 | 700 | 5 | 5 | 6360 | 600 | 5 | 5 |
| HGHFE4060 | 6000 | 800 | 6 | 6 | 5300 | 650 | 6 | 6 |
| HGHFE4080 | 4450 | 1000 | 8 | 8 | 3980 | 800 | 8 | 8 |
| HGHFE4100 | 3600 | 1200 | 10 | 10 | 3185 | 900 | 10 | 10 |
| HGHFE4120 | 3000 | 1200 | 12 | 12 | 2750 | 1000 | 12 | 12 |
| HGHFE4160 | 2250 | 1000 | 16 | 16 | 2050 | 800 | 16 | 16 |
| HGHFE4200 | 1800 | 800 | 20 | 20 | 1640 | 600 | 20 | 20 |

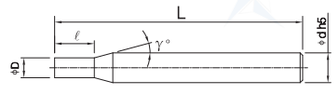
● For Z-level and face milling, the recommended axial depth of cut (ap) is 0.3 x CR.

## HGHFE HPC End Mill Trochodial Milling

| Workpiece | Pre-Hardened Steels (~30HRC) | | | | Hardened Steels (35-45HRC) | | | |
|---|---|---|---|---|---|---|---|---|
| Type No. | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm |
| HGHFE4010 | 40000 | 300 | 2 | 0.2 | 36000 | 270 | 1 | 0.18 |
| HGHFE4020 | 20000 | 400 | 4 | 0.4 | 18000 | 360 | 2 | 0.36 |
| HGHFE4030 | 13500 | 600 | 6 | 0.6 | 12150 | 540 | 3 | 0.54 |
| HGHFE4040 | 10000 | 1000 | 8 | 0.8 | 9000 | 900 | 4 | 0.72 |
| HGHFE4050 | 8000 | 1500 | 10 | 1 | 7200 | 1350 | 5 | 0.9 |
| HGHFE4060 | 6500 | 2000 | 12 | 1.2 | 5850 | 1800 | 6 | 1.08 |
| HGHFE4080 | 5000 | 2000 | 16 | 1.6 | 4500 | 1800 | 8 | 1.44 |
| HGHFE4100 | 4000 | 2500 | 20 | 2 | 3600 | 2250 | 10 | 1.8 |
| HGHFE4120 | 3350 | 3000 | 24 | 2.4 | 3015 | 2700 | 12 | 2.16 |
| HGHFE4160 | 2500 | 2500 | 32 | 2 | 2250 | 2250 | 16 | 1.8 |
| HGHFE4200 | 2000 | 2000 | 40 | 2 | 1800 | 1800 | 20 | 1.8 |

● For Z-level and face milling, the recommended axial depth of cut (ap) is 0.3 x CR.

# HGXEF 4-Flutes Power End Mill




UMG ATX 4 45° Spiral Angle Arc Back Angle <55 HRC

| ØD | D Tol. [mm] |
|---|---|
| D≤3 | 0~-0.010 |
| 3<D≤6 | 0~-0.012 |
| 6<D≤10 | 0~-0.015 |
| 10<D≤18 | 0~-0.018 |
| D>18 | 0~-0.020 |

Unit:mm

| Type No. | Dia. | Length of Cut | Neck Taper Angle | Overall Length | Shank Dia. |
|---|---|---|---|---|---|
| | ϕD | ℓ | γ/° | L | ϕd |
| HGXEF4010 0450 | 1 | 3 | 12 | 50 | 4 |
| HGXEF4010 0650 | 1 | 3 | 12 | 50 | 6 |
| HGXEF4012 0450 | 1.2 | 3.5 | 11 | 50 | 4 |
| HGXEF4014 0450 | 1.4 | 4 | 11 | 50 | 4 |
| HGXEF4015 0450 | 1.5 | 4 | 11 | 50 | 4 |
| HGXEF4015 0650 | 1.5 | 4 | 11 | 50 | 6 |
| HGXEF4016 0450 | 1.6 | 5 | 11 | 50 | 4 |
| HGXEF4020 0450 | 2 | 6 | 11 | 50 | 4 |
| HGXEF4020 0650 | 2 | 6 | 11 | 50 | 6 |
| HGXEF4025 0450 | 2.5 | 8 | 11 | 50 | 4 |
| HGXEF4025 0650 | 2.5 | 8 | 11 | 50 | 6 |
| HGXEF4030 0450 | 3 | 8 | 11 | 50 | 4 |
| HGXEF4030 0650 | 3 | 8 | 11 | 50 | 6 |
| HGXEF4030 0660 | 3 | 8 | 11 | 60 | 6 |
| HGXEF4030 0675 | 3 | 12 | 11 | 75 | 6 |
| HGXEF4040 0450 | 4 | 11 | - | 50 | 4 |
| HGXEF4040 0475 | 4 | 15 | - | 75 | 4 |
| HGXEF4040 0650 | 4 | 11 | 11 | 50 | 6 |
| HGXEF4040 0660 | 4 | 11 | 11 | 60 | 6 |
| HGXEF4040 0675 | 4 | 15 | 11 | 75 | 6 |
| HGXEF4050 0650 | 5 | 13 | 11 | 50 | 6 |
| HGXEF4050 0660 | 5 | 13 | 11 | 60 | 6 |
| HGXEF4050 0675 | 5 | 18 | 11 | 75 | 6 |
| HGXEF4060 0650 | 6 | 16 | - | 50 | 6 |
| HGXEF4060 0660 | 6 | 16 | - | 60 | 6 |
| HGXEF4060 0675 | 6 | 20 | - | 75 | 6 |



SQUARE END MILL
HGX SERIES

# HGXEF 4-Flutes Power End Mill

Unit:mm

| Type No. | Dia. | Length of Cut | Neck Taper Angle | Overall Length | Shank Dia. |
|---|---|---|---|---|---|
| | ϕD | ℓ | γ/° | L | ϕd |
| HGXEF4060 06100 | 6 | 20 | – | 100 | 6 |
| HGXEF4080 0860 | 8 | 20 | – | 60 | 8 |
| HGXEF4080 0875 | 8 | 20 | – | 75 | 8 |
| HGXEF4080 08100 | 8 | 25 | – | 100 | 8 |
| HGXEF4100 1075 | 10 | 25 | – | 75 | 10 |
| HGXEF4100 10100 | 10 | 30 | – | 100 | 10 |
| HGXEF4100 10125 | 10 | 35 | – | 125 | 10 |
| HGXEF4120 1275 | 12 | 30 | – | 75 | 12 |
| HGXEF4120 12100 | 12 | 35 | – | 100 | 12 |
| HGXEF4120 12125 | 12 | 42 | – | 125 | 12 |
| HGXEF4160 16100 | 16 | 45 | – | 100 | 16 |
| HGXEF4160 16150 | 16 | 50 | – | 150 | 16 |
| HGXEF4200 20100 | 20 | 45 | – | 100 | 20 |
| HGXEF4200 20150 | 20 | 55 | – | 150 | 20 |

TABLE OF RECOMMENDED MILLING MATERIALS

○Very suitable ○Suitable

| CARBON STEELS PREHARDENED STEELS | ALLOY STEELS TOOL STEELS | PREHARDENED STEELS | | HARDENED STEELS | | STANLESS STEELS | CASTIRON DUCTILE CAST IRON | COPPER ALLOYS | ALUMINUM ALLOY | GRAPHITE | TITANIUM ALLOY | HEAT RESISTANT ALLOYS | PLASTIC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~40HRC | | ~50HRC | ~55HRC | ~60HRC | ~65HRC | ~35HRC | ~350HB | | | | | | |
| ○ | | ○ | ○ | | | ○ | ○ | ○ | ○ | | ○ | ○ | |

# Cutting Parameter

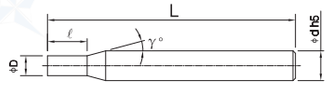
## HGXEF 4-Flutes Power End Mill Side Milling

| Workpiece | Carbon Steels、Alloy Steels (≤35HRC) | | | | Pre-Hardened Steels (35~45HRC) | | | | Hardened Steels (45-55HRC) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Type No. | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm |
| HGXEF4010 0450 | 18150 | 320 | 2 | 0.1 | 16500 | 320 | 2 | 0.05 | 15000 | 250 | 1.5 | 0.05 |
| HGXEF4012 0450 | 18150 | 320 | 2.4 | 0.1 | 16500 | 320 | 2.4 | 0.05 | 15000 | 250 | 1.8 | 0.05 |
| HGXEF4014 0450 | 15000 | 350 | 2.8 | 0.1 | 14000 | 340 | 2.8 | 0.1 | 13500 | 280 | 2.1 | 0.05 |
| HGXEF4015 0450 | 14520 | 360 | 3 | 0.1 | 13200 | 360 | 3 | 0.1 | 12000 | 300 | 2.25 | 0.05 |
| HGXEF4016 0450 | 14000 | 380 | 3.2 | 0.1 | 12500 | 400 | 3.2 | 0.1 | 11800 | 320 | 2.4 | 0.05 |
| HGXEF4020 0450 | 12100 | 400 | 4 | 0.15 | 11000 | 400 | 4 | 0.1 | 11000 | 350 | 3 | 0.05 |
| HGXEF4025 0450 | 10285 | 440 | 5 | 0.15 | 9350 | 440 | 5 | 0.1 | 8500 | 400 | 3.75 | 0.05 |
| HGXEF4030 0450 | 9075 | 480 | 6 | 0.15 | 8250 | 480 | 6 | 0.1 | 7500 | 450 | 4.5 | 0.05 |
| HGXEF4040 0450 | 7018 | 600 | 8 | 0.15 | 6380 | 600 | 8 | 0.1 | 5800 | 550 | 6 | 0.08 |
| HGXEF4050 0650 | 6050 | 700 | 10 | 0.2 | 5500 | 700 | 10 | 0.1 | 5000 | 580 | 7.5 | 0.1 |
| HGXEF4060 0660 | 5445 | 1000 | 12 | 0.2 | 4950 | 1000 | 12 | 0.1 | 4500 | 600 | 9 | 0.1 |
| HGXEF4080 0875 | 4598 | 1500 | 16 | 0.3 | 4180 | 1500 | 16 | 0.2 | 3800 | 600 | 12 | 0.1 |
| HGXEF4100 1075 | 4235 | 2000 | 20 | 0.3 | 3850 | 2000 | 20 | 0.2 | 3500 | 550 | 15 | 0.1 |
| HGXEF4120 1275 | 3388 | 2500 | 24 | 0.3 | 3080 | 2500 | 24 | 0.2 | 2800 | 500 | 18 | 0.1 |
| HGXEF4140 1475 | 3025 | 2000 | 28 | 0.3 | 2750 | 2000 | 28 | 0.2 | 2500 | 500 | 21 | 0.1 |
| HGXEF4160 16100 | 2662 | 2000 | 32 | 0.3 | 2420 | 2000 | 32 | 0.2 | 2200 | 450 | 24 | 0.1 |
| HGXEF4200 20100 | 2420 | 2000 | 40 | 0.3 | 2200 | 2000 | 40 | 0.2 | 2000 | 400 | 30 | 0.1 |





# HGXE 2-Flutes General Purpose End Mill




UMG ATX 2 30° Spiral Angle Straight Back Angle <55 HRC

| Ø D | D Tol. [ mm ] |
|---|---|
| D≤3 | 0~-0.010 |
| 3<D≤6 | 0~-0.012 |
| 6<D≤10 | 0~-0.015 |
| 10<D≤18 | 0~-0.018 |
| D>18 | 0~-0.020 |

Unit:mm

| Type No. | Dia. | Length of Cut | Neck Taper Angle | Overall Length | Shank Dia. |
|---|---|---|---|---|---|
| | φD | ℓ | γ/° | L | φd |
| HGXE2001 0450 | 0.1 | 0.2 | 12 | 50 | 4 |
| HGXE20015 0450 | 0.15 | 0.3 | 12 | 50 | 4 |
| HGXE2002 0450 | 0.2 | 0.4 | 12 | 50 | 4 |
| HGXE2003 0450 | 0.3 | 0.6 | 12 | 50 | 4 |
| HGXE2004 0450 | 0.4 | 1.2 | 12 | 50 | 4 |
| HGXE2005 0450 | 0.5 | 1.5 | 12 | 50 | 4 |
| HGXE2006 0450 | 0.6 | 1.8 | 12 | 50 | 4 |
| HGXE2007 0450 | 0.7 | 2.1 | 12 | 50 | 4 |
| HGXE2008 0450 | 0.8 | 2.4 | 12 | 50 | 4 |
| HGXE2010 0450 | 1 | 3 | 12 | 50 | 4 |
| HGXE2010 0650 | 1 | 3 | 12 | 50 | 6 |
| HGXE2012 0450 | 1.2 | 3.5 | 11 | 50 | 4 |
| HGXE2014 0450 | 1.4 | 4 | 11 | 50 | 4 |
| HGXE2015 0450 | 1.5 | 4 | 11 | 50 | 4 |
| HGXE2015 0650 | 1.5 | 4 | 11 | 50 | 6 |
| HGXE2016 0450 | 1.6 | 5 | 11 | 50 | 4 |
| HGXE2020 0450 | 2 | 6 | 11 | 50 | 4 |
| HGXE2020 0650 | 2 | 6 | 11 | 50 | 6 |
| HGXE2025 0450 | 2.5 | 8 | 11 | 50 | 4 |
| HGXE2025 0650 | 2.5 | 8 | 11 | 50 | 6 |
| HGXE2030 0450 | 3 | 8 | 11 | 50 | 4 |
| HGXE2030 0650 | 3 | 8 | 11 | 50 | 6 |
| HGXE2030 0675 | 3 | 12 | 11 | 75 | 6 |
| HGXE2040 0450 | 4 | 11 | - | 50 | 4 |
| HGXE2040 0650 | 4 | 11 | 11 | 50 | 6 |
| HGXE2040 0675 | 4 | 15 | 11 | 75 | 6 |
| HGXE2050 0650 | 5 | 13 | 11 | 50 | 6 |
| HGXE2050 0675 | 5 | 18 | 11 | 75 | 6 |

# HGXE 2-Flutes General Purpose End Mill

Unit:mm

| Type No. | Dia. | Length of Cut | Neck Taper Angle | Overall Length | Shank Dia. |
|---|---|---|---|---|---|
| | ϕD | ℓ | γ/° | L | ϕd |
| HGXE2060 0650 | 6 | 16 | – | 50 | 6 |
| HGXE2060 0660 | 6 | 16 | – | 60 | 6 |
| HGXE2060 0675 | 6 | 20 | – | 75 | 6 |
| HGXE2080 0860 | 8 | 20 | – | 60 | 8 |
| HGXE2080 0875 | 8 | 20 | – | 75 | 8 |
| HGXE2080 08100 | 8 | 25 | – | 100 | 8 |
| HGXE2100 1075 | 10 | 25 | – | 75 | 10 |
| HGXE2100 10100 | 10 | 30 | – | 100 | 10 |
| HGXE2120 1275 | 12 | 30 | – | 75 | 12 |
| HGXE2120 12100 | 12 | 35 | – | 100 | 12 |
| HGXE2160 16100 | 16 | 45 | – | 100 | 16 |
| HGXE2200 20100 | 20 | 45 | – | 100 | 20 |

TABLE OF RECOMMENDED MILLING MATERIALS

◎Very suitable ○Suitable

| CARBON STEELS PREHARDENED STEELS / ALLOY STEELS TOOL STEELS | PREHARDENED STEELS | | HARDENED STEELS | | STANLESS STEELS | CASTIRON DUCTILE CAST IRON | COPPER ALLOYS | ALUMINUM ALLOY | GRAPHITE | TITANIUM ALLOY | HEAT RESISTANT ALLOYS | PLASTIC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~40HRC | ~50HRC | ~55HRC | ~60HRC | ~65HRC | ~35HRC | ~350HB | | | | | | |
| ◎ | ◎ | ○ | | | ◎ | ○ | ○ | ○ | | ◎ | ◎ | |





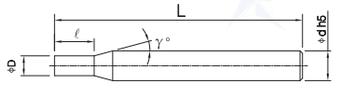
# Cutting Parameter

## HGXE 2-Flutes General Purpose End Mill Face Milling

| Workpiece | Carbon Steels、Alloy Steels (≤35HRC) | | | | Pre-Hardened Steels (35~45HRC) | | | | Hardened Steels (45-55HRC) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Type No. | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm |
| HGXE2001 0450 | 48000 | 150 | 0.006 | 0.06 | 40000 | 150 | 0.005 | 0.06 | 32000 | 120 | 0.003 | 0.05 |
| HGXE20015 0450 | 48000 | 150 | 0.006 | 0.09 | 40000 | 180 | 0.005 | 0.09 | 32000 | 80 | 0.003 | 0.05 |
| HGXE2002 0450 | 36000 | 240 | 0.006 | 0.12 | 30000 | 240 | 0.005 | 0.12 | 24000 | 200 | 0.003 | 0.1 |
| HGXE2003 0450 | 36000 | 300 | 0.01 | 0.2 | 30000 | 300 | 0.01 | 0.2 | 24000 | 300 | 0.01 | 0.2 |
| HGXE2004 0450 | 33880 | 325 | 0.03 | 0.28 | 30800 | 300 | 0.03 | 0.28 | 28000 | 300 | 0.03 | 0.28 |
| HGXE2005 0450 | 30250 | 363 | 0.03 | 0.3 | 27500 | 330 | 0.03 | 0.3 | 25000 | 300 | 0.03 | 0.3 |
| HGXE2006 0450 | 26620 | 425 | 0.04 | 0.42 | 24200 | 385 | 0.04 | 0.42 | 22000 | 350 | 0.04 | 0.42 |
| HGXE2007 0450 | 25000 | 450 | 0.04 | 0.49 | 23200 | 420 | 0.04 | 0.49 | 21000 | 380 | 0.04 | 0.49 |
| HGXE2008 0450 | 24200 | 484 | 0.04 | 0.56 | 22000 | 440 | 0.04 | 0.56 | 20000 | 400 | 0.04 | 0.56 |
| HGXE2010 0450 | 21780 | 605 | 0.05 | 0.7 | 19800 | 550 | 0.05 | 0.7 | 18000 | 500 | 0.05 | 0.7 |
| HGXE2012 0450 | 21080 | 650 | 0.05 | 0.84 | 11900 | 550 | 0.05 | 0.84 | 17000 | 500 | 0.05 | 0.84 |
| HGXE2014 0450 | 19580 | 695 | 0.05 | 0.91 | 17500 | 600 | 0.05 | 0.91 | 16000 | 550 | 0.05 | 0.91 |
| HGXE2015 0450 | 18150 | 726 | 0.05 | 1.05 | 16500 | 660 | 0.05 | 1.05 | 15000 | 600 | 0.05 | 1.05 |
| HGXE2016 0450 | 16620 | 800 | 0.05 | 1.12 | 14500 | 750 | 0.05 | 1.12 | 13500 | 650 | 0.05 | 1.12 |
| HGXE2020 0450 | 15125 | 900 | 0.1 | 1.5 | 13750 | 825 | 0.1 | 1.5 | 12500 | 750 | 0.05 | 1.5 |
| HGXE2025 0450 | 12100 | 1210 | 0.1 | 1.75 | 11000 | 1100 | 0.1 | 1.75 | 10000 | 1000 | 0.05 | 1.75 |
| HGXE2030 0450 | 9680 | 1210 | 0.1 | 2.1 | 8800 | 1100 | 0.1 | 2.1 | 8000 | 1000 | 0.05 | 2.1 |
| HGXE2040 0450 | 7865 | 1210 | 0.1 | 2.8 | 7150 | 1100 | 0.1 | 2.8 | 6500 | 1100 | 0.05 | 2.8 |
| HGXE2050 0650 | 7260 | 1210 | 0.1 | 3.5 | 6600 | 1100 | 0.1 | 3.5 | 6000 | 1000 | 0.1 | 3.5 |
| HGXE2060 0650 | 6050 | 726 | 0.1 | 4.2 | 5500 | 660 | 0.1 | 4.2 | 5000 | 600 | 0.1 | 4.2 |
| HGXE2080 0860 | 5445 | 726 | 0.2 | 5.6 | 4950 | 660 | 0.1 | 5.6 | 4500 | 600 | 0.1 | 5.6 |
| HGXE2100 1075 | 4840 | 605 | 0.2 | 7 | 4400 | 550 | 0.2 | 7 | 4000 | 500 | 0.1 | 7 |
| HGXE2120 1275 | 4235 | 605 | 0.2 | 8.4 | 3850 | 550 | 0.2 | 8.4 | 3500 | 500 | 0.1 | 8.4 |
| HGXE2140 1475 | 3630 | 605 | 0.2 | 9.6 | 3300 | 550 | 0.2 | 9.6 | 3000 | 500 | 0.1 | 9.6 |
| HGXE2160 16100 | 3388 | 605 | 0.2 | 11.2 | 3080 | 550 | 0.2 | 11.2 | 2800 | 500 | 0.1 | 11.2 |
| HGXE2200 20100 | 3025 | 605 | 0.2 | 14 | 2750 | 550 | 0.2 | 14 | 2500 | 500 | 0.1 | 14 |

● **This item can be used for side milling and slotting applicaitons**

# HGXE 4-Flutes General Purpose End Mill




UMG ATX 4 30° Spiral Angle Arc Back Angle <55 HRC

| Ø D | D Tol. [mm] |
|---|---|
| D≤3 | 0~-0.010 |
| 3<D≤6 | 0~-0.012 |
| 6<D≤10 | 0~-0.015 |
| 10<D≤18 | 0~-0.018 |
| D>18 | 0~-0.020 |

Unit:mm

| Type No. | Dia. | Length of Cut | Neck Taper Angle | Overall Length | Shank Dia. |
|---|---|---|---|---|---|
| | ϕD | ℓ | γ/° | L | ϕd |
| HGXE4008 0450 | 0.8 | 2.4 | 12 | 50 | 4 |
| HGXE4010 0450 | 1 | 3 | 12 | 50 | 4 |
| HGXE4010 0650 | 1 | 3 | 12 | 50 | 6 |
| HGXE4012 0450 | 1.2 | 3.5 | 11 | 50 | 4 |
| HGXE4014 0450 | 1.4 | 4 | 11 | 50 | 4 |
| HGXE4015 0450 | 1.5 | 4 | 11 | 50 | 4 |
| HGXE4015 0650 | 1.5 | 4 | 11 | 50 | 6 |
| HGXE4016 0450 | 1.6 | 5 | 11 | 50 | 4 |
| HGXE4020 0450 | 2 | 6 | 11 | 50 | 4 |
| HGXE4020 0650 | 2 | 6 | 11 | 50 | 6 |
| HGXE4025 0450 | 2.5 | 8 | 11 | 50 | 4 |
| HGXE4025 0650 | 2.5 | 8 | 11 | 50 | 6 |
| HGXE4030 0450 | 3 | 8 | 11 | 50 | 4 |
| HGXE4030 0650 | 3 | 8 | 11 | 50 | 6 |
| HGXE4030 0675 | 3 | 12 | 11 | 75 | 6 |
| HGXE4040 0450 | 4 | 11 | - | 50 | 4 |
| HGXE4040 0475 | 4 | 15 | - | 75 | 4 |
| HGXE4040 0650 | 4 | 11 | 11 | 50 | 6 |
| HGXE4040 0675 | 4 | 15 | 11 | 75 | 6 |
| HGXE4050 0650 | 5 | 13 | 11 | 50 | 6 |
| HGXE4050 0675 | 5 | 18 | 11 | 75 | 6 |
| HGXE4060 0650 | 6 | 16 | - | 50 | 6 |
| HGXE4060 0660 | 6 | 16 | - | 60 | 6 |
| HGXE4060 0675 | 6 | 20 | - | 75 | 6 |



SQUARE END MILL
HGX SERIES

# HGXE 4-Flutes General Purpose End Mill

Unit:mm

| Type No. | Dia. | Length of Cut | Neck Taper Angle | Overall Length | Shank Dia. |
|---|---|---|---|---|---|
| | ϕD | ℓ | γ/° | L | ϕd |
| HGXE4060 06100 | 6 | 20 | – | 100 | 6 |
| HGXE4080 0860 | 8 | 20 | – | 60 | 8 |
| HGXE4080 0875 | 8 | 20 | – | 75 | 8 |
| HGXE4080 08100 | 8 | 25 | – | 100 | 8 |
| HGXE4100 1075 | 10 | 25 | – | 75 | 10 |
| HGXE4100 10100 | 10 | 30 | – | 100 | 10 |
| HGXE4120 1275 | 12 | 30 | – | 75 | 12 |
| HGXE4120 12100 | 12 | 35 | – | 100 | 12 |
| HGXE4160 16100 | 16 | 45 | – | 100 | 16 |
| HGXE4160 16125 | 16 | 50 | – | 125 | 16 |
| HGXE4200 20100 | 20 | 45 | – | 100 | 20 |
| HGXE4200 20125 | 20 | 55 | – | 125 | 20 |

TABLE OF RECOMMENDED MILLING MATERIALS

○Very suitable ○Suitable

| CARBON STEELS / PREHARDENED STEELS | ALLOY STEELS / TOOL STEELS | PREHARDENED STEELS | | HARDENED STEELS | | STANLESS STEELS | CASTIRON DUCTILE CAST IRON | COPPER ALLOYS | ALUMINUM ALLOY | GRAPHITE | TITANIUM ALLOY | HEAT RESISTANT ALLOYS | PLASTIC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~40HRC | | ~50HRC | ~55HRC | ~60HRC | ~65HRC | ~35HRC | ~350HB | | | | | | |
| ○ | | ○ | ○ | | | ○ | ○ | ○ | ○ | | ○ | ○ | |

# Cutting Parameter

## HGXE 4-Flutes General Purpose End Mill Face Milling

| Workpiece | Carbon Steels、Alloy Steels (≤35HRC) | | | | Pre-Hardened Steels (35~45HRC) | | | | Hardened Steels (45-55HRC) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Type No. | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm |
| HGXE4008 0450 | 22000 | 1200 | 0.03 | 0.56 | 21600 | 1160 | 0.03 | 0.56 | 19800 | 720 | 0.03 | 0.56 |
| HGXE4010 0450 | 21780 | 1400 | 0.05 | 0.7 | 19800 | 1240 | 0.05 | 0.7 | 18000 | 800 | 0.05 | 0.7 |
| HGXE4012 0450 | 20000 | 1500 | 0.05 | 0.8 | 18000 | 1280 | 0.05 | 0.8 | 17000 | 850 | 0.05 | 0.8 |
| HGXE4014 0450 | 18800 | 1680 | 0.05 | 1 | 17200 | 1320 | 0.05 | 1 | 16000 | 900 | 0.05 | 1 |
| HGXE4015 0450 | 18150 | 1680 | 0.05 | 1.05 | 16500 | 1488 | 0.05 | 1.05 | 15000 | 960 | 0.05 | 1.05 |
| HGXE4016 0450 | 18150 | 1680 | 0.05 | 1.1 | 16500 | 1488 | 0.05 | 1.1 | 15000 | 960 | 0.05 | 1.1 |
| HGXE4020 0450 | 15125 | 2100 | 0.1 | 1.5 | 13750 | 1860 | 0.1 | 1.5 | 12500 | 1200 | 0.05 | 1.5 |
| HGXE4025 0450 | 12100 | 2800 | 0.1 | 1.75 | 11000 | 2480 | 0.1 | 1.75 | 1100 | 1600 | 0.05 | 1.75 |
| HGXE4030 0450 | 9680 | 2800 | 0.1 | 2.1 | 8800 | 2480 | 0.1 | 2.1 | 8000 | 1600 | 0.05 | 2.1 |
| HGXE4040 0450 | 7865 | 2800 | 0.1 | 2.8 | 7150 | 2480 | 0.1 | 2.8 | 6500 | 1600 | 0.05 | 2.8 |
| HGXE4050 0650 | 7260 | 2100 | 0.1 | 3.5 | 6600 | 1860 | 0.1 | 3.5 | 6000 | 1200 | 0.1 | 3.5 |
| HGXE4060 0650 | 6050 | 1680 | 0.1 | 4.2 | 5500 | 1488 | 0.1 | 4.2 | 5000 | 960 | 0.1 | 4.2 |
| HGXE4080 0860 | 5445 | 1680 | 0.2 | 5.6 | 4950 | 1488 | 0.2 | 5.6 | 4500 | 960 | 0.1 | 5.6 |
| HGXE4100 1075 | 4840 | 1400 | 0.2 | 7 | 4400 | 1240 | 0.2 | 7 | 4000 | 800 | 0.1 | 7 |
| HGXE4120 1275 | 4235 | 1400 | 0.2 | 8.4 | 3850 | 1240 | 0.2 | 8.4 | 3500 | 800 | 0.1 | 8.4 |
| HGXE4140 1475 | 3630 | 1400 | 0.2 | 9.6 | 3300 | 1240 | 0.2 | 9.6 | 3000 | 800 | 0.1 | 9.6 |
| HGXE4160 16100 | 3388 | 1400 | 0.2 | 11.2 | 3080 | 1240 | 0.2 | 11.2 | 2800 | 800 | 0.1 | 11.2 |
| HGXE4200 20100 | 3025 | 1400 | 0.2 | 14 | 2750 | 1240 | 0.2 | 14 | 2500 | 800 | 0.1 | 14 |

- This item can be used for side milling and slotting applicaitons



# HGESW SERIES

## HGESW-Mold Base Milling

- Perpendicularity maintained within 0.01mm;
- Surface roughness controlled under Ra 1.6um;
- No visible chatter marks during extra-long edge machining

# HGESW 4-Flutes Long Flute End Mill

UMG ATX 4 45° Spiral Angle Arc Back Angle <55 HRC

| Ø D | D Tol. [ mm ] |
|---|---|
| 8≤D< 10 | 0~-0.015 |
| 10≤D< 18 | 0~-0.018 |
| D>18 | 0~-0.020 |

Unit:mm

| Type No. | Dia. | Length of Cut | Overall Length | Shank Dia. |
|---|---|---|---|---|
| | ϕD | ℓ | L | ϕd |
| HGESW4080-40 08100 | 8 | 40 | 100 | 8 |
| HGESW4100-45 10100 | 10 | 45 | 100 | 10 |
| HGESW4100-55 10100 | 10 | 55 | 100 | 10 |
| HGESW4120-50 12100 | 12 | 50 | 100 | 12 |
| HGESW4120-55 12100 | 12 | 55 | 100 | 12 |
| HGESW4160-70 16150 | 16 | 70 | 150 | 16 |
| HGESW4200-75 200150 | 20 | 75 | 150 | 20 |



# Cutting Parameter

## HGESW 4-Flutes Long Flute End Mill

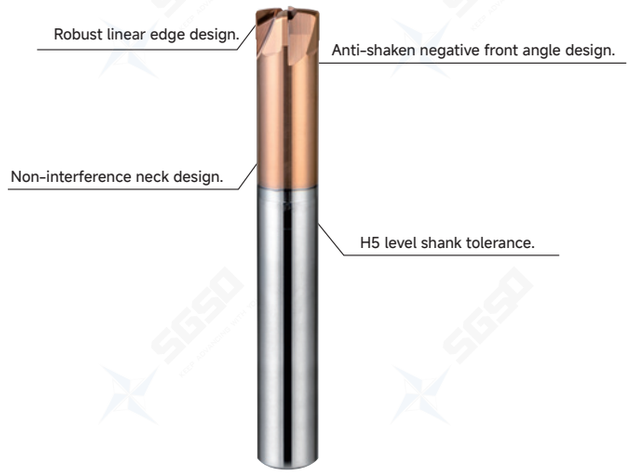
| Workpiece | Carbon Steels、Alloy Steels (≤35HRC) | | | | Pre-Hardened Steels (35-45HRC) | | | |
|---|---|---|---|---|---|---|---|---|
| Type No. | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm |
| HGESW4060-25 0675 | 4000 | 2500 | 20 | 0.1 | 4000 | 2000 | 20 | 0.1 |
| HGESW4080-32 0875 | 3500 | 2500 | 30 | 0.1 | 3000 | 2000 | 30 | 0.1 |
| HGESW4080-40 08100 | 3500 | 1500 | 35 | 0.1 | 3000 | 1200 | 35 | 0.1 |
| HGESW4100-45 10100 | 3000 | 1500 | 40 | 0.1 | 2750 | 1200 | 40 | 0.1 |
| HGESW4120-55 12100 | 2500 | 1200 | 50 | 0.1 | 1800 | 1000 | 50 | 0.1 |
| HGESW4160-70 16150 | 2000 | 1000 | 65 | 0.1 | 1500 | 800 | 65 | 0.1 |
| HGESW4200-75 20150 | 1800 | 1000 | 70 | 0.1 | 1500 | 600 | 70 | 0.1 |

# HSHFR SERIES

## High Efficiency Roughing Endmills.

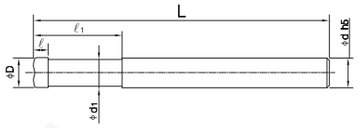
- Robust linear cutting edge.
- TiSiN multilayer coatings with Chrome concentration > 13%.
- Wide range of shank diameters for different machining purposes.
- Specially designed for hardened materials (1.2379,1.2083,1.2343).

**≤65HRC**






# HSHFR 4-Flutes High Feed End Mill




UMG | HX | 4 | 0° Spiral Angle | Straight Back Angle | R | <65 HRC

| Ø D | D Tol. [mm] |
|---|---|
| 6<D<12 | 0~-0.02 |

Unit:mm

| Type No. | Dia. | CAM-R | Length of Cut | Under Neck Length | Neck Dia. | Overall Length | Shank Dia. |
|---|---|---|---|---|---|---|---|
| | ϕD | R | ℓ | ℓ1 | ϕd1 | L | ϕd |
| HSHFR4060R0.55 0660 | 6 | R0.55 | 3 | 18 | 5.8 | 60 | 6 |
| HSHFR4080R0.75 0875 | 8 | R0.75 | 4 | 24 | 7.8 | 75 | 8 |
| HSHFR4100R0.95 1075 | 10 | R0.95 | 5 | 30 | 9.6 | 75 | 10 |
| HSHFR4120R1.15 1275 | 12 | R1.15 | 6 | 36 | 11.6 | 75 | 12 |

TABLE OF RECOMMENDED MILLING MATERIALS

○Very suitable ○Suitable

| CARBON STEELS PREHARDENED STEELS / ALLOY STEELS TOOL STEELS | PREHARDENED STEELS | | HARDENED STEELS | | STANLESS STEELS | CASTIRON DUCTILE CAST IRON | COPPER ALLOYS | ALUMINUM ALLOY | GRAPHITE | TITANIUM ALLOY | HEAT RESISTANT ALLOYS | PLASTIC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~40HRC | ~45HRC | ~55HRC | ~60HRC | ~65HRC | ~35HRC | ~350HB | | | | | | |
| ○ | ○ | ◎ | ◎ | ◎ | ○ | | | | | | | |

# Cutting Parameter

## HSHFR 4-Flutes High Feed End Mill Z-Level Milling Roughing

| Workpiece | Pre-Hardened Steels (35-45HRC) | | | | Hardened Steels (45-55HRC) | | | | Hardened Steels (55-65HRC) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Type No. | n/min$^{-1}$ | Vf-mm/min | ap/mm | ae/mm | n/min$^{-1}$ | Vf-mm/min | ap/mm | ae/mm | n/min$^{-1}$ | Vf-mm/min | ap/mm | ae/mm |
| HSHFR4060R0.55 0660 | 6000 | 4000 | 0.2 | 3 | 6000 | 4000 | 0.2 | 2.5 | 4200 | 2500 | 0.1 | 2 |
| HSHFR4080RO.75 0875 | 4500 | 5000 | 0.3 | 4 | 4500 | 5000 | 0.3 | 3 | 4000 | 3000 | 0.1 | 2.5 |
| HSHFR4100R0.95 1075 | 4000 | 4500 | 0.35 | 5 | 4000 | 4500 | 0.35 | 4 | 3600 | 3000 | 0.1 | 3 |
| HSHFR4120R1.O 1275 | 4000 | 4000 | 0.42 | 6 | 4000 | 4000 | 0.42 | 5 | 3200 | 3000 | 0.1 | 4 |



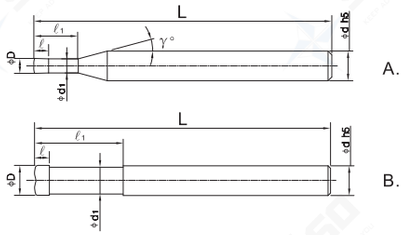
# HSX SERIES

## HSXHR-Highlights

- Axial cutting force minimizes vibration.
- Optimized high feed radius for lower cutting resistance.
- Multi-edge design for high efficiency.
- Suitable for 45-70HRC materials.
- HSX coating for long tool life

**45-70HRC**

# HSXHR 4/6-Flutes High Feed End Millr




UMG AHX 4 6 20° Spiral Angle Arc Back Angle R ≤70 HRC

| Ø D | D Tol. [ mm ] |
|---|---|
| D≤12 | 0~-0.02 |

Unit:mm

| Type No. | Dia. | CAM-R | Length of Cut | Under Neck Length | Neck Dia. | Neck Taper Angle | Overall Length | Flute No. | Shank Dia. | Shank |
|---|---|---|---|---|---|---|---|---|---|---|
| | ϕD | R | $\ell$ | $\ell_1$ | ϕd1 | γ/° | L | | ϕd | |
| HSXHR4010 0450 | 1 | R0.130 | 1 | 3 | 0.95 | 15 | 50 | 4 | 4 | A |
| HSXHR4010 0650 | 1 | R0.130 | 1 | 3 | 0.95 | 15 | 50 | 4 | 6 | A |
| HSXHR4020 0450 | 2 | R0.183 | 2 | 6 | 1.9 | 15 | 50 | 4 | 4 | A |
| HSXHR4020 0650 | 2 | R0.183 | 2 | 6 | 1.9 | 15 | 50 | 4 | 6 | A |
| HSXHR4030 0450 | 3 | R0.315 | 3 | 0 | 2.9 | 15 | 50 | 4 | 4 | A |
| HSXHR4030 0660 | 3 | R0.315 | 3 | 9 | 2.9 | 15 | 60 | 4 | 6 | A |
| HSXHR6040 0450 | 4 | R0.370 | 4 | 12 | 3.9 | - | 50 | 6 | 4 | B |
| HSXHR6040 0660 | 4 | R0.370 | 4 | 12 | 3.9 | 15 | 60 | 6 | 6 | A |
| HSXHR6050 0660 | 5 | R0.500 | 5 | 15 | 4.85 | 15 | 60 | 6 | 6 | A |
| HSXHR6060 0660 | 6 | R0.530 | 6 | 18 | 5.85 | - | 60 | 6 | 6 | B |
| HSXHR6080 0875 | 8 | R0.800 | 8 | 24 | 7.8 | - | 75 | 6 | 8 | B |
| HSXHR6080 08100 | 8 | R0.800 | 8 | 24 | 7.8 | - | 100 | 6 | 8 | B |
| HSXHR6100 1075 | 10 | R0.900 | 10 | 30 | 9.8 | - | 75 | 6 | 10 | B |
| HSXHR6100 10100 | 10 | R0.900 | 10 | 30 | 9.8 | - | 100 | 6 | 10 | B |
| New HSXHR6120 1275 | 12 | R1.000 | 12 | 36 | 11.7 | - | 75 | 6 | 12 | B |
| HSXHR6120 12100 | 12 | R1.000 | 12 | 36 | 11.7 | - | 100 | 6 | 12 | B |

| Diameter/D | CAM/R | Leftover | Diameter/D | CAM/R | Leftover |
|---|---|---|---|---|---|
| 1 | 0.13 | 0.023 | 6 | 0.53 | 0.168 |
| 2 | 0.183 | 0.06 | 8 | 0.8 | 0.229 |
| 3 | 0.315 | 0.083 | 10 | 0.9 | 0.305 |
| 4 | 0.37 | 0.12 | 12 | 1 | 0.383 |
| 5 | 0.5 | 0.138 | | | |

●Please set up CAM R as radius.
If you need DXF or STP files, please contact with us.

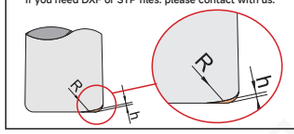



TABLE OF RECOMMENDED MILLING MATERIALS

○Very suitable ○Suitable

| CARBON STEELS | ALLOY STEELS | PREHARDENED STEELS | HARDENED STEELS | | | | CASTIRON | COPPER ALLOYS | ALUMINUM ALLOY | GRAPHITE | TITANIUM ALLOY | HEAT RESISTANT ALLOYS | PLASTIC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | ~55HRC | ~60HRC | ~65HRC | ~70HRC | DUCTILE CAST IRON | | | | | | |
| | | ○ | ◎ | ◎ | ◎ | ◎ | ○ | | | | | | |





# Cutting Parameter

## HSXHR 4/6-Flutes High Feed End Mill Z constant Roughing

| Workpiece | Hardened Steels (≤52HRC) | | | | Hardened Steels (58-62HRC) | | | | Hardened Steels (63-69HRC) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Type No. | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm |
| HSXHR4010R0.13 0450 | 25500 | 3800 | 0.04 | 0.53 | 19100 | 1800 | 0.02 | 0.53 | 15900 | 1070 | 0.012 | 0.5 |
| HSXHR4010R0.13 0650 | 25500 | 3800 | 0.04 | 0.53 | 19100 | 1800 | 0.02 | 0.53 | 15900 | 1070 | 0.012 | 0.5 |
| HSXHR4020R0.183 0450 | 12700 | 3800 | 0.08 | 1.11 | 9600 | 2000 | 0.04 | 1.11 | 8000 | 1080 | 0.02 | 1 |
| HSXHR4020R0.183 0650 | 12700 | 3800 | 0.08 | 1.11 | 9600 | 2000 | 0.04 | 1.11 | 8000 | 1080 | 0.02 | 1 |
| HSXHR4030R0.315 0450 | 8500 | 4000 | 0.12 | 1.62 | 6400 | 2400 | 0.06 | 1.62 | 5300 | 1120 | 0.03 | 1.5 |
| HSXHR4030R0.315 0660 | 8500 | 4000 | 0.12 | 1.62 | 6400 | 2400 | 0.06 | 1.62 | 5300 | 1120 | 0.03 | 1.5 |
| HSXHR6040R0.37 0450 | 6400 | 5850 | 0.16 | 2.18 | 4800 | 2700 | 0.08 | 2.18 | 4000 | 1710 | 0.05 | 2 |
| HSXHR6040R0.37 0650 | 6400 | 5850 | 0.16 | 2.18 | 4800 | 2700 | 0.08 | 2.18 | 4000 | 1710 | 0.05 | 2 |
| HSXHR6050R0.5 0660 | 5100 | 6000 | 0.2 | 2.73 | 3800 | 2750 | 0.1 | 2.73 | 4000 | 1710 | 0.05 | 2 |
| HSXHR6060R0.53 0650 | 4200 | 5870 | 0.24 | 3.27 | 3200 | 2800 | 0.1 | 3.27 | 2700 | 1770 | 0.08 | 3 |
| HSXHR6060R0.53 0660 | 4200 | 5870 | 0.24 | 3.27 | 3200 | 2800 | 0.1 | 3.27 | 2700 | 1770 | 0.08 | 3 |
| HSXHR6080R0.8 0860 | 3200 | 6150 | 0.28 | 4.36 | 2400 | 3000 | 0.15 | 4.36 | 2000 | 1800 | 0.1 | 4 |
| HSXHR6080R0.8 0875 | 4200 | 5870 | 0.24 | 3.27 | 2400 | 2900 | 0.15 | 3.27 | 2000 | 1800 | 0.1 | 4 |
| HSXHR6080R0.8 08100 | 4200 | 5870 | 0.24 | 3.27 | 2400 | 2800 | 0.15 | 3.27 | 2000 | 1800 | 0.1 | 4 |
| HSXHR6100R0.9 1075 | 2500 | 6000 | 0.3 | 5.46 | 1900 | 3150 | 0.2 | 5.46 | 1600 | 1800 | 0.15 | 5 |
| HSXHR6100R0.9 10100 | 2500 | 6000 | 0.3 | 5.46 | 1900 | 3000 | 0.2 | 5.46 | 1600 | 1800 | 0.15 | 5 |
| HSXHR6120R1 1275 | 2100 | 5750 | 0.35 | 6.57 | 1600 | 3000 | 0.25 | 6.57 | 1300 | 1670 | 0.18 | 6 |
| HSXHR6120R1 12100 | 2100 | 5750 | 0.35 | 6.57 | 1600 | 3000 | 0.25 | 6.57 | 1300 | 1670 | 0.18 | 6 |

# HSXDT SERIES

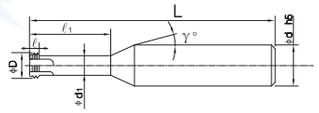
## HSXDT Thread Mill- Highlights

- Long tool life with excellent wear resistance.
- Stable performance from optimized flute design.
- Sharper and strong edges for minimal burs and cleaner threads.
- Left-hand cutting - use with counterclockwiserotation.
- Capable of machining materials up to 70HRC.

<70HRC



# HSXDT Thread Milling Cutter-2.5D Underneck



UMG AHX 4 LEFT BLADE ≤70 HRC

Unit:mm

| Type No. | Dia | Regular Thread | Z | Pitch | Length of Cut | Under Neck Length | Neck Dia | Neck Taper Angle | Overall Length | Shank Dia. |
|---|---|---|---|---|---|---|---|---|---|---|
| | ϕD | | Z | P | ℓ | ℓ1 | ϕd1 | γ/° | L | ϕd |
| New HSXDT-0.4-5-0450 | 1.4 | M2 | 4 | 0.4 | 1.2 | 5 | 0.9 | 20° | 50 | 4 |
| HSXDT-0.4-5 0650 | 1.4 | M2 | 4 | 0.4 | 1.2 | 5 | 0.9 | 20° | 50 | 6 |
| New HSXDT-0.45-6.25-0450 | 1.8 | M2.5 | 4 | 0.45 | 1.35 | 6.25 | 1.25 | 20° | 50 | 4 |
| HSXDT-0.45-6.25 0650 | 1.8 | M2.5 | 4 | 0.45 | 1.35 | 6.25 | 1.25 | 20° | 50 | 6 |
| New HSXDT-0.5-7.5-0450 | 2.4 | M3 | 4 | 0.5 | 1.5 | 7.5 | 1.8 | 20° | 50 | 4 |
| HSXDT-0.5-7.5 0650 | 2.4 | M3 | 4 | 0.5 | 1.5 | 7.5 | 1.8 | 20° | 50 | 6 |
| New HSXDT-0.7-10-0450 | 3.1 | M4 | 4 | 0.7 | 2.1 | 10 | 2.25 | 20° | 50 | 4 |
| HSXDT-0.7-10 0650 | 3.1 | M4 | 4 | 0.7 | 2.1 | 10 | 2.25 | 20° | 50 | 6 |
| New HSXDT-0.8-12.5-0450 | 3.8 | M5 | 4 | 0.8 | 2.4 | 12.5 | 5.15 | 20° | 50 | 4 |
| HSXDT-0.8-12.5 0650 | 3.8 | M5 | 4 | 0.8 | 2.4 | 12.5 | 2.8 | 20° | 50 | 6 |
| HSXDT-1.0-15 0650 | 4.6 | M6 | 4 | 1 | 3 | 15 | 3.35 | 20° | 50 | 6 |
| New HSXDT-1.25-20-0860 | 6.2 | M8 | 4 | 1.25 | 3.75 | 20 | 4.65 | 20° | 60 | 8 |
| HSXDT-1.25-20 1075 | 6.2 | M8 | 4 | 1.25 | 3.75 | 20 | 4.65 | 20° | 75 | 10 |
| HSXDT-0.75-20 1075 | 6.2 | * | 4 | 0.75 | 2.25 | 20 | 5.15 | 20° | 75 | 10 |
| New HSXDT-1.5-25-0860 | 7.5 | M10 | 4 | 1.5 | 4.5 | 25 | 5.6 | 20° | 60 | 8 |
| HSXDT-1.5-25 1075 | 7.5 | M10 | 4 | 1.5 | 4.5 | 25 | 5.6 | 20° | 75 | 10 |
| HSXDT-1.0-25 1075 | 7.5 | * | 4 | 1 | 3 | 25 | 6.1 | 20° | 75 | 10 |
| HSXDT-1.75-30 1075 | 9 | M12 | 4 | 1.75 | 5.25 | 30 | 6.8 | 20° | 75 | 10 |
| HSXDT-2-40 12100 | 11.5 | M16 | 4 | 2 | 6 | 40 | 8.85 | 20° | 100 | 12 |
| HSXDT-2.5-50 16125 | 15 | M20 | 4 | 2.5 | 7.5 | 50 | 11.7 | 20° | 125 | 16 |

TABLE OF RECOMMENDED MILLING MATERIALS

◎Very suitable ○Suitable

| CARBON STEELS | ALLOY STEELS | PREHARDENED STEELS | HARDENED STEELS | | | | CASTIRON | COPPER ALLOYS | ALUMINUM ALLOY | GRAPHITE | TITANIUM ALLOY | HEAT RESISTANT ALLOYS | PLASTIC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | ~55HRC | ~60HRC | ~65HRC | ~70HRC | DUCTILE CAST IRON | | | | | | |
| ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ○ | ○ | ○ | ◎ | ◎ | ○ |

# Cutting Parameter

## HSXDT Thread Milling Cutter

| Workpiece | | Tool steels (25-35HRC) | | | Hardened Steels (≤45HRC) | | |
|---|---|---|---|---|---|---|---|
| Type No. | DCmm. | n/min$^{-1}$ | F-mm/min | fz-mm/t | n/min$^{-1}$ | F-mm/min | fz-mm/t |
| HSXDT-M2-0.4-5 0650 | 1.4 | 16800 | 121 | 0.0018 | 14280 | 114 | 0.002 |
| HSXDT-M2.5-0.45-6.25 0650 | 1.8 | 12500 | 95 | 0.019 | 10625 | 106 | 0.0025 |
| HSXDT-M3-0.5-7.5 0650 | 2.4 | 9500 | 87 | 0.0023 | 8075 | 80 | 0.0025 |
| HSXDT-M4-0.7-10 0650 | 3.1 | 7500 | 120 | 0.004 | 6375 | 76 | 0.003 |
| HSXDT-M5-0.8-12.5 1075 | 3.8 | 6500 | 130 | 0.005 | 5525 | 88 | 0.004 |
| HSXDT-M6-1.0-15 1075 | 4.6 | 5000 | 120 | 0.006 | 4250 | 85 | 0.005 |
| HSXDT-M8-1.25-20 1075 | 6.2 | 3600 | 109 | 0.007 | 3060 | 85 | 0.007 |
| HSXDT-M10-1.5-25 1075 | 7.5 | 3000 | 120 | 0.01 | 2550 | 92 | 0.009 |
| HSXDT-M12-1.75-30 1075 | 9 | 2700 | 119 | 0.011 | 2295 | 92 | 0.01 |
| HSXDT-M16-2-40 12100 | 11.5 | 2200 | 123 | 0.014 | 1870 | 112 | 0.015 |
| HSXDT-M20-2.5-50 16125 | 15 | 1600 | 109 | 0.017 | 1360 | 87 | 0.016 |

| Workpiece | | Hardened Steels (≤52HRC) | | | Hardened Steels (58~62HRC) | | |
|---|---|---|---|---|---|---|---|
| Type No. | DCmm. | n/min$^{-1}$ | F-mm/min | fz-mm/t | n/min$^{-1}$ | F-mm/min | fz-mm/t |
| HSXDT-M2-0.4-5 0650 | 1.4 | 12500 | 100 | 0.002 | 10000 | 69 | 0.0017 |
| HSXDT-M2.5-0.45-6.25 0650 | 1.8 | 9700 | 77 | 0.002 | 7760 | 68 | 0.0022 |
| HSXDT-M3-0.5-7.5 0650 | 2.4 | 7300 | 58 | 0.002 | 5840 | 70 | 0.003 |
| HSXDT-M4-0.7-10 0650 | 3.1 | 5600 | 67 | 0.003 | 4480 | 71 | 0.004 |
| HSXDT-M5-0.8-12.5 1075 | 3.8 | 4600 | 74 | 0.004 | 3680 | 74 | 0.005 |
| HSXDT-M6-1.0-15 1075 | 4.6 | 3800 | 76 | 0.005 | 3040 | 61 | 0.005 |
| HSXDT-M8-1.25-20 1075 | 6.2 | 2800 | 67 | 0.006 | 2240 | 63 | 0.007 |
| HSXDT-M10-1.5-25 1075 | 7.5 | 2300 | 83 | 0.009 | 1840 | 66 | 0.009 |
| HSXDT-M12-1.75-30 1075 | 9 | 1900 | 84 | 0.011 | 1520 | 67 | 0.011 |
| HSXDT-M16-2-40 12100 | 11.5 | 1500 | 90 | 0.015 | 1200 | 67 | 0.014 |
| HSXDT-M20-2.5-50 16125 | 15 | 1200 | 77 | 0.016 | 960 | 69 | 0.018 |

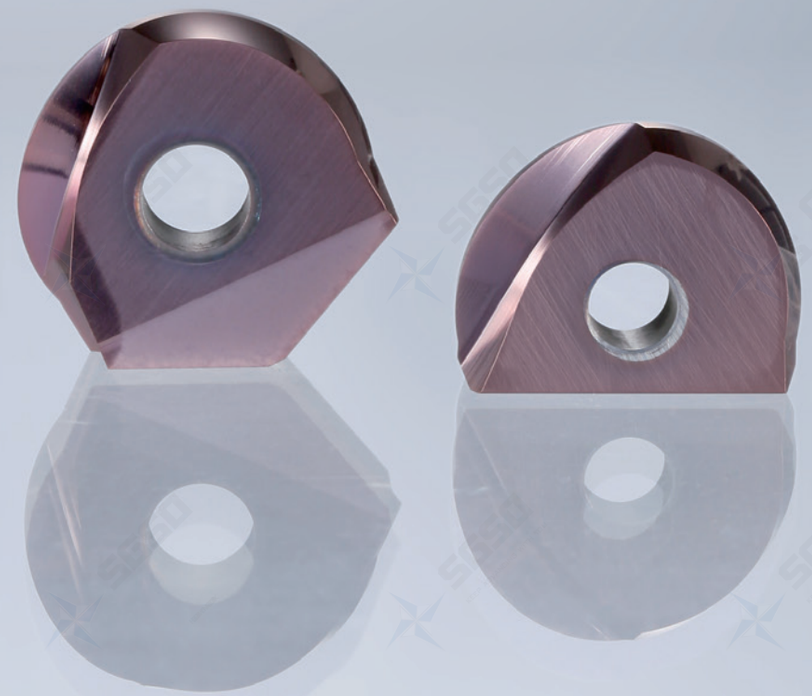


# VSB&MSB Insert

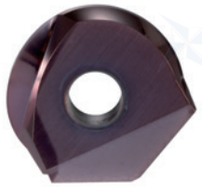
**INTERCHANGABLE BALL HEAD MILLING CUTTER**

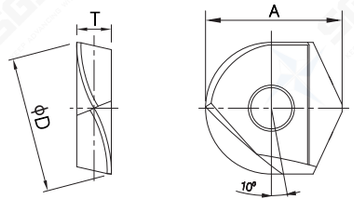
## The Speciality of Insert Series

- Ultra-Fined Micro-Particle Substrate, High Hardness and Excellent Wear Resistance.
- Insert Clamping R Accuracy +0.01mm.
- S-Shaped Spiral Design,Low Cutting Vibration,High Quality Workpiece Surface.
- AHX Nano Multi-Layer Coating up to 70HRC.



# VSB Finishing Ball Nose Insert



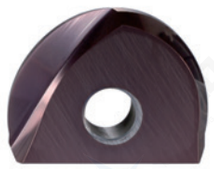


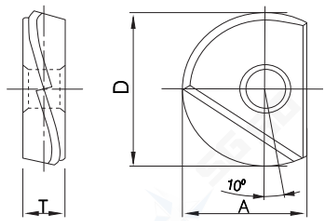

UMG AHX 2 ≤70 HRC

Unit: mm

| Type No. | D | R | A | T |
|---|---|---|---|---|
| VSB160-BS-R9105-B | 16 | 8 | 16.6 | 4.2 |
| VSB200-BS-R9105-B | 20 | 10 | 20.2 | 5.2 |
| VSB250-BS-R9105-B | 25 | 12.5 | 24.3 | 6.2 |
| VSB300-BS-R9105-B | 30 | 15 | 29.2 | 7.2 |

# MSB Finishing Ball Nose Insert






UMG AHX 2 ≤70 HRC

Unit: mm

| Type No. | D | R | A | T |
|---|---|---|---|---|
| MSB120-S-R 9105-B | 12 | 6 | 10 | 3 |
| MSB160-S-R 9105-B | 16 | 8 | 12 | 4 |
| MSB200-S-R 9105-B | 20 | 10 | 15 | 5 |
| MSB250-S-R 9105-B | 25 | 12.5 | 18.5 | 6 |
| MSB300-S-R 9105-B | 30 | 15 | 22.5 | 7 |





# Cutting Parameter

## VSB Finishing Ball Nose Insert

| Workpiece | Pre-Hardened Steels (<45HRC) | | | | Hardened Steels (45-55HRC) | | | | Hardened Steels (55-65HRC) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Type No. | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm |
| VSB160-BS-R 9105-B | 6000-10000 | 6000-10000 | 0.05-0.1 | 0.2 | 5500 - 6000 | 2500-3000 | 0.05-0.1 | 0.2 | 5500 - 6000 | 2500 - 3000 | 0.05-0.1 | 0.2 |
| VSB200-BS-R 9105-B | 6000-10000 | 6000-10000 | 0.05-0.12 | 0.25 | 5500-6000 | 3000 - 3600 | 0.05-0.12 | 0.25 | 5500 - 6000 | 3000-3600 | 0.05-0.12 | 0.25 |
| VSB250-BS-R 9105-B | 6000 - 8000 | 6000 - 8000 | 0.05-0.12 | 0.25 | 5000-5500 | 3000-4500 | 0.05 - 0.12 | 0.25 | 5000 - 5500 | 3000-4500 | 0.05-0.12 | 0.25 |
| VSB300-BS-R 9105-B | 5000 - 8000 | 5000-8000 | 0.05-0.2 | 0.3 | 4500-5000 | 3000 - 6000 | 0.05-0.2 | 0.3 | 4500-5000 | 3000-6000 | 0.05-0.2 | 0.3 |

## MSB Finishing Ball Nose Insert

| Workpiece | Pre-Hardened Steels (<45HRC) | | | | Hardened Steels (45-55HRC) | | | | Hardened Steels (55-65HRC) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Type No. | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm | n/min⁻¹ | Vf-mm/min | ap/mm | ae/mm |
| MSB120-S-R9105-B | 8000-10000 | 2500 - 5000 | 0.05-0.1 | 0.2 | 6000 - 6500 | 2500 - 3000 | 0.05-0.1 | 0.2 | 6000 - 6500 | 2500 - 3000 | 0.05-0.1 | 0.2 |
| MSB160-S-R 9105-B | 6000-10000 | 6000-10000 | 0.05 - 0.1 | 0.2 | 5500 - 6000 | 2500-3000 | 0.05-0.1 | 0.2 | 5500-6000 | 2500 - 3000 | 0.05-0.1 | 0.2 |
| MSB200-S-R 9105-B | 6000-10000 | 6000-10000 | 0.05 - 0.12 | 0.25 | 5500-6000 | 3000-3600 | 0.05 - 0.12 | 0.25 | 5500 - 6000 | 3000-3600 | 0.05 - 0.12 | 0.25 |
| MSB250-S-R 9105-B | 6000-8000 | 6000 - 8000 | 0.05 - 0.12 | 0.25 | 5000-5500 | 3000-4500 | 0.05 - 0.12 | 0.25 | 5000-5500 | 3000-4500 | 0.05 - 0.12 | 0.25 |
| MSB300-S-R 9105-B | 5000 - 8000 | 5000-8000 | 0.05-0.2 | 0.3 | 4500-5000 | 3000 - 6000 | 0.05 - 0.2 | 0.3 | 4500-5000 | 3000 - 6000 | 0.05 - 0.2 | 0.3 |

## 1 Vc(m/min) Cutting Speed

$$Vc=\frac{\pi \times D \times n}{1000}$$

π =3.14 (the Circular Constant)
D =Outside Diameter
n =Rotation

## 2 n (r.p.m) Rotation

$$n = \frac{1000 \times Vc}{\pi \times D}$$

Vc= Cutting Speed
π = 3.14 (the Circular Constant)
D = Outside Diameter

## 3 Vf (mm/min) Feed Rate

$$Vf= f_z \times Z \times n$$

n = Rotation
Z = Number of flutes
$f_z$ = Feed per tooth

## 4 fz (mm/Z) Feed Per Tooth

$$f_z= \frac{Vf}{n \times Z}$$

Vf = Feed Rate
n = Rotation
Z = Number of flutes