FOR TOUGH STEEL, CAST IRON, STAINLESS STEEL AND EXOTIC MATERIALS:
NOTHING CUTS IT BETTER

INDUSTRY-LEADING HIGH-PERFORMANCE CARBIDE END MILLS:
- 4 Flute & 6 Flute
- Square, Chamfer, Radius, Ball Nose
- Standard & Extended Length
- Plain & Weldon Flat Shanks
- Inch & Metric Sizes

NEW
6 Flute Chip Splitter
Size Expansion in 1/2" x 1/2" x 1-1/4" x 3"

Over 1,500 Items in Stock.
YG-1 is the undisputed world leader in carbide end mill offerings. And now, with our newly expanded V7 Plus A line, you have even more high-performance choices than ever before. Choose from a full array of 4 Flute and 6 Flute standard-stocked or custom-designed solutions. No matter what your machining challenge, we have a product for you.

How Our Innovative V7 Plus A Design Started a REVOLUTION in End Mill Technology

We didn’t create the great cutting performance of our V7 Plus A end mills line by just doing what others have done. We engineered our line from the tip of flute to end of shank with performance-enhancing technology in mind. It’s what makes the V7 Plus A line the top choice in end mill performance.

For excellent performance in stainless steels, mild steels, low/medium hardness materials and exotic materials to boot, the V7 Plus A’s advanced geometry provides:

- Excellent material removal rates and surface finishes
- Unequal indexing for reduced chatter (harmonics) and improved stability
- Advanced coating for superior performance and tool life
- Improved flute geometry for impressive chip formation and evacuation
- Noticeably smooth operation in high-speed machining and peel-milling applications
- Superior slotting and profiling in most ferrous materials for more flexible use
- Excellent performance in high-speed trochoidal milling applications for improved accuracy, reduced vibration and better heat displacement
- Premium-grade carbide substrate for longer tool life

Better by Every Measure

From its higher stability for lower vibration to its improved performance in high-speed and trochoidal milling applications, the V7 Plus A 6 Flute solid carbide, 45-degree helix, was designed with longer tool life and higher productivity in mind.

Trochoidal Milling

With our V7 Plus A 6 Flute’s unique cutting geometry, we made it easier to apply a small radial width-of-cut along with higher cutting speeds and excellent feed per tooth. That’s why we perform better in trochoidal milling application. Here’s why:

- Smaller arc engagement provides lower cutting force and better heat displacement
- More flutes provide deeper depth of cut for more productivity and reduced wear
- Stability-inducing geometry reduces vibration for increased accuracy and longer tool life
- Aggressive feed-per-tooth provides excellent chip evacuation

GUIDE TO ICONS

The tool is made of micrograin carbide

No. of Flutes

Tolerance of Ball Radius

Type of Shank

Tool Ends

Chip Splitters

Special Chip Splitter Design

Shorter Chip Length at High Axial Machining,
Improving Chip Removal from both the Component and the Machine
<table>
<thead>
<tr>
<th>Material Description</th>
<th>Composition / Structure / Heat Treatment</th>
<th>HRC</th>
<th></th>
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<tbody>
<tr>
<td>Low alloy steel</td>
<td>About 0.1% C, about 0.5% Si, Cu, Mn, ...</td>
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<td>Difficult-to-machine steel</td>
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<td>Copper alloy</td>
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<tr>
<td>Silver</td>
<td>About 99.9% Ag, about 0.1% Cu</td>
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<tr>
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<tr>
<td>Brass</td>
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**Recommended cutting conditions:**
- **P:** 10
- **W:** 0.5
- **V:** 30
- **A:** 45°
- **Z:** 3

**Key:**
- **M:** High performance solid carbide end mills for steels, cast iron and stainless steels
- **P:** Premium grade
- **N:** Standard grade
- **S:** Special grade
- **H:** High performance grade
- **G:** General purpose grade
- **L:** Low performance grade

**Flute:**
- **Plain Shank:**
- **Multiple Helix:**

**Heli Angle:**
- **45°**
- **35°/37°**

**Cutting Edge Shape:**
- **SQUARE**
- **CHAMFER**
- **CORNER RADIUS**

**Size Min:**
- 1/8
- 1/4
- 3/8
- 1/16

**Size Max:**
- 1
- 1
- 1
- 1

**PAGE:**
- **9**
- **12**

**Recommended Cutting Conditions:**
- **P:** 10
- **W:** 0.5
- **V:** 30
- **A:** 45°
- **Z:** 3

**Flute (Shank):**
- **4 (Plain Shank):**
- **4 (Flat Shank):**

**Heli Angle:**
- **45°**
- **35°/37°**

**Cutting Edge Shape:**
- **SQUARE**
- **BALL NOSE**
- **CORNER RADIUS**

**Size Min:**
- 1/8
- 1/8
- 3/8
- 1/16

**Size Max:**
- 1
- 1
- 1
- 1

**PAGE:**
- **13**
- **21**
- **23**
- **24**
- **29**

**Recommended Cutting Conditions:**
- **P:** 10
- **W:** 0.5
- **V:** 30
- **A:** 45°
- **Z:** 3

**Flute (Shank):**
- **4 (Plain Shank):**
- **4 (Flat Shank):**

**Heli Angle:**
- **45°**
- **35°/37°**

**Cutting Edge Shape:**
- **SQUARE**
- **CORNER RADIUS**

**Size Min:**
- 1/8
- 1/8
- 3/8
- 1/16

**Size Max:**
- 1
- 1
- 1
- 1

**PAGE:**
- **21**
- **23**
- **24**
- **29**
SOLID CARBIDE V7 PLUS A END MILLS
High performance carbide end mills for Steels, Cast Iron and Stainless Steels

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Please visit www.yg1usa.com for material search.

Recommended cutting conditions: 
P6

YG-1 CO., LTD.
800-765-8665 | yg1usa.com

800-765-8665 | yg1usa.com
4 FLUTE

Innovative cutting performance that's not just a chip off the old block.

Our highly engineered flute geometry with multi-helix design eliminates vibration, and our premium substrate and coating ensures longer tool life. Did we mention better cutting performance, too?

HIGH-PERFORMANCE SOLID CARBIDE

4 FLUTE END MILLS

CASE STUDY

4 Flute vs Competitor

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Mill Dia. Tolerance (inch) :  .0012
Shank Dia. Tolerance :  .0012 (± .0004)

**Next Page**
### Y-Coated SOLID CARBIDE END MILLS
#### 4 FLUTE STANDARD LENGTH (PLAIN SHANK)

- **Material:**
  - High-performance solid carbide
  - UGMF70, Ball Nose
  - UGMG76, Square

- **Recommended for:**
  - Stainless steels, mild steels, cast iron, low/medium hardness materials, and all exotic materials up to HRc40

- **Additional Features:**
  - Special flute geometry and multiple helix eliminate vibrations
  - Excellent performance for stainless steels, mild steels, cast iron, low/medium hardness materials, and all exotic materials up to HRc40
  - Advanced coating for superior performance and tool life

---

### Unit: INCH

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<td>Non-alloy steel</td>
<td>Ball Nose</td>
<td>MFER</td>
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<td>UGMG53</td>
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### Material

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<th>Description</th>
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<td>UGMF70</td>
<td>Non-alloy steel</td>
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<td>MFER</td>
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<td>UGMG53</td>
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### Shank Dia. Tolerance

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<th>Shank Dia. Tolerance</th>
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<tbody>
<tr>
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</table>

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### EDP No.

- UGMF68: Chamber 1
- UGMF70: Ball Nose
- UGMG53: Square

---

### Corner Radius

- Square: 3/8, 1/2, 5/8, 1/4, 3/16, 1/8
- Chamber: 7/64, 1/8, 5/32, 1/4, 3/16, 1/8
- Ball Nose: 7/32, 1/8, 1/4, 3/16, 1/8

---

### Ball Nose Key

- 1/4: 3
- 1/2: 4
- 5/8: 5
- 3/4: 6
- 1: 7

---

### Additional Information

- Length of cut in excess of 1½" in any 37° single helix requires feed reduction of approximately 50%.
Y-Coated SOLID CARBIDE END MILLS
4 FLUTE STANDARD LENGTH (FLAT SHANK)

- Special flute geometry and multiple helix eliminate vibrations
- Excellent performance for stainless steels, mild steels, cast iron, low/medium hardness materials and all exotic materials up to HRc40
- Advanced coating for superior performance and tool life

Unit : INCH

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<th>EDP No.</th>
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<th>EDP No.</th>
<th>EDP No.</th>
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<th>EDP No.</th>
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**Mill Dia. Tolerance (inch):** 0.0012

Y-Coated SOLID CARBIDE END MILLS
4 FLUTE EXTENDED LENGTH (PLAIN SHANK)

- Special flute geometry and multiple helix eliminate vibrations
- Excellent performance for stainless steels, mild steels, cast iron, low/medium hardness materials and all exotic materials up to HRc40
- Advanced coating for superior performance and tool life

Unit : INCH

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**Mill Dia. Tolerance (inch):** 0.0012

**Chamfer and Ball Nose on Page 11**
Y-Coated SOLID CARBIDE END MILLS
4 FLUTE EXTENDED LENGTH (PLAIN SHANK)

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- Length of cut in inches of 1/2° single helix at feed reduction of approximately 50%

Mill Dia. Tolerance (inch) Shank Dia. Tolerance
0 ~ .0012 H5 (±0.012/.06)

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Y-Coated SOLID CARBIDE END MILLS
4 FLUTE EXTENDED LENGTH (FLAT SHANK)

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- Length of cut in inches of 1/2° single helix at feed reduction of approximately 50%

Mill Dia. Tolerance (inch) Shank Dia. Tolerance
0 ~ .0012 H5 (±0.012/.06)
Y-Coated SOLID CARBIDE END MILLS
4 FLUTE STANDARD LENGTH (PLAIN SHANK)

- Special flute geometry and multiple helix eliminate vibrations
- Excellent performance for stainless steels, mild steels, cast iron, low/medium hardness materials and all exotic materials up to HRc40
- Advanced coating for superior performance and tool life

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Material 

- Non-alloy steel 
- Low alloy steel 
- Malleable cast iron 
- Grey cast iron 
- Alloys 
- Copper and Copper Alloys 
- Stainless steel 
- Heat Resistant Super Alloys 
- Titanium Alloys

Non-alloy steel, Malleable cast iron, Grey cast iron, Alloys, Copper and Copper Alloys, Stainless steel, Heat Resistant Super Alloys, Titanium Alloys, Non-alloy steel, Copper and Copper Alloys, Stainless steel, Heat Resistant Super Alloys, Titanium Alloys
### Y-Coated SOLID CARBIDE END MILLS

**4 FLUTE EXTENDED LENGTH (PLAIN SHANK)**

- Special flute geometry and multiple helix eliminate vibrations
- Excellent performance for stainless steels, mild steels, cast iron, low/medium hardness materials and all exotic materials up to HRc40
- Advanced coating for superior performance and tool life

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**Y-Coated SOLID CARBIDE END MILLS**

**4 FLUTE EXTENDED LENGTH (FLAT SHANK)**

- Special flute geometry and multiple helix eliminate vibrations
- Excellent performance for stainless steels, mild steels, cast iron, low/medium hardness materials and all exotic materials up to HRc40
- Advanced coating for superior performance and tool life

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**Recommended Materials**

- Non-alloy steel
- Low alloy steel
- Stainless steel
- Heat Resistant Super Alloys
- Titanium Alloys
- Carbide
- PVD coated carbide

---

**YG-1 CO., LTD.**

800-765-8665 | yg1usa.com
HIGH-PERFORMANCE SOLID CARBIDE

6 FLUTE END MILLS

6 Flute vs. Competitor

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Milling Length (ft.) 1.181 787

Size (mm) ø12(.045) x ø12 x 26 x 83

Work Material - AISI: 1405 - DIN: C45

Milling Method Trochoidal Cutting

Mill Dia. Tolerance (mm) ±.0008

Corner Radius 1/4 5/32 1/8 1/4 3/8 1/2

Y-Coated SOLID CARBIDE END MILLS

6 FLUTE STANDARD LENGTH (PLAIN SHANK)

The unique geometry of the variable pitch provides the best chatter free tool for high speed and trochoidal milling

Excellent performance for Stainless Steels, Nlkl Steels, Cast Iron, Low/Medium hardness materials under Hrc40

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Machining Center

Heat Resistant Super Alloys

Titanium Alloys

Stainless steel

Non Metallic Materials

Bronze / Brass

Copper and Copper Alloys

Non-alloy steel

Low alloy steel

High alloyed steel,  and tool steel

Nodular cast iron

Chilled iron

Aluminum - wrought alloy

Aluminum - cast alloy

Corrosion resistant Alloys

Heat Resistant: Super Alloys

Thermal Alloys

Hardened Tool steels

Roughing (R)

Finish (F)

M: Excellent ○: Good

Material class (K)

DIN: Machine accuracy

ISO: Product class

USA: Product class

Product class: 000 to 7

Accuracy: 10 to 50

Surface roughness: .325 to 6.350

Recommended Cutting Speed: 400 - 800 ft/min

Feed: .0005 to .010 in/tooth

Depth of cut: .005 to .100 in.
### Y-Coated SOLID CARBIDE END MILLS
#### 6 FLUTE STANDARD LENGTH (PLAIN SHANK)

**Material:**
- Stainless steel
- Mild steel
- Cast iron
- Low/Medium hardness materials under HRc40

**Description:**
- Excellent performance for Stainless Steels, Mild Steel, Cast Iron, Low/Medium hardness materials under HRc40

#### VDI 3323

**Material:**
- Aluminum-cast, alloyed
- Steel and tool steel
- Stainless steel
- Grey cast iron
- Malleable cast iron
- Hardened steel
- Hardened wrought alloy steel
- Non-alloy steel
- Low alloy steel
- High alloyed steel, 10% Al
- Non Metallic: Cast iron
- Square End

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<th>OAL (L)</th>
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### Y-Coated SOLID CARBIDE END MILLS

**6 FLUTE EXTENDED LENGTH (PLAIN SHANK)**

- The unique geometry of the variable pitch provides the best chatter free tool for high speed and trochoidal milling
- Excellent performance for Stainless Steels, Mild Steels, Cast Iron, Low/Medium hardness materials under HRc40

#### Unit: INCH

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</table>

#### Series: UGMH08

#### Square Corner Radius

- Reinforced cutting edge

#### Series: UGMH09

#### Square Corner Radius

- Reinforced cutting edge

---

**Y-Coated SOLID CARBIDE END MILLS**

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#### Series: UGMH08

#### Square Corner Radius

- Reinforced cutting edge

#### Series: UGMH09

#### Square Corner Radius

- Reinforced cutting edge

---

**Table of Materials:**

- Non-alloy steel
- Low alloy steel
- Stainless steel
- Grey cast iron
- Modulfused cast iron
- Hardened cast iron
- Malleable cast iron
- Braden / Brass

**Table of Materials:**

- Aluminum-cast
- Alloyed Aluminum
- Super coated and Copper Alloys
- Non-Metallic Non-Messing
- Heat Resistant Super Alloys
- Titanium Alloys

---

**Recommendation:**

- ○: Excellent
- ◎: Good

---

**Contact Information:**

- 800-765-8665 | yg1usa.com
- 800-765-8665 | yg1usa.com

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**INDEX:**

- Page 24
- Page 25

---

**ISO Standard:**

- Non-alloy steel
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- Malleable cast iron
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---

**NEXT PAGE**
### HIGH-PERFORMANCE SOLID CARBIDE

#### 6 FLUTE STANDARD LENGTH (PLAIN SHANK)

**The unique geometry of the variable pitch provides the best chatter free tool for high speed and trochoidal milling**

**Excellent performance for Stainless Steels, Mild Steels, Cast Iron, Low/Medium hardness materials under HRc40**

**Y-Coated SOLID CARBIDE END MILLS**

**Material**

- **Aluminum-cast, alloyed**
- **Copper and Copper Alloys**
- **Stainless steel**
- **Grey cast iron**
- **Chilled iron**
- **Hardened Cast Iron**
- **Non Metallic**
- **Heat Resistant Super Alloys**
- **Titanium Alloys**
- **Non-alloy steel**
- **Low alloy steel**
- **High alloyed steel**
- **Chromium cast iron**
- **Non-Metallic Materials**
- **Heat Resistant Super Alloys**
- **Titanium Alloys**

**ISO Diameter Chart**

- **Non-alloy steel**
- **Low alloy steel**
- **High alloyed steel**
- **Stainless steel**
- **Grey cast iron**
- **Moulded cast iron**
- **Heat Resistant Super Alloys**
- **Titanium Alloys**

**Recommended Mill Dia. Tolerance (mm)**

- **Up to Ø12**
- **Over Ø12**

**End Milling Selection Guide**

**Y-Coated SOLID CARBIDE END MILLS**

**Material**

- **Aluminum-cast, alloyed**
- **Copper and Copper Alloys**
- **Stainless steel**
- **Grey cast iron**
- **Chilled iron**
- **Hardened Cast Iron**
- **Non Metallic**
- **Heat Resistant Super Alloys**
- **Titanium Alloys**
- **Non-alloy steel**
- **Low alloy steel**
- **High alloyed steel**
- **Chromium cast iron**
- **Non-Metallic Materials**

**ISO Diameter Chart**

- **Non-alloy steel**
- **Low alloy steel**
- **High alloyed steel**
- **Stainless steel**
- **Grey cast iron**
- **Moulded cast iron**
- **Heat Resistant Super Alloys**
- **Titanium Alloys**

**Recommended Mill Dia. Tolerance (mm)**

- **Up to Ø12**
- **Over Ø12**

---

**Metric**

- **6.0**
- **8.0**
- **10.0**
- **12.0**
- **16.0**
- **20.0**
- **25.0**

**Square**

- **SD (in)**
- **LOD (in)**
- **QAL (in)**
- **Square End (mm)**
- **Corner Radius (mm)**
- **HRc**
- **HB**
- **Rm**
- **R**
- **LOC**
- **L**
- **D**

**Series**

- **GMG12, GMG14, GMG16, GMG18**
- **GMG13, GMG15, GMG17, GMG19**

**Unit**

- **METRIC**

---

**Series**

- **GMG12, GMG14, GMG16, GMG18**
- **GMG13, GMG15, GMG17, GMG19**

**Unit**

- **METRIC**

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**End Milling Selection Guide**

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- **Titanium Alloys**

**Recommended Mill Dia. Tolerance (mm)**

- **Up to Ø12**
- **Over Ø12**

---

**Series**

- **GMG12, GMG14, GMG16, GMG18**
- **GMG13, GMG15, GMG17, GMG19**

**Unit**

- **METRIC**

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**End Milling Selection Guide**

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- **Titanium Alloys**

**Recommended Mill Dia. Tolerance (mm)**

- **Up to Ø12**
- **Over Ø12**
HIGH-PERFORMANCE SOLID CARBIDE

6 FLUTE CHIP SPLITTER

Do Chips a Complete Makeover

The New V7 Plus Chip Splitter reduces vibrations and realizes outstanding machining performance and surface finish by applying unequal index design which is the strength of V7 Plus. Furthermore, the optimized chip splitter design shortens the length of the chips into approximately 1/3 than other end mills that leads to excellent chip evacuation, as well. As the V7 Plus Chip Splitter shows a superior performance in high-speed machining and trochoidal milling.

Unit : INCH

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<tr>
<th>Material</th>
<th>Description</th>
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<th>Milling Length (Pl)</th>
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<th>SD (Dia.)</th>
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V7 Plus A                 | Competitor

6 Flute Chip Splitter vs Competitor

Y-Coated SOLID CARBIDE END MILLS
6 FLUTE CHIP SPLITTER (PLAIN SHANK)

Series

GMH72

6 Flute Chip Splitter (Corner Radius)

High Performance for Steels, Stainless Steels and Cast Iron

Recommend

◎ : Excellent   ○ : Good
### RECOMMENDED CUTTING CONDITIONS

#### INCH

**UGMF68, UGMF69, UGMF70, UGMF71, UGMF72, UGMF73, UGMF74, UGMF75, UGMF76, UGMF77 SERIES**

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<th>SFM(Vc)</th>
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**NOTES:**
1. Feed to be reduced by approximately 30% if L.O.C. (Length Of Cut) is over 3x D.
2. The above recommendations are based on ideal conditions; for smaller taper machining centers or less rigid conditions please adjust parameters accordingly as diameter greater than 1/2”.
3. Profile operations, engage more than 2/3, reduce the radial depth of cut by 50%–60%.
4. Flutes cut typically require reduced cutting speeds and feeds, also, it is recommended the radial width of cut (Ap) should not exceed 2% of D.

---

### RECOMMENDED CUTTING CONDITIONS

#### INCH

**UGMG53 UGMG54 UGMH10 SERIES**

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### Side Cutting

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### Ball Nose

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### UGMM20, UGMM21, UGMM22, UGMM23, UGMH08, UGMH09 SERIES

#### 6 FLUTE - SIDE CUTTING

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<td>Titanium Alloys</td>
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#### RECOMMENDED CUTTING CONDITIONS INCH

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(If product's Length of Cut Lc (C) is below 2D, it must be applied Lc % 90%)}
### RECOMMENDED CUTTING CONDITIONS

#### METRIC

<table>
<thead>
<tr>
<th>ISO</th>
<th>VDI 3333</th>
<th>Material Description</th>
<th>Ap</th>
<th>Parameter</th>
<th>fz (in. / tooth)</th>
<th>RPM</th>
<th>f_z (mm / rev)</th>
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| 1-4 | Non-alloy steel | 0.5D 1.0D | 0.5D 1.0D 1.5D | 0.5D 1.0D 1.5D | 0.5D 1.0D 1.5D | 0.5D 1.0D 1.5D | 0.5D 1.0D 1.5D | 0.5D 1.0D 1.5D |<|> 0.5D 1.0D 1.5D |<|> 0.5D 1.0D 1.5D |<|> 0.5D 1.0D 1.5D |<|>

#### 4 FLUTE - SIDE & SLOTTING

- **Series:** GMF52, GMF53, GMF54, GMF55, GMF56, GMF57
- **Series:** GMF58, GMF59, GMF60, GMF61, GMF62, GMF63

#### 4 FLUTE BALL NOSE

- **Series:** GM55S, GM56S

---

**Notes:**
- The above recommendations are based on ideal conditions; for smaller taper machining centers, the width of cut (AE) should not exceed 2% x D1.
- Feed rates are per tooth, in mm/tooth.
- RPMs are for 4-flute end mills.
- The tool life expectancy is influenced by the tool's quality, the type of workpiece material, and the machining conditions. Always verify the tool life before starting the machining process.
- When machining hard materials, it's recommended to use lower RPM and higher feed rates to improve tool life and surface finish.
### RECOMMENDED CUTTING CONDITIONS

#### METRIC

#### GMG12, GMG13, GMG14, GMG15

**GMG16, GMG17, GMG18, GMG19 SERIES**

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<td>6 FLUTE - SIDE CUTTING</td>
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<tr>
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<td>0.05D</td>
<td>6 FLUTE - SIDE CUTTING</td>
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**6 FLUTE - SIDE CUTTING**

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<th>10.0</th>
<th>12.0</th>
<th>15.0</th>
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<tbody>
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<td>765</td>
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<td>8665</td>
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### RECOMMENDED CUTTING CONDITIONS

#### METRIC

#### GMH56, GMH58, GMH57, GMH59 SERIES

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<td>6 FLUTE - SIDE CUTTING</td>
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<td>P</td>
<td>0.05D</td>
<td>6 FLUTE - SIDE CUTTING</td>
<td>0.05D</td>
</tr>
<tr>
<td>8-9</td>
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<th>Diameter (Ø)</th>
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</table>

### Notes
- **SFM**: ft./min. **FEED**: in./min. **RPM**: rev./min.
- FEED = in./min. **ISO**: M | P | S
- Low alloy steel, tool steel
- Stainless steel, heat resistant super alloys
- Use a 6 FLUTE GMG16, GMG17, GMG18, GMG19 series for all materials.
- Use a 6 FLUTE GMH56, GMH58, GMH57, GMH59 series for all materials.

---

**(**) If product's Length of Cut (LOC) is below 20D, it must be applied L = LOC x 0.8%
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- Three-dimensional simulation provides predictable performance data consistency

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- Laser-assisted measuring for high-tolerance reliability
- Prototype testing in actual conditions to ensure best cost per piece

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211, Sewolcheon-ro, Buyeong-gu, Incheon, South Korea
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E-mail : yg1@yg1.kr
www.yg1.kr

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730 Corporate Woods Parkway, Vernon Hill, IL 60061 U.S.A.
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Vernon Hills, IL 60061 U.S.A.
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Technical Assistance: 888-868-5988
yg1usa.com

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FAX: +1 905-335-4003
Customer Service: orders@yg1.ca
yg1.ca

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Incheon, Korea
Phone: +82-32-526-0909
yg1.kr
E-mail: yg1@yg1.kr

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