



Premium Solid Carbide & Cobalt HSS End Mills, Drills, & Cutting Tools

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





# ABOUT US

Family owned and operated since 1940, Melin Tool began as one of the early manufacturers of end mills. Today, Melin Tool continues to be a leader in offering an ever-expanding product line of our high quality High Performance end mills and other cutting tools such as Drills, Thread Mills, Countersinks, & Specialty Tools.

Our strategy is to manufacture precision rotary shank cutting tools, provide technical solutions, be easy to do business with and exceed all customer expectations.

We are committed to market and support our products and services through industrial distributor partners.

At Melin Tool Company, It is understood that we will not prosper without COMPLETE customer satisfaction. Success at Melin is measured by how well we serve the customers who distribute and use our products.

Quality is an attitude at Melin. It is an every day, every tool, every order commitment to supply products which meet or exceed ALL of the detailed specifications of our customers. Another major quality goal is to monitor and , where possible, improve upon the processes used to achieve this HIGH QUALITY.

**Melin Is Committed To Our Customers**

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# GENERAL PURPOSE CARBIDE

## General Purpose Single End



Square End Mill - 2 Flute  
Series: [AMG](#), [AMGN](#) (Metric pg: 18)



Corner Radius - 2 Flute  
Series: [AMG](#)-R (Metric pg: 21)



Ball Nose End Mill - 2 Flute  
Series: [AMG](#)-B, or [AMGN](#)-B (Metric pg: 24)



Square End Mill - 3 Flute  
Series: [EMG](#) (Metric pg: 26)



Ball Nose End Mill - 3 Flute  
Series: [EMG](#)-B (Metric pg: 28)



Square End Mill - 4 Flute  
Series: [CCMG](#) (Metric pg: 31)



Corner Radius - 4 Flute  
Series: [CCMG](#)-R (Metric pg: 35)



Ball Nose End Mill - 4 Flute  
Series: [CCMG](#)-B or [CCMGN](#)-B (Metric pg: 38)



NC Tolerance - 2 Flute  
Series: [AMG](#)-NC



NC Tolerance Ball Nose - 2 Flute  
Series: [AMG](#)-NCB



NC Tolerance - 4 Flute  
Series: [CCMG](#)-NC



NC Tolerance Ball Nose - 4 Flute  
Series: [CCMG](#)-NCB

## Double End



Double End Stub End Mill - 2 Flute  
Series: [BSMG](#)



Double End Mill - 2 Flute  
Series: [BMG](#)



Double End Stub Ball Nose End Mill - 2 Flute  
Series: [BSMG](#)-B



Double End Ball Nose End Mill - 2 Flute  
Series: [BMG](#)-B



Double End Stub End Mill - 4 Flute  
Series: [DDSMG](#)



Double End Mill - 4 Flute  
Series: [DDMG](#)



Double End Stub Ball Nose End Mill - 4 Flute  
Series: [DDSMG](#)-B



Double End Ball Nose End Mill - 4 Flute  
Series: [DDMG](#)-B

## 40° Helix



40° Helix - 2 Flute  
Series: [AMG40](#)



40° Helix - 2 Flute Ball End  
Series: [AMG40](#)-B



40° Helix - 3 Flute  
Series: [EMG40](#)



40° Helix - 4 Flute  
Series: [CCMG40](#)



40° Helix - 4 Flute Ball End  
Series: [CCMG40](#)-B



# SPECIAL USE CARBIDE

## Routers & Corner Round



Routers For Aluminum - 1 Flute  
Series: [ARMG](#)

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Routers For Plastic - 1 Flute  
Series: [PRMG](#)

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Straight Flute - 2 Flute  
Series: [SAMG](#)

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Wood Router - Up Cut - 2 Flute  
Series: [WRUMG](#)

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Wood Router - Down Cut - 2 Flute  
Series: [WRDMG](#)

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Die Sinking End Mills - 2 Flute - 3°, 5°, 7°, 10°  
Series: [AMGDS](#)

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Tapered End Mills - 3 Flute  
Series: [EMG- - T](#)

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Tapered Ball Nose End Mills - 3 Flute  
Series: [EMG- - TB](#)

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Double End Corner Rounding  
Series: [BRMG](#)

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Corner Rounding - 3 Flute  
Series: [RMG](#)

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Corner Rounding - 4 Flute  
Series: [RCMG](#) (Metric pg: 53)

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## Chamfer & Drill Point



Chamfer End Mills - 2 Flute - 60° or 90°  
Series: [CMG2- -](#)

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Double End Chamfer End Mills - 2 Flute - 90°  
Series: [DMG2](#)

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Chamfer End Mills - 4 Flute - 60° or 90°  
Series: [CMG4- -](#)

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Back Chamfer- Multiple Flute  
Series: [BC](#)

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Back Chamfer Tools For Lathes Single Flute  
Series: [BCL](#)

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Drill Point - 2 Flute - 60°, 82°, or 90°  
Series: [AMG- -DP](#)

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Drill Point - 4 Flute - 60°, 82°, or 90°  
Series: [CCMG- -DP](#)

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## Carbide Blanks



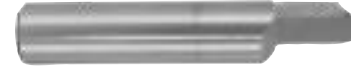
Centerless Ground  
Series: [Carbide Blanks](#)

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Engraving Blanks - Single & Double End  
Series: [Carbide Blanks](#)

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Half Round Blanks  
Series: [Carbide Blanks](#)

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Half Round 60° Conical Blanks  
Series: [Carbide Blanks](#)

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Half Round Square Blanks  
Series: [Carbide Blanks](#)

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Conical Blanks - 30°, 60°, or 90°  
Series: [Carbide Blanks](#)

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Double End Conical Blanks - 30°, 60°, or 90°  
Series: [Carbide Blanks](#)

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Split Ball Nose Blanks  
Series: [Carbide Blanks](#)

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Double End Ball Nose Split Blanks  
Series: [Carbide Blanks](#)

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# POWDERED METAL END MILLS

## Powdered Metal



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Fine Pitch CC Roughing - Multiple Flute  
Series: [CCFPM](#)



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Coarse Pitch CC Roughing - Multiple Flute  
Series: [CCRPM](#)



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CC Finishing End Mills - 4 Flute  
Series: [CCPM](#)



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CC Variable Flute - 4 Flute  
Series: [VHPM](#)

# COBALT M42(8%) & HSS ROUGHING END MILLS

## Roughing End Mills



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Fine Pitch CC Roughing - Multiple Flute  
Series: [CCFP](#) (Metric pg: 68)



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Fine Pitch NCC Roughing - Multiple Flute  
Series: [CFP](#)



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Fine Pitch Ball Nose CC Roughing - Multiple Flute  
Series: [CCFP](#) -B



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Coarse Pitch NCC Roughing - Multiple Flute - HSS  
Series: [CR](#)



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Coarse Pitch T-Slot Roughing - Multiple Flute  
Series: [CRPN](#)



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Coarse Pitch CC Roughing - Multiple Flute  
Series: [CCRPM](#)

## Roughing End Mills



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Coarse Pitch NCC Roughing - Multiple Flute  
Series: [CRP](#)



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Fine Pitch Rougher w/35° High Helix for Alum - 3 FL  
Series: [EFP](#)



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Coarse Pitch Rougher w/35° Helix for Alum - 3 FL  
Series: [ERP](#)

## Roughing/ Finishing End Mills



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Fine Pitch Rougher Finisher w/35° Helix for Alum - 3 FL  
Series: [ERFP](#)



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CC Rougher/Finisher - Multiple Flute  
Series: [CCRFP](#)



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NCC Rougher/Finisher - Multiple Flute  
Series: [CRFP](#)

# COBALT & HSS END MILLS

## 2 & 3 Flute Cobalt & HSS End Mills



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CC End Mills - 2 Flute  
Series: **A** (Metric pg: 81)



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CC End Mills - 2 Flute Radius  
Series: **A- -R**



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CC End Mills - 2 Flute - Metric/Inch  
Series: **AP- M**



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CC Ball Nose End Mills - 2 Flute  
Series: **A- -B** (Metric pg: 84)



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CC Ball Nose End Mills - 2 Flute - Metric/Inch  
Series: **AP- M -B**



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CC End Mills - 2 Flute - Extended Neck  
Series: **AN**



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CC Ball Nose End Mills - 2 Flute - Extended Neck  
Series: **AN- -B**



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CC End Mills - 2 Flute - Keyway Tolerances  
Series: **AK**



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CC End Mills - 3 Flute  
Series: **E**



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CC End Mills - 3 Flute - Extended Neck  
Series: **EN**



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CC Ball Nose End Mills - 3 Flute  
Series: **E- -B**

## 4 Flute Cobalt & HSS End Mills



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Micro CC End Mills - 4 Flute  
Series: **C**



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CC End Mills - 4 and 6 Flute  
Series: **CC** (Metric pg: 96)



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NCC End Mills - 4, 6, and 8 Flute  
Series: **C** (Metric pg: 96)



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CC End Mills - 4 Flute - Radius  
Series: **CC- -R**



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CC End Mills - 4 Flute - Metric/Inch  
Series: **CCP- M**



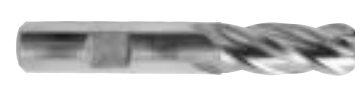
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CC End Mills - 4 Flute - Extended Neck  
Series: **CCN**



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NCC End Mills - 4 Flute - Extended Neck  
Series: **CN**



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CC Ball Nose End Mills - 4 Flute  
Series: **CC- -B** (Metric pg: 99)



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CC Ball Nose End Mills - 4 Flute - Metric/Inch  
Series: **CCP- M -B**



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CC Ball Nose End Mills - 4 Flute - Extended Neck  
Series: **CCN- -B**

## 40° Helix Cobalt & HSS End Mills



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40° Helix CC For Aluminum - 2 Flute  
Series: **AA**



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40° Helix Ball Nose CC For Aluminum - 2 Flute  
Series: **AA- -B**

## Cobalt & HSS End Mills



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60° Helix CC End Mills - 3 Flute  
Series: **E60**



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NCC Corner Rounding End Mill - 3 Flute  
Series: **R**



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NCC Corner Rounding End Mill - 4 Flute  
Series: **RC**



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Drill Point - 2 Flute - 60°, 82°, 90°, 100° & 120°  
Series: **A- -DP**



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Angle Double & Single End Mill - 2 Flute  
Series: **AM**



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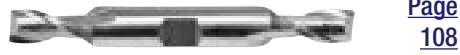
NC Spotting Drill 82°, 90°, & 120°  
Series: **HSNC**

# COBALT & HSS END MILLS

## 2 Flute Double End Mills



DE Micro CC End Mills - 2 Flute  
Series: [B](#)



DE CC End Mills - 2 Flute  
Series: [B](#)



DE CC End Mills - 2 Flute - Left Hand Spiral/Cut  
Series: [XB](#)



DE CC End Mills - 2 Flute - Metric/Inch  
Series: [B- M](#)



DE Micro CC Ball Nose End Mills - 2 Flute  
Series: [B- -B](#)



DE CC Ball Nose End Mills - 2 Flute  
Series: [B- -B](#)

## 3 Flute Double End Mills



DE CC End Mills - 3 Flute  
Series: [F](#)



DE CC Ball Nose End Mills - 3 Flute  
Series: [F- -B](#)

## 4 Flute Double End Mills



DE Micro CC End Mills - 4 Flute  
Series: [D](#)



DE CC End Mills - 4 Flute  
Series: [DD](#)



DE CC End Mills - 4 Flute - Metric/Inch  
Series: [DD- M](#)



DE CC Ball Nose End Mills - 4 Flute  
Series: [DD- -B](#)



DE CC End Mills - 4 Flute - Left Hand Spiral/Cut  
Series: [XD](#)

# CARBIDE DRILLS

## General Purpose Carbide Drills



Solid Style Drills  
Series: [LDR](#)



Jobber Length Drills  
Series: [HDR](#)



Stub Length Drills  
Series: [IDR](#)



Straight Flute Drills  
Series: [JDR](#)

## Combined Carbide Drills



60° DE Combined Drills & Countersinks  
Series: [KDR](#)



60° DE Combined Drills & Countersinks - HSS  
Series: [HSCD](#)

## NC Spotting Drills



NC Carbide Spotting Drills, 60°, 90°, & 120°  
Series: [HDRNC](#)



NC HSSCo Spotting Drills, 82°, 90°, & 120°  
Series: [HSNC](#)



# COUNTERSINK

## Countersinks



Zero Flute Countersink- HSS  
Series: [HS0](#)



Zero Flute Countersink - M42 8% Cobalt  
Series: [HSP0](#)



Single Flute Countersink -Single End-Carbide  
Series: [C1](#)



Single Flute Countersink - HSS  
Series: [HS1](#)



Single Flute Extra Long Countersinks - HSS  
Series: [HS1EL](#)



Single Flute Countersink - M42 8% Cobalt  
Series: [HSP1 & HSP1- -T](#)



3 Flute Countersink - Single End - Carbide  
Series: [C3](#)



3 Flute Countersink - HSS  
Series: [HS3- -T](#)



3 Flute Countersinks - M42 8% Cobalt  
Series: [HSP3 & HSP3- -T \(page 132\)](#)



3 & 4 Flute Center Reamer - Single End - HSS  
Series: [HSCR](#)



4 Flute Countersink -Single End-Carbide  
Series: [C4](#)



4 Flute Countersink - HSS  
Series: [HS4](#)

## Countersinks



4 Flute Drill Point - Single End - HSS  
Series: [HS4DP](#)



4 Flute Machine Countersinks -Single End-HSS  
Series: [HSMC](#)



6 Flute Countersink -Single End-Carbide  
Series: [C6](#)



6 Flute CNC Precision Countersink-Carbide  
Series: [C6NC](#)



6 Flute CNC Precision Countersinks - HSS  
Series: [HS6NC](#)



6 Flute Countersinks - HSS  
Series: [HS6](#)



6 Flute Countersinks - M42 8% Cobalt  
Series: [HSP6- -T](#)



6 Flute Extra Long Countersinks - HSS  
Series: [HS6EL](#)

## DE Countersinks



Combined Drill & Countersink - HSS  
Series: [HSCD](#)



2 Flute Drill & Countersink - Carbide  
Series: [KDR](#)



Single Flute Countersink -Double End-Carbide  
Series: [DC1](#)



Single Flute Countersink -Double End-HSS  
Series: [DHS1](#)



4 Flute Drill Point Countersink- Double End-Carbide  
Series: [DC4DP](#)



4 Flute Countersink - Double End - Carbide  
Series: [DC4](#)



4 Flute Countersink - Double End - HSS  
Series: [DHS4](#)



4 Flute Drill Point - Double End - HSS  
Series: [DHS4DP](#)



6 Flute Countersink - Double End - Carbide  
Series: [DC6](#)



6 Flute Countersinks - Double End - HSS  
Series: [DHS6](#)



Countersink Sets  
Series: [MS](#)

## Carbide Burs



SA Burs- Double Cut, Cylindrical No Endcut  
Series: [SA](#)



SB Burs- Double Cut, Cylindrical With Endcut  
Series: [SB](#)



SC Burs- Double Cut, Radius Cylinder  
Series: [SC](#)



SD Burs- Double Cut, Ball Shape  
Series: [SD](#)



SE Burs- Double Cut, Oval Shape  
Series: [SE](#)



SF Burs- Double Cut, Tree Shape  
Series: [SF](#)



SG Burs- Double Cut, Pointed Tree Shape  
Series: [SG](#)



SH Burs- Double Cut, Flame Shape  
Series: [SH](#)



SJ Burs- Single Cut, 60° Included Cone  
Series: [SJ](#)



SK Burs- Single Cut, 90° Included Cone  
Series: [SK](#)



SL Burs- Double Cut, 8° Or 14° Included Cone  
Series: [SL](#)

## Carbide Burs



SM Burs- Double Cut, Pointed Cone Shape  
Series: [SM](#)



SN Burs- Double Cut, Inverted Cone Shape  
Series: [SN](#)



Double Cut, Cylindrical Piloted Die Mill  
Series: [PDM](#)

# TECHNICAL

## COATING CHARTS

Explore our diverse coating options to maximize performance

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## ICON GLOSSARY

Tool characteristics, target work piece hardness, ISO material group & machining operations

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## CUSTOM TOOLING

Explore our options for getting you the perfect tool for the job

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## OUR PART NUMBERS

Understand our part number to order tools quickly

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## SPEED & FEED

Speed and Feed Charts - Also listed online at [www.melintool.com](http://www.melintool.com)

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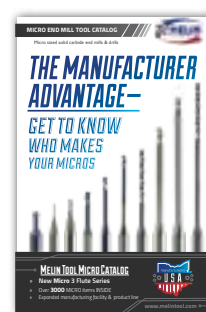
# ADDITIONAL PRODUCT

Melin offers additional products in our [High Performance Catalog](#) and [Micro End Mill Catalog](#).

Online at [www.melintool.com](http://www.melintool.com) or call customer service at PH: 216-362-4200 or 1-800-521-1078



MELIN HIGH PERFORMANCE CATALOG



MICRO CATALOG

MELIN COATINGS:

- TiN
- TiCN
- AlTiN
- nAlCo
- nAlCrO
- ZrN
- DLC Diamond
- CVD Diamond
- TiXCo
- TiB<sub>2</sub>

# COATING

**IN HOUSE** coating allows us to provide you with the best coating for your applications. We can put any coating, **EVEN DIAMOND** on any tool style and size you need!



Melin Tool operates our own, **IN-HOUSE** PVD (Physical Vapor Deposition) coating work center in order to provide our customers with the highest level of consistency in coating composition and the most **FLEXIBILITY** in coating selection. We've chosen Platit coating centers because of the superior performance their coating process provides for Melin's solid round cutting tools. With Platit's revolutionary and patented LARC® (Lateral Rotating Cathodes) and CERC® (Central Rotating Cathodes) technologies, Melin is able to provide far greater consistency from batch to batch and superior adhesion for its conventional coatings, as well as unique, specially tailored coatings designed for enhancing performance in specific applications.

We currently house several **PLATIT** machines, including the n411, which has more than 4 times the chamber capacity of our other units. We now have the ability to do next generation high performance triple coatings. Our equipment enables us to coat more tools, provide more coating types and to do so with shorter setups and changeover time. Equally important, we can provide our customers with unique coatings for their specific application to truly maximize the performance achievable with Melin cutting tools.

## THE MANUFACTURER ADVANTAGE -

Melin's highest quality manufacturing on state-of-the-art CNC equipment ensures superior performance with reliable, as well as consistent quality!

Test Melin PVD Coatings and prove to yourself...

**Not all coatings are the same.**

## COATING PROPERTIES

		<b>Hardness</b>	<b>Coefficient of Friction</b>	<b>Thermal Stability</b>	<b>1st Digit of Coated EDP</b>
TiN	Titanium Nitride	24GPa	0.40	1112F (600C)	2
TiCN	Titanium Carbonitride	37GPa	0.25	752F (400C)	4
AlTiN	Aluminum Titanium Nitride	38GPa	0.60	1472F (800C)	5
nAlCo	Aluminum Titanium Nitride + Silicon Nitride	45GPa	0.40	2192F (1200C)	8
nAlCrO	Aluminum Chrome Nitride + Silicon Nitride	40GPa	0.45	2012F (1100C)	3
ZrN	Zirconium Nitride	25GPa	0.40	1049F (565C)	6
TiXCo	Titanium Silicon Nitride + nAlCo	45GPa	0.35	1832F (1000C)	-
TiB <sub>2</sub>	Titanium DiBoride	39GPa	0.45	1562F (850C)	-
DIA	CVD Diamond	80-100GPa	0.10	1094F (590C)	-
DLC	DLC Amorphous Diamond	50GPa	0.10	932F (500C)	7





Titanium Carbonitride has an exceptional high hardness & low coefficient of friction coating which provides excellent wear resistance. **TiCN** performs well cutting **Alloy Steels, Stainless Steels, and in high speed cutting where moderate temperatures are generated at the cutting edge**. High lubricity facilitates chip flow, prevents build up and reduces cutting forces & temperature. Provides excellent surface quality on machined components. Also, excellent in applications which require high feed & speed rates.

## TiCN



Our unique Titanium Nitride coating is ideal for a wide range of applications, materials, and cutting conditions where tool life and higher feeds and speeds are operating objectives. **TiN** reduces wear and improves chip formation to extend tool life. **TiN** is a good choice for the machining of iron-based materials, molding of plastics, and for components requiring resistance to abrasive and adhesive wear.

## TiN

Aluminum Titanium Nitride is ideal for high temperature cutting operation in many materials such as **Titanium & Nickel Alloys, Co-Cr-Mo, Stainless Steel, Alloy Steels & Cast Iron**. When exposed to higher temperatures, it forms a HARD aluminum oxide layer and, as temperatures increase, the coating insulates the tool transferring heat into the chips. It is an EXTREMELY TOUGH coating that will hold up in heavy and interrupted cuts. Contains a higher aluminum content than the similar TiAlN coating which makes it harder & smoother than TiAlN. **AlTiN** is ideal for smaller depths of cut and excels in high speed and dry machining applications and when machining hardened steel.

## AlTiN

Aluminum Titanium Nitride + Silicon Nitride coating is extremely well suited for high performance DRILLING and MILLING applications. It has a great ability to resist high heat up to 1200°C before it starts to oxidize and break down. It has a tough core with HIGH wear and heat resistance. A top layer with extreme high Nanohardness. A very low coefficient of friction for less resistance. Up to (1-7) µm thickness in coating layers for the most protection against heat and tool breakdown.

## nACo

Aluminum Chrome Nitride + Silicon Nitride coating is an excellent coating for high ABRASIVE wear and HEAT resistance. A top layer with high hardness and toughness. Heat resistance of up to 1100°C before it starts to oxidize and break down. It has a wide application range and is good in **Super Alloys** applications. It has a very low coefficient of friction for less resistance (0.35). Best in very tough operations. Up to (1-7) µm thickness in coating layers. A premium coating for those difficult applications.

## nACRo



Zirconium Nitride coating is a coating developed specifically for machining **ALUMINUM**, yet excellent when **machining all Non-Ferrous materials**. **ZrN** is also highly recommended for machining **Fiberglass, Nylon and most Polymer** materials. The Maximum working temperature = 600°C/1110°F. It has a coating thickness of 1 to 2 microns. The coefficient of friction against steel (dry) is 0.55 and the micro hardness (HV 0.05) is equal to 3000.

## ZrN

CVD diamond coating takes place in a vacuum chamber using a hot-filament, chemical vapor deposition (**CVD**) process. Carbon gases are introduced into the vacuum chamber where high temperatures cause carbon atoms to re-bond into a 100% pure crystalline diamond structure. The crystalline diamond slowly grows on the surface of cutting tools, forming a continuous coating of up to 20 microns in thickness. **CVD diamond** coated end mills are a standard choice among **Mold and Die shops for Machining Graphite**, and among manufacturers machining component parts made of **Hard Carbon, High-Silicon Aluminum and other Non-Ferrous materials**.

## CVD Diamond

DLC amorphous diamond coating is a less expensive alternative to CVD Diamond. This PVD process of applying **DLC** coating produces hard, smooth, hydrogen free diamond like carbon (**DLC**) film. This coating can be applied to any uncoated carbide tool (CVD Diamond requires a special carbide substrate).

## DLC Diamond

TiXCo is a nACo based coating with a top layer of Titanium Silicon Nitride. It is a very hard coating with a low coefficient of friction. It is best suited for **Super Hard Drilling and milling of Die and Mold Steels**. It can also be used in **Graphite and some Composites**.

## TiXCo





MELIN COATINGS:

- TiN
- TiCN
- AlTiN
- nACo
- nACRo
- ZrN
- DLC Diamond
- CVD Diamond
- TiXCo

# COATING

## CONVENTIONAL COATINGS



gold

TiN - Titanium Nitride



blue-grey

TiCN - Titanium Carbonitride



blue-black

AlTiN - Aluminum Titanium Nitride

## HIGH PERFORMANCE COATINGS



violet-blue

nACo - Aluminum Titanium Nitride + Silicon Nitride



blue-grey

nACRo - Aluminum Chrome Nitride + Silicon Nitride



grey-black

Diamond - CVD Diamond  
Amorphous Diamond-DLC



Copper

TiXCo - TiN-nACo-TiSiN



White-gold

ZrN - Zirconium Nitride

Material	Hardness	TiCN	AlTiN	nACo	nACRo	ZrN	DIA	DLC	TiXCo
Austenitic Stainless Steel	< 35 HRc	*	*		X				
Martensitic Stainless Steel	< 35 HRc	*	*		X				
Martensitic Stainless Steel	>= 35 HRc	*	*		X				
PH Stainless Steel	< 35 HRc	*	*		X				
PH Stainless Steel	>= 35 HRc	*	*		X				
Ni, Co, Fe Based Super Alloys		*	*		X				
Titanium		*	*		X				
Alloy Steel	16-23 HRc	*	*	X					
Alloy Steel	23-38 HRc	*	*	X					
Alloy Steel	> 38 HRc	*	*	X					X
Carbon Steel	16-23 HRc	*	*	X					
Carbon Steel	23-38 HRc	*	*	X					
Carbon Steel	> 38 HRc	*	*	X					
Low Carbon Steel	13-23 HRc	*	*	X					
Low Carbon Steel	23-38 HRc	*	*	X					
Low Carbon Steel	> 38 HRc	*	*	X					X
Gray Cast Iron	18-22 HRc	X		*	*				
Nodular Cast Iron	22-32 HRc	X		*	*				
Aluminium <10% Si		*				X		X	
Aluminium >10% Si		*			*		X		
Graphite							X	*	*
Composites							X	*	*
Hardened Steel	>45 HRc			X					X

X = For BEST performance

\* = Additional recommended coating options

# How To ORDER A TOOL WITH A NON-STANDARD COATING

## How To ORDER COATING:

2 ways to order a coating on a bright tool

**1** Add the coating term, -TiN, -TiCN, -AlTiN, -nACo, -nACRo, -ZrN, or -DLC after the tool name and diameter.

Example: Bright Part - CCMG-1616  
AlTiN Part - CCMG-1616-**ALTiN**

**2** Change first digit of the EDP to the specific number designated for each coating. See chart below.

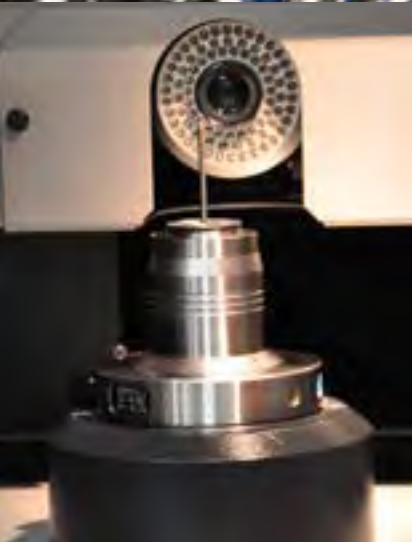
Example: Bright Part & EDP - AMG-1616 = EDP 14042  
AlTiN Part & EDP - AMG-1616-**AlTiN** = EDP **5**4042

**NOTE:** EDPs with "H" as the leading digit: DO NOT change the EDP structure. - Please call customer service for a new "H" coated EDP or add the desired coating to the end of the part name. Also, CVD Diamond is only offered on specific series throughout this catalog or by special request.

Leading Digit of EDP	Coating Designation
2	-TiN
3	-nACRo
4	-TiCN
5	-AlTiN
6	-ZrN
7	-DLC
8	-nACo

**PREFERRED COATING:** Melin has listed what we believe to be the most efficient coating throughout the General purpose Catalog. Our preferred coating is our recommended and stocked coating. You can always order any of the Melin coatings on our bright parts, these are our suggestions.





# Icon Glossary

Icon Glossary: ○

- Tool Characteristics
- Coating
- Target Workpiece Mat.
- ISO Material Group
- Machining Operations

## TOOL CHARACTERISTICS

**SUBSTRATE** CARBIDE HSSCo PM HSSCo M42 HSS - Tool substrate for each tool series

**FLUTES** 2 3 4 5 6 7 9 10 - # of flutes for each series.

**HELIX** 30° 40° 45° 60° 30° - Helix angle for each series.

**TOLERANCE** +.000 -0.002 +.0005 -0.0005 <1/8 +.000 -0.002 ≥1/8 +.000mm -0.050mm +.013 -0.013 <3mm +.000 -0.05 ≥3mm - Cutting diameter tolerance

**CORNER** SQUARE BALL END CHAMFER RADIUS CORNER ROUND DRILL POINT - Corner style for each series.

**PROFILE** Coarse Pitch Fine Pitch Rough/Finish Rougher 60° - Profile of cutting edge

**MISC.** Center Cutting Non - Center Cutting

## COATINGS

**COATING TYPES**

Bright TiN TiCN AlTiN nACo nACRo ZnN CVD Diamond DLC Diamond TiXCo

Bright TiCN Bright AlTiN Bright nACo Bright nACRo Bright ZnN TiXCo nACo

- Coated icon when series comes coated as standard

- Coated icon when series comes standard bright/or coated with a recommended preferred coating or additional stocked coating option

## TARGETED WORKPIECE HARDNESS

**HRC** HRC HRC HRC - Range of work piece material hardness

<40 <48 <54 <70

## ISO MATERIAL GROUP

CODE	MATERIAL GROUP	MATERIAL SELECTION	CODE	MATERIAL GROUP	MATERIAL SELECTION
<b>P</b>	Steels	Carbon Steel, Alloy Steels, Die Steels 1018, 1045, 4140, D-2	<b>K</b>	Cast Iron	Grey-Cast Iron & Ductile Iron Class-20, (60-40-18)
<b>M</b>	Stainless	Martensitic & Austenitic 304, 316, 312, 316L, 421, 420, 17-4PH	<b>S</b>	Special Alloys	Inconel, Hastelloy, Titanium, etc Inconel 718, Hastello B, 6Al-4V
<b>H</b>	Hardened Steels	D-2, 4340, H-13	<b>N</b>	Non-Ferrous	Aluminum-6060-T6, 7075, Plastics, Delron, Graphite, Fiberglass

## MACHINING OPERATIONS

SLOT PROFILE PLUNGING RAMPING PROFILE CUTTING DRILLING CHAMFER DEEP CAVITY

RADIUS UNDERCUT SLOT WITH RADIUS TROCHOIDAL MILLING HELICAL INTERPOLATION FACE MILLING 3D PROFILE MILLING THREAD MILLING

## Service & Customs

- Metal Max Testing
- FAST TurnAround SPL
- Second Look Quoting

# Custom Tooling & Services

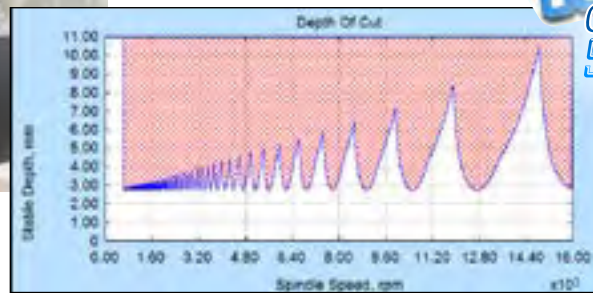
Melin continues to provide our customers with the latest technology to enhance the benefits our high performance tools already provide. Listed below are specialized and customized services and features Melin can ADD to our standard high performance offering

## METALMAX TESTING

Melin's EXPERT technical field application engineers are available to provide **FREE** on-site, "tap testing" analysis of your machine, for fine tuning cutting parameters to dramatically reduce vibration and optimize productivity. Contact your local distributor, our regional sales rep, Melin customer service, or visit us Online to submit a request. [www.melintool.com](http://www.melintool.com)



# METALMAX™



**Free**  
OnThe  
SPINDLE

## FAST DELIVERY ON SPECIALS

Melin Now Offers Expedited Special Solutions

**Get your special QUICKLY!** Getting the MOST from your tooling & maximizing performance, requires completely aligned tooling & set up process' tailored to the specific application at hand. Many times, that requires customizing the cutting tool geometry and coating to provide the least amount of machining time.

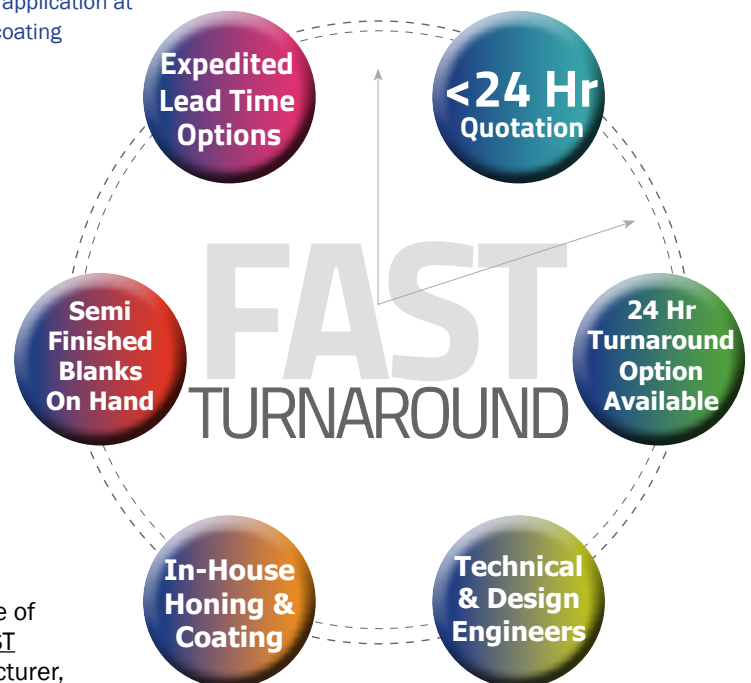
- Melin Tool is set up to deliver what you need... **FAST!**

QUOTATIONS GUARANTEED WITHIN 24 HOURS  
*Most often "SAME DAY"*

EXPEDITED DELIVERY OPTION ON SPECIALS AVAILABLE BY REQUEST

SIMPLE, COMPLEX & CUSTOM DESIGN INCLUDED

24 HOUR TURN AROUND IS AVAILABLE ON CERTAIN SERIES



## NEED A SECOND LOOK?

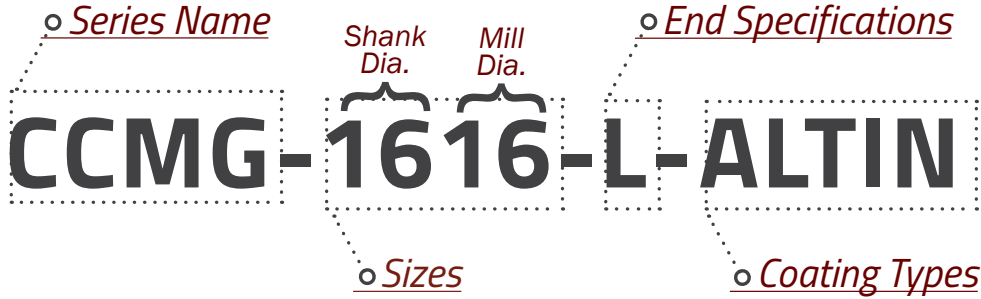
Sometimes the job can't wait. We understand... and can take care of you. Our manufacturing processes are highly flexible to enable **FAST** priority adjustments just for this purpose. We're a **LARGE** manufacturer, with small business maneuverability. If our quoted lead time isn't good enough.. **Call us. We'll surprise you at how often we can help!**

Call Customer Service to get your quote with expedited lead times: 216-362-4200

# Melin Part Number

MELIN  
PART NAME:

- Series Name
- Shank Diameter
- Mill Diameter
- End Specifications
- Coating



## Series Name:

The series name is a code that references the number of flutes, the material, machining applications, and being either high performance or a general purpose cutting tool.

*(miscellaneous series may not reference every product detail in series name)*

### EXAMPLES:

- C-** General Purpose / Cobalt / 4 Flute
- E-** General Purpose / Cobalt / 3 Flute
- EMG-** General Purpose / Carbide / 3 Flute
- EXMG-** High Performance / Carbide / 3 Flute

## Coating Types:

- TICN-** Titanium Carbonitride
- ALTIN-** Aluminum Titanium Nitride
- NACO-** Aluminum Titanium Nitride + Silicon Nitride
- NACRO-** Aluminum Chrome Nitride + Silicon Nitride
- ZRN-** Zirconium Nitride
- TiB<sub>2</sub>-** Titanium DiBoride
- TiXCo-** Titanium Silicon Nitride + nACo
- DIA-** CVD Diamond
- DLC-** Amorphous Diamond

## Sizes (Mill & Shank Diameter):

CODES & FRACTIONAL EQUIVALENTS			
code	fraction	code	fraction
0	1/8	11	11/16
1	1/8	12	3/8
2	1/8	13	13/16
3	3/8	14	7/8
4	1/4	15	15/16
5	5/8	16	1/2
6	3/4	17	17/16
7	7/8	18	9/8
8	1/2	20	5/8
9	9/8	24	3/4
10	5/4	28	7/8
11	11/8	32	1

### EXAMPLES:

**Metric-** 7mm DIA x 8mm SHK = CCMG- **M8M7**

## End Specifications:

### FLUTE LENGTH:

- S:** Stub
- M:** Medium
- MM:** Medium/Medium
- ML:** Medium/Long
- L:** Long
- LL:** Long/Long
- LF:** Long Flute
- E:** Extra Long
- EL:** Extra Long
- EE:** Extra/Extra Long
- 3X:** 3x Length Drill
- 5X:** 5x Length Drill
- 7X:** 7x Length Drill
- SF:** Short Flute
- LF:** Long Flute
- HM:** Hard Material

### END STYLE:

- B:** Ball End
- H:** Helical
- DP:** Drill Point
- NE:** No End

### RADIUS STYLE:

- NR:** No Radius
- R:** Radius

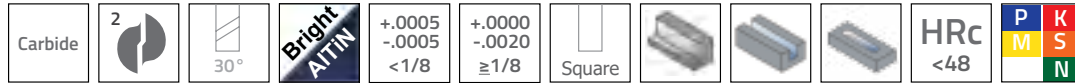
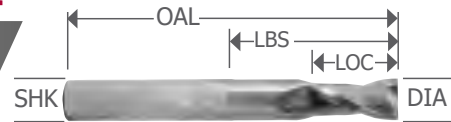
### NECK STYLE:

- NN:** No Neck
- N:** Extended Neck



# GENERAL PURPOSE CARBIDE END MILL

## 2 FLUTE • GENERAL PURPOSE END MILLS



### SERIES: AMG

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DIA	SHK	LOC	LBS	OAL	LENGTH	TOOL	BRIGHT EDP	BRIGHT PRICE	ALTiN EDP	ALTiN PRICE
1/64	1/8	3/64		1-1/2	std	AMG-400-1/2	13385	19.80	53385	22.87
1/32	1/8	1/16		1-1/2	stub	AMGS-401	16146	11.57	56146	13.80
1/32	1/8	3/32		1-1/2	std	AMG-401	14000	11.41	54000	14.11
3/64	1/8	3/32		1-1/2	stub	AMGS-401-1/2	16147	11.40	56147	14.11
3/64	1/8	1/8		1-1/2	std	AMG-401-1/2	14002	11.41	54002	14.11
1/16	1/8	1/8		1-1/2	stub	AMGS-402	16148	9.35	56148	11.12
1/16	1/8	3/16		1-1/2	std	AMG-402	14004	9.41	54004	11.64
1/16	1/8	1/4		1-1/2	med	AMG-402-M	19126	9.88	59126	12.10
1/16	1/8	3/8		1-1/2	long	AMG-402-L	11521	20.33	51521	23.69
5/64	1/8	1/8		1-1/2	stub	AMGS-402-1/2	11517	9.41	51517	11.64
5/64	1/8	3/16		1-1/2	std	AMG-402-1/2	14006	9.41	54006	11.64
5/64	1/8	1/4		1-1/2	med	AMG-402-1/2-M	19127	9.41	59127	12.14
3/32	1/8	3/16		1-1/2	stub	AMGS-403	16149	9.09	56149	10.82
3/32	1/8	3/8		1-1/2	std	AMG-403	14008	9.41	54008	11.64
3/32	1/8	3/8	3/4	2	ext neck	AMGN-403	19128	13.83	59128	19.26
3/32	1/8	1/2		1-1/2	med	AMG-403-M	19129	10.06	59129	13.08
3/32	1/8	9/16		3	long	AMG-403-L	16060	19.75	56060	23.48
7/64	1/8	7/32		1-1/2	stub	AMGS-403-1/2	14011	9.28	54011	12.01
7/64	1/8	3/8		1-1/2	std	AMG-403-1/2	14009	9.41	54009	11.64
1/8	1/8	1/4		1-1/2	stub	AMGS-404	16150	8.71	56150	10.82
1/8	1/8	1/2		1-1/2	std	AMG-404	14010	9.13	54010	11.33
1/8	1/8	5/8		2	med	AMG-404-M	11523	13.32	51523	16.48
1/8	1/8	5/8	1	2	ext neck	AMGN-404	16713	13.83	56713	17.20
1/8	1/8	3/4		2-1/4	med/long	AMG-404-ML	12751	13.77	52751	17.10
1/8	1/8	3/4		3	long	AMG-404-L	16061	13.77	56061	17.10
1/8	1/8	1		3	xl	AMG-404-E	16062	17.48	56062	20.81
9/64	3/16	9/16		2	std	AMG-604-1/2	15893	13.57	55893	16.48
5/32	3/16	5/16		1-1/2	stub	AMGS-605	16151	11.97	56151	14.21
5/32	3/16	9/16		2	std	AMG-605	14020	13.57	54020	16.48
5/32	3/16	3/4		3	long	AMG-605-L	16063	21.70	56063	25.85
5/32	3/16	1-1/8		3	xl	AMG-605-E	19130	21.04	59130	31.00
11/64	3/16	9/16		2	std	AMG-605-1/2	15894	13.57	55894	16.48
3/16	3/16	3/8		1-1/2	stub	AMGS-606	16152	11.52	56152	13.70
3/16	3/16	5/8		2	std	AMG-606	14022	12.93	54022	15.76
3/16	3/16	3/4		2-1/2	med/long	AMG-606-ML	12753	17.51	52753	20.91
3/16	3/16	3/4		3	long	AMG-606-L	16064	17.51	56064	20.91
3/16	3/16	1	1-5/8	3	ext neck	AMGN-606	16714	19.56	56714	22.97
3/16	3/16	1	2-5/8	4	ext neck	AMGN-606-2	16715	26.36	56715	30.28
3/16	3/16	1	no neck	4	no neck	AMG-606-NN	19131	26.36	59131	30.28
3/16	3/16	1-1/8		3	xl	AMG-606-E	16065	20.40	56065	24.31
13/64	1/4	5/8		2-1/2	std	AMG-806-1/2	15895	17.72	55895	21.94
7/32	1/4	1/2		2	stub	AMGS-807	16153	14.84	56153	18.44
7/32	1/4	5/8		2-1/2	std	AMG-807	14024	17.72	54024	21.94
15/64	1/4	3/4		2-1/2	std	AMG-807-1/2	15896	17.46	55896	21.63
1/4	1/4	1/2		2	stub	AMGS-808	16154	13.55	56154	16.17
1/4	1/4	3/4		2-1/2	std	AMG-808	14026	16.68	54026	20.70
1/4	1/4	1	2-1/4	4	ext neck	AMGN-808	16716	28.88	56716	35.33
1/4	1/4	1-1/8		3	long	AMG-808-L	14028	22.10	54028	27.40
1/4	1/4	1-1/2		4	xl	AMG-808-E	14030	26.82	54030	33.27

sizes continued on next page

# GENERAL PURPOSE CARBIDE END MILL

## 2 FLUTE • GENERAL PURPOSE END MILLS

SERIES: AMG

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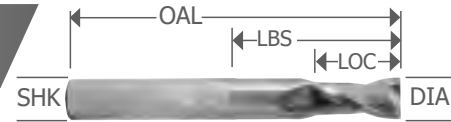
DIA	SHK	LOC	LBS	OAL	LENGTH	TOOL	BRIGHT EDP	BRIGHT PRICE	ALTIM EDP	ALTIM PRICE
1/4	1/4	1-1/2	4-1/4	6	ext neck	AMGN-808-2	16717	39.53	56717	46.97
1/4	1/4	1-1/2	no neck	6	no neck	AMG-808-NN	19132	39.53	59132	46.97
17/64	5/16	3/4		2-1/2	std	AMG-1008-1/2	15897	23.02	55897	28.53
9/32	5/16	3/4		2-1/2	std	AMG-1009	15898	23.02	55898	28.53
19/64	5/16	13/16		2-1/2	std	AMG-1009-1/2	15899	21.98	55899	27.30
5/16	5/16	1/2		2	stub	AMGS-1010	16155	20.88	56155	25.85
5/16	5/16	13/16		2-1/2	std	AMG-1010	14032	21.98	54032	27.30
5/16	5/16	1	2-5/16	4	ext neck	AMGN-1010	16718	40.06	56718	49.65
5/16	5/16	1-1/8		3	long	AMG-1010-L	16066	25.71	56066	30.59
5/16	5/16	1-1/2	4-5/16	6	ext neck	AMGN-1010-2	16719	57.35	56719	68.29
5/16	5/16	1-5/8		4	xl	AMG-1010-E	16027	34.72	56027	41.30
21/64	3/8	7/8		2-1/2	std	AMG-1210-1/2	16119	28.35	56119	33.78
11/32	3/8	7/8		2-1/2	std	AMG-1211	15900	27.62	55900	34.30
23/64	3/8	7/8		2-1/2	std	AMG-1211-1/2	16120	28.35	56120	33.78
3/8	3/8	5/8		2	stub	AMGS-1212	16156	25.67	56156	31.83
3/8	3/8	1		2-1/2	std	AMG-1212	14034	25.99	54034	30.90
3/8	3/8	1	2-3/8	4	ext neck	AMGN-1212	16720	42.09	56720	51.60
3/8	3/8	1-1/8		3	long	AMG-1212-L	14036	35.50	54036	43.26
3/8	3/8	1-1/2	4-3/8	6	ext neck	AMGN-1212-2	16721	62.38	56721	73.34
3/8	3/8	1-1/2	no neck	6	no neck	AMG-1212-NN	19133	62.38	59133	73.34
3/8	3/8	1-3/4		4	xl	AMG-1212-E	14038	40.96	54038	50.47
3/8	3/8	2		4	xl	AMG-1212-EL	19134	44.24	59134	71.28
3/8	3/8	3		6	xxl	AMG-1212-EE	13621	64.78	53621	77.04
25/64	7/16	1		2-3/4	std	AMG-1412-1/2	16121	40.05	56121	49.14
13/32	7/16	1		2-3/4	std	AMG-1413	15901	39.16	55901	46.62
27/64	7/16	1		2-3/4	std	AMG-1413-1/2	16122	40.05	56122	49.14
7/16	7/16	5/8		2-1/2	stub	AMGS-1414	16157	32.24	56157	38.32
7/16	7/16	1	2-3/4	4	std	AMG-1414	14040	35.79	54040	42.63
7/16	7/16	1	2-1/4	4	ext neck	AMGN-1414	16722	60.38	56722	72.34
7/16	7/16	1-1/2	4-1/4	6	ext neck	AMGN-1414-2	16723	79.99	56723	91.98
7/16	7/16	2		4	long	AMG-1414-L	16029	57.48	56029	69.40
7/16	7/16	3		6	xl	AMG-1414-E	16028	76.95	56028	95.44
29/64	1/2	1		3	std	AMG-1614-1/2	16123	49.61	56123	59.01
15/32	1/2	1		3	std	AMG-1615	15902	49.72	55902	58.80
31/64	1/2	1		3	std	AMG-1615-1/2	16124	49.61	56124	59.01
1/2	1/2	5/8		2-1/2	stub	AMGS-1616	16158	42.89	56158	51.98
1/2	1/2	1		3	std	AMG-1616	14042	44.00	54042	53.02
1/2	1/2	1	2	4	ext neck	AMGN-1616	16724	61.34	56724	73.29
1/2	1/2	1-1/4		3	med	AMG-1616-M	11529	45.31	51529	56.18
1/2	1/2	1-1/2		4	med/long	AMG-1616-ML	19135	55.00	59135	68.36
1/2	1/2	1-1/2	4	6	ext neck	AMGN-1616-2	16725	92.10	56725	111.82
1/2	1/2	1-1/2	no neck	6	no neck	AMG-1616-NN	11919	92.10	51919	111.82
1/2	1/2	2		4	long	AMG-1616-L	14044	56.20	54044	66.88
1/2	1/2	3		6	xl	AMG-1616-E	14046	87.31	54046	103.84
17/32	9/16	1-1/4		3-1/2	std	AMG-1817	11515	83.88	51515	99.86
9/16	9/16	1-1/4		3-1/2	std	AMG-1818	15903	76.46	55903	90.51
9/16	9/16	2	3-3/4	6	ext neck	AMGN-1818	16726	122.94	56726	145.00
9/16	9/16	3		6	xl	AMG-1818-E	16727	143.08	56727	170.27
5/8	5/8	3/4		3	stub	AMGS-2020	16159	75.17	56159	89.46
5/8	5/8	1-1/4		3-1/2	std	AMG-2020	14048	83.88	54048	99.86
5/8	5/8	2	3-3/4	6	ext neck	AMGN-2020	16728	133.51	56728	155.61
5/8	5/8	2	no neck	6	no neck	AMG-2020-NN	19136	133.51	59136	155.61
5/8	5/8	2-1/4		5	long	AMG-2020-L	16067	111.69	56067	132.93
5/8	5/8	3		6	xl	AMG-2020-E	16068	130.88	56068	152.88

sizes continued on next page

# GENERAL PURPOSE CARBIDE END MILL

## 2 FLUTE • GENERAL PURPOSE END MILLS

### SERIES: AMG



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DIA	SHK	LOC	LBS	OAL	LENGTH	TOOL	BRIGHT EDP	BRIGHT PRICE	ALTIN EDP	ALTIN PRICE
11/16	3/4	1-3/8		4	std	AMG-2422	11918	131.69	51918	158.66
3/4	3/4	1		3	stub	AMGS-2424	16160	110.01	56160	130.94
3/4	3/4	1-1/2		4	std	AMG-2424	14050	126.44	54050	149.62
3/4	3/4	2	3-1/2	6	ext neck	AMGN-2424	16729	211.66	56729	252.52
3/4	3/4	2-1/4		5	long	AMG-2424-L	16069	164.60	56069	188.79
3/4	3/4	3		6	xl	AMG-2424-E	14052	207.92	54052	248.74
7/8	7/8	1-1/2		4	std	AMG-2828	16125	191.42	56125	227.74
1	1	1-1/2		4	std	AMG-3232	14054	193.43	54054	220.50
1	1	2	3-1/2	6	ext neck	AMGN-3232	16730	364.94	56730	416.01
1	1	2-1/4		5	long	AMG-3232-L	12755	324.50	52755	386.19
1	1	3		6	xl	AMG-3232-E	14056	359.00	54056	409.29
1	1	4		7	xxl	AMG-3232-EE	14027	484.62	54027	569.52

## 2 FLUTE • GENERAL PURPOSE END MILLS



### SERIES: AMG-M\_M\_

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DIA	SHK	LOC	OAL	LENGTH	TOOL	BRIGHT EDP	BRIGHT PRICE	ALTIN EDP	ALTIN PRICE
1mm	3mm	2mm	38mm	stub	AMGS-M3M1	13733	11.41	53733	14.11
1mm	3mm	3mm	38mm	std	AMG-M3M1	16935	11.41	56935	14.11
1.5mm	3mm	3mm	38mm	stub	AMGS-M3M1.5	14031	11.41	54031	14.11
1.5mm	3mm	6mm	38mm	std	AMG-M3M1.5	16936	11.41	56936	14.11
2mm	3mm	4mm	38mm	stub	AMGS-M3M2	13967	9.41	53967	11.64
2mm	3mm	9mm	38mm	std	AMG-M3M2	15987	9.41	55987	11.64
2.5mm	3mm	5mm	38mm	stub	AMGS-M3M2.5	14051	9.41	54051	11.67
2.5mm	3mm	12mm	38mm	std	AMG-M3M2.5	15988	9.41	55988	11.64
3mm	3mm	6mm	38mm	stub	AMGS-M3M3	13968	9.41	53968	11.64
3mm	3mm	12mm	38mm	std	AMG-M3M3	15989	9.41	55989	11.64
3mm	3mm	18mm	57mm	long	AMG-M3M3-L	13972	12.58	53972	15.45
3mm	6mm	12mm	63mm	std	AMG-M6M3	19750	17.31	59750	21.42
3.5mm	4mm	7mm	51mm	stub	AMGS-M4M3.5	14023	13.57	54023	16.44
3.5mm	4mm	12mm	51mm	std	AMG-M4M3.5	15990	13.57	55990	16.48
4mm	4mm	8mm	51mm	stub	AMGS-M4M4	13969	13.57	53969	16.48
4mm	4mm	14mm	51mm	std	AMG-M4M4	15991	13.57	55991	16.48
4mm	4mm	20mm	63mm	long	AMG-M4M4-L	13973	17.96	53973	20.81
4mm	6mm	14mm	63mm	std	AMG-M6M4	19751	17.31	59751	21.42
4.5mm	5mm	9mm	51mm	stub	AMGS-M5M4.5	10991	15.47	50991	18.33
4.5mm	5mm	14mm	51mm	std	AMG-M5M4.5	15992	15.47	55992	18.33
5mm	5mm	10mm	51mm	stub	AMGS-M5M5	13970	15.47	53970	18.82
5mm	5mm	20mm	51mm	std	AMG-M5M5	15993	15.47	55993	18.33
5mm	5mm	25mm	64mm	long	AMG-M5M5-L	13736	18.54	53736	21.42

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# GENERAL PURPOSE CARBIDE END MILL

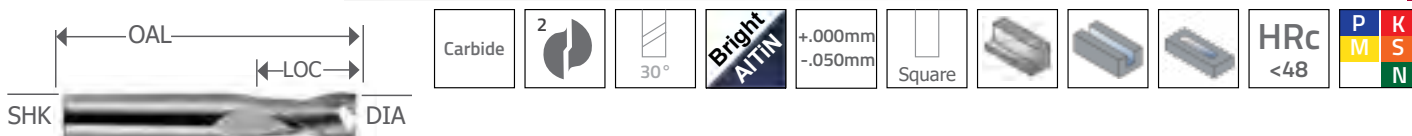
## 2 FLUTE • GENERAL PURPOSE END MILLS

SERIES: AMG-M\_M\_

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DIA	SHK	LOC	OAL	LENGTH	TOOL	BRIGHT EDP	BRIGHT PRICE	ALTIN EDP	ALTIN PRICE
5mm	6mm	20mm	63mm	std	AMG-M6M5	10588	17.31	50588	21.42
6mm	6mm	12mm	51mm	stub	AMGS-M6M6	13955	17.31	53955	21.42
6mm	6mm	20mm	63mm	std	AMG-M6M6	15994	17.31	55994	21.42
6mm	6mm	28mm	75mm	long	AMG-M6M6-L	13961	22.17	53961	27.50
7mm	8mm	12mm	51mm	stub	AMGS-M8M7	13734	20.98	53734	26.02
7mm	8mm	20mm	63mm	std	AMG-M8M7	15995	20.98	55995	26.06
8mm	8mm	12mm	51mm	stub	AMGS-M8M8	13735	20.98	53735	26.06
8mm	8mm	20mm	63mm	std	AMG-M8M8	15996	20.98	55996	26.06
8mm	8mm	32mm	75mm	long	AMG-M8M8-L	13974	26.73	53974	33.17
9mm	10mm	14mm	51mm	stub	AMGS-M10M9	10264	34.18	50264	42.38
9mm	10mm	22mm	70mm	std	AMG-M10M9	15997	34.18	55997	42.44
10mm	10mm	14mm	51mm	stub	AMGS-M10M10	13971	34.18	53971	42.44
10mm	10mm	25mm	70mm	std	AMG-M10M10	15998	34.18	55998	42.44
10mm	10mm	38mm	76mm	med	AMG-M10M10-M	13965	39.06	53965	47.90
10mm	10mm	40mm	100mm	long	AMG-M10M10-L	13953	43.82	53953	52.63
11mm	12mm	25mm	76mm	std	AMG-M12M11	10218	44.02	50218	53.13
12mm	12mm	25mm	76mm	std	AMG-M12M12	15999	44.02	55999	53.13
12mm	12mm	50mm	100mm	long	AMG-M12M12-L	13975	56.03	53975	65.10
14mm	14mm	32mm	89mm	std	AMG-M14M14	16926	77.57	56926	91.66
16mm	16mm	32mm	89mm	std	AMG-M16M16	16927	85.04	56927	99.22
16mm	16mm	57mm	127mm	long	AMG-M16M16-L	19752	120.50	59752	137.37
18mm	18mm	38mm	100mm	std	AMG-M18M18	16928	129.69	56928	147.84
18mm	18mm	57mm	127mm	long	AMG-M18M18-L	14059	173.23	54059	197.47
20mm	20mm	38mm	100mm	std	AMG-M20M20	16929	161.40	56929	183.96
20mm	20mm	57mm	127mm	long	AMG-M20M20-L	19753	198.70	59753	226.53
22mm	22mm	38mm	100mm	std	AMG-M22M22	16930	207.00	56930	235.94
25mm	25mm	38mm	100mm	std	AMG-M25M25	16931	212.92	56931	242.76

## 2 FLUTE • GENERAL PURPOSE METRIC/INCH END MILLS



SERIES: AMG-\_M\_

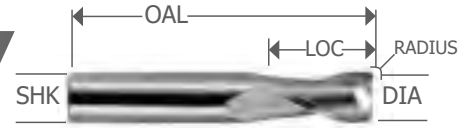
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DIA	SHK	LOC	OAL	LENGTH	TOOL	BRIGHT EDP	BRIGHT PRICE	ALTIN EDP	ALTIN PRICE
3mm	1/8	3/8	1-1/2	std	AMG-4M3	15967	11.26	55967	14.01
4mm	3/16	1/2	2	std	AMG-6M4	15968	15.19	55968	18.07
5mm	1/4	5/8	2-1/2	std	AMG-8M5	15969	19.14	55969	23.74
6mm	1/4	5/8	2-1/2	std	AMG-8M6	15970	19.14	55970	23.79
7mm	5/16	3/4	2-1/2	std	AMG-10M7	15971	26.03	55971	32.24
8mm	3/8	7/8	2-1/2	std	AMG-12M8	15972	29.83	55972	36.98
9mm	3/8	7/8	2-1/2	std	AMG-12M9	15973	29.83	55973	36.98
10mm	7/16	1	2-3/4	std	AMG-14M10	15974	41.73	55974	50.82
11mm	7/16	1	2-3/4	std	AMG-14M11	15975	41.73	55975	50.82
12mm	1/2	1	3	std	AMG-16M12	15976	51.12	55976	60.16



# GENERAL PURPOSE CARBIDE END MILL

## 2 FLUTE • CORNER RADIUS END MILLS



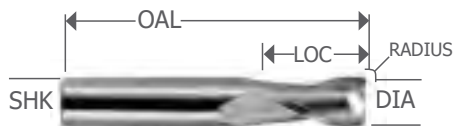
Carbide	2	30°	Bright ATTIN	+0.0005 -0.0005 <1/8	+0.000 -0.002	Radius					HRC <48	P M K S N
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### SERIES: AMG-\_\_-R\_\_

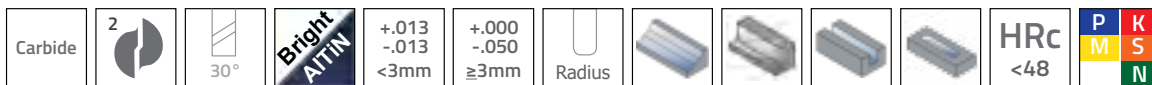
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DIA	SHK	LOC	OAL	RADIUS	LENGTH	TOOL	BRIGHT EDP	BRIGHT PRICE	ALTIN EDP	ALTIN PRICE
3/32	1/8	3/8	1-1/2	.010	std	AMG-403-R010	10584	11.97	50584	14.21
3/32	1/8	3/8	1-1/2	.015	std	AMG-403-R015	10809	11.97	50809	14.21
1/8	1/8	1/2	1-1/2	.010	std	AMG-404-R010	11328	11.97	51328	14.21
1/8	1/8	1/2	1-1/2	.015	std	AMG-404-R015	15300	11.97	55300	14.21
1/8	1/8	1/2	1-1/2	.020	std	AMG-404-R020	11329	11.97	51329	14.21
1/8	1/8	1/2	1-1/2	.030	std	AMG-404-R030	11330	11.97	51330	14.21
3/16	3/16	5/8	2	.010	std	AMG-606-R010	11331	15.51	51331	18.44
3/16	3/16	5/8	2	.015	std	AMG-606-R015	11551	15.51	51551	18.44
3/16	3/16	5/8	2	.020	std	AMG-606-R020	15302	15.51	55302	18.44
3/16	3/16	5/8	2	.030	std	AMG-606-R030	15304	15.51	55304	18.44
3/16	3/16	5/8	2	.045	std	AMG-606-R045	11336	15.51	51336	18.44
1/4	1/4	3/4	2-1/2	.010	std	AMG-808-R010	11345	19.14	51345	22.76
1/4	1/4	3/4	2-1/2	.015	std	AMG-808-R015	16322	19.14	56322	22.76
1/4	1/4	3/4	2-1/2	.020	std	AMG-808-R020	15306	19.14	55306	22.76
1/4	1/4	3/4	2-1/2	.030	std	AMG-808-R030	15308	19.14	55308	22.76
1/4	1/4	3/4	2-1/2	.045	std	AMG-808-R045	15310	19.14	55310	22.76
1/4	1/4	3/4	2-1/2	.060	std	AMG-808-R060	11348	19.14	51348	22.76
5/16	5/16	13/16	2-1/2	.020	std	AMG-1010-R020	15312	26.38	55312	31.42
5/16	5/16	13/16	2-1/2	.030	std	AMG-1010-R030	15314	26.38	55314	31.42
5/16	5/16	13/16	2-1/2	.045	std	AMG-1010-R045	15316	26.38	55316	31.42
3/8	3/8	1	2-1/2	.020	std	AMG-1212-R020	15318	30.36	55318	36.15
3/8	3/8	1	2-1/2	.030	std	AMG-1212-R030	15320	30.36	55320	36.15
3/8	3/8	1	2-1/2	.045	std	AMG-1212-R045	15322	30.36	55322	36.15
3/8	3/8	1	2-1/2	.060	std	AMG-1212-R060	11349	30.36	51349	36.15
1/2	1/2	1	3	.020	std	AMG-1616-R020	15324	52.80	55324	62.79
1/2	1/2	1	3	.030	std	AMG-1616-R030	15326	52.80	55326	62.79
1/2	1/2	1	3	.045	std	AMG-1616-R045	15328	52.80	55328	62.79
1/2	1/2	1	3	.060	std	AMG-1616-R060	15330	52.80	55330	62.79
1/2	1/2	1	3	.090	std	AMG-1616-R090	11576	52.80	51576	62.79
1/2	1/2	1	3	.125	std	AMG-1616-R125	11579	52.80	51579	62.79
5/8	5/8	1-1/4	3-1/2	.020	std	AMG-2020-R020	15332	100.58	55332	119.70
5/8	5/8	1-1/4	3-1/2	.030	std	AMG-2020-R030	15334	100.58	55334	119.70
5/8	5/8	1-1/4	3-1/2	.045	std	AMG-2020-R045	15336	100.58	55336	119.70
5/8	5/8	1-1/4	3-1/2	.060	std	AMG-2020-R060	15338	100.58	55338	119.70
5/8	5/8	1-1/4	3-1/2	.090	std	AMG-2020-R090	15340	100.58	55340	119.70
3/4	3/4	1-1/2	4	.020	std	AMG-2424-R020	15342	152.29	55342	181.23
3/4	3/4	1-1/2	4	.030	std	AMG-2424-R030	15344	152.29	55344	181.23
3/4	3/4	1-1/2	4	.045	std	AMG-2424-R045	15346	152.29	55346	181.23
3/4	3/4	1-1/2	4	.060	std	AMG-2424-R060	15348	152.29	55348	181.23
3/4	3/4	1-1/2	4	.090	std	AMG-2424-R090	15350	152.29	55350	181.23
3/4	3/4	1-1/2	4	.125	std	AMG-2424-R125	15352	152.29	55352	181.23
1	1	1-1/2	4	.020	std	AMG-3232-R020	15354	239.94	55354	285.50
1	1	1-1/2	4	.030	std	AMG-3232-R030	15356	239.94	55356	285.50
1	1	1-1/2	4	.045	std	AMG-3232-R045	15358	239.94	55358	285.50
1	1	1-1/2	4	.060	std	AMG-3232-R060	15428	239.94	55428	285.50
1	1	1-1/2	4	.090	std	AMG-3232-R090	15430	239.94	55430	285.50
1	1	1-1/2	4	.125	std	AMG-3232-R125	15432	239.94	55432	285.50

# GENERAL PURPOSE CARBIDE END MILL



## 2 FLUTE • CORNER RADIUS END MILLS



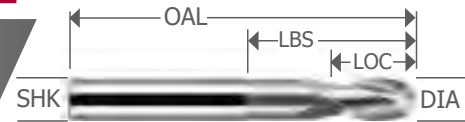
### SERIES: AMG-M\_M\_-R\_ \_

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DIA	SHK	LOC	OAL	RADIUS	LENGTH	TOOL	BRIGHT EDP	BRIGHT PRICE	ALTiN EDP	ALTiN PRICE
2mm	3mm	9mm	38mm	0.4mm	std	AMG-M3M2-R0.4	16851	11.76	56851	14.63
2.5mm	3mm	12mm	38mm	0.4mm	std	AMG-M3M2.5-R0.4	16852	11.76	56852	14.58
3mm	3mm	12mm	38mm	0.4mm	std	AMG-M3M3-R0.4	16853	11.76	56853	14.63
3.5mm	4mm	12mm	50mm	0.4mm	std	AMG-M4M3.5-R0.4	16854	16.96	56854	19.83
4mm	4mm	14mm	50mm	0.4mm	std	AMG-M4M4-R0.4	16855	16.96	56855	19.88
4.5mm	5mm	14mm	50mm	0.4mm	std	AMG-M5M4.5-R0.4	16856	19.34	56856	22.21
5mm	5mm	20mm	50mm	0.4mm	std	AMG-M5M5-R0.4	16857	19.34	56857	22.25
6mm	6mm	20mm	63mm	0.5mm	std	AMG-M6M6-R0.5	16858	21.64	56858	26.88
7mm	8mm	22mm	63mm	0.5mm	std	AMG-M8M7-R0.5	16859	26.24	56859	32.55
8mm	8mm	22mm	63mm	0.5mm	std	AMG-M8M8-R0.5	16860	26.24	56860	32.55
9mm	10mm	22mm	70mm	0.7mm	std	AMG-M10M9-R0.7	16861	42.72	56861	50.47
10mm	10mm	25mm	70mm	0.7mm	std	AMG-M10M10-R0.7	16862	42.72	56862	51.50
12mm	12mm	25mm	76mm	0.7mm	std	AMG-M12M12-R0.7	16863	55.02	56863	64.05
14mm	14mm	32mm	89mm	0.8mm	std	AMG-M14M14-R0.8	16864	96.98	56864	110.55
16mm	16mm	38mm	89mm	0.8mm	std	AMG-M16M16-R0.8	16865	106.29	56865	121.17
20mm	20mm	38mm	100mm	1.0mm	std	AMG-M20M20-R1.0	16867	201.74	56867	229.98

# GENERAL PURPOSE CARBIDE END MILL

## 2 FLUTE • BALL NOSE END MILLS



### SERIES: AMG-\_\_-B

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DIA	SHK	LOC	LBS	OAL	LENGTH	TOOL	BRIGHT EDP	BRIGHT PRICE	ALTIN EDP	ALTIN PRICE
1/64	1/8	3/64		1-1/2	std	AMG-400-1/2-B	13487	24.38	53487	27.81
1/32	1/8	1/16		1-1/2	stub	AMGS-401-B	16161	15.08	56161	17.92
1/32	1/8	3/32		1-1/2	std	AMG-401-B	15904	13.68	55904	16.48
3/64	1/8	3/32		1-1/2	stub	AMGS-401-1/2-B	16162	13.67	56162	16.48
3/64	1/8	1/8		1-1/2	std	AMG-401-1/2-B	15905	13.68	55905	16.48
1/16	1/8	1/8		1-1/2	stub	AMGS-402-B	16163	10.65	56163	13.18
1/16	1/8	3/16		1-1/2	std	AMG-402-B	15906	11.28	55906	14.01
1/16	1/8	3/8		1-1/2	long	AMG-402-LB	19537	12.17	59537	14.94
5/64	1/8	3/16		1-1/2	std	AMG-402-1/2-B	15907	11.28	55907	14.01
3/32	1/8	3/16		1-1/2	stub	AMGS-403-B	16164	10.23	56164	12.67
3/32	1/8	3/8		1-1/2	std	AMG-403-B	15908	11.28	55908	14.01
7/64	1/8	3/8		1-1/2	std	AMG-403-1/2-B	15909	11.28	55909	14.01
1/8	1/8	1/4		1-1/2	stub	AMGS-404-B	16165	9.80	56165	12.15
1/8	1/8	1/2		1-1/2	std	AMG-404-B	14058	11.28	54058	14.01
1/8	1/8	5/8	1	2	ext neck	AMGN-404-B	16749	16.17	56749	19.57
1/8	1/8	3/4		2-1/4	med	AMG-404-MB	11127	17.39	51127	21.73
1/8	1/8	3/4		3	long	AMG-404-LB	16110	18.54	56110	21.94
1/8	1/8	1		3	xl	AMG-404-EB	16176	25.63	56176	29.25
9/64	3/16	9/16		2	std	AMG-604-1/2-B	16126	16.27	56126	19.16
5/32	3/16	5/16		1-1/2	stub	AMGS-605-B	16166	15.00	56166	17.92
5/32	3/16	9/16		2	std	AMG-605-B	15910	16.27	55910	19.16
11/64	3/16	9/16		2	std	AMG-605-1/2-B	16127	16.27	56127	19.16
3/16	3/16	3/8		1-1/2	stub	AMGS-606-B	16167	14.11	56167	17.00
3/16	3/16	5/8		2	std	AMG-606-B	14060	16.27	54060	19.16
3/16	3/16	3/4		2-1/2	med	AMG-606-MB	19554	28.46	59554	35.54
3/16	3/16	3/4		3	long	AMG-606-LB	16111	28.66	56111	32.65
3/16	3/16	1	1-5/8	3	ext neck	AMGN-606-B	16750	28.01	56750	31.93
3/16	3/16	1	2-5/8	4	ext neck	AMGN-606-2B	16751	30.24	56751	34.50
3/16	3/16	1-1/8		3	xl	AMG-606-EB	16177	28.66	56177	32.65
13/64	1/4	5/8		2-1/2	std	AMG-806-1/2-B	16128	21.47	56128	26.57
7/32	1/4	1/2		2	stub	AMGS-807-B	16168	17.03	56168	21.12
7/32	1/4	5/8		2-1/2	std	AMG-807-B	15911	21.47	55911	26.57
15/64	1/4	3/4		2-1/2	std	AMG-807-1/2-B	16129	21.47	56129	26.57
1/4	1/4	1/2		2	stub	AMGS-808-B	16169	16.66	56169	20.70
1/4	1/4	3/4		2-1/2	std	AMG-808-B	14062	20.53	54062	25.44
1/4	1/4	1	2-1/4	4	ext neck	AMGN-808-B	16752	34.26	56752	40.68
1/4	1/4	1-1/8		3	long	AMG-808-LB	16112	33.19	56112	39.66
1/4	1/4	1-1/2		4	xl	AMG-808-EB	16178	34.92	56178	41.30
1/4	1/4	1-1/2	4-1/4	6	ext neck	AMGN-808-2B	16753	44.52	56753	51.91
17/64	5/16	3/4		2-1/2	std	AMG-1008-1/2-B	16130	27.63	56130	34.30
9/32	5/16	3/4		2-1/2	std	AMG-1009-B	15912	27.62	55912	34.30
19/64	5/16	13/16		2-1/2	std	AMG-1009-1/2-B	16131	27.63	56131	34.30
5/16	5/16	1/2		2	stub	AMGS-1010-B	16170	25.06	56170	31.11
5/16	5/16	13/16		2-1/2	std	AMG-1010-B	14064	25.99	54064	32.24
5/16	5/16	1-1/8		3	long	AMG-1010-LB	16113	41.59	56113	49.34
5/16	5/16	1-5/8		4	xl	AMG-1010-EB	16179	46.43	56179	55.93
5/16	5/16	1	2-5/16	4	ext neck	AMGN-1010-B	16754	45.53	56754	55.00

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# GENERAL PURPOSE CARBIDE END MILL

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SERIES: AMG-\_\_-B

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DIA	SHK	LOC	LBS	OAL	LENGTH	TOOL	BRIGHT EDP	BRIGHT PRICE	ALTIN EDP	ALTIN PRICE
5/16	5/16	1-1/2	4-5/16	6	ext neck	AMGN-1010-2B	16755	67.50	56755	78.49
21/64	3/8	7/8		2-1/2	std	AMG-1210-1/2-B	16132	38.91	56132	46.66
11/32	3/8	7/8		2-1/2	std	AMG-1211-B	16133	38.91	56133	46.66
23/64	3/8	7/8		2-1/2	std	AMG-1211-1/2-B	16134	38.91	56134	46.66
3/8	3/8	5/8		2	stub	AMGS-1212-B	16171	30.80	56171	37.49
3/8	3/8	1		2-1/2	std	AMG-1212-B	14066	31.20	54066	38.73
3/8	3/8	1	2-3/8	4	ext neck	AMGN-1212-B	16756	49.93	56756	59.43
3/8	3/8	1-1/8		3	long	AMG-1212-LB	16114	46.80	56114	54.59
3/8	3/8	1-1/2	4-3/8	6	ext neck	AMGN-1212-2B	16757	69.79	56757	80.75
3/8	3/8	1-3/4		4	xl	AMG-1212-EB	16180	51.38	56180	60.87
25/64	7/16	1		2-3/4	std	AMG-1412-1/2-B	16135	49.50	56135	58.59
13/32	7/16	1		2-3/4	std	AMG-1413-B	16136	49.50	56136	58.59
27/64	7/16	1		2-3/4	std	AMG-1413-1/2-B	16137	49.50	56137	58.59
7/16	7/16	5/8		2-1/2	stub	AMGS-1414-B	16172	41.31	56172	50.40
7/16	7/16	1		2-3/4	std	AMG-1414-B	15913	45.56	55913	54.60
7/16	7/16	1	2-1/4	4	ext neck	AMGN-1414-B	16758	71.88	56758	83.79
7/16	7/16	1-1/2	4-1/4	6	ext neck	AMGN-1414-2B	16759	93.14	56759	106.16
7/16	7/16	2		4	long	AMG-1414-LB	16115	73.10	56115	85.05
7/16	7/16	3		6	xl	AMG-1414-EB	16181	95.00	56181	114.76
29/64	1/2	1		3	std	AMG-1614-1/2-B	16138	70.92	56138	80.85
15/32	1/2	1		3	std	AMG-1615-B	16139	70.92	56139	80.85
31/64	1/2	1		3	std	AMG-1615-1/2-B	16140	70.92	56140	80.85
1/2	1/2	5/8		2-1/2	stub	AMGS-1616-B	16173	49.96	56173	59.01
1/2	1/2	1		3	std	AMG-1616-B	14068	54.40	54068	63.52
1/2	1/2	1	2	4	ext neck	AMGN-1616-B	16760	72.81	56760	84.74
1/2	1/2	1-1/2	4	6	ext neck	AMGN-1616-2B	16761	103.06	56761	122.85
1/2	1/2	2		4	long	AMG-1616-LB	16116	74.66	56116	86.62
1/2	1/2	3		6	xl	AMG-1616-EB	16182	105.75	56182	125.48
9/16	9/16	1-1/4		3-1/2	std	AMG-1818-B	16141	93.50	56141	107.52
9/16	9/16	2	3-3/4	6	ext neck	AMGN-1818-B	16762	144.65	56762	166.64
5/8	5/8	3/4		3	stub	AMGS-2020-B	16174	96.98	56174	110.56
5/8	5/8	1-1/4		3-1/2	std	AMG-2020-B	16142	103.80	56142	118.34
5/8	5/8	2	3-3/4	6	ext neck	AMGN-2020-B	16764	152.39	56764	173.78
5/8	5/8	2-1/4		5	long	AMG-2020-LB	16117	149.70	56117	171.78
5/8	5/8	3		6	xl	AMG-2020-EB	16183	163.01	56183	185.85
11/16	3/4	1-3/8		4	std	AMG-2422-B	19575	154.21	59575	192.78
3/4	3/4	1		3	stub	AMGS-2424-B	16175	143.24	56175	163.28
3/4	3/4	1-1/2		4	std	AMG-2424-B	16143	154.21	56143	177.34
3/4	3/4	2	3-1/2	6	ext neck	AMGN-2424-B	16765	252.12	56765	292.95
3/4	3/4	2-1/4		5	long	AMG-2424-LB	16118	248.30	56118	283.08
3/4	3/4	3		6	xl	AMG-2424-EB	16184	269.22	56184	310.06
7/8	7/8	1-1/2		4	std	AMG-2828-B	16144	246.95	56144	281.50
1	1	1-1/2		4	std	AMG-3232-B	16145	267.45	56145	304.92
1	1	2	3-1/2	6	ext neck	AMGN-3232-B	16766	429.00	56766	489.09
1	1	3		6	xl	AMG-3232-EB	16185	437.93	56185	499.28



# GENERAL PURPOSE CARBIDE END MILL

## 2 FLUTE • BALL NOSE END MILLS



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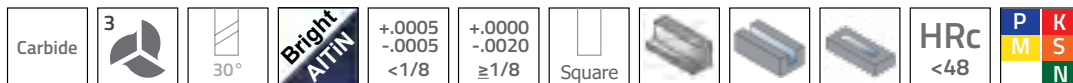
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DIA	SHK	LOC	OAL	LENGTH	TOOL	BRIGHT EDP	BRIGHT PRICE	ALTiN EDP	ALTiN PRICE
1mm	3mm	2mm	38mm	stub	AMGS-M3M1-B	13976	13.40	53976	16.27
1mm	3mm	3mm	38mm	std	AMG-M3M1-B	16805	13.40	56805	16.27
1.5mm	3mm	3mm	38mm	stub	AMGS-M3M1.5-B	14033	13.40	54033	16.23
1.5mm	3mm	6mm	38mm	std	AMG-M3M1.5-B	16806	13.40	56806	16.27
2mm	3mm	4mm	38mm	stub	AMGS-M3M2-B	13739	11.05	53739	13.70
2mm	3mm	9mm	38mm	std	AMG-M3M2-B	16555	11.05	56555	13.70
2.5mm	3mm	5mm	38mm	stub	AMGS-M3M2.5-B	14063	13.40	54063	16.27
2.5mm	3mm	12mm	38mm	std	AMG-M3M2.5-B	16556	11.05	56556	13.70
3mm	3mm	6mm	38mm	stub	AMGS-M3M3-B	13977	11.05	53977	13.70
3mm	3mm	12mm	38mm	std	AMG-M3M3-B	16557	11.05	56557	13.70
3mm	3mm	18mm	57mm	long	AMG-M3M3-LB	13979	15.10	53979	17.92
3.5mm	4mm	7mm	51mm	stub	AMGS-M4M3.5-B	14043	15.94	54043	18.82
3.5mm	4mm	12mm	51mm	std	AMG-M4M3.5-B	16558	15.94	56558	18.85
4mm	4mm	8mm	51mm	stub	AMGS-M4M4-B	13963	15.94	53963	18.85
4mm	4mm	14mm	51mm	std	AMG-M4M4-B	16559	15.94	56559	18.85
4mm	4mm	20mm	63mm	long	AMG-M4M4-LB	19755	21.55	59755	24.62
4.5mm	5mm	14mm	51mm	std	AMG-M5M4.5-B	16560	18.20	56560	21.12
5mm	5mm	10mm	51mm	stub	AMGS-M5M5-B	13956	17.52	53956	20.87
5mm	5mm	20mm	51mm	std	AMG-M5M5-B	16561	18.20	56561	21.12
5mm	5mm	25mm	64mm	long	AMG-M5M5-LB	13743	21.97	53743	25.03
6mm	6mm	12mm	51mm	stub	AMGS-M6M6-B	13740	20.33	53740	25.24
6mm	6mm	20mm	63mm	std	AMG-M6M6-B	16562	20.33	56562	25.24
6mm	6mm	28mm	75mm	long	AMG-M6M6-LB	13954	26.59	53954	33.01
7mm	8mm	12mm	51mm	stub	AMGS-M8M7-B	14045	24.67	54045	30.59
7mm	8mm	20mm	63mm	std	AMG-M8M7-B	16563	24.67	56563	30.59
8mm	8mm	12mm	51mm	stub	AMGS-M8M8-B	13741	24.67	53741	30.59
8mm	8mm	20mm	63mm	std	AMG-M8M8-B	16564	24.67	56564	30.59
8mm	8mm	32mm	75mm	long	AMG-M8M8-LB	19756	32.08	59756	39.85
9mm	10mm	22mm	70mm	std	AMG-M10M9-B	16565	40.16	56565	47.90
10mm	10mm	14mm	51mm	stub	AMGS-M10M10-B	13978	40.16	53978	47.93
10mm	10mm	25mm	70mm	std	AMG-M10M10-B	16566	40.16	56566	48.92
10mm	10mm	31mm	76mm	med	AMG-M10M10-MB	19757	47.16	59757	55.95
10mm	10mm	40mm	100mm	long	AMG-M10M10-LB	19758	52.57	59758	61.39
11mm	12mm	25mm	76mm	std	AMG-M12M11-B	14067	53.21	54067	62.26
12mm	12mm	25mm	76mm	std	AMG-M12M12-B	16567	53.21	56567	62.26
12mm	12mm	50mm	100mm	long	AMG-M12M12-LB	13980	67.25	53980	76.67
14mm	14mm	32mm	89mm	std	AMG-M14M14-B	16568	91.15	56568	105.21
16mm	16mm	32mm	89mm	std	AMG-M16M16-B	16569	99.93	56569	113.92
16mm	16mm	57mm	127mm	long	AMG-M16M16-LB	19759	144.60	59759	164.84
18mm	18mm	38mm	100mm	std	AMG-M18M18-B	16570	152.38	56570	173.67
18mm	18mm	57mm	127mm	long	AMG-M18M18-LB	19760	207.87	59760	237.18
20mm	20mm	38mm	100mm	std	AMG-M20M20-B	16571	192.86	56571	219.87
20mm	20mm	57mm	127mm	long	AMG-M20M20-LB	19761	238.44	59761	271.83
22mm	22mm	38mm	100mm	std	AMG-M22M22-B	16807	251.32	56807	286.50
25mm	25mm	38mm	100mm	std	AMG-M25M25-B	16808	258.48	56808	294.63

# GENERAL PURPOSE CARBIDE END MILL



## 3 FLUTE • GENERAL PURPOSE END MILLS



### SERIES: EMG

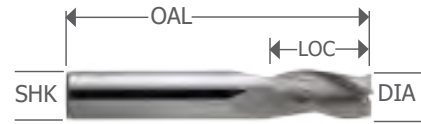
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DIA	SHK	LOC	OAL	LENGTH	TOOL	BRIGHT EDP	BRIGHT PRICE	ALTIN EDP	ALTIN PRICE
1/32	1/8	1/16	1-1/2	stub	EMGS-401	17791	11.57	57791	13.80
1/32	1/8	3/32	1-1/2	std	EMG-401	17792	9.41	57792	11.64
3/64	1/8	3/32	1-1/2	stub	EMGS-401-1/2	17793	11.41	57793	14.11
3/64	1/8	1/8	1-1/2	std	EMG-401-1/2	17794	9.41	57794	11.64
1/16	1/8	1/8	1-1/2	stub	EMGS-402	17795	9.35	57795	11.12
1/16	1/8	3/16	1-1/2	std	EMG-402	17638	9.41	57638	11.64
1/16	1/8	1/4	1-1/2	med	EMG-402-M	19137	9.84	59137	12.57
5/64	1/8	3/16	1-1/2	std	EMG-402-1/2	17796	9.41	57796	11.64
5/64	1/8	1/4	1-1/2	med	EMG-402-1/2-M	19138	9.41	59138	11.64
3/32	1/8	3/16	1-1/2	stub	EMGS-403	17797	9.09	57797	10.82
3/32	1/8	3/8	1-1/2	std	EMG-403	17639	9.41	57639	11.64
7/64	1/8	3/8	1-1/2	std	EMG-403-1/2	17798	9.56	57798	11.43
1/8	1/8	1/4	1-1/2	stub	EMGS-404	17799	8.71	57799	10.82
1/8	1/8	1/2	1-1/2	std	EMG-404	17640	9.13	57640	11.33
1/8	1/8	3/4	2-1/4	med/long	EMG-404-ML	19730	13.77	59730	17.20
1/8	1/8	3/4	3	long	EMG-404-L	17800	13.77	57800	17.10
1/8	1/8	1	3	xl	EMG-404-E	19566	17.48	59566	21.84
9/64	3/16	1/2	2	std	EMG-604-1/2	14049	13.57	54049	16.48
5/32	3/16	9/16	2	std	EMG-605	17641	13.57	57641	16.48
3/16	3/16	3/8	1-1/2	stub	EMGS-606	17801	11.52	57801	13.70
3/16	3/16	5/8	2	std	EMG-606	17642	12.93	57642	15.76
3/16	3/16	3/4	2-1/2	med/long	EMG-606-ML	19731	17.51	59731	21.94
3/16	3/16	3/4	3	long	EMG-606-L	17802	17.51	57802	20.91
3/16	3/16	1-1/8	3	xl	EMG-606-E	19567	19.56	59567	24.41
13/64	1/4	5/8	2-1/2	std	EMG-806-1/2	10586	17.72	50586	21.94
7/32	1/4	5/8	2-1/2	std	EMG-807	13744	17.72	53744	21.94
15/64	1/4	3/4	2-1/2	std	EMG-807-1/2	14039	17.45	54039	21.63
1/4	1/4	1/2	2	stub	EMGS-808	17803	13.55	57803	16.17
1/4	1/4	3/4	2-1/2	std	EMG-808	17644	16.68	57644	20.70
1/4	1/4	1-1/8	3	long	EMG-808-L	17804	22.10	57804	27.40
1/4	1/4	1-1/2	4	xl	EMG-808-E	19568	26.82	59568	33.58
17/64	5/16	3/4	2-1/2	std	EMG-1008-1/2	13745	23.02	53745	28.32
9/32	5/16	3/4	2-1/2	std	EMG-1009	13746	23.02	53746	28.32
19/64	5/16	13/16	2-1/2	std	EMG-1009-1/2	13952	23.02	53952	28.32
5/16	5/16	1/2	2	stub	EMGS-1010	17805	20.88	57805	25.85
5/16	5/16	13/16	2-1/2	std	EMG-1010	17646	21.98	57646	27.30
5/16	5/16	1-1/8	3	long	EMG-1010-L	17806	25.71	57806	30.59
5/16	5/16	1-5/8	4	xl	EMG-1010-E	19569	33.92	59569	42.44
11/32	3/8	7/8	2-1/2	std	EMG-1211	12890	27.62	52890	34.26
3/8	3/8	5/8	2	stub	EMGS-1212	17807	25.67	57807	31.83
3/8	3/8	1	2-1/2	std	EMG-1212	17648	25.99	57648	30.90
3/8	3/8	1-1/8	3	long	EMG-1212-L	17808	35.50	57808	43.26
3/8	3/8	1-3/4	4	xl	EMG-1212-E	19570	40.96	59570	47.59
13/32	7/16	1	2-3/4	std	EMG-1413	12807	39.16	52807	46.60
7/16	7/16	1	2-3/4	std	EMG-1414	17650	35.79	57650	42.63
7/16	7/16	2	4	long	EMG-1414-L	19571	57.48	59571	71.82
1/2	1/2	5/8	2-1/2	stub	EMGS-1616	17809	42.89	57809	51.98
1/2	1/2	1	3	std	EMG-1616	17652	44.00	57652	53.02
1/2	1/2	2	4	long	EMG-1616-L	17810	56.20	57810	66.88
1/2	1/2	3	6	xl	EMG-1616-E	19572	86.32	59572	107.94
9/16	9/16	1-1/4	3-1/2	std	EMG-1818	11299	76.46	51299	90.51
5/8	5/8	3/4	3	stub	EMGS-2020	17811	75.19	57811	89.46
5/8	5/8	1-1/4	3-1/2	std	EMG-2020	17654	83.88	57654	99.86
5/8	5/8	2-1/4	5	long	EMG-2020-L	17812	111.69	57812	132.93
5/8	5/8	3	6	xl	EMG-2020-E	19573	130.88	59573	163.59

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# GENERAL PURPOSE CARBIDE END MILL

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### SERIES: EMG

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DIA	SHK	LOC	OAL	LENGTH	TOOL	BRIGHT EDP	BRIGHT PRICE	ALTIN EDP	ALTIN PRICE
11/16	3/4	1-3/8	4	std	EMG-2422	12795	138.73	52795	161.91
3/4	3/4	1-1/2	4	std	EMG-2424	17655	126.44	57655	149.62
3/4	3/4	2-1/4	5	long	EMG-2424-L	11189	164.60	51189	188.79
3/4	3/4	3	6	xl	EMG-2424-E	19574	207.92	59574	229.22
7/8	7/8	1-1/2	4	std	EMG-2828	14041	199.23	54041	227.74
1	1	1-1/2	4	std	EMG-3232	11191	193.43	51191	220.50

## 3 FLUTE • GENERAL PURPOSE END MILLS



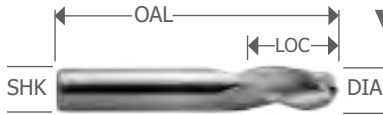
Carbide	3	30°	Bright ATTIN	+0.013 -0.013 <3mm	+0.000 -0.050 ≥3mm	Square				HRC <48	P M	K S	N
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DIA	SHK	LOC	OAL	LENGTH	TOOL	BRIGHT EDP	BRIGHT PRICE	ALTIN EDP	ALTIN PRICE
1mm	3mm	3mm	38mm	std	EMG-M3M1	16809	11.41	56809	14.11
1.5mm	3mm	6mm	38mm	std	EMG-M3M1.5	16810	11.41	56810	14.11
2mm	3mm	9mm	38mm	std	EMG-M3M2	16811	9.41	56811	11.64
2.5mm	3mm	12mm	38mm	std	EMG-M3M2.5	16812	9.41	56812	11.64
3mm	3mm	12mm	38mm	std	EMG-M3M3	16813	9.41	56813	11.64
3.5mm	4mm	12mm	51mm	std	EMG-M4M3.5	16814	13.57	56814	16.48
4mm	4mm	14mm	51mm	std	EMG-M4M4	16815	13.57	56815	16.48
4.5mm	5mm	14mm	51mm	std	EMG-M5M4.5	16816	15.47	56816	18.33
5mm	5mm	20mm	51mm	std	EMG-M5M5	16817	15.47	56817	18.33
6mm	6mm	20mm	63mm	std	EMG-M6M6	16818	17.31	56818	21.42
6mm	6mm	25mm	100mm	med	EMG-M6M6-ML	14787	34.65	54787	38.76
7mm	8mm	20mm	63mm	std	EMG-M8M7	16819	20.98	56819	26.06
8mm	8mm	20mm	63mm	std	EMG-M8M8	16820	20.98	56820	26.06
8mm	8mm	50mm	150mm	xl	EMG-M8M8-E	14788	60.50	54788	74.70
9mm	10mm	22mm	70mm	std	EMG-M10M9	16821	34.18	56821	42.44
10mm	10mm	25mm	70mm	std	EMG-M10M10	16822	34.18	56822	42.44
10mm	10mm	50mm	100mm	x long	EMG-M10M10-LL	14779	45.70	54779	55.05
10mm	10mm	75mm	150mm	xl	EMG-M10M10-E	14780	68.96	54780	82.58
12mm	12mm	25mm	76mm	std	EMG-M12M12	16823	44.02	56823	53.13
14mm	14mm	32mm	89mm	std	EMG-M14M14	16824	77.57	56824	91.66
14mm	14mm	50mm	100mm	med	EMG-M14M14-ML	14783	90.07	54783	104.16
16mm	16mm	32mm	89mm	std	EMG-M16M16	16825	85.04	56825	99.22
16mm	16mm	75mm	150mm	xl	EMG-M16M16-E	14784	135.06	54784	163.44
18mm	18mm	38mm	100mm	std	EMG-M18M18	16826	129.69	56826	147.84
20mm	20mm	38mm	100mm	std	EMG-M20M20	16827	161.40	56827	183.96
22mm	22mm	38mm	100mm	std	EMG-M22M22	16828	207.00	56828	235.98
25mm	25mm	38mm	100mm	std	EMG-M25M25	16829	212.92	56829	242.76

# GENERAL PURPOSE CARBIDE END MILL



## 3 FLUTE • GENERAL PURPOSE BALL NOSE END MILLS

Carbide	3	30°	Bright ALTIN	+0.0005 -0.0005 <1/8	+0.0000 -0.0020 ≥1/8	Ball					HRC <48	P M K S N
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### SERIES: EMG-\_\_-B

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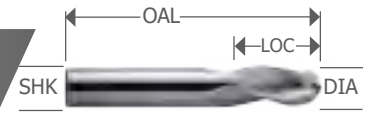
DIA	SHK	LOC	OAL	LENGTH	TOOL	BRIGHT EDP	BRIGHT PRICE	ALTIN EDP	ALTIN PRICE
1/64	1/8	3/64	1-1/2	std	EMG-400-1/2-B	19577	24.38	59577	30.49
1/32	1/8	1/16	1-1/2	stub	EMGS-401-B	17814	15.08	57814	17.92
1/32	1/8	3/32	1-1/2	std	EMG-401-B	17815	13.68	57815	16.48
3/64	1/8	3/32	1-1/2	stub	EMGS-401-1/2-B	17816	13.67	57816	16.48
3/64	1/8	1/8	1-1/2	std	EMG-401-1/2-B	17817	13.68	57817	16.48
1/16	1/8	1/8	1-1/2	stub	EMGS-402-B	17818	10.65	57818	13.18
1/16	1/8	3/16	1-1/2	std	EMG-402-B	17819	11.28	57819	14.01
5/64	1/8	3/16	1-1/2	std	EMG-402-1/2-B	17820	9.41	57820	11.64
3/32	1/8	3/16	1-1/2	stub	EMGS-403-B	17821	10.23	57821	12.68
3/32	1/8	3/8	1-1/2	std	EMG-403-B	17822	11.28	57822	14.01
7/64	1/8	3/8	1-1/2	std	EMG-403-1/2-B	17823	11.28	57823	14.01
1/8	1/8	1/4	1-1/2	stub	EMGS-404-B	17824	9.80	57824	12.15
1/8	1/8	1/2	1-1/2	std	EMG-404-B	17825	11.28	57825	14.01
1/8	1/8	3/4	2-1/4	med	EMG-404-MB	19557	17.55	59557	21.94
1/8	1/8	3/4	3	long	EMG-404-LB	17826	18.54	57826	21.94
1/8	1/8	1	3	xl	EMG-404-EB	19578	25.63	59578	32.03
9/64	3/16	1/2	2	std	EMG-604-1/2-B	10322	16.27	50322	20.39
5/32	3/16	9/16	2	std	EMG-605-B	17827	16.27	57827	19.16
11/64	3/16	9/16	2	std	EMG-605-1/2-B	10288	16.27	50288	20.39
3/16	3/16	5/16	1-1/2	stub	EMGS-606-B	17828	14.11	57828	17.00
3/16	3/16	5/8	2	std	EMG-606-B	17829	16.27	57829	19.16
3/16	3/16	3/4	2-1/2	med	EMG-606-MB	19558	28.46	59558	35.54
3/16	3/16	3/4	3	long	EMG-606-LB	17830	28.66	57830	32.65
3/16	3/16	1-1/8	3	xl	EMG-606-EB	19581	28.68	59581	35.84
13/64	1/4	5/8	2-1/2	std	EMG-806-1/2-B	10348	21.47	50348	26.88
7/32	1/4	5/8	2-1/2	std	EMG-807-B	14061	21.47	54061	26.88
15/64	1/4	3/4	2-1/2	std	EMG-807-1/2-B	19584	21.47	59584	26.88
1/4	1/4	1/2	2	stub	EMGS-808-B	17831	16.62	57831	20.60
1/4	1/4	3/4	2-1/2	std	EMG-808-B	17832	20.53	57832	25.44
1/4	1/4	1-1/8	3	long	EMG-808-LB	17833	33.19	57833	39.66
1/4	1/4	1-1/2	4	xl	EMG-808-EB	19585	34.93	59585	43.67
17/64	5/16	3/4	2-1/2	std	EMG-1008-1/2-B	19586	27.63	59586	34.50
9/32	5/16	3/4	2-1/2	std	EMG-1009-B	19587	27.62	59587	34.50
19/64	5/16	13/16	2-1/2	std	EMG-1009-1/2-B	19588	27.63	59588	34.50
5/16	5/16	1/2	2	stub	EMGS-1010-B	17834	25.06	57834	31.11
5/16	5/16	13/16	2-1/2	std	EMG-1010-B	17835	25.99	57835	32.24
5/16	5/16	1-1/8	3	long	EMG-1010-LB	17836	41.60	57836	49.34
5/16	5/16	1-5/8	4	xl	EMG-1010-EB	19589	46.43	59589	58.09
21/64	3/8	7/8	2-1/2	std	EMG-1210-1/2-B	19590	38.92	59590	48.62
11/32	3/8	7/8	2-1/2	std	EMG-1211-B	19591	38.92	59591	48.62
23/64	3/8	7/8	2-1/2	std	EMG-1211-1/2-B	19592	38.92	59592	48.62
3/8	3/8	5/8	2	stub	EMGS-1212-B	17837	30.80	57837	37.49
3/8	3/8	1	2-1/2	std	EMG-1212-B	17838	31.20	57838	38.73
3/8	3/8	1-1/8	3	long	EMG-1212-LB	17839	46.80	57839	54.59
3/8	3/8	1-3/4	4	xl	EMG-1212-EB	19593	51.38	59593	64.27
13/32	7/16	1	2-3/4	std	EMG-1413-B	19594	49.50	59594	61.84
27/64	7/16	1	2-3/4	std	EMG-1413-1/2-B	19595	49.50	59595	58.59
7/16	7/16	1	2-3/4	std	EMG-1414-B	17840	45.56	57840	54.60
7/16	7/16	2	4	long	EMG-1414-LB	19596	73.10	59596	85.05
29/64	1/2	1	3	std	EMG-1614-1/2-B	19597	70.92	59597	88.62

sizes continued on next page



# GENERAL PURPOSE CARBIDE END MILL

## 3 FLUTE • GENERAL PURPOSE BALL NOSE END MILLS

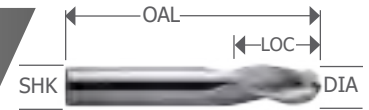


### SERIES: EMG-\_\_-B

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DIA	SHK	LOC	OAL	LENGTH	TOOL	BRIGHT EDP	BRIGHT PRICE	ALTIN EDP	ALTIN PRICE
15/32	1/2	1	3	std	EMG-1615-B	19598	70.92	59598	88.62
31/64	1/2	1	3	std	EMG-1615-1/2-B	19599	70.92	59599	88.62
1/2	1/2	5/8	2-1/2	stub	EMGS-1616-B	17841	49.96	57841	51.98
1/2	1/2	1	3	std	EMG-1616-B	17842	54.40	57842	63.52
1/2	1/2	2	4	long	EMG-1616-LB	17843	74.66	57843	86.62
1/2	1/2	3	6	xl	EMG-1616-EB	19559	105.74	59559	132.20
9/16	9/16	1-1/8	3-1/2	std	EMG-1818-B	19560	93.51	59560	116.86
5/8	5/8	3/4	3	stub	EMGS-2020-B	17844	96.98	57844	110.56
5/8	5/8	1-1/4	3-1/2	std	EMG-2020-B	17845	103.80	57845	118.34
5/8	5/8	2-1/4	5	long	EMG-2020-LB	17846	149.70	57846	171.78
5/8	5/8	3	6	xl	EMG-2020-EB	19561	163.01	59561	185.85
11/16	3/4	1-3/8	4	std	EMG-2422-B	19562	154.21	59562	192.78
3/4	3/4	1-1/2	4	std	EMG-2424-B	17847	154.21	57847	177.34
3/4	3/4	2-1/4	5	long	EMG-2424-LB	19563	248.30	59563	310.38
3/4	3/4	3	6	xl	EMG-2424-EB	19564	269.23	59564	336.52
7/8	7/8	1-1/2	4	std	EMG-2828-B	19565	246.95	59565	308.70
1	1	1-1/2	4	std	EMG-3232-B	11397	267.45	51397	304.92

## 3 FLUTE • GENERAL PURPOSE BALL NOSE END MILLS



Carbide
3
30°
Bright ALTIN
+0.013  
-0.013  
<3mm
+0.000  
-0.050  
≥3mm
Ball
HRC <48

P	K
M	S
N	

### SERIES: EMG-M\_M\_-B

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DIA	SHK	LOC	OAL	LENGTH	TOOL	BRIGHT EDP	BRIGHT PRICE	ALTIN EDP	ALTIN PRICE
1mm	3mm	3mm	38mm	std	EMG-M3M1-B	16830	13.40	56830	16.27
1.5mm	3mm	6mm	38mm	std	EMG-M3M1.5-B	16831	13.40	56831	16.23
2mm	3mm	9mm	38mm	std	EMG-M3M2-B	16832	11.05	56832	13.70
2.5mm	3mm	12mm	38mm	std	EMG-M3M2.5-B	16833	11.05	56833	13.70
3mm	3mm	12mm	38mm	std	EMG-M3M3-B	16834	11.05	56834	13.70
3.5mm	4mm	12mm	51mm	std	EMG-M4M3.5-B	16835	15.94	56835	18.82
4mm	4mm	14mm	51mm	std	EMG-M4M4-B	16836	15.94	56836	18.85
4.5mm	5mm	14mm	51mm	std	EMG-M5M4.5-B	16837	18.20	56837	21.06
5mm	5mm	20mm	51mm	std	EMG-M5M5-B	16838	18.20	56838	21.12
6mm	6mm	20mm	63mm	std	EMG-M6M6-B	16839	20.33	56839	25.24
7mm	8mm	20mm	63mm	std	EMG-M8M7-B	16840	24.67	56840	30.80
8mm	8mm	20mm	63mm	std	EMG-M8M8-B	16841	24.67	56841	30.59
9mm	10mm	22mm	70mm	std	EMG-M10M9-B	16842	40.16	56842	47.90
10mm	10mm	25mm	70mm	std	EMG-M10M10-B	16843	40.16	56843	48.92
12mm	12mm	25mm	76mm	std	EMG-M12M12-B	16844	53.21	56844	62.26
14mm	14mm	32mm	89mm	std	EMG-M14M14-B	16845	91.15	56845	105.19
16mm	16mm	32mm	89mm	std	EMG-M16M16-B	16846	99.93	56846	113.92
18mm	18mm	38mm	100mm	std	EMG-M18M18-B	16847	152.38	56847	173.70
20mm	20mm	38mm	100mm	std	EMG-M20M20-B	16848	192.86	56848	219.87
22mm	22mm	38mm	100mm	std	EMG-M22M22-B	16849	251.32	56849	286.50
25mm	25mm	38mm	100mm	std	EMG-M25M25-B	16850	258.48	56850	294.67

# GENERAL PURPOSE CARBIDE END MILL



## 4 FLUTE • GENERAL PURPOSE END MILLS

Carbide	4	30°	Bright ALTIN	+0.0005 -0.0005 <1/8	+0.0000 -0.0020 ≥1/8	Square				HRC <48	P M N	K S N
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### SERIES: CCMG

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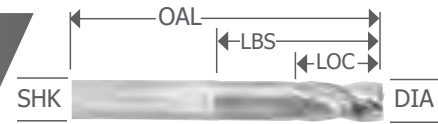
DIA	SHK	LOC	LBS	OAL	LENGTH	TOOL	BRIGHT EDP	BRIGHT PRICE	ALTIN EDP	ALTIN PRICE
1/64	1/8	3/64		1-1/2	std	CCMG-400-1/2	13386	19.80	53386	22.87
1/32	1/8	1/16		1-1/2	stub	CCMGS-401	16224	11.57	56224	13.80
1/32	1/8	3/32		1-1/2	std	CCMG-401	14121	11.08	54121	13.18
1/32	1/8	9/64		1-1/2	long	CCMG-401-L	19139	13.54	59139	16.28
1/32	1/8	0.150		2-1/2	long	CCMG-401-LF	12382	19.97	52382	22.56
3/64	1/8	3/32		1-1/2	stub	CCMGS-401-1/2	16225	11.40	56225	14.11
3/64	1/8	1/8		1-1/2	std	CCMG-401-1/2	14122	11.41	54122	14.11
3/64	1/8	3/16		1-1/2	long	CCMG-401-1/2-L	12365	12.85	52365	15.55
3/64	1/8	1/4		2-1/2	long	CCMG-401-1/2-LF	12385	19.97	52385	22.56
1/16	1/8	1/8		1-1/2	stub	CCMGS-402	16226	9.35	56226	11.12
1/16	1/8	3/16		1-1/2	std	CCMG-402	14124	9.41	54124	11.64
1/16	1/8	1/4		1-1/2	med	CCMG-402-M	11040	13.16	51040	15.86
1/16	1/8	3/8		1-1/2	long	CCMG-402-L	17860	20.33	57860	23.69
1/16	1/8	1/2		2-1/2	long	CCMG-402-LF	12388	19.97	52388	22.56
5/64	1/8	1/8		1-1/2	stub	CCMGS-402-1/2	16595	9.41	56595	11.64
5/64	1/8	3/16		1-1/2	std	CCMG-402-1/2	14126	9.41	54126	11.64
5/64	1/8	1/4		1-1/2	med	CCMG-402-1/2-M	11042	13.16	51042	15.86
5/64	1/8	3/8		1-1/2	med/long	CCMG-402-1/2-ML	19149	13.16	59149	15.86
5/64	1/8	1/2		1-1/2	long	CCMG-402-1/2-L	19141	13.16	59141	15.33
5/64	1/8	1/2		2-1/2	long	CCMG-402-1/2-LF	10540	19.51	50540	21.12
3/32	1/8	3/16		1-1/2	stub	CCMGS-403	16227	9.09	56227	10.82
3/32	1/8	3/8		1-1/2	std	CCMG-403	14128	9.41	54128	11.64
3/32	1/8	3/8	3/4	2	ext neck	CCMGN-403	19142	13.83	59142	19.26
3/32	1/8	1/2		1-1/2	med	CCMG-403-M	19150	10.83	59150	13.08
3/32	1/8	9/16		3	long	CCMG-403-L	16186	19.75	56186	23.48
3/32	1/8	0.600		2-1/2	long	CCMG-403-LF	12589	19.97	52589	22.56
7/64	1/8	7/32		1-1/2	stub	CCMGS-403-1/2	14025	9.28	54025	11.84
7/64	1/8	3/8		1-1/2	std	CCMG-403-1/2	14130	9.41	54130	11.64
7/64	1/8	3/4		2	long	CCMG-403-1/2-L	19143	13.83	59143	17.51
1/8	1/8	1/4		1-1/2	stub	CCMGS-404	16228	8.71	56228	10.82
1/8	1/8	1/2		1-1/2	std	CCMG-404	14132	9.13	54132	11.33
1/8	1/8	5/8		2	med	CCMG-404-M	11489	13.32	51489	16.48
1/8	1/8	5/8	1	2	ext neck	CCMGN-404	16731	13.83	56731	17.20
1/8	1/8	3/4		2-1/4	med/long	CCMG-404-ML	12745	13.77	52745	17.10
1/8	1/8	3/4		3	long	CCMG-404-L	16071	13.77	56071	17.10
1/8	1/8	1		3	xl	CCMG-404-E	16072	17.48	56072	20.81
9/64	3/16	9/32		2	stub	CCMGS-604-1/2	10965	13.57	50965	16.48
9/64	3/16	9/16		2	std	CCMG-604-1/2	14134	13.57	54134	16.48
5/32	3/16	5/16		1-1/2	stub	CCMGS-605	16229	11.97	56229	14.21
5/32	3/16	9/16		2	std	CCMG-605	14136	13.57	54136	16.48
5/32	3/16	3/4		3	long	CCMG-605-L	16187	21.70	56187	25.85
11/64	3/16	9/16		2	std	CCMG-605-1/2	15919	13.57	55919	16.48
3/16	3/16	3/8		1-1/2	stub	CCMGS-606	16230	11.52	56230	13.70
3/16	3/16	5/8		2	std	CCMG-606	14138	12.93	54138	15.76
3/16	3/16	3/4		2-1/2	med/long	CCMG-606-ML	12747	17.51	52747	20.91
3/16	3/16	3/4		3	long	CCMG-606-L	16073	17.51	56073	20.91
3/16	3/16	1	1-5/8	3	ext neck	CCMGN-606	16732	19.56	56732	22.97
3/16	3/16	1	2-5/8	4	ext neck	CCMGN-606-2	16733	26.36	56733	30.28
3/16	3/16	1		4	no neck	CCMG-606-NN	11922	26.36	51922	30.28
3/16	3/16	1-1/8		3	xl	CCMG-606-E	16074	20.40	56074	24.31

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# GENERAL PURPOSE CARBIDE END MILL

## 4 FLUTE • GENERAL PURPOSE END MILLS

### SERIES: CCMG



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DIA	SHK	LOC	LBS	OAL	LENGTH	TOOL	BRIGHT EDP	BRIGHT PRICE	ALTIN EDP	ALTIN PRICE
13/64	1/4	5/8		2-1/2	std	CCMG-806-1/2	15920	17.72	55920	21.94
7/32	1/4	1/2		2	stub	CCMGS-807	16231	14.84	56231	18.44
7/32	1/4	5/8		2-1/2	std	CCMG-807	14140	17.72	54140	21.94
15/64	1/4	3/4		2-1/2	std	CCMG-807-1/2	15921	17.46	55921	21.63
1/4	1/4	1/2		2	stub	CCMGS-808	16232	13.55	56232	16.17
1/4	1/4	3/4		2-1/2	std	CCMG-808	14142	16.68	54142	20.70
1/4	1/4	1	2-1/4	4	ext neck	CCMGN-808	16734	28.88	56734	35.33
1/4	1/4	1-1/8		3	long	CCMG-808-L	14144	22.10	54144	27.40
1/4	1/4	1-1/2		4	xl	CCMG-808-E	14146	26.82	54146	33.27
1/4	1/4	1-1/2	4-1/4	6	ext neck	CCMGN-808-2	16735	39.53	56735	46.97
1/4	1/4	1-1/2	no neck	6	no neck	CCMG-808-NN	19144	39.53	59144	46.97
17/64	5/16	3/4		2-1/2	std	CCMG-1008-1/2	15922	23.02	55922	28.53
9/32	5/16	3/4		2-1/2	std	CCMG-1009	14148	23.02	54148	28.53
19/64	5/16	13/16		2-1/2	std	CCMG-1009-1/2	15923	21.98	55923	27.30
5/16	5/16	1/2		2	stub	CCMGS-1010	16233	20.88	56233	25.85
5/16	5/16	13/16		2-1/2	std	CCMG-1010	14150	21.98	54150	27.30
5/16	5/16	1	2-5/16	4	ext neck	CCMGN-1010	16736	40.06	56736	49.65
5/16	5/16	1-1/8		3	long	CCMG-1010-L	16075	25.71	56075	30.59
5/16	5/16	1-1/2	4-5/16	6	ext neck	CCMGN-1010-2	16737	57.35	56737	68.29
5/16	5/16	1-5/8		4	xl	CCMG-1010-E	16076	34.72	56076	41.30
21/64	3/8	7/8		2-1/2	std	CCMG-1210-1/2	16197	28.35	56197	33.78
11/32	3/8	7/8		2-1/2	std	CCMG-1211	15924	27.62	55924	34.30
23/64	3/8	7/8		2-1/2	std	CCMG-1211-1/2	16198	28.35	56198	33.78
3/8	3/8	5/8		2	stub	CCMGS-1212	16234	25.67	56234	31.83
3/8	3/8	1		2-1/2	std	CCMG-1212	14152	25.99	54152	30.90
3/8	3/8	1	2-3/8	4	ext neck	CCMGN-1212	16738	42.09	56738	51.60
3/8	3/8	1-1/8		3	long	CCMG-1212-L	14154	35.50	54154	43.26
3/8	3/8	1-1/2		6	xl	CCMG-1212-LL	11881	66.66	51881	82.81
3/8	3/8	1-1/2	4-3/8	6	ext neck	CCMGN-1212-2	16739	62.38	56739	73.34
3/8	3/8	1-1/2	no neck	6	no neck	CCMG-1212-NN	11940	62.38	51940	73.34
3/8	3/8	1-3/4		4	xl	CCMG-1212-E	14156	40.96	54156	50.47
3/8	3/8	2		4	xl	CCMG-1212-EL	19145	44.24	59145	55.00
3/8	3/8	3		6	xxl	CCMG-1212-EE	17735	64.78	57735	77.04
25/64	7/16	1		2-3/4	std	CCMG-1412-1/2	16199	40.05	56199	49.14
13/32	7/16	1		2-3/4	std	CCMG-1413	15925	39.16	55925	46.62
27/64	7/16	1		2-3/4	std	CCMG-1413-1/2	16200	40.05	56200	49.14
7/16	7/16	5/8		2-1/2	stub	CCMGS-1414	16235	32.24	56235	38.32
7/16	7/16	1		2-3/4	std	CCMG-1414	14158	35.79	54158	42.63
7/16	7/16	1	2-1/4	4	ext neck	CCMGN-1414	16740	60.38	56740	72.34
7/16	7/16	1-1/2	4-1/4	6	ext neck	CCMGN-1414-2	16741	79.99	56741	91.98
7/16	7/16	2		4	long	CCMG-1414-L	16077	57.48	56077	69.40
7/16	7/16	3		6	xl	CCMG-1414-E	16078	76.95	56078	95.44
29/64	1/2	1		3	std	CCMG-1614-1/2	16201	49.61	56201	59.01
15/32	1/2	1		3	std	CCMG-1615	15926	49.72	55926	58.80
31/64	1/2	1		3	std	CCMG-1615-1/2	16202	49.61	56202	59.01
1/2	1/2	5/8		2-1/2	stub	CCMGS-1616	16236	42.89	56236	51.98
1/2	1/2	1		3	std	CCMG-1616	14160	44.00	54160	53.02
1/2	1/2	1	2	4	ext neck	CCMGN-1616	16742	61.34	56742	73.29
1/2	1/2	1-1/4		3	med	CCMG-1616-M	16466	45.31	56466	56.18
1/2	1/2	1-1/2		4	med/long	CCMG-1616-ML	19146	56.20	59146	63.63
1/2	1/2	1-1/2	4	6	ext neck	CCMGN-1616-2	16743	92.10	56743	111.82
1/2	1/2	1-1/2	no neck	6	no neck	CCMG-1616-NN	11941	92.10	51941	111.82

sizes continued on next page

# GENERAL PURPOSE CARBIDE END MILL

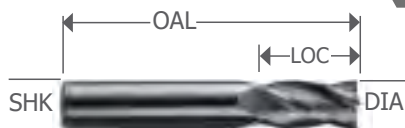
## 4 FLUTE • GENERAL PURPOSE END MILLS

SERIES: CCMG

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DIA	SHK	LOC	LBS	OAL	LENGTH	TOOL	BRIGHT EDP	BRIGHT PRICE	ALTIN EDP	ALTIN PRICE
1/2	1/2	2		4	long	CCMG-1616-L	14162	56.20	54162	66.88
1/2	1/2	1-1/2		6	xl	CCMG-1616-LL	11883	86.32	51883	86.32
1/2	1/2	3		6	xl	CCMG-1616-E	14164	87.31	54164	103.84
17/32	9/16	1-1/4		3-1/2	std	CCMG-1817	16785	83.88	56785	99.86
9/16	9/16	1/2		3-1/2	stub	CCMGS-1818	12731	71.13	52731	84.63
9/16	9/16	1-1/4		3-1/2	std	CCMG-1818	15927	76.46	55927	90.51
9/16	9/16	2	3-3/4	6	ext neck	CCMGN-1818	16744	122.94	56744	145.00
9/16	9/16	3		6	xl	CCMG-1818-E	12799	122.94	52799	145.00
5/8	5/8	3/4		3	stub	CCMGS-2020	16237	75.17	56237	89.46
5/8	5/8	1-1/4		3-1/2	std	CCMG-2020	14166	83.88	54166	99.86
5/8	5/8	2-1/4		5	long	CCMG-2020-L	16079	111.69	56079	132.93
5/8	5/8	2		6	xl	CCMG-2020-LL	11885	130.88	51885	147.74
5/8	5/8	2	3-3/4	6	ext neck	CCMGN-2020	16746	133.51	56746	155.61
5/8	5/8	3		6	xl	CCMG-2020-E	16080	130.88	56080	152.88
11/16	3/4	1-3/8		4	std	CCMG-2422	15723	138.73	55723	161.91
3/4	3/4	1		3	stub	CCMGS-2424	16238	110.01	56238	130.94
3/4	3/4	1-1/2		4	std	CCMG-2424	14168	126.44	54168	149.62
3/4	3/4	2	3-1/2	6	ext neck	CCMGN-2424	16747	211.66	56747	252.52
3/4	3/4	2	no neck	6	no neck	CCMG-2424-NN	19147	206.41	59147	247.28
3/4	3/4	2-1/4		5	long	CCMG-2424-L	16081	164.60	56081	188.79
3/4	3/4	3		6	xl	CCMG-2424-E	14170	207.92	54170	248.74
3/4	3/4	4		7	xxl	CCMG-2424-EE	17736	289.61	57736	344.61
7/8	7/8	1-1/2		4	std	CCMG-2828	16203	191.42	56203	227.74
1	1	1-1/2		4	std	CCMG-3232	14172	193.43	54172	220.50
1	1	2	3-1/2	6	ext neck	CCMGN-3232	16748	364.94	56748	416.01
1	1	2	no neck	6	no neck	CCMG-3232-NN	19148	354.44	59148	405.51
1	1	2-1/4		5	long	CCMG-3232-L	12749	324.50	52749	386.19
1	1	3		6	xl	CCMG-3232-E	14174	359.00	54174	409.29
1	1	4		7	xxl	CCMG-3232-EE	16315	446.65	56315	531.51

## 4 FLUTE • GENERAL PURPOSE METRIC/INCH END MILLS



Carbide	4	30°	Bright ALTIN	+0.013 -0.013 <3mm	+0.000 -0.050 ≥3mm	Square				HRC <48	
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SERIES: CCMG- \_M\_

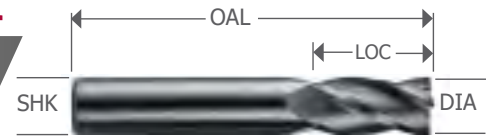
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DIA	SHK	LOC	OAL	LENGTH	TOOL	BRIGHT EDP	BRIGHT PRICE	ALTIN EDP	ALTIN PRICE
3mm	1/8	3/8	1-1/2	std	CCMG-4M3	15977	11.26	55977	14.01
4mm	3/16	1/2	2	std	CCMG-6M4	15978	15.19	55978	18.02
5mm	1/4	5/8	2-1/2	std	CCMG-8M5	15979	19.14	55979	23.79
6mm	1/4	5/8	2-1/2	std	CCMG-8M6	15980	19.14	55980	23.79
7mm	5/16	3/4	2-1/2	std	CCMG-10M7	15981	26.03	55981	32.24
8mm	3/8	7/8	2-1/2	std	CCMG-12M8	15982	29.83	55982	36.98
9mm	3/8	7/8	2-1/2	std	CCMG-12M9	15983	29.83	55983	36.98
10mm	7/16	1	2-3/4	std	CCMG-14M10	15984	41.73	55984	50.82
11mm	7/16	1	2-3/4	std	CCMG-14M11	15985	41.73	55985	50.82
12mm	1/2	1	3	std	CCMG-16M12	15986	51.12	55986	60.16



# GENERAL PURPOSE CARBIDE END MILL

## 4 FLUTE • GENERAL PURPOSE END MILLS



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DIA	SHK	LOC	OAL	LENGTH	TOOL	BRIGHT EDP	BRIGHT PRICE	ALTiN EDP	ALTiN PRICE
1mm	3mm	2mm	38mm	stub	CCMGS-M3M1	13747	11.41	53747	14.11
1mm	3mm	3mm	38mm	std	CCMG-M3M1	16933	11.41	56933	14.11
1.5mm	3mm	3mm	38mm	stub	CCMGS-M3M1.5	13957	11.41	53957	14.15
1.5mm	3mm	6mm	38mm	std	CCMG-M3M1.5	16934	11.41	56934	14.11
2mm	3mm	4mm	38mm	stub	CCMGS-M3M2	13981	9.41	53981	11.64
2mm	3mm	9mm	38mm	std	CCMG-M3M2	16000	9.41	56000	11.64
2.5mm	3mm	5mm	38mm	stub	CCMGS-M3M2.5	14053	9.41	54053	11.64
2.5mm	3mm	12mm	38mm	std	CCMG-M3M2.5	16001	9.41	56001	11.64
3mm	3mm	6mm	38mm	stub	CCMGS-M3M3	13982	9.41	53982	11.64
3mm	3mm	12mm	38mm	std	CCMG-M3M3	16002	9.41	56002	11.64
3mm	6mm	12mm	63mm	std	CCMG-M6M3	11693	17.31	51693	21.63
3mm	3mm	18mm	57mm	long	CCMG-M3M3-L	13637	12.58	53637	15.45
3mm	3mm	20mm	75mm	xl	CCMG-M3M3-E	14729	17.14	54729	21.43
3.5mm	4mm	7mm	51mm	stub	CCMGS-M4M3.5	14055	13.57	54055	16.44
3.5mm	4mm	12mm	51mm	std	CCMG-M4M3.5	16003	13.57	56003	16.48
4mm	4mm	8mm	51mm	stub	CCMGS-M4M4	13983	13.57	53983	16.48
4mm	4mm	14mm	51mm	std	CCMG-M4M4	16004	13.57	56004	16.48
4mm	6mm	14mm	63mm	std	CCMG-M6M4	11694	17.31	51694	21.42
4mm	4mm	20mm	63mm	long	CCMG-M4M4-L	13638	17.96	53638	20.81
4mm	4mm	20mm	75mm	x long	CCMG-M4M4-LL	14731	21.74	54731	25.39
4mm	4mm	25mm	75mm	xl	CCMG-M4M4-E	14732	22.43	54732	26.08
4.5mm	5mm	9mm	51mm	stub	CCMGS-M5M4.5	13709	15.47	53709	18.33
4.5mm	5mm	14mm	51mm	std	CCMG-M5M4.5	16005	15.47	56005	18.33
5mm	5mm	10mm	51mm	stub	CCMGS-M5M5	19747	15.47	59747	18.33
5mm	5mm	20mm	51mm	std	CCMG-M5M5	16006	15.47	56006	18.33
5mm	6mm	20mm	63mm	std	CCMG-M6M5	10889	17.31	50889	21.42
5mm	5mm	25mm	64mm	long	CCMG-M5M5-L	13986	18.54	53986	21.42
5mm	5mm	25mm	75mm	x long	CCMG-M5M5-LL	14735	23.58	54735	26.36
6mm	6mm	12mm	51mm	stub	CCMGS-M6M6	13748	17.31	53748	21.42
6mm	6mm	20mm	63mm	std	CCMG-M6M6	16007	17.31	56007	21.42
6mm	6mm	28mm	75mm	long	CCMG-M6M6-L	13639	22.17	53639	27.50
6mm	6mm	32mm	100mm	x long	CCMG-M6M6-LL	14741	27.72	54741	35.59
6mm	6mm	38mm	150mm	xl	CCMG-M6M6-E	14744	37.49	54744	46.97
7mm	8mm	12mm	51mm	stub	CCMGS-M8M7	14037	20.98	54037	26.02
7mm	8mm	20mm	63mm	std	CCMG-M8M7	16008	20.98	56008	26.06
8mm	8mm	12mm	51mm	stub	CCMGS-M8M8	19748	20.98	59748	27.11
8mm	8mm	20mm	63mm	std	CCMG-M8M8	16009	20.98	56009	26.06
8mm	8mm	32mm	75mm	long	CCMG-M8M8-L	13640	26.73	53640	33.17
8mm	8mm	41mm	100mm	x long	CCMG-M8M8-LL	14751	34.61	54751	42.38
9mm	10mm	14mm	51mm	stub	CCMGS-M10M9	19749	34.18	59749	42.38
9mm	10mm	22mm	70mm	std	CCMG-M10M9	16010	34.18	56010	42.44
10mm	10mm	14mm	51mm	stub	CCMGS-M10M10	11679	34.18	51679	42.38
10mm	10mm	25mm	70mm	std	CCMG-M10M10	16011	34.18	56011	42.44
10mm	10mm	38mm	76mm	med	CCMG-M10M10-M	13966	39.06	53966	47.90
10mm	10mm	40mm	100mm	long	CCMG-M10M10-L	13641	43.82	53641	52.63
11mm	12mm	25mm	76mm	std	CCMG-M12M11	13988	44.02	53988	53.13
12mm	12mm	16mm	64mm	stub	CCMGS-M12M12	13059	43.00	53059	52.05
12mm	12mm	25mm	76mm	std	CCMG-M12M12	16012	44.02	56012	53.13
12mm	12mm	50mm	100mm	long	CCMG-M12M12-L	13642	56.03	53642	65.10
12mm	12mm	75mm	150mm	xl	CCMG-M12M12-E	14768	95.88	54768	108.52

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# GENERAL PURPOSE CARBIDE END MILL

## 4 FLUTE • GENERAL PURPOSE END MILLS

SERIES: CCMG-M\_M\_

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DIA	SHK	LOC	OAL	LENGTH	TOOL	BRIGHT EDP	BRIGHT PRICE	ALTIN EDP	ALTIN PRICE
13mm	13mm	26mm	76mm	std	CCMG-M13M13	12762	74.48	52762	87.68
14mm	14mm	32mm	89mm	std	CCMG-M14M14	16795	77.57	56795	91.66
14mm	14mm	51mm	127mm	long	CCMG-M14M14-L	13749	101.58	53749	123.64
14mm	14mm	75mm	150mm	xl	CCMG-M14M14-E	14769	132.94	5476914768	147.98
16mm	16mm	32mm	89mm	std	CCMG-M16M16	16796	85.04	56796	99.22
16mm	16mm	57mm	127mm	long	CCMG-M16M16-L	19754	120.50	59754	137.34
16mm	16mm	50mm	150mm	x long	CCMG-M16M16-LL	14776	132.78	54776	155.11
16mm	16mm	75mm	150mm	xl	CCMG-M16M16-E	14777	142.05	54777	164.38
18mm	18mm	38mm	100mm	std	CCMG-M18M18	16797	129.69	56797	147.84
18mm	18mm	57mm	127mm	long	CCMG-M18M18-L	14869	173.23	54869	197.50
20mm	20mm	38mm	100mm	std	CCMG-M20M20	16798	161.40	56798	183.96
20mm	20mm	57mm	127mm	long	CCMG-M20M20-L	13990	198.70	53990	226.48
20mm	20mm	75mm	150mm	xl	CCMG-M20M20-E	14781	239.70	54781	280.29
22mm	22mm	38mm	100mm	std	CCMG-M22M22	16799	207.00	56799	235.94
25mm	25mm	38mm	100mm	std	CCMG-M25M25	16800	212.92	56800	242.76



## 4 FLUTE • CORNER RADIUS END MILLS

Carbide

SERIES: CCMG-\_\_-R\_\_

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DIA	SHK	LOC	OAL	RADIUS	LENGTH	TOOL	BRIGHT EDP	BRIGHT PRICE	ALTIN EDP	ALTIN PRICE
3/32	1/8	3/8	1-1/2	0.010	std	CCMG-403-R010	11061	11.73	51061	14.01
3/32	1/8	3/8	1-1/2	0.015	std	CCMG-403-R015	11063	11.73	51063	14.01
3/32	1/8	3/8	1-1/2	0.020	std	CCMG-403-R020	11065	11.73	51065	14.01
1/8	1/8	1/4	1-1/2	0.010	stub	CCMGS-404-R010	16904	10.76	56904	12.77
1/8	1/8	1/2	1-1/2	0.005	std	CCMG-404-R005	H1906	10.95	H1907	12.98
1/8	1/8	1/2	1-1/2	0.010	std	CCMG-404-R010	11067	10.95	51067	12.98
1/8	1/8	1/2	1-1/2	0.015	std	CCMG-404-R015	15422	10.95	55422	12.98
1/8	1/8	1/2	1-1/2	0.020	std	CCMG-404-R020	11069	10.95	51069	12.98
1/8	1/8	1/2	1-1/2	0.030	std	CCMG-404-R030	11071	10.95	51071	12.98
5/32	3/16	5/16	2	0.010	stub	CCMGS-605-R010	16905	16.62	56905	19.78
5/32	3/16	5/16	2	0.010	std	CCMG-605-R010	H2076	16.03	H1910	18.95
5/32	3/16	5/16	2	0.015	std	CCMG-605-R015	H1911	16.03	H1912	18.95
5/32	3/16	5/16	2	0.030	std	CCMG-605-R030	H1913	16.03	H1914	18.95
3/16	3/16	5/16	2	0.010	stub	CCMGS-606-R010	16906	14.39	56906	17.10
3/16	3/16	5/8	2	0.010	std	CCMG-606-R010	11073	15.51	51073	18.44
3/16	3/16	5/8	2	0.015	std	CCMG-606-R015	11075	15.51	51075	18.44
3/16	3/16	5/8	2	0.020	std	CCMG-606-R020	15424	15.51	55424	18.44
3/16	3/16	5/8	2	0.030	std	CCMG-606-R030	15426	15.51	55426	18.44
3/16	3/16	5/8	2	0.045	std	CCMG-606-R045	H1915	15.51	H1916	15.51
7/32	1/4	3/8	2	0.020	stub	CCMGS-807-R020	16907	18.01	56907	21.42
1/4	1/4	1/2	2	0.020	stub	CCMGS-808-R020	16463	16.77	56463	19.98
1/4	1/4	3/4	2-1/2	0.010	std	CCMG-808-R010	H1918	19.14	H1919	22.33
1/4	1/4	3/4	2-1/2	0.015	std	CCMG-808-R015	15360	19.14	55360	22.76
1/4	1/4	3/4	2-1/2	0.020	std	CCMG-808-R020	15362	19.14	55362	22.76
1/4	1/4	3/4	2-1/2	0.030	std	CCMG-808-R030	15364	19.14	55364	22.76
1/4	1/4	3/4	2-1/2	0.045	std	CCMG-808-R045	15366	19.14	55366	22.76
1/4	1/4	3/4	2-1/2	0.060	std	CCMG-808-R060	H1921	19.14	H1922	22.33

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# GENERAL PURPOSE CARBIDE END MILL

## 4 FLUTE • CORNER RADIUS END MILLS



SERIES: CCMG-\_\_-R\_\_

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DIA	SHK	LOC	OAL	RADIUS	LENGTH	TOOL	BRIGHT EDP	BRIGHT PRICE	ALTIN EDP	ALTIN PRICE
5/16	5/16	7/16	2	0.020	stub	CCMGS-1010-R020	16909	25.36	56909	30.18
5/16	5/16	1/2	2	0.030	stub	CCMGS-1010-R030	16338	26.38	56338	31.42
5/16	5/16	13/16	2-1/2	0.015	std	CCMG-1010-R015	11077	26.38	51077	31.42
5/16	5/16	13/16	2-1/2	0.020	std	CCMG-1010-R020	15368	26.38	55368	31.42
5/16	5/16	13/16	2-1/2	0.030	std	CCMG-1010-R030	15370	26.38	55370	31.42
5/16	5/16	13/16	2-1/2	0.045	std	CCMG-1010-R045	15372	26.38	55372	31.42
5/16	5/16	13/16	2-1/2	0.060	std	CCMG-1010-R060	11079	26.38	51079	31.42
3/8	3/8	1/2	2	0.020	stub	CCMGS-1212-R020	16910	30.58	56910	36.36
3/8	3/8	1	2-1/2	0.015	std	CCMG-1212-R015	11081	30.36	51081	36.15
3/8	3/8	1	2-1/2	0.020	std	CCMG-1212-R020	15374	30.36	55374	36.15
3/8	3/8	1	2-1/2	0.030	std	CCMG-1212-R030	15376	30.36	55376	36.15
3/8	3/8	1	2-1/2	0.045	std	CCMG-1212-R045	15378	30.36	55378	36.15
3/8	3/8	1	2-1/2	0.060	std	CCMG-1212-R060	11083	30.36	51083	36.15
7/16	7/16	9/16	2-1/2	0.020	stub	CCMGS-1414-R020	16911	44.51	56911	52.92
1/2	1/2	5/8	2-1/2	0.030	stub	CCMGS-1616-R030	16912	51.61	56912	61.42
1/2	1/2	1	3	0.015	std	CCMG-1616-R015	11085	52.80	51085	62.79
1/2	1/2	1	3	0.020	std	CCMG-1616-R020	15380	52.80	55380	62.79
1/2	1/2	1	3	0.030	std	CCMG-1616-R030	15382	52.80	55382	62.79
1/2	1/2	1	3	0.045	std	CCMG-1616-R045	15384	52.80	55384	62.79
1/2	1/2	1	3	0.060	std	CCMG-1616-R060	15386	52.80	55386	62.79
1/2	1/2	1	3	0.090	std	CCMG-1616-R090	11087	52.80	51087	62.79
1/2	1/2	1	3	0.125	std	CCMG-1616-R125	11089	52.80	51089	62.79
5/8	5/8	3/4	3	0.030	stub	CCMGS-2020-R030	16913	98.57	56913	117.28
5/8	5/8	1-1/4	3-1/2	0.015	std	CCMG-2020-R015	11091	100.58	51091	119.70
5/8	5/8	1-1/4	3-1/2	0.020	std	CCMG-2020-R020	15388	100.58	55388	119.70
5/8	5/8	1-1/4	3-1/2	0.030	std	CCMG-2020-R030	15390	100.58	55390	119.70
5/8	5/8	1-1/4	3-1/2	0.045	std	CCMG-2020-R045	15392	100.58	55392	119.70
5/8	5/8	1-1/4	3-1/2	0.060	std	CCMG-2020-R060	15394	100.58	55394	119.70
5/8	5/8	1-1/4	3-1/2	0.090	std	CCMG-2020-R090	15396	100.58	55396	119.70
3/4	3/4	1	3	0.030	stub	CCMGS-2424-R030	16914	145.61	56914	173.25
3/4	3/4	1-1/2	4	0.015	std	CCMG-2424-R015	11093	152.29	51093	181.23
3/4	3/4	1-1/2	4	0.020	std	CCMG-2424-R020	15398	152.29	55398	181.23
3/4	3/4	1-1/2	4	0.030	std	CCMG-2424-R030	15400	152.29	55400	181.23
3/4	3/4	1-1/2	4	0.045	std	CCMG-2424-R045	15402	152.29	55402	181.23
3/4	3/4	1-1/2	4	0.060	std	CCMG-2424-R060	15404	152.29	55404	181.23
3/4	3/4	1-1/2	4	0.090	std	CCMG-2424-R090	15406	152.29	55406	181.23
3/4	3/4	1-1/2	4	0.125	std	CCMG-2424-R125	15408	152.29	55408	181.23
1	1	1-1/2	4	0.015	std	CCMG-3232-R015	11095	239.94	51095	285.50
1	1	1-1/2	4	0.020	std	CCMG-3232-R020	15410	239.94	55410	285.50
1	1	1-1/2	4	0.030	std	CCMG-3232-R030	15412	239.94	55412	285.50
1	1	1-1/2	4	0.045	std	CCMG-3232-R045	15414	239.94	55414	285.50
1	1	1-1/2	4	0.060	std	CCMG-3232-R060	15416	239.94	55416	285.50
1	1	1-1/2	4	0.090	std	CCMG-3232-R090	15418	239.94	55418	285.50
1	1	1-1/2	4	0.125	std	CCMG-3232-R125	15420	239.94	55420	285.50

# GENERAL PURPOSE CARBIDE END MILL



## 4 FLUTE • CORNER RADIUS END MILLS

Carbide				+0.013 -0.013 <3mm	+0.000 -0.050 ≥3mm						HRC <48	
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### SERIES: CCMG-M\_M\_-R\_

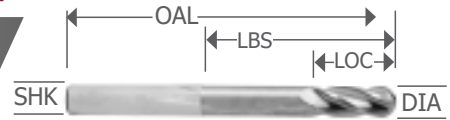
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DIA	SHK	LOC	OAL	RADIUS	LENGTH	TOOL	BRIGHT EDP	BRIGHT PRICE	ALTiN EDP	ALTiN PRICE
2mm	3mm	9mm	38mm	0.4mm	std	CCMG-M3M2-R0.4	16870	11.76	56870	14.63
2.5mm	3mm	12mm	38mm	0.4mm	std	CCMG-M3M2.5-R0.4	16871	11.76	56871	14.63
3mm	3mm	12mm	38mm	0.2mm	std	CCMG-M3M3-R0.2	14728	11.76	54728	14.63
3mm	3mm	12mm	38mm	0.4mm	std	CCMG-M3M3-R0.4	16872	11.76	56872	14.63
3.5mm	4mm	12mm	50mm	0.4mm	std	CCMG-M4M3.5-R0.4	16873	16.96	56873	19.83
4mm	4mm	14mm	50mm	0.4mm	std	CCMG-M4M4-R0.4	16874	16.96	56874	19.88
4.5mm	5mm	14mm	50mm	0.4mm	std	CCMG-M5M4.5-R0.4	16875	19.34	56875	22.21
5mm	5mm	16mm	50mm	0.3mm	std	CCMG-M5M5-R0.3	14733	19.34	54733	22.25
5mm	5mm	16mm	50mm	0.4mm	std	CCMG-M5M5-R0.4	16876	19.34	56876	22.25
5mm	5mm	16mm	65mm	0.5mm	med	CCMG-M5M5-MR0.5	14734	24.27	54734	26.76
6mm	6mm	20mm	63mm	0.5mm	std	CCMG-M6M6-R0.5	16877	21.64	56877	26.88
6mm	6mm	20mm	63mm	0.8mm	std	CCMG-M6M6-R0.8	14736	21.64	54736	26.88
6mm	6mm	20mm	63mm	1.0mm	std	CCMG-M6M6-R1.0	14737	21.64	54737	26.88
6mm	6mm	20mm	63mm	1.5mm	std	CCMG-M6M6-R1.5	14738	23.79	54738	29.04
6mm	6mm	20mm	63mm	2.0mm	std	CCMG-M6M6-R2.0	14739	23.79	54739	29.04
7mm	8mm	22mm	63mm	0.5mm	std	CCMG-M8M7-R0.5	16878	26.24	56878	32.55
8mm	8mm	22mm	63mm	0.5mm	std	CCMG-M8M8-R0.5	16879	26.24	56879	32.55
8mm	8mm	22mm	63mm	0.8mm	std	CCMG-M8M8-R0.8	14745	26.24	54745	32.55
8mm	8mm	22mm	63mm	1.0mm	std	CCMG-M8M8-R1.0	14746	26.24	54746	32.55
8mm	8mm	22mm	63mm	1.5mm	std	CCMG-M8M8-R1.5	14747	26.24	54747	32.55
8mm	8mm	22mm	63mm	2.0mm	std	CCMG-M8M8-R2.0	14748	28.85	54748	35.15
8mm	8mm	22mm	63mm	2.5mm	std	CCMG-M8M8-R2.5	14749	28.85	54749	35.15
8mm	8mm	22mm	63mm	3.0mm	std	CCMG-M8M8-R3.0	14750	28.85	54750	35.15
9mm	10mm	22mm	70mm	0.7mm	std	CCMG-M10M9-R0.7	16880	42.72	56880	50.47
10mm	10mm	25mm	70mm	0.5mm	std	CCMG-M10M10-R0.5	14753	42.72	54753	51.50
10mm	10mm	25mm	70mm	0.7mm	std	CCMG-M10M10-R0.7	16881	42.72	56881	51.50
10mm	10mm	25mm	70mm	0.8mm	std	CCMG-M10M10-R0.8	14759	42.72	54759	51.50
10mm	10mm	25mm	70mm	1.0mm	std	CCMG-M10M10-R1.0	14754	42.72	54754	51.50
10mm	10mm	25mm	70mm	1.5mm	std	CCMG-M10M10-R1.5	14755	42.72	54755	51.50
10mm	10mm	25mm	70mm	2.0mm	std	CCMG-M10M10-R2.0	14756	42.72	54756	51.50
10mm	10mm	25mm	70mm	2.5mm	std	CCMG-M10M10-R2.5	14757	46.84	54757	55.62
10mm	10mm	25mm	70mm	3.0mm	std	CCMG-M10M10-R3.0	14758	46.84	54758	55.62
12mm	12mm	25mm	76mm	0.5mm	std	CCMG-M12M12-R0.5	14762	55.02	54762	64.05
12mm	12mm	25mm	76mm	0.7mm	std	CCMG-M12M12-R0.7	16882	55.02	56882	64.05
12mm	12mm	25mm	76mm	1.0mm	std	CCMG-M12M12-R1.0	14763	55.02	54763	64.05
12mm	12mm	25mm	76mm	1.5mm	std	CCMG-M12M12-R1.5	14764	55.02	54764	64.05
12mm	12mm	25mm	76mm	2.0mm	std	CCMG-M12M12-R2.0	14765	55.02	54765	64.05
12mm	12mm	25mm	76mm	2.5mm	std	CCMG-M12M12-R2.5	14766	60.14	54766	69.17
12mm	12mm	25mm	76mm	3.0mm	std	CCMG-M12M12-R3.0	14767	60.14	54767	69.17
14mm	14mm	32mm	89mm	0.8mm	std	CCMG-M14M14-R0.8	16883	96.98	56883	110.56
16mm	16mm	38mm	89mm	0.5mm	std	CCMG-M16M16-R0.5	14771	106.29	54771	121.17
16mm	16mm	38mm	89mm	0.8mm	std	CCMG-M16M16-R0.8	16884	106.29	56884	121.17
16mm	16mm	38mm	89mm	1.0mm	std	CCMG-M16M16-R1.0	14772	106.29	54772	121.17
16mm	16mm	38mm	89mm	2.0mm	std	CCMG-M16M16-R2.0	14773	106.29	54773	121.17
16mm	16mm	38mm	89mm	2.5mm	std	CCMG-M16M16-R2.5	14770	106.29	54770	121.17
16mm	16mm	38mm	89mm	3.0mm	std	CCMG-M16M16-R3.0	14774	106.29	54774	121.17
16mm	16mm	38mm	89mm	4.0mm	std	CCMG-M16M16-R4.0	14775	115.98	54775	130.86
20mm	20mm	38mm	100mm	1.0mm	std	CCMG-M20M20-R1.0	16886	201.74	56886	229.95
20mm	20mm	38mm	100mm	2.0mm	std	CCMG-M20M20-R2.0	14778	201.74	54778	229.95



# GENERAL PURPOSE CARBIDE END MILL

## 4 FLUTE • BALL NOSE END MILLS



Carbide



Bright  
ALTIN

+0.0005  
-0.0005  
<1/8

+0.0000  
-0.0020  
≥1/8



HRC  
<48



### SERIES: CCMG-\_\_-B

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DIA	SHK	LOC	LBS	OAL	LENGTH	TOOL	BRIGHT EDP	BRIGHT PRICE	ALTIN EDP	ALTIN PRICE
1/64	1/8	3/64		1-1/2	std	CCMG-400-1/2-B	13488	24.38	53488	27.81
1/32	1/8	1/16		1-1/2	stub	CCMGS-401-B	16239	15.08	56239	17.92
1/32	1/8	3/32		1-1/2	std	CCMG-401-B	15928	13.68	55928	16.48
1/32	1/8	0.150		2-1/2	long	CCMG-401-LF-B	12395	22.60	52395	28.53
3/64	1/8	3/32		1-1/2	stub	CCMGS-401-1/2-B	16240	13.67	56240	16.48
3/64	1/8	1/8		1-1/2	std	CCMG-401-1/2-B	15929	13.68	55929	16.48
3/64	1/8	1/4		2-1/2	long	CCMG-401-1/2-LF-B	12398	22.60	52398	28.53
1/16	1/8	1/8		1-1/2	stub	CCMGS-402-B	16241	10.65	56241	13.18
1/16	1/8	3/16		1-1/2	std	CCMG-402-B	15930	11.28	55930	14.01
1/16	1/8	1/4		1-1/2	med	CCMG-402-MB	11205	11.83	51205	14.73
1/16	1/8	3/8		1-1/2	long	CCMG-402-LB	19528	12.17	59528	14.94
1/16	1/8	1/2		2-1/2	long	CCMG-402-LF-B	12401	22.60	52401	28.53
5/64	1/8	3/16		1-1/2	std	CCMG-402-1/2-B	15931	11.28	55931	14.01
5/64	1/8	1/2		2-1/2	long	CCMG-402-1/2-LF-B	13023	22.60	53023	24.20
3/32	1/8	3/16		1-1/2	stub	CCMGS-403-B	16242	10.23	56242	12.67
3/32	1/8	3/8		1-1/2	std	CCMG-403-B	15932	11.28	55932	14.01
3/32	1/8	1/2		2	med	CCMG-403-MB	19529	12.17	59529	15.86
3/32	1/8	0.600		2-1/2	long	CCMG-403-LF-B	12595	22.60	52595	24.20
7/64	1/8	7/32		1-1/2	stub	CCMGS-403-1/2-B	13985	11.17	53985	14.01
7/64	1/8	3/8		1-1/2	std	CCMG-403-1/2-B	15933	11.28	55933	14.01
1/8	1/8	1/4		1-1/2	stub	CCMGS-404-B	16243	9.80	56243	12.15
1/8	1/8	1/2		1-1/2	std	CCMG-404-B	14176	11.28	54176	14.01
1/8	1/8	5/8	1	2	ext neck	CCMGN-404-B	16767	16.17	56767	19.57
1/8	1/8	3/4		2-1/4	med	CCMG-404-MB	10997	17.39	50997	21.73
1/8	1/8	3/4		3	long	CCMG-404-LB	16188	18.54	56188	21.94
1/8	1/8	1		3	xl	CCMG-404-EB	16254	25.63	56254	29.25
9/64	3/16	9/32		1-1/2	stub	CCMGS-604-1/2-B	10970	16.27	50970	19.16
9/64	3/16	9/16		2	std	CCMG-604-1/2-B	16204	16.27	56204	19.16
5/32	3/16	5/16		1-1/2	stub	CCMGS-605-B	16244	15.00	56244	17.92
5/32	3/16	9/16		2	std	CCMG-605-B	15852	16.27	55852	19.16
11/64	3/16	9/16		2	std	CCMG-605-1/2-B	16205	16.27	56205	19.16
3/16	3/16	3/8		1-1/2	stub	CCMGS-606-B	16245	14.11	56245	17.00
3/16	3/16	5/8		2	std	CCMG-606-B	14178	16.27	54178	19.16
3/16	3/16	3/4		2-1/2	med	CCMG-606-MB	19556	28.46	59556	35.54
3/16	3/16	1	1-5/8	3	ext neck	CCMGN-606-B	16768	28.01	56768	31.93
3/16	3/16	3/4		3	long	CCMG-606-LB	16189	28.66	56189	32.65
3/16	3/16	1	2-5/8	4	ext neck	CCMGN-606-2B	16769	30.24	56769	34.50
3/16	3/16	1-1/8		3	xl	CCMG-606-EB	16255	28.66	56255	32.65
13/64	1/4	5/8		2-1/2	std	CCMG-806-1/2-B	16206	21.47	56206	26.57
7/32	1/4	1/2		2	stub	CCMGS-807-B	16246	17.03	56246	21.12
7/32	1/4	5/8		2-1/2	std	CCMG-807-B	15934	21.47	55934	26.57
15/64	1/4	3/4		2-1/2	std	CCMG-807-1/2-B	16207	21.47	56207	26.57
1/4	1/4	1/2		2	stub	CCMGS-808-B	16247	16.66	56247	20.70
1/4	1/4	3/4		2-1/2	std	CCMG-808-B	14180	20.53	54180	25.44
1/4	1/4	1	2-1/4	4	ext neck	CCMGN-808-B	16770	34.26	56770	40.68
1/4	1/4	1-1/8		3	long	CCMG-808-LB	16190	33.19	56190	39.66
1/4	1/4	1-1/2		4	xl	CCMG-808-EB	16256	34.92	56256	41.30
1/4	1/4	1-1/2	4-1/4	6	ext neck	CCMGN-808-2B	16771	44.52	56771	51.91
17/64	5/16	3/4		2-1/2	std	CCMG-1008-1/2-B	16208	27.63	56208	34.30

sizes continued on next page



# GENERAL PURPOSE CARBIDE END MILL

## 4 FLUTE • BALL NOSE END MILLS

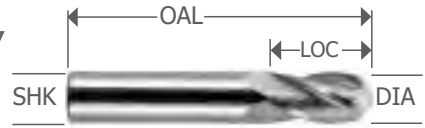
SERIES: CCMG-\_\_-B

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DIA	SHK	LOC	LBS	OAL	LENGTH	TOOL	BRIGHT EDP	BRIGHT PRICE	ALTIN EDP	ALTIN PRICE
9/32	5/16	3/4		2-1/2	std	CCMG-1009-B	15935	27.62	55935	34.30
19/64	5/16	13/16		2-1/2	std	CCMG-1009-1/2-B	16209	27.63	56209	34.30
5/16	5/16	1/2		2	stub	CCMGS-1010-B	16248	25.06	56248	31.11
5/16	5/16	13/16		2-1/2	std	CCMG-1010-B	14182	25.99	54182	32.24
5/16	5/16	1	2-5/16	4	ext neck	CCMG-1010-B	16772	45.53	56772	55.00
5/16	5/16	1-1/8		3	long	CCMG-1010-LB	16191	41.59	56191	49.34
5/16	5/16	1-1/2	4-5/16	6	ext neck	CCMGN-1010-2B	16773	67.50	56773	78.49
5/16	5/16	1-5/8		4	xl	CCMG-1010-EB	16257	46.43	56257	55.93
21/64	3/8	7/8		2-1/2	std	CCMG-1210-1/2-B	16210	38.91	56210	46.66
11/32	3/8	7/8		2-1/2	std	CCMG-1211-B	16211	38.91	56211	46.66
23/64	3/8	7/8		2-1/2	std	CCMG-1211-1/2-B	16212	38.91	56212	46.66
3/8	3/8	5/8		2	stub	CCMGS-1212-B	16249	30.80	56249	37.49
3/8	3/8	1		2-1/2	std	CCMG-1212-B	14184	31.20	54184	38.73
3/8	3/8	1	2-3/8	4	ext neck	CCMGN-1212-B	16774	49.93	56774	59.43
3/8	3/8	1-1/8		3	long	CCMG-1212-LB	16192	46.80	56192	54.59
3/8	3/8	1-1/2	4-3/8	6	ext neck	CCMGN-1212-2B	16775	69.79	56775	80.75
3/8	3/8	1-3/4		4	xl	CCMG-1212-EB	16258	51.38	56258	60.87
25/64	7/16	1		2-3/4	std	CCMG-1412-1/2-B	16213	49.50	56213	58.59
13/32	7/16	1		2-3/4	std	CCMG-1413-B	16214	49.50	56214	58.59
27/64	7/16	1		2-3/4	std	CCMG-1413-1/2-B	16215	49.50	56215	58.59
7/16	7/16	5/8		2-1/2	stub	CCMGS-1414-B	16250	41.31	56250	50.40
7/16	7/16	1		2-3/4	std	CCMG-1414-B	15936	45.56	55936	54.60
7/16	7/16	1	2-1/4	4	ext neck	CCMGN-1414-B	16776	71.88	56776	83.79
7/16	7/16	1-1/2	4-1/4	6	ext neck	CCMGN-1414-2B	16777	93.14	56777	106.18
7/16	7/16	2		4	long	CCMG-1414-LB	16193	73.10	56193	85.05
7/16	7/16	3		6	xl	CCMG-1414-EB	16259	95.00	56259	114.76
29/64	1/2	1		3	std	CCMG-1614-1/2-B	16216	70.92	56216	80.85
15/32	1/2	1		3	std	CCMG-1615-B	16217	70.92	56217	80.85
31/64	1/2	1		3	std	CCMG-1615-1/2-B	16218	70.92	56218	80.85
1/2	1/2	5/8		2-1/2	stub	CCMGS-1616-B	16251	49.96	56251	59.01
1/2	1/2	1		3	std	CCMG-1616-B	14186	54.40	54186	63.52
1/2	1/2	1	2	4	ext neck	CCMGN-1616-B	16778	72.81	56778	84.74
1/2	1/2	1-1/2		4	med	CCMG-1616-MB	11078	74.67	51078	93.34
1/2	1/2	1-1/2	4	6	ext neck	CCMGN-1616-2B	16779	103.06	56779	122.85
1/2	1/2	2		4	long	CCMG-1616-LB	16194	74.66	56194	86.62
1/2	1/2	3		6	xl	CCMG-1616-EB	16260	105.75	56260	125.48
9/16	9/16	1-1/4		3-1/2	std	CCMG-1818-B	16219	93.50	56219	107.52
9/16	9/16	2	3-3/4	6	ext neck	CCMGN-1818-B	16780	144.65	56780	166.68
5/8	5/8	3/4		3	stub	CCMGS-2020-B	16252	96.98	56252	110.56
5/8	5/8	1-1/4		3-1/2	std	CCMG-2020-B	16220	103.80	56220	118.34
5/8	5/8	2	3-3/4	6	ext neck	CCMGN-2020-B	16782	152.39	56782	173.78
5/8	5/8	2-1/4		5	long	CCMG-2020-LB	16195	149.70	56195	171.78
5/8	5/8	3		6	xl	CCMG-2020-EB	16261	163.01	56261	185.85
11/16	3/4	1-3/8		4	std	CCMG-2422-B	19576	154.21	59576	192.78
3/4	3/4	1		3	stub	CCMGS-2424-B	16253	143.24	56253	163.28
3/4	3/4	1-1/2		4	std	CCMG-2424-B	16221	154.21	56221	177.34
3/4	3/4	2	3-1/2	6	ext neck	CCMGN-2424-B	16783	252.12	56783	292.95
3/4	3/4	2-1/4		5	long	CCMG-2424-LB	16196	248.30	56196	283.08
3/4	3/4	3		6	xl	CCMG-2424-EB	16262	269.22	56262	310.06
7/8	7/8	1-1/2		4	std	CCMG-2828-B	16222	246.95	56222	281.50
1	1	1-1/2		4	std	CCMG-3232-B	16223	267.45	56223	304.92
1	1	2	3-1/2	6	ext neck	CCMGN-3232-B	16784	429.00	56784	489.07
1	1	2-1/4		5	long	CCMG-3232-LB	12093	389.40	52093	451.09
1	1	3		6	xl	CCMG-3232-EB	16263	437.93	56263	499.28

# GENERAL PURPOSE CARBIDE END MILL

## 4 FLUTE • BALL NOSE END MILLS



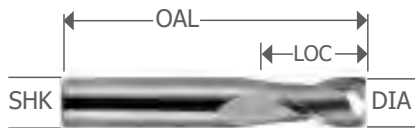
Carbide	4	30°	Bright ALTIN	+0.013 -.013 <3mm	+0.000 -.050 ≥3mm	Ball					HRC <48	<table border="1"> <tr><td>P</td><td>K</td></tr> <tr><td>M</td><td>S</td></tr> <tr><td>N</td><td></td></tr> </table>	P	K	M	S	N	
P	K																	
M	S																	
N																		

### SERIES: CCMG-M\_M\_-B

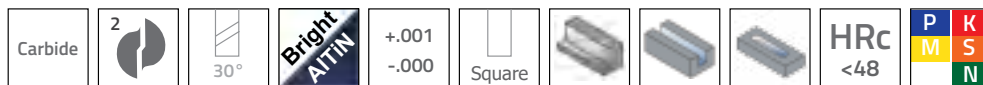
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	DIA	SHK	LOC	OAL	LENGTH	TOOL	BRIGHT EDP	BRIGHT PRICE	ALTIN EDP	ALTIN PRICE
ALTIN PRICE	3mm	2mm	38mm	stub		CCMGS-M3M1-B	19546	13.40	59546	16.27
	1mm	3mm	38mm	std		CCMG-M3M1-B	16801	13.40	56801	16.27
	1.5mm	3mm	38mm	stub		CCMGS-M3M1.5-B	10804	13.40	50804	16.23
	1.5mm	3mm	6mm	std		CCMG-M3M1.5-B	16802	13.40	56802	16.27
	2mm	3mm	4mm	38mm	stub	CCMGS-M3M2-B	19547	11.05	59547	13.70
	2mm	3mm	9mm	38mm	std	CCMG-M3M2-B	16572	11.05	56572	13.70
	2.5mm	3mm	5mm	38mm	stub	CCMGS-M3M2.5-B	19548	11.05	59548	16.27
	2.5mm	3mm	12mm	38mm	std	CCMG-M3M2.5-B	16573	11.05	56573	13.70
	3mm	3mm	6mm	38mm	stub	CCMGS-M3M3-B	11211	11.05	51211	13.70
	3mm	3mm	12mm	38mm	std	CCMG-M3M3-B	16574	11.05	56574	13.70
	3mm	3mm	18mm	57mm	long	CCMG-M3M3-LB	13643	15.10	53643	17.92
	3.5mm	4mm	7mm	51mm	stub	CCMGS-M4M3.5-B	19550	15.94	59550	18.85
	3.5mm	4mm	12mm	51mm	std	CCMG-M4M3.5-B	16575	15.94	56575	18.85
	4mm	4mm	8mm	51mm	stub	CCMGS-M4M4-B	19551	15.94	59551	18.82
	4mm	4mm	14mm	51mm	std	CCMG-M4M4-B	16576	15.94	56576	18.85
	4mm	4mm	20mm	63mm	long	CCMG-M4M4-LB	13644	21.55	53644	27.16
	4.5mm	5mm	14mm	51mm	std	CCMG-M5M4.5-B	16577	18.20	56577	21.12
	5mm	5mm	10mm	51mm	stub	CCMGS-M5M5-B	19552	18.20	59552	20.38
	5mm	5mm	20mm	51mm	std	CCMG-M5M5-B	16578	18.20	56578	21.12
	5mm	5mm	25mm	64mm	long	CCMG-M5M5-LB	14029	21.97	54029	25.03
	6mm	6mm	12mm	51mm	stub	CCMGS-M6M6-B	19727	20.33	59727	24.86
	6mm	6mm	20mm	63mm	std	CCMG-M6M6-B	16579	20.33	56579	25.24
	6mm	6mm	28mm	75mm	long	CCMG-M6M6-LB	13645	26.59	53645	33.06
	6mm	6mm	32mm	100mm	x long	CCMG-M6M6-LLB	14743	34.52	54743	42.37
	7mm	8mm	12mm	51mm	stub	CCMGS-M8M7-B	19728	24.67	59728	30.59
	7mm	8mm	20mm	63mm	std	CCMG-M8M7-B	16580	24.67	56580	30.59
	8mm	8mm	12mm	51mm	stub	CCMGS-M8M8-B	19729	24.67	59729	30.59
	8mm	8mm	20mm	63mm	std	CCMG-M8M8-B	16581	24.67	56581	30.59
	8mm	8mm	32mm	75mm	long	CCMG-M8M8-LB	13646	32.08	53646	39.86
	8mm	8mm	41mm	100mm	x long	CCMG-M8M8-LLB	14752	42.36	54752	50.14
	9mm	10mm	22mm	70mm	std	CCMG-M10M9-B	16582	40.16	56582	47.90
	10mm	10mm	25mm	70mm	std	CCMG-M10M10-B	16583	40.16	56583	48.92
	10mm	10mm	29mm	76mm	med	CCMG-M10M10-MB	10304	47.16	50304	55.93
	10mm	10mm	40mm	100mm	long	CCMG-M10M10-LB	13647	52.57	53647	61.39
	10mm	10mm	75mm	150mm	xl	CCMG-M10M10-EB	14761	83.53	54761	97.15
	11mm	12mm	25mm	75mm	std	CCMG-M12M11-B	10286	53.21	50286	62.26
	12mm	12mm	25mm	76mm	std	CCMG-M12M12-B	16584	53.21	56584	62.26
	12mm	12mm	50mm	100mm	long	CCMG-M12M12-LB	13648	67.25	53648	76.65
	14mm	14mm	32mm	89mm	std	CCMG-M14M14-B	16585	91.15	56585	105.21
	16mm	16mm	32mm	89mm	std	CCMG-M16M16-B	16586	99.93	56586	113.92
	16mm	16mm	57mm	127mm	long	CCMG-M16M16-LB	19762	144.60	59762	164.85
	18mm	18mm	38mm	100mm	std	CCMG-M18M18-B	16587	152.38	56587	173.67
	18mm	18mm	57mm	127mm	long	CCMG-M18M18-LB	19763	207.87	59763	236.98
	20mm	20mm	38mm	100mm	std	CCMG-M20M20-B	16588	192.86	56588	219.87
	20mm	20mm	57mm	127mm	long	CCMG-M20M20-LB	13962	238.44	53962	271.84
	22mm	22mm	38mm	100mm	std	CCMG-M22M22-B	16803	251.32	56803	286.54
	25mm	25mm	38mm	100mm	std	CCMG-M25M25-B	16804	258.48	56804	294.63

# GENERAL PURPOSE CARBIDE END MILL



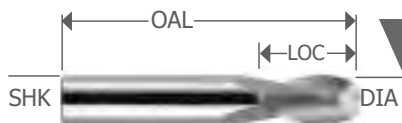
## 2 FLUTE • NC TOLERANCE END MILLS



### SERIES: AMG-\_\_-NC

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DIA	SHK	LOC	OAL	LENGTH	TOOL	BRIGHT EDP	BRIGHT PRICE	ALTiN EDP	ALTiN PRICE
1/16	1/8	3/16	1-1/2	std	AMG-402-NC	16968	11.70	56968	14.50
3/32	1/8	3/8	1-1/2	std	AMG-403-NC	16969	11.70	56969	14.50
1/8	1/8	1/2	1-1/2	std	AMG-404-NC	16970	11.70	56970	14.52
5/32	3/16	9/16	2	std	AMG-605-NC	16971	16.70	56971	19.67
3/16	3/16	5/8	2	std	AMG-606-NC	16972	16.70	56972	19.67
7/32	1/4	5/8	2-1/2	std	AMG-807-NC	16973	21.51	56973	26.68
1/4	1/4	3/4	2-1/2	std	AMG-808-NC	16974	21.51	56974	26.68
9/32	5/16	3/4	2-1/2	std	AMG-1009-NC	16975	28.22	56975	35.00
5/16	5/16	13/16	2-1/2	std	AMG-1010-NC	16976	28.22	56976	34.35
3/8	3/8	1	2-1/2	std	AMG-1212-NC	16977	32.74	56977	40.58
7/16	7/16	1	2-3/4	std	AMG-1414-NC	16978	47.47	56978	56.98
1/2	1/2	1	3	std	AMG-1616-NC	16979	56.42	56979	65.94
5/8	5/8	1-1/4	3-1/2	std	AMG-2020-NC	16980	106.20	56980	121.06
3/4	3/4	1-1/2	4	std	AMG-2424-NC	16981	162.15	56981	186.48
1	1	1-1/2	4	std	AMG-3232-NC	16982	247.75	56982	282.43



## 2 FLUTE • NC TOLERANCE BALL NOSE END MILLS



### SERIES: AMG-\_\_-NCB







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DIA	SHK	LOC	OAL	LENGTH	TOOL	BRIGHT EDP	BRIGHT PRICE	ALTiN EDP	ALTiN PRICE
1/16	1/8	3/16	1-1/2	std	AMG-402-NCB	16938	14.63	56938	17.61
3/32	1/8	3/8	1-1/2	std	AMG-403-NCB	16939	14.63	56939	17.61
1/8	1/8	1/2	1-1/2	std	AMG-404-NCB	16940	14.63	56940	17.59
5/32	3/16	9/16	2	std	AMG-605-NCB	16941	21.16	56941	24.11
3/16	3/16	5/8	2	std	AMG-606-NCB	16942	21.16	56942	24.11
7/32	1/4	5/8	2-1/2	std	AMG-807-NCB	16943	26.34	56943	32.66
1/4	1/4	3/4	2-1/2	std	AMG-808-NCB	16944	26.34	56944	32.65
9/32	5/16	3/4	2-1/2	std	AMG-1009-NCB	16945	28.14	56945	34.90
5/16	5/16	13/16	2-1/2	std	AMG-1010-NCB	16946	33.49	56946	41.61
3/8	3/8	1	2-1/2	std	AMG-1212-NCB	16947	40.26	56947	48.42
7/16	7/16	1	2-3/4	std	AMG-1414-NCB	16948	58.35	56948	67.87
1/2	1/2	1	3	std	AMG-1616-NCB	16949	70.02	56949	79.80
5/8	5/8	1-1/4	3-1/2	std	AMG-2020-NCB	16950	133.05	56950	151.67
3/4	3/4	1-1/2	4	std	AMG-2424-NCB	16951	197.49	56951	225.12
1	1	1-1/2	4	std	AMG-3232-NCB	16952	343.16	56952	391.20

# GENERAL PURPOSE CARBIDE END MILL

## 4 FLUTE • NC TOLERANCE END MILLS



Carbide   **Bright ALTiN**  $\begin{matrix} +.001 \\ -.000 \end{matrix}$      **HRC <48**

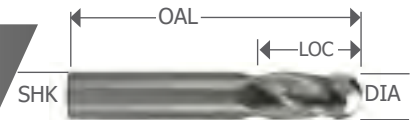
P	K
M	S
	N

### SERIES: CCMG-\_\_-NC

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DIA	SHK	LOC	OAL	LENGTH	TOOL	BRIGHT EDP	BRIGHT PRICE	ALTiN EDP	ALTiN PRICE
1/16	1/8	3/16	1-1/2	std	CCMG-402-NC	16983	11.70	56983	14.52
3/32	1/8	3/8	1-1/2	std	CCMG-403-NC	16984	11.70	56984	14.52
1/8	1/8	1/2	1-1/2	std	CCMG-404-NC	16985	11.70	56985	14.52
5/32	3/16	9/16	2	std	CCMG-605-NC	16986	16.70	56986	19.67
3/16	3/16	5/8	2	std	CCMG-606-NC	16987	16.70	56987	19.67
7/32	1/4	5/8	2-1/2	std	CCMG-807-NC	16988	21.51	56988	26.68
1/4	1/4	3/4	2-1/2	std	CCMG-808-NC	16989	21.51	56989	26.68
9/32	5/16	3/4	2-1/2	std	CCMG-1009-NC	16990	28.22	56990	35.00
5/16	5/16	13/16	2-1/2	std	CCMG-1010-NC	16991	28.22	56991	35.02
3/8	3/8	1	2-1/2	std	CCMG-1212-NC	16992	32.74	56992	40.58
7/16	7/16	1	2-3/4	std	CCMG-1414-NC	16993	47.47	56993	57.02
1/2	1/2	1	3	std	CCMG-1616-NC	16994	56.42	56994	65.94
5/8	5/8	1-1/4	3-1/2	std	CCMG-2020-NC	16995	106.20	56995	121.06
3/4	3/4	1-1/2	4	std	CCMG-2424-NC	16996	162.15	56996	186.48
1	1	1-1/2	4	std	CCMG-3232-NC	16997	247.75	56997	282.45

## 4 FLUTE • NC TOLERANCE BALL NOSE END MILLS



Carbide   **Bright ALTiN**  $\begin{matrix} +.001 \\ -.000 \end{matrix}$      **HRC <48**

P	K
M	S
	N

### SERIES: CCMG-\_\_-NCB

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DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	OAL L <sub>1</sub>	LENGTH	TOOL	BRIGHT EDP	BRIGHT PRICE	ALTiN EDP	ALTiN PRICE
1/16	1/8	3/16	1-1/2	std	CCMG-402-NCB	16953	14.63	56953	17.59
3/32	1/8	3/8	1-1/2	std	CCMG-403-NCB	16954	14.63	56954	17.59
1/8	1/8	1/2	1-1/2	std	CCMG-404-NCB	16955	14.63	56955	17.61
5/32	3/16	9/16	2	std	CCMG-605-NCB	16956	21.16	56956	24.10
3/16	3/16	5/8	2	std	CCMG-606-NCB	16957	21.16	56957	24.10
7/32	1/4	5/8	2-1/2	std	CCMG-807-NCB	16958	26.34	56958	32.66
1/4	1/4	3/4	2-1/2	std	CCMG-808-NCB	16959	26.34	56959	32.65
9/32	5/16	3/4	2-1/2	std	CCMG-1009-NCB	16960	28.14	56960	34.90
5/16	5/16	13/16	2-1/2	std	CCMG-1010-NCB	16961	33.49	56961	41.65
3/8	3/8	1	2-1/2	std	CCMG-1212-NCB	16962	40.26	56962	48.41
7/16	7/16	1	2-3/4	std	CCMG-1414-NCB	16963	58.35	56963	67.83
1/2	1/2	1	3	std	CCMG-1616-NCB	16964	70.02	56964	79.80
5/8	5/8	1-1/4	3-1/2	std	CCMG-2020-NCB	16965	133.05	56965	151.67
3/4	3/4	1-1/2	4	std	CCMG-2424-NCB	16966	197.49	56966	225.14
1	1	1-1/2	4	std	CCMG-3232-NCB	16967	343.16	56967	391.20



# GENERAL PURPOSE CARBIDE END MILL



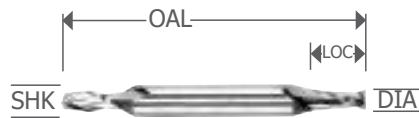
## 2 FLUTE • DOUBLE END STUB LENGTH END MILLS

Carbide	2	30°	Bright AITIN	+0.005 -0.005 <1/8	+0.00 -0.02	Square				HRC <48	P M N	K S N
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### SERIES: BSMG

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DIA	SHK	LOC	OAL	LENGTH	TOOL	BRIGHT EDP	BRIGHT PRICE
1/32	1/8	1/16	1-1/2	stub	<b>BSMG-401</b>	14070	19.55
3/64	1/8	3/32	1-1/2	stub	<b>BSMG-401-1/2</b>	14072	20.21
1/16	1/8	1/8	1-1/2	stub	<b>BSMG-402</b>	14074	16.21
5/64	1/8	1/8	1-1/2	stub	<b>BSMG-402-1/2</b>	14076	16.21
3/32	1/8	3/16	1-1/2	stub	<b>BSMG-403</b>	14078	16.21
7/64	1/8	1/4	1-1/2	stub	<b>BSMG-403-1/2</b>	17848	16.21
1/8	1/8	1/4	1-1/2	stub	<b>BSMG-404</b>	14080	16.21
1/8	3/16	1/4	2	stub	<b>BSMG-604</b>	11739	22.29
9/64	3/16	5/16	2	stub	<b>BSMG-604-1/2</b>	17849	22.29
5/32	3/16	5/16	2	stub	<b>BSMG-605</b>	14084	22.29
11/64	3/16	3/8	2	stub	<b>BSMG-605-1/2</b>	16319	22.29
3/16	3/16	3/8	2	stub	<b>BSMG-606</b>	14086	22.20
13/64	1/4	1/2	2-1/2	stub	<b>BSMG-806-1/2</b>	17850	26.80
7/32	1/4	1/2	2-1/2	stub	<b>BSMG-807</b>	14092	26.80
15/64	1/4	1/2	2-1/2	stub	<b>BSMG-807-1/2</b>	16320	26.29
1/4	1/4	1/2	2-1/2	stub	<b>BSMG-808</b>	14094	25.96
5/16	5/16	1/2	2-1/2	stub	<b>BSMG-1010</b>	14098	32.47
3/8	3/8	9/16	2-1/2	stub	<b>BSMG-1212</b>	14102	37.02
7/16	7/16	5/8	3	stub	<b>BSMG-1414</b>	15915	47.98
1/2	1/2	5/8	3	stub	<b>BSMG-1616</b>	14106	60.71
5/8	5/8	3/4	4	stub	<b>BSMG-2020</b>	17851	117.98
3/4	3/4	1	4	stub	<b>BSMG-2424</b>	17852	158.68



## 2 FLUTE • DOUBLE END, END MILLS

Carbide	2	30°	BRIGHT	+0.00 -0.02	Square				HRC <48	P M N	K S N
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### SERIES: BMG

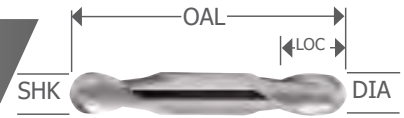
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DIA	SHK	LOC	OAL	LENGTH	TOOL	BRIGHT EDP	BRIGHT PRICE
1/8	1/8	3/8	2	std	<b>BMG-404</b>	16070	16.46
1/8	3/8	3/8	3-1/16	std	<b>BMG-1204</b>	14082	39.16
5/32	3/8	7/16	3-1/4	std	<b>BMG-1205</b>	11357	46.00
3/16	3/8	1/2	3-1/4	std	<b>BMG-1206</b>	14090	46.00
7/32	3/8	5/8	3-1/2	std	<b>BMG-1207</b>	11581	45.71
1/4	3/8	5/8	3-1/2	std	<b>BMG-1208</b>	14096	45.71
9/32	3/8	11/16	3-1/2	std	<b>BMG-1209</b>	15914	48.62
5/16	3/8	3/4	3-1/2	std	<b>BMG-1210</b>	14100	48.62
3/8	3/8	3/4	3-1/2	std	<b>BMG-1212*</b>	14104	51.25
1/2	1/2	1	4	std	<b>BMG-1616*</b>	14108	77.62

\* = Weldon Flat

# GENERAL PURPOSE CARBIDE END MILL

## 2 FLUTE • DOUBLE END STUB BALL NOSE END MILLS



Carbide 2 30° BRIGHT +.000 -.002 Ball  HRC <48 

### SERIES: BSMG-\_\_-B

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DIA	SHK	LOC	OAL	LENGTH	TOOL	BRIGHT EDP	BRIGHT PRICE
1/8	1/8	1/4	1-1/2	stub	<b>BSMG-404-B</b>	14110	19.49
1/8	3/16	1/4	2	stub	<b>BSMG-604-B</b>	11795	26.75
5/32	3/16	5/16	2	stub	<b>BSMG-605-B</b>	15916	26.75
3/16	3/16	3/8	2	stub	<b>BSMG-606-B</b>	14112	26.75
7/32	1/4	1/2	2-1/2	stub	<b>BSMG-807-B</b>	15917	30.69
1/4	1/4	1/2	2-1/2	stub	<b>BSMG-808-B</b>	14114	30.69
5/16	5/16	1/2	2-1/2	stub	<b>BSMG-1010-B</b>	14116	39.06
3/8	3/8	9/16	2-1/2	stub	<b>BSMG-1212-B</b>	14118	44.11
7/16	7/16	5/8	3	stub	<b>BSMG-1414-B</b>	15918	57.28
1/2	1/2	5/8	3	stub	<b>BSMG-1616-B</b>	14120	71.27

## 2 FLUTE • DOUBLE END BALL NOSE END MILLS

Carbide 2 30° BRIGHT +.000 -.002 Ball  HRC <48 



### SERIES: BMG-\_\_-B

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DIA	SHK	LOC	OAL	LENGTH	TOOL	BRIGHT EDP	BRIGHT PRICE
1/8	1/8	3/8	2	std	<b>BMG-404-B</b>	11696	20.06
1/8	3/8	3/8	3-1/16	std	<b>BMG-1204-B</b>	16271	46.99
5/32	3/8	7/16	3-1/4	std	<b>BMG-1205-B</b>	10438	55.20
3/16	3/8	1/2	3-1/4	std	<b>BMG-1206-B</b>	16272	55.20
7/32	3/8	5/8	3-1/2	std	<b>BMG-1207-B</b>	16317	54.86
1/4	3/8	5/8	3-1/2	std	<b>BMG-1208-B</b>	16273	54.86
9/32	3/8	11/16	3-1/2	std	<b>BMG-1209-B</b>	16274	58.94
5/16	3/8	3/4	3-1/2	std	<b>BMG-1210-B</b>	16275	58.94
11/32	3/8	3/4	3-1/2	std	<b>BMG-1211-B</b>	10196	60.42
3/8	3/8	3/4	3-1/2	std	<b>BMG-1212-B*</b>	16276	60.42
1/2	1/2	1	4	std	<b>BMG-1616-B*</b>	16277	93.42

\* = Weldon Flat

# GENERAL PURPOSE CARBIDE END MILL



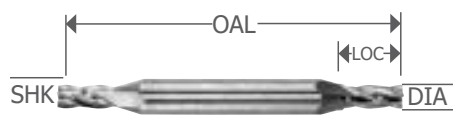
## 4 FLUTE • DOUBLE END STUB LENGTH END MILLS

Carbide			BRIGHT	+0.0005 -0.0005 <1/8	+0.000 -0.002	Square				HRC <48	<table border="1"><tr><td>P</td><td>K</td></tr><tr><td>M</td><td>S</td></tr><tr><td></td><td>N</td></tr></table>	P	K	M	S		N
P	K																
M	S																
	N																

### SERIES: DDSMG

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DIA	SHK	LOC	OAL	LENGTH	TOOL	BRIGHT EDP	BRIGHT PRICE
1/32	1/8	1/16	1-1/2	stub	DDSMG-401	14188	19.55
3/64	1/8	3/32	1-1/2	stub	DDSMG-401-1/2	14190	20.21
1/16	1/8	1/8	1-1/2	stub	DDSMG-402	14192	16.21
5/64	1/8	1/8	1-1/2	stub	DDSMG-402-1/2	14194	16.21
3/32	1/8	3/16	1-1/2	stub	DDSMG-403	14196	16.21
7/64	1/8	1/4	1-1/2	stub	DDSMG-403-1/2	17853	16.21
1/8	1/8	1/4	1-1/2	stub	DDSMG-404	14198	16.21
1/8	3/16	1/4	2	stub	DDSMG-604	13075	22.29
9/64	3/16	5/16	2	stub	DDSMG-604-1/2	17854	22.29
5/32	3/16	5/16	2	stub	DDSMG-605	14202	22.29
11/64	3/16	3/8	2	stub	DDSMG-605-1/2	17855	22.29
3/16	3/16	3/8	2	stub	DDSMG-606	14204	22.20
13/64	1/4	1/2	2-1/2	stub	DDSMG-806-1/2	17856	26.80
7/32	1/4	1/2	2-1/2	stub	DDSMG-807	14208	26.80
15/64	1/4	1/2	2-1/2	stub	DDSMG-807-1/2	17857	26.29
1/4	1/4	1/2	2-1/2	stub	DDSMG-808	14210	25.96
5/16	5/16	1/2	2-1/2	stub	DDSMG-1010	14214	32.47
3/8	3/8	9/16	2-1/2	stub	DDSMG-1212	14218	37.02
7/16	7/16	5/8	3	stub	DDSMG-1414	15938	47.98
1/2	1/2	5/8	3	stub	DDSMG-1616	14222	60.71
5/8	5/8	3/4	4	stub	DDSMG-2020	17858	117.98
3/4	3/4	1	4	stub	DDSMG-2424	17859	158.68



## 4 FLUTE • DOUBLE END, END MILLS

Carbide			BRIGHT	+0.000 -0.002	Square				HRC <48	<table border="1"><tr><td>P</td><td>K</td></tr><tr><td>M</td><td>S</td></tr><tr><td></td><td>N</td></tr></table>	P	K	M	S		N
P	K															
M	S															
	N															

### SERIES: DDMG

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.65	SHK	LOC	OAL	LENGTH	TOOL	BRIGHT EDP	BRIGHT PRICE
1/8	1/8	3/8	2	std	DDMG-404	16321	16.46
1/8	3/8	3/8	3-1/16	std	DDMG-1204	14200	39.16
5/32	3/8	7/16	3-1/4	std	DDMG-1205	10845	46.00
3/16	3/8	1/2	3-1/4	std	DDMG-1206	14206	46.00
7/32	3/8	5/8	3-1/2	std	DDMG-1207	12217	45.71
1/4	3/8	5/8	3-1/2	std	DDMG-1208	14212	45.71
9/32	3/8	11/16	3-1/2	std	DDMG-1209	15937	48.62
5/16	3/8	3/4	3-1/2	std	DDMG-1210	14216	48.62
11/32	3/8	3/4	3-1/2	std	DDMG-1211	13937	47.48
3/8	3/8	3/4	3-1/2	std	DDMG-1212*	14220	51.25
7/16	1/2	7/8	4	std	DDMG-1614	13061	76.53
1/2	1/2	1	4	std	DDMG-1616*	14224	77.62

\* = Weldon Flat

# GENERAL PURPOSE CARBIDE END MILL

## 4 FLUTE • DOUBLE END STUB LENGTH BALL NOSE END MILLS

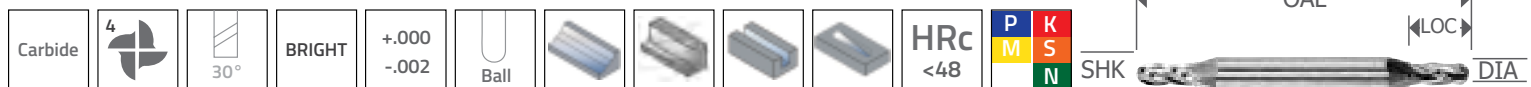


### SERIES: DDSMG-\_\_-B

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DIA	SHK	LOC	OAL	LENGTH	TOOL	BRIGHT EDP	BBRIGHT PRICE
1/8	1/8	1/4	1-1/2	stub	<b>DDSMG-404-B</b>	14226	19.49
1/8	3/16	1/4	2	stub	<b>DDSMG-604-B</b>	11730	26.75
5/32	3/16	5/16	2	stub	<b>DDSMG-605-B</b>	15939	26.75
3/16	3/16	3/8	2	stub	<b>DDSMG-606-B</b>	14228	26.75
7/32	1/4	1/2	2-1/2	stub	<b>DDSMG-807-B</b>	15940	30.69
1/4	1/4	1/2	2-1/2	stub	<b>DDSMG-808-B</b>	14230	30.69
5/16	5/16	1/2	2-1/2	stub	<b>DDSMG-1010-B</b>	14232	39.06
3/8	3/8	9/16	2-1/2	stub	<b>DDSMG-1212-B</b>	14234	44.11
7/16	7/16	5/8	3	stub	<b>DDSMG-1414-B</b>	15941	57.28
1/2	1/2	5/8	3	stub	<b>DDSMG-1616-B</b>	14236	71.27

## 4 FLUTE • DOUBLE END BALL NOSE END MILLS



### SERIES: DDMG-\_\_-B

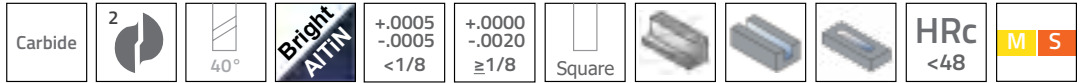
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DIA	SHK	LOC	OAL	LENGTH	TOOL	BRIGHT EDP	BRIGHT PRICE
1/8	1/8	3/8	2	std	<b>DDMG-404-B</b>	11791	20.06
1/8	3/8	3/8	3-1/16	std	<b>DDMG-1204-B</b>	16264	46.99
5/32	3/8	7/16	3-1/4	std	<b>DDMG-1205-B</b>	10951	55.20
3/16	3/8	1/2	3-1/4	std	<b>DDMG-1206-B</b>	16265	55.20
7/32	3/8	5/8	3-1/2	std	<b>DDMG-1207-B</b>	16318	54.86
1/4	3/8	5/8	3-1/2	std	<b>DDMG-1208-B</b>	16266	54.86
9/32	3/8	11/16	3-1/2	std	<b>DDMG-1209-B</b>	16267	58.94
5/16	3/8	3/4	3-1/2	std	<b>DDMG-1210-B</b>	16268	58.94
3/8	3/8	3/4	3-1/2	std	<b>DDMG-1212-B*</b>	16269	60.42
1/2	1/2	1	4	std	<b>DDMG-1616-B*</b>	16270	93.42

\* = Weldon Flat

# GENERAL PURPOSE CARBIDE END MILL

## 2 FLUTE • 40° HELIX END MILLS



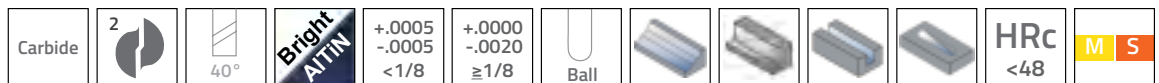
### SERIES: AMG40

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DIA	SHK	LOC	OAL	LENGTH	TOOL	BRIGHT EDP	BRIGHT PRICE	ALTiN EDP	ALTiN PRICE
1/32	1/8	3/32	1-1/2	std	AMG40-401	12191	11.70	52191	14.49
3/64	1/8	1/8	1-1/2	std	AMG40-401-1/2	12121	11.70	52121	14.63
1/16	1/8	3/16	1-1/2	std	AMG40-402	12081	9.65	52081	11.95
1/16	1/8	1/8	1-1/2	stub	AMGS40-402	12202	9.87	52202	12.26
3/32	1/8	3/8	1-1/2	std	AMG40-403	12083	9.65	52083	11.95
1/8	1/8	1/2	1-1/2	std	AMG40-404	11997	9.36	51997	11.64
1/8	1/8	1/4	1-1/2	stub	AMGS40-404	12203	8.94	52203	11.12
9/64	3/16	9/16	2	std	AMG40-604-1/2	12129	13.92	52129	17.41
5/32	3/16	9/16	2	std	AMG40-605	12085	13.92	52085	16.76
11/64	3/16	9/16	2	std	AMG40-605-1/2	12131	13.92	52131	17.41
3/16	3/16	3/8	1-1/2	stub	AMGS40-606	12115	12.06	52115	14.94
3/16	3/16	5/8	2	std	AMG40-606	11999	13.26	51999	16.07
13/64	1/4	5/8	2-1/2	std	AMG40-806-1/2	12135	18.17	52135	22.76
7/32	1/4	5/8	2-1/2	std	AMG40-807	12137	18.17	52137	22.53
15/64	1/4	3/4	2-1/2	std	AMG40-807-1/2	12001	17.89	52001	22.35
1/4	1/4	1/2	2	stub	AMGS40-808	12035	14.20	52035	17.61
1/4	1/4	3/4	2-1/2	std	AMG40-808	12003	17.10	52003	21.22
1/4	1/4	1-1/2	4	xl	AMG40-808-E	13987	27.62	53987	34.92
17/64	5/16	3/4	2-1/2	std	AMG40-1008-1/2	12117	23.60	52117	29.46
5/16	5/16	13/16	2-1/2	std	AMG40-1010	12118	22.54	52118	27.91
5/16	5/16	1-5/8	4	xl	AMG40-1010-E	13948	34.79	53948	44.60
3/8	3/8	5/8	2	stub	AMGS40-1212	12204	26.33	52204	32.65
3/8	3/8	1	2-1/2	std	AMG40-1212	12005	25.94	52005	32.14
3/8	3/8	1-1/8	3	long	AMG40-1212-L	14047	36.58	54047	44.70
7/16	7/16	1	2-3/4	std	AMG40-1414	13091	38.03	53091	47.01
1/2	1/2	5/8	2-1/2	stub	AMGS40-1616	12113	43.98	52113	52.98
1/2	1/2	1	3	std	AMG40-1616	12075	45.11	52075	54.08
1/2	1/2	2	4	long	AMG40-1616-L	13730	56.97	53730	70.35
5/8	5/8	1-1/4	3-1/2	std	AMG40-2020	13093	84.99	53093	98.91
3/4	3/4	1-1/2	4	std	AMG40-2424	12080	129.07	52080	151.90



## 2 FLUTE • 40° HELIX BALL NOSE END MILLS



### SERIES: AMG40-\_\_-B

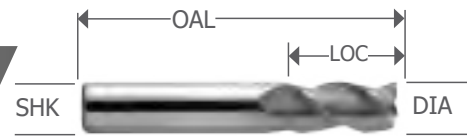
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DIA	SHK	LOC	OAL	LENGTH	TOOL	BRIGHT EDP	BRIGHT PRICE	ALTiN EDP	ALTiN PRICE
1/32	1/8	3/32	1-1/2	std	AMG40-401-B	12123	14.04	52123	16.83
1/16	1/8	3/16	1-1/2	std	AMG40-402-B	12125	11.56	52125	14.32
3/32	1/8	3/8	1-1/2	std	AMG40-403-B	12127	11.56	52127	14.32
1/8	1/8	1/2	1-1/2	std	AMG40-404-B	12009	11.56	52009	14.36
5/32	3/16	9/16	2	std	AMG40-605-B	12099	16.70	52099	19.57
3/16	3/16	5/8	2	std	AMG40-606-B	12133	16.70	52133	19.57
1/4	1/4	3/4	2-1/2	std	AMG40-808-B	12139	21.04	52139	26.06
5/16	5/16	13/16	2-1/2	std	AMG40-1010-B	13095	26.64	53095	33.06
3/8	3/8	1	2-1/2	std	AMG40-1212-B	12119	31.99	52119	39.66
1/2	1/2	1	3	std	AMG40-1616-B	12079	55.78	52079	64.78



# GENERAL PURPOSE CARBIDE END MILL

## 3 FLUTE • 40° HELIX END MILLS



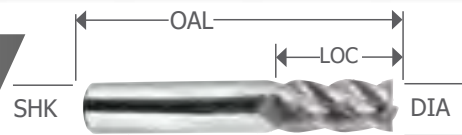
Carbide	3	40°	Bright ALTiN	+0.0005 -0.0005 <1/8	+0.0000 -0.0020 ≥1/8	Square				HRC <48	M S
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### SERIES: EMG40

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DIA	SHK	LOC	OAL	LENGTH	TOOL	BRIGHT EDP	BRIGHT PRICE	ALTiN EDP	ALTiN PRICE
1/32	1/8	3/32	1-1/2	std	EMG40-401	10722	11.70	50722	14.10
3/64	1/8	1/8	1-1/2	std	EMG40-401-1/2	10724	11.70	50724	14.10
1/16	1/8	1/8	1-1/2	stub	EMGS40-402	19485	9.97	59485	12.26
1/16	1/8	3/16	1-1/2	std	EMG40-402	10726	9.65	50726	11.97
3/32	1/8	3/8	1-1/2	std	EMG40-403	10728	9.65	50728	11.97
1/8	1/8	1/4	1-1/2	stub	EMGS40-404	19500	9.02	59500	11.12
1/8	1/8	1/2	1-1/2	std	EMG40-404	10730	9.36	50730	9.36
9/64	3/16	9/16	2	std	EMG40-604-1/2	10732	13.92	50732	16.27
5/32	3/16	9/16	2	std	EMG40-605	10750	13.92	50750	16.28
11/64	3/16	9/16	2	std	EMG40-605-1/2	10754	13.92	50754	16.27
3/16	3/16	3/8	1-1/2	stub	EMGS40-606	19290	12.17	59290	14.94
3/16	3/16	5/8	2	std	EMG40-606	10768	13.26	50768	15.66
13/64	1/4	5/8	2-1/2	std	EMG40-806-1/2	10772	18.17	50772	22.53
7/32	1/4	5/8	2-1/2	std	EMG40-807	10776	18.17	50776	22.56
15/64	1/4	3/4	2-1/2	std	EMG40-807-1/2	10780	17.89	50780	22.19
1/4	1/4	3/4	2-1/2	std	EMG40-808	10782	17.10	50782	21.22
17/64	5/16	3/4	2-1/2	std	EMG40-1008-1/2	10784	23.60	50784	29.25
5/16	5/16	13/16	2-1/2	std	EMG40-1010	10786	22.54	50786	27.94
5/16	5/16	1-5/8	4	xl	EMG40-1010-E	10788	34.78	50788	43.03
3/8	3/8	5/8	2	stub	EMGS40-1212	11990	26.57	51990	32.65
3/8	3/8	1	2-1/2	std	EMG40-1212	10790	25.94	50790	32.17
3/8	3/8	1-1/8	3	long	EMG40-1212-L	10796	36.58	50796	44.27
7/16	7/16	1	2-3/4	std	EMG40-1414	10453	38.03	50453	47.01
1/2	1/2	5/8	2-1/2	stub	EMGS40-1616	19527	44.40	59527	53.02
1/2	1/2	1	3	std	EMG40-1616	10798	45.11	50798	54.08
1/2	1/2	2	4	long	EMG40-1616-L	10799	56.97	50799	68.80
5/8	5/8	1-1/4	3-1/2	std	EMG40-2020	10800	84.99	50800	96.88
5/8	5/8	2-1/4	5	long	EMG40-2020-L	10801	113.20	50801	135.06
3/4	3/4	1-1/2	4	std	EMG40-2424	10802	129.07	50802	147.14

## 4 FLUTE • 40° HELIX END MILLS



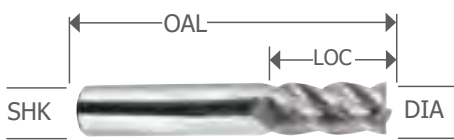
Carbide	4	40°	Bright ALTiN	+0.0005 -0.0005 <1/8	+0.0000 -0.0020 ≥1/8	Square				HRC <48	P K M S
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### SERIES: CCMG40

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DIA	SHK	LOC	OAL	LENGTH	TOOL	BRIGHT EDP	BRIGHT PRICE	ALTiN EDP	ALTiN PRICE
1/32	1/8	3/32	1-1/2	std	CCMG40-401	12169	11.70	52169	14.11
3/64	1/8	1/8	1-1/2	std	CCMG40-401-1/2	12171	11.70	52171	14.63
1/16	1/8	1/8	1-1/2	stub	CCMGS40-402	12109	9.87	52109	12.26
1/16	1/8	3/16	1-1/2	std	CCMG40-402	12175	9.65	52175	11.95
5/64	1/8	3/16	1-1/2	std	CCMG40-402-1/2	12177	9.65	52177	11.95
3/32	1/8	3/16	1-1/2	stub	CCMGS40-403	12111	9.40	52111	11.74
3/32	1/8	3/8	1-1/2	std	CCMG40-403	12087	9.65	52087	11.95
7/64	1/8	3/8	1-1/2	std	CCMG40-403-1/2	12013	9.65	52013	12.05
1/8	1/8	1/4	1-1/2	stub	CCMGS40-404	12102	8.94	52102	11.64
1/8	1/8	1/2	1-1/2	std	CCMG40-404	12076	9.36	52076	11.64

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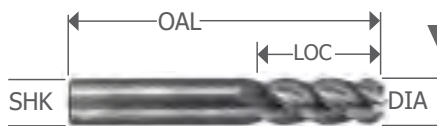
# GENERAL PURPOSE CARBIDE END MILL

## 4 FLUTE • 40° HELIX END MILLS

### SERIES: CCMG40

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DIA	SHK	LOC	OAL	LENGTH	TOOL	BRIGHT EDP	BRIGHT PRICE	ALTIN EDP	ALTIN PRICE
9/64	3/16	9/16	2	std	CCMG40-604-1/2	12015	13.92	52015	17.41
5/32	3/16	3/8	1-1/2	stub	CCMG40-605	12097	12.39	52097	15.45
5/32	3/16	9/16	2	std	CCMG40-605	12017	13.92	52017	16.27
11/64	3/16	9/16	2	std	CCMG40-605-1/2	12181	13.92	52181	17.41
3/16	3/16	3/8	1-1/2	stub	CCMG40-606	12065	12.06	52065	14.94
3/16	3/16	5/8	2	std	CCMG40-606	12019	13.26	52019	15.66
13/64	1/4	5/8	2-1/2	std	CCMG40-806-1/2	12183	18.17	52183	22.76
7/32	1/4	5/8	2-1/2	std	CCMG40-807	12185	18.17	52185	22.56
15/64	1/4	3/4	2-1/2	std	CCMG40-807-1/2	12187	17.89	52187	22.35
1/4	1/4	1/2	2	stub	CCMG40-808	12037	14.20	52037	17.61
1/4	1/4	3/4	2-1/2	std	CCMG40-808	12089	17.10	52089	21.22
17/64	5/16	3/4	2-1/2	std	CCMG40-1008-1/2	12020	23.60	52020	29.46
9/32	5/16	3/4	2-1/2	std	CCMG40-1009	12021	23.60	52021	29.46
5/16	5/16	1/2	2	stub	CCMG40-1010	12107	12.13	52107	15.14
5/16	5/16	13/16	2-1/2	std	CCMG40-1010	12023	22.54	52023	27.91
21/64	3/8	7/8	2-1/2	std	CCMG40-1210-1/2	12143	30.83	52143	38.52
11/32	3/8	7/8	2-1/2	std	CCMG40-1211	12145	28.34	52145	35.43
3/8	3/8	5/8	2	stub	CCMG40-1212	12103	26.33	52103	32.65
3/8	3/8	1	2-1/2	std	CCMG40-1212	12147	25.94	52147	32.14
13/32	7/16	1	2-3/4	std	CCMG40-1413	12151	39.62	52151	49.56
27/64	7/16	1	2-3/4	std	CCMG40-1413-1/2	12153	41.07	52153	51.35
7/16	7/16	1	2-3/4	std	CCMG40-1414	12155	38.03	52155	45.78
29/64	1/2	1	3	std	CCMG40-1614-1/2	12157	52.72	52157	65.94
1/2	1/2	5/8	2-1/2	stub	CCMG40-1616	12063	43.98	52063	53.02
1/2	1/2	1	3	std	CCMG40-1616	12077	45.11	52077	54.08
9/16	9/16	1-1/4	3-1/2	std	CCMG40-1818	12161	78.40	52161	97.96
5/8	5/8	3/4	3	stub	CCMG40-2020	12105	80.06	52105	100.06
5/8	5/8	1-1/4	3-1/2	std	CCMG40-2020	12163	84.99	52163	98.91
3/4	3/4	1-1/2	4	std	CCMG40-2424	12165	129.07	52165	151.94
1	1	1-1/2	4	std	CCMG40-3232	12167	197.44	52167	246.86



## 4 FLUTE • 40° HELIX BALL NOSE END MILLS

Carbide
4
40°
Bright ALTiN
+0.0005  
-0.0005  
<1/8
+0.0000  
-0.0020  
≥1/8
Ball
HRC <48
P M K S

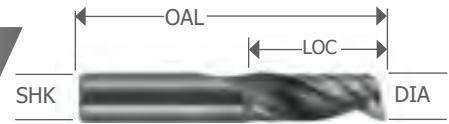
### SERIES: CCMG40-\_\_-B

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DIA	SHK	LOC	OAL	LENGTH	TOOL	BRIGHT EDP	BRIGHT PRICE	ALTIN EDP	ALTIN PRICE
1/32	1/8	3/32	1-1/2	std	CCMG40-401-B	12173	14.04	52173	16.79
1/16	1/8	3/16	1-1/2	std	CCMG40-402-B	12101	11.56	52101	14.32
3/32	1/8	3/8	1-1/2	std	CCMG40-403-B	12179	11.56	52179	14.32
1/8	1/8	1/2	1-1/2	std	CCMG40-404-B	12025	11.56	52025	14.32
5/32	3/16	9/16	2	std	CCMG40-605-B	12027	16.70	52027	19.57
3/16	3/16	5/8	2	std	CCMG40-606-B	12029	16.70	52029	19.57
7/32	1/4	5/8	2-1/2	std	CCMG40-807-B	12189	22.01	52189	27.50
1/4	1/4	3/4	2-1/2	std	CCMG40-808-B	12031	21.04	52031	26.06
5/16	5/16	13/16	2-1/2	std	CCMG40-1010-B	12141	26.64	52141	33.06
3/8	3/8	1	2-1/2	std	CCMG40-1212-B	12149	31.99	52149	39.66
1/2	1/2	1	3	std	CCMG40-1616-B	12159	55.78	52159	64.78

# SPECIAL USE CARBIDE END MILLS

## 1 FLUTE • ROUTERS FOR ALUMINUM

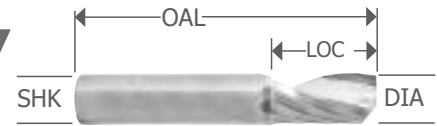


### SERIES: ARMG

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DIA	SHK	LOC	OAL	LENGTH	TOOL	BRIGHT EDP	BRIGHT PRICE	TICN EDP	TICN PRICE
1/16	1/8	1/4	1-1/2	std	ARMG-402	12855	24.03	42855	27.40
1/16	1/4	1/4	2	std	ARMG-802	12865	28.65	42865	32.65
1/8	1/8	1/4	1-1/2	stub	ARMG-404-S	12857	21.18	42857	24.10
1/8	1/8	1/2	1-1/2	std	ARMG-404	12859	21.18	42859	24.10
1/8	1/4	1/4	2	stub	ARMG-804-S	12867	25.13	42867	28.63
1/8	1/4	1/2	2	std	ARMG-804	12869	25.13	42869	28.63
3/16	3/16	3/8	2	stub	ARMG-606-S	12861	23.76	42861	27.09
3/16	1/4	1/2	2	stub	ARMG-806-S	12873	25.13	42873	28.63
3/16	3/16	5/8	2	std	ARMG-606	12863	23.76	42863	27.09
3/16	1/4	5/8	2	std	ARMG-806	12875	25.13	42875	28.65
5/32	1/4	5/8	2	std	ARMG-805	12871	25.13	42871	28.63
7/32	1/4	3/4	2-1/2	std	ARMG-807	12877	25.13	42877	31.17
1/4	1/4	3/8	2-1/2	stub	ARMG-808-S	12879	25.13	42879	29.66
1/4	1/4	3/4	2-1/2	std	ARMG-808	12881	25.13	42881	31.21
1/4	1/4	1-1/4	3	long	ARMG-808-L	12883	28.38	42883	34.81
3/8	3/8	1-1/8	3	std	ARMG-1212	12885	38.25	42885	46.04
1/2	1/2	1	3	std	ARMG-1616	12887	65.55	42887	74.76
1/2	1/2	1-1/2	3-1/2	med	ARMG-1616-M	12889	68.95	42889	80.85

## 1 FLUTE • ROUTERS FOR PLASTIC

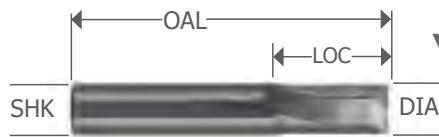


### SERIES: PRMG

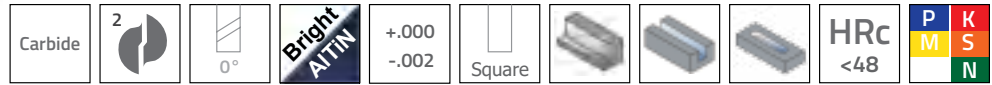
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DIA	SHK	LOC	OAL	LENGTH	TOOL	BRIGHT EDP	BRIGHT PRICE	TICN EDP	TICN PRICE
1/16	1/8	1/4	1-1/2	std	PRMG-402	12819	24.03	42819	26.19
1/16	1/4	1/4	2	std	PRMG-802	12829	28.65	42829	32.67
1/8	1/8	1/4	1-1/2	stub	PRMG-404-S	12821	21.18	42821	24.18
1/8	1/4	1/4	2	stub	PRMG-804-S	12831	25.13	42831	28.65
1/8	1/8	1/2	1-1/2	std	PRMG-404	12823	21.18	42823	24.13
1/8	1/4	1/2	2	std	PRMG-804	12833	25.13	42833	28.65
3/16	3/16	3/8	2	stub	PRMG-606-S	12825	23.76	42825	26.44
3/16	1/4	1/2	2	stub	PRMG-806-S	12837	25.13	42837	28.65
3/16	3/16	5/8	2	std	PRMG-606	12827	23.76	42827	27.09
3/16	1/4	5/8	2	std	PRMG-806	12839	25.13	42839	28.65
5/32	1/4	5/8	2	std	PRMG-805	12835	25.13	42835	27.81
7/32	1/4	3/4	2-1/2	std	PRMG-807	12841	25.13	42841	31.17
1/4	1/4	3/8	2-1/2	stub	PRMG-808-S	12843	25.13	42843	28.32
1/4	1/4	3/4	2-1/2	std	PRMG-808	12845	25.13	42845	31.21
1/4	1/4	1-1/4	3	long	PRMG-808-L	12847	28.38	42847	34.81
3/8	3/8	1-1/8	3	std	PRMG-1212	12849	38.25	42849	46.04
1/2	1/2	1	3	std	PRMG-1616	12851	65.55	42851	73.85
1/2	1/2	1-1/2	3-1/2	med	PRMG-1616-M	12853	68.95	42853	80.89

# SPECIAL USE CARBIDE END MILLS



## 2 FLUTE • STRAIGHT FLUTE END MILLS



### SERIES: SAMG

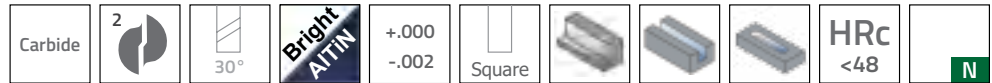
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DIA	SHK	LOC	OAL	LENGTH	TOOL	BRIGHT EDP	BRIGHT PRICE	ALTiN EDP	ALTiN PRICE
1/16	1/8	3/16	1-1/2	std	<b>SAMG-402*</b>	11493	10.34	51493	12.88
3/32	1/8	9/32	1-1/2	std	<b>SAMG-403*</b>	11495	10.34	51495	12.88
1/8	1/8	1/2	1-1/2	std	<b>SAMG-404*</b>	11497	10.02	51497	12.46
5/32	3/16	1/2	2	std	<b>SAMG-605</b>	11499	14.94	51499	17.82
3/16	3/16	5/8	2	std	<b>SAMG-606*</b>	11501	14.21	51501	17.10
7/32	1/4	5/8	2-1/2	std	<b>SAMG-807</b>	11503	19.50	51503	24.20
1/4	1/4	3/4	2-1/2	std	<b>SAMG-808</b>	11505	18.33	51505	22.76
5/16	5/16	13/16	2-1/2	std	<b>SAMG-1010</b>	11507	24.16	51507	29.97
3/8	3/8	1	2-1/2	std	<b>SAMG-1212*</b>	11509	27.82	51509	34.50
7/16	7/16	1	2-3/4	std	<b>SAMG-1414*</b>	11511	40.77	51511	49.88
1/2	1/2	1	3	std	<b>SAMG-1616*</b>	11513	48.37	51513	57.44

\*4 Flute • Straight Flute End Mills Available in Stock. Call Customer Service for Details



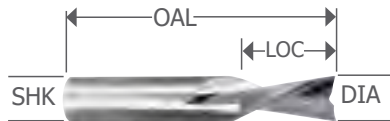
## 2 FLUTE • WOOD ROUTER - UP CUT (RHS/RHC)



### SERIES: WRUMG

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DIA	SHK	LOC	OAL	LENGTH	TOOL	BRIGHT EDP	BRIGHT PRICE	ALTiN EDP	ALTiN PRICE
1/8	1/8	1/2	1-1/2	std	<b>WRUMG-404</b>	10693	14.00	50693	16.69
1/8	1/4	1/2	2-1/2	std	<b>WRUMG-804</b>	10695	24.23	50695	28.78
3/16	1/4	5/8	2-1/2	std	<b>WRUMG-806</b>	10697	24.23	50697	27.60
1/4	1/4	3/4	2-1/2	std	<b>WRUMG-808</b>	10699	22.18	50699	25.37
1/4	1/4	1-1/8	3	long	<b>WRUMG-808-L</b>	10701	29.41	50701	36.19
5/16	5/16	13/16	2-1/2	std	<b>WRUMG-1010</b>	10703	29.94	50703	37.18
3/8	3/8	7/8	2-1/2	std	<b>WRUMG-1212</b>	10705	33.63	50705	41.72
3/8	3/8	1-1/4	3	long	<b>WRUMG-1212-L</b>	10707	47.22	50707	55.52
1/2	1/2	1	3	std	<b>WRUMG-1616</b>	10709	58.52	50709	68.56
1/2	1/2	2	4	long	<b>WRUMG-1616-L</b>	10711	73.72	50711	86.77



## 2 FLUTE • WOOD ROUTER - DOWN CUT (LHS/RHC)



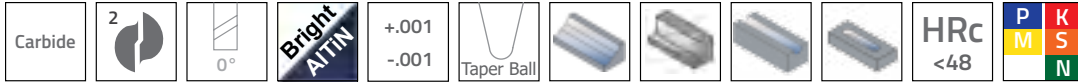
### SERIES: WRDMG

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DIA	SHK	LOC	OAL	LENGTH	TOOL	BRIGHT EDP	BRIGHT PRICE	ALTiN EDP	ALTiN PRICE
1/8	1/8	1/2	1-1/2	std	<b>WRDMG-404</b>	10713	14.00	50713	16.16
1/8	1/4	1/2	2-1/2	std	<b>WRDMG-804</b>	10715	24.23	50715	27.61
3/16	1/4	5/8	2-1/2	std	<b>WRDMG-806</b>	10717	24.23	50717	24.23
1/4	1/4	3/4	2-1/2	std	<b>WRDMG-808</b>	10719	22.18	50719	27.49
1/4	1/4	1-1/8	3	long	<b>WRDMG-808-L</b>	10721	29.41	50721	36.15
5/16	5/16	13/16	2-1/2	std	<b>WRDMG-1010</b>	10723	29.94	50723	37.18
3/8	3/8	7/8	2-1/2	std	<b>WRDMG-1212</b>	10725	33.63	50725	41.72
3/8	3/8	1-1/4	3	long	<b>WRDMG-1212-L</b>	10727	47.22	50727	55.52
1/2	1/2	1	3	std	<b>WRDMG-1616</b>	10729	58.52	50729	68.56
1/2	1/2	2	4	long	<b>WRDMG-1616-L</b>	10731	73.72	50731	86.73

# SPECIAL USE CARBIDE END MILLS

## 2 FLUTE • DIE SINKING END MILLS



### SERIES: AMGDS

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DEG/ SIDE	TIP RADIUS	SHK	LOC	OAL	LENGTH	TOOL	BRIGHT EDP	BRIGHT PRICE	ALTIN EDP	ALTIN PRICE
3°	.0156	1/8	7/8	2	std	AMGDS-401-3B	16998	18.12	56998	20.91
3°	.0313	1/8	9/16	2	std	AMGDS-402-3B	16999	17.07	56999	19.88
3°	.0469	3/16	7/8	2	std	AMGDS-603-3B	17607	24.73	57607	28.22
3°	.0625	1/4	1	2-1/2	std	AMGDS-804-3B	17608	31.10	57608	37.49
3°	.0781	5/16	1	2-1/2	std	AMGDS-1005-3B	17609	35.84	57609	43.59
3°	.0938	3/8	1	2-1/2	std	AMGDS-1206-3B	17610	47.30	57610	55.10
3°	.1094	7/16	1	2-3/4	std	AMGDS-1407-3B	17611	60.78	57611	69.81
3°	.1250	1/2	1	3	std	AMGDS-1608-3B	17612	74.10	57612	84.46

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DEG/ SIDE	TIP RADIUS	SHK	LOC	OAL	LENGTH	TOOL	BRIGHT EDP	BRIGHT PRICE	ALTIN EDP	ALTIN PRICE
5°	.0156	1/8	1/2	2	std	AMGDS-401-5B	17613	18.12	57613	20.91
5°	.0313	1/8	5/16	2	std	AMGDS-402-5B	17614	17.07	57614	19.88
5°	.0469	3/16	1/2	2	std	AMGDS-603-5B	17615	24.73	57615	28.22
5°	.0625	1/4	11/16	2-1/2	std	AMGDS-804-5B	17616	31.10	57616	37.49
5°	.0781	5/16	7/8	2-1/2	std	AMGDS-1005-5B	17617	35.84	57617	43.59
5°	.0938	3/8	1	2-1/2	std	AMGDS-1206-5B	17618	47.30	57618	55.10
5°	.1094	7/16	1	2-3/4	std	AMGDS-1407-5B	17619	60.78	57619	69.81
5°	.1250	1/2	1	3	std	AMGDS-1608-5B	17620	74.10	57620	84.46

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DEG/ SIDE	TIP RADIUS	SHK	LOC	OAL	LENGTH	TOOL	BRIGHT EDP	BRIGHT PRICE	ALTIN EDP	ALTIN PRICE
7°	.0156	1/8	3/8	1-1/2	std	AMGDS-401-7B	17621	18.12	57621	20.91
7°	.0313	1/8	1/4	1-1/2	std	AMGDS-402-7B	17622	17.07	57622	19.88
7°	.0469	3/16	3/8	2	std	AMGDS-603-7B	17623	24.73	57623	28.22
7°	.0625	1/4	1/2	2-1/2	std	AMGDS-804-7B	17624	31.10	57624	37.49
7°	.0781	5/16	5/8	2-1/2	std	AMGDS-1005-7B	17625	35.84	57625	43.59
7°	.0938	3/8	3/4	2-1/2	std	AMGDS-1206-7B	17626	47.30	57626	55.10
7°	.1094	7/16	7/8	2-3/4	std	AMGDS-1407-7B	17627	60.78	57627	69.81
7°	.1250	1/2	1	3	std	AMGDS-1608-7B	17628	74.10	57628	84.46

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DEG/ SIDE	TIP RADIUS	SHK	LOC	OAL	LENGTH	TOOL	BRIGHT EDP	BRIGHT PRICE	ALTIN EDP	ALTIN PRICE
10°	.0156	1/8	1/4	1-1/2	std	AMGDS-401-10B	17629	18.12	57629	20.91
10°	.0313	1/8	3/16	1-1/2	std	AMGDS-402-10B	17630	17.07	57630	19.88
10°	.0469	3/16	1/4	2	std	AMGDS-603-10B	17631	24.73	57631	28.22
10°	.0625	1/4	5/16	2-1/2	std	AMGDS-804-10B	17632	31.10	57632	37.49
10°	.0781	5/16	7/16	2-1/2	std	AMGDS-1005-10B	17633	35.84	57633	43.59
10°	.0938	3/8	9/16	2-1/2	std	AMGDS-1206-10B	17634	47.30	57634	55.07
10°	.1094	7/16	5/8	2-3/4	std	AMGDS-1407-10B	17635	60.78	57635	69.82
10°	.1250	1/2	11/16	3	std	AMGDS-1608-10B	17636	74.10	57636	84.42



# SPECIAL USE CARBIDE END MILLS



## 3 FLUTE • TAPERED END MILLS



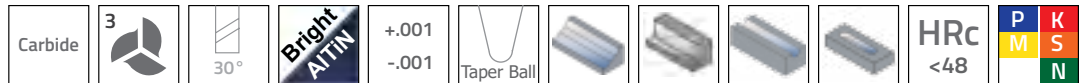
### SERIES: EMG-\_\_-\_T

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TAPER/ SIDE	TIP DIA	SHK	LOC	OAL	LENGTH	TOOL	BRIGHT EDP	BRIGHT PRICE	ALTiN EDP	ALTiN PRICE
1°	1/8	1/4	1-1/2	3	std	EMG-804-1T	10257	32.36	50257	38.83
1°	3/16	3/8	1-3/4	3-1/2	std	EMG-1206-1T	10259	49.40	50259	58.92
1° 30'	1/8	1/4	1-1/2	3	std	EMG-804-1.5T	10261	33.28	50261	39.66
1° 30'	3/16	3/8	1-3/4	3-1/2	std	EMG-1206-1.5T	10263	51.26	50263	60.77
2°	1/8	1/4	1	3	std	EMG-804-2T	10265	32.36	50265	38.83
2°	3/16	3/8	1-3/4	3-1/2	std	EMG-1206-2T	10267	49.40	50267	58.92
2°	1/4	1/2	2	4	std	EMG-1608-2T	10269	71.06	50269	83.06
3°	1/8	1/4	1	3	std	EMG-804-3T	10271	33.28	50271	39.66
3°	5/32	3/8	1-3/4	3-1/2	std	EMG-1205-3T	10273	51.26	50273	60.77
3°	1/4	1/2	2	4	std	EMG-1608-3T	10275	71.06	50275	83.06
5°	1/8	1/4	3/4	3	std	EMG-804-5T	10277	33.28	50277	39.66
5°	1/8	3/8	1-1/2	3-1/2	std	EMG-1204-5T	10279	51.26	50279	60.77
5°	1/4	1/2	1-1/4	4	std	EMG-1608-5T	10281	71.06	50281	83.06
7°	1/8	1/4	1/2	3	std	EMG-804-7T	10283	33.28	50283	39.66
7°	5/32	3/8	3/4	3-1/2	std	EMG-1205-7T	10285	51.26	50285	60.77
7°	3/16	1/2	1-1/4	4	std	EMG-1606-7T	10287	71.06	50287	83.06



## 3 FLUTE • TAPERED BALL NOSE END MILLS



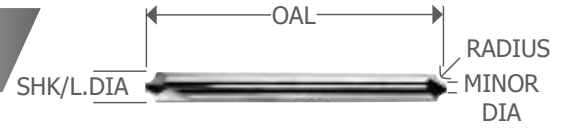
### SERIES: EMG-\_\_-\_TB

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TAPER/ SIDE	TIP DIA	SHK	LOC	OAL	LENGTH	TOOL	BRIGHT EDP	BRIGHT PRICE	ALTiN EDP	ALTiN PRICE
1°	1/8	1/4	1-1/2	3	std	EMG-804-1TB	10289	37.21	50289	43.67
1°	3/16	3/8	1-3/4	3-1/2	std	EMG-1206-1TB	10291	56.78	50291	66.33
1° 30'	1/8	1/4	1-1/2	3	std	EMG-804-1.5TB	10293	38.26	50293	44.70
1° 30'	3/16	3/8	1-3/4	3-1/2	std	EMG-1206-1.5TB	10295	58.97	50295	68.50
2°	1/8	1/4	1	3	std	EMG-804-2TB	10297	37.21	50297	43.67
2°	3/16	3/8	1-3/4	3-1/2	std	EMG-1206-2TB	10299	56.78	50299	66.33
2°	1/4	1/2	2	4	std	EMG-1608-2TB	10301	81.72	50301	93.66
3°	1/8	1/4	1	3	std	EMG-804-3TB	10303	38.26	50303	44.70
3°	5/32	3/8	1-3/4	3-1/2	std	EMG-1205-3TB	10305	58.97	50305	68.50
3°	1/4	1/2	2	4	std	EMG-1608-3TB	10307	81.72	50307	93.66
5°	1/8	1/4	3/4	3	std	EMG-804-5TB	10309	38.26	50309	44.70
5°	1/8	3/8	1-1/2	3-1/2	std	EMG-1204-5TB	10311	58.97	50311	68.50
5°	1/4	1/2	1-1/4	4	std	EMG-1608-5TB	10313	81.72	50313	93.66
7°	1/8	1/4	1/2	3	std	EMG-804-7TB	10315	38.26	50315	44.70
7°	5/32	3/8	3/4	3-1/2	std	EMG-1205-7TB	10317	58.97	50317	68.50
7°	3/16	1/2	1-1/4	4	std	EMG-1606-7TB	10319	81.72	50319	93.66

# SPECIAL USE CARBIDE END MILLS

## 2 FLUTE • DOUBLE END CORNER ROUNDERS

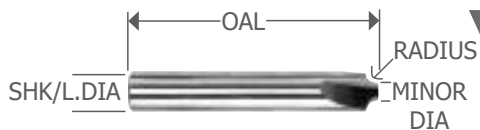


### SERIES: BRMG

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RADIUS	MINOR DIA	SHK/ LARGE DIA	OAL	LENGTH	TOOL	BRIGHT EDP	BRIGHT PRICE	ALTiN EDP	ALTiN PRICE
0.010	0.047	1/8	1-1/2	stub	<b>BRMG-4010-S</b>	11178	26.67	51178	30.39
0.010	0.105	1/8	1-1/2	std	<b>BRMG-4010</b>	16293	26.67	56293	30.39
0.015	0.047	1/8	1-1/2	stub	<b>BRMG-4015-S</b>	11179	26.67	51179	30.39
0.015	0.095	1/8	1-1/2	std	<b>BRMG-4015</b>	16294	26.67	56294	30.39
0.020	0.047	1/8	1-1/2	stub	<b>BRMG-4020-S</b>	11181	26.67	51181	30.39
0.020	0.085	1/8	1-1/2	std	<b>BRMG-4020</b>	16295	26.67	56295	30.39
0.025	0.075	1/8	1-1/2	std	<b>BRMG-4025</b>	16296	26.67	56296	30.39
0.030	0.047	1/8	1-1/2	stub	<b>BRMG-4030-S</b>	11703	26.67	51703	30.39
0.031	0.047	1/8	1-1/2	stub	<b>BRMG-4031-S</b>	11182	26.67	51182	30.39
0.031	0.063	1/8	1-1/2	std	<b>BRMG-4031</b>	16297	26.67	56297	30.39
0.035	0.055	1/8	1-1/2	std	<b>BRMG-4035</b>	16298	26.67	56298	30.39
0.039	0.047	1/8	1-1/2	std	<b>BRMG-4039</b>	16299	26.67	56299	30.39
0.047	0.047	3/16	2	stub	<b>BRMG-6047-S</b>	11183	34.65	51183	39.51
0.047	0.094	3/16	2	std	<b>BRMG-6047</b>	16300	34.65	56300	39.55
0.050	0.088	3/16	2	std	<b>BRMG-6050</b>	16301	34.65	56301	39.55
0.055	0.078	3/16	2	std	<b>BRMG-6055</b>	16302	34.65	56302	39.55
0.062	0.047	3/16	2	stub	<b>BRMG-6062-S</b>	11185	34.65	51185	39.55
0.062	0.064	3/16	2	std	<b>BRMG-6062</b>	16303	34.65	56303	39.55
0.072	0.106	1/4	2-1/2	std	<b>BRMG-8072</b>	16304	34.65	56304	41.10
0.078	0.047	1/4	2	stub	<b>BRMG-8078-S</b>	11186	41.06	51186	47.48
0.078	0.094	1/4	2-1/2	std	<b>BRMG-8078</b>	16305	41.06	56305	47.48
0.093	0.064	1/4	2-1/2	std	<b>BRMG-8093</b>	16306	41.06	56306	47.48
0.094	0.047	1/4	2	stub	<b>BRMG-8094-S</b>	11187	41.06	51187	47.48
0.100	0.050	1/4	2-1/2	std	<b>BRMG-8100</b>	16307	41.06	56307	47.48
0.109	0.095	5/16	2-1/2	std	<b>BRMG-10109</b>	16308	45.08	56308	52.84
0.118	0.077	5/16	2-1/2	std	<b>BRMG-10118</b>	16309	45.08	56309	52.84
0.125	0.063	5/16	2-1/2	std	<b>BRMG-10125</b>	16310	45.08	56310	52.84
0.140	0.095	3/8	2-1/2	std	<b>BRMG-12140</b>	16311	57.88	56311	66.02
0.156	0.063	3/8	2-1/2	std	<b>BRMG-12156</b>	16312	57.88	56312	66.02

# SPECIAL USE CARBIDE END MILLS



## 3 FLUTE • CORNER ROUNDING END MILLS

Carbide **Bright ALTiN**  $\pm .001$   $-.001$  radius HRC <48

### SERIES: RMG

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RADIUS	MINOR DIA	SHK/ LARGE DIA	OAL	LENGTH	TOOL	BRIGHT EDP	BRIGHT PRICE	ALTiN EDP	ALTiN PRICE
1/32	1/8	3/16	2	std	<b>RMG-601</b>	16092	20.12	56092	22.97
1/16	1/8	1/4	2-1/2	std	<b>RMG-802</b>	16093	27.59	56093	33.99
3/32	3/16	3/8	2-1/2	std	<b>RMG-1203</b>	16094	45.44	56094	53.25
1/8	1/4	1/2	3	std	<b>RMG-1604</b>	16095	67.43	56095	76.86
5/32	5/16	5/8	3-1/2	std	<b>RMG-2005</b>	16096	99.83	56096	113.82
3/16	3/8	3/4	4	std	<b>RMG-2406</b>	16097	147.93	56097	171.15
1/4	1/2	1	4	std	<b>RMG-3208</b>	16098	239.14	56098	272.58

## 4 FLUTE • CORNER ROUNDING END MILLS

Carbide **Bright ALTiN**  $\pm .001$   $-.001$  radius HRC <48

### SERIES: RCMG

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RADIUS	MINOR DIA	SHK/ LARGE DIA	OAL	LENGTH	TOOL	BRIGHT EDP	BRIGHT PRICE	ALTiN EDP	ALTiN PRICE
1/32	1/8	3/16	2	std	<b>RCMG-601</b>	16099	20.12	56099	22.97
1/16	1/8	1/4	2-1/2	std	<b>RCMG-802</b>	16100	27.59	56100	33.99
3/32	3/16	3/8	2-1/2	std	<b>RCMG-1203</b>	16101	45.44	56101	53.25
1/8	1/4	1/2	3	std	<b>RCMG-1604</b>	16102	67.43	56102	76.86
5/32	5/16	5/8	3-1/2	std	<b>RCMG-2005</b>	16103	99.83	56103	113.82
3/16	3/8	3/4	4	std	<b>RCMG-2406</b>	16104	147.93	56104	171.15
1/4	1/2	1	4	std	<b>RCMG-3208</b>	16105	239.14	56105	272.58

## 4 FLUTE • CORNER ROUNDING END MILLS

Carbide **Bright ALTiN**  $\pm .025\text{mm}$   $-.025\text{mm}$  radius HRC <48

### SERIES: RCMG

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RADIUS	MINOR DIA	SHK/ LARGE DIA	OAL	LENGTH	TOOL	BRIGHT EDP	BRIGHT PRICE	ALTiN EDP	ALTiN PRICE
1mm	4mm	6mm	63mm	std	<b>RCMG-M6M1</b>	13632	31.56	53632	37.98
1.5mm	3mm	6mm	63mm	std	<b>RCMG-M6M1.5</b>	13633	31.55	53633	38.01
2mm	4mm	8mm	63mm	std	<b>RCMG-M8M2</b>	13634	43.44	53634	51.19
3mm	6mm	12mm	76mm	std	<b>RCMG-M12M3</b>	13635	64.18	53635	73.18
4mm	8mm	16mm	89mm	std	<b>RCMG-M16M4</b>	13636	102.81	53636	117.18

# SPECIAL USE CARBIDE END MILLS

## 2 FLUTE • 60° OR 90° CHAMFER END MILLS



Carbide	MULTI FLUTES	Bright ALTiN	+0.0000 -0.0020	Drill Pt.		HRC <48	P M K S N
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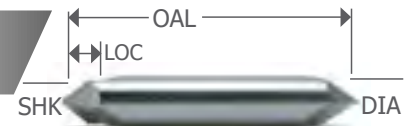
### SERIES: CMG2

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DIA	SHK	LOC	OAL	ANGLE	LENGTH	TOOL	BRIGHT EDP	BRIGHT PRICE	ALTiN EDP	ALTiN PRICE
1/4	1/4	3/16	2-1/2	60°	std	CMG2-808-60	16281	22.96	56281	28.43
3/8	3/8	5/16	2-1/2	60°	std	CMG2-1212-60	16282	36.33	56282	44.08
1/2	1/2	7/16	3	60°	std	CMG2-1616-60	16283	62.26	56283	71.30
3/4	3/4	5/8	4	60°	std	CMG2-2424-60	11575	176.74	51575	201.50

DIA	SHK	LOC	OAL	ANGLE	LENGTH	TOOL	BRIGHT EDP	BRIGHT PRICE	ALTiN EDP	ALTiN PRICE
1/8	1/8	1/16	1-1/2	90°	std	CMG2-404-90	12091	12.85	52091	15.66
1/4	1/4	1/8	2-1/2	90°	std	CMG2-808-90	16284	22.96	56284	28.43
3/8	3/8	3/16	2-1/2	90°	std	CMG2-1212-90	16278	36.33	56278	44.08
1/2	1/2	1/4	3	90°	std	CMG2-1616-90	16285	62.26	56285	71.30
3/4	3/4	3/8	4	90°	std	CMG2-2424-90	12293	176.73	52293	201.50

## 2 FLUTE • 90° DOUBLE END CHAMFER END MILLS



### SERIES: DMG2

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DIA	SHK	LOC	OAL	LENGTH	TOOL	BRIGHT EDP	BRIGHT PRICE
1/8	1/8	1/16	1-1/2	std	DMG2-404-90	10971	22.48
3/16	3/16	3/32	2	std	DMG2-606-90	10973	28.87
1/4	1/4	1/8	2-1/2	std	DMG2-808-90	10975	37.63
3/8	3/8	3/16	2-1/2	std	DMG2-1212-90	10977	66.16
1/2	1/2	1/4	3	std	DMG2-1616-90	10979	100.54
5/8	5/8	5/16	3-1/2	std	DMG2-2020-90	13097	133.31
3/4	3/4	3/8	4	std	DMG2-2424-90	13099	192.21

## 4 FLUTE • 60° OR 90° CHAMFER END MILLS



### SERIES: CMG4

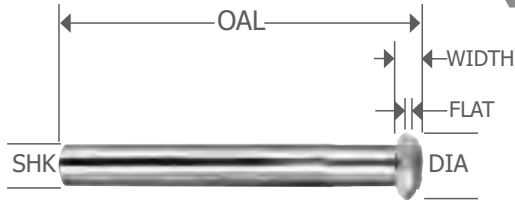
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DIA	SHK	LOC	OAL	ANGLE	LENGTH	TOOL	BRIGHT EDP	BRIGHT PRICE	ALTiN EDP	ALTiN PRICE
1/4	1/4	3/16	2-1/2	60°	std	CMG4-808-60	16286	22.96	56286	28.43
3/8	3/8	5/16	2-1/2	60°	std	CMG4-1212-60	16287	36.33	56287	44.08
1/2	1/2	7/16	3	60°	std	CMG4-1616-60	16288	62.26	56288	71.30
3/4	3/4	5/8	4	60°	std	CMG4-2424-60	16289	176.73	56289	201.50

DIA	SHK	LOC	OAL	ANGLE	LENGTH	TOOL	BRIGHT EDP	BRIGHT PRICE	ALTiN EDP	ALTiN PRICE
1/4	1/4	1/8	2-1/2	90°	std	CMG4-808-90	16290	22.96	56290	28.43
3/8	3/8	3/16	2-1/2	90°	std	CMG4-1212-90	16279	36.33	56279	44.08
1/2	1/2	1/4	3	90°	std	CMG4-1616-90	16291	62.26	56291	71.30
3/4	3/4	3/8	4	90°	std	CMG4-2424-90	16292	176.73	56292	201.50

# SPECIAL USE CARBIDE END MILLS

## MULTI FLUTE • BACK CHAMFER END MILLS



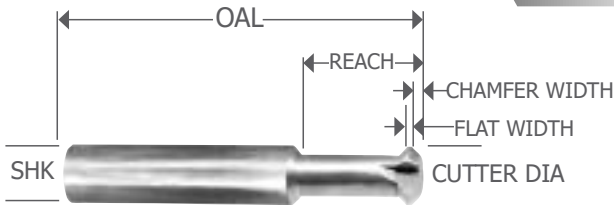
Carbide	MULTI FLUTES		BRIGHT	+.0000 -.0050 O.D.	HRC <48	<table border="1"><tr><td>P</td><td>K</td></tr><tr><td>M</td><td>S</td></tr><tr><td></td><td>N</td></tr></table>	P	K	M	S		N
P	K											
M	S											
	N											

### SERIES: BC

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CUTTER DIA	SHANK DIA	OAL	WIDTH	FLAT	NECK DIA	NECK WIDTH	FLUTES	TOOL	BRIGHT EDP	BRIGHT PRICE
3/8	1/4	2-5/8	.125	0.031	.220	.365	4	BC-3/8	12340	65.64
1/2	5/16	2-5/8	.125	0.031	.295	.365	5	BC-1/2	12341	82.27
3/4	3/8	2-21/32	.156	0.031	----	----	6	BC-3/4	12342	106.33
1	1/2	3-3/16	.188	0.031	----	----	7	BC-1	12343	154.24

## 1 FLUTE • BACK CHAMFER FOR LATHES



Carbide			BRIGHT	+.0000 -.0050 O.D.	HRC <48	<table border="1"><tr><td>P</td><td>K</td></tr><tr><td>M</td><td>S</td></tr><tr><td></td><td>N</td></tr></table>	P	K	M	S		N
P	K											
M	S											
	N											

### SERIES: BCL

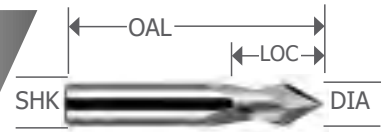
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CUTTER DIA	SHANK DIA	OAL	CHAMFER WIDTH	FLAT WIDTH	NECK DIA	REACH	TOOL	BRIGHT EDP	BRIGHT PRICE
.177	3/16	2-1/2	0.026	0.031	0.125	0.775	BCL-3/16	12333	33.64
1/4	1/4	2-1/2	0.035	0.031	0.170	0.775	BCL-1/4	12334	42.74
1/4	1/4	2-1/2	0.035	0.031	0.170	1.275	BCL-1/4-L	12335	44.92
.300	5/16	2-1/2	0.045	0.031	0.210	0.775	BCL-5/16	12336	50.70
.360	3/8	2-1/2	0.055	0.031	0.250	0.775	BCL-3/8	12337	63.24
.360	3/8	2-1/2	0.055	0.031	0.250	1.275	BCL-3/8-L	12338	66.95
.490	1/2	3	0.070	0.031	0.350	1.000	BCL-1/2	12339	130.28



# SPECIAL USE CARBIDE END MILLS

## 2 FLUTE • 60°, 82° & 90° DRILL POINT END MILLS



Carbide	2	30°	Bright AlTiN	+0.0005 -.0005 <1/8	+0.0000 -.0020 ≥1/8	Drill Pt.	HRC <48	P M	K S N
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### SERIES: AMG-\_\_-DP60

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DIA	SHK	LOC	OAL	ANGLE	LENGTH	TOOL	BRIGHT EDP	BRIGHT PRICE	ALTIN EDP	ALTIN PRICE
1/16	1/8	3/16	1-1/2	60°	std	AMG-402-DP60	12199	13.39	52199	16.17
3/32	1/8	3/8	1-1/2	60°	std	AMG-403-DP60	12200	13.39	52200	16.17
1/8	1/8	1/2	1-1/2	60°	std	AMG-404-DP60	11663	12.85	51663	15.66
3/16	3/16	5/8	2	60°	std	AMG-606-DP60	12201	18.35	52201	21.22
1/4	1/4	3/4	2-1/2	60°	std	AMG-808-DP60	11665	22.96	51665	28.43
5/16	5/16	13/16	2-1/2	60°	std	AMG-1010-DP60	12193	28.90	52193	35.84
3/8	3/8	1	2-1/2	60°	std	AMG-1212-DP60	11667	36.33	51667	44.08
7/16	7/16	1	2-3/4	60°	std	AMG-1414-DP60	12195	50.79	52195	59.85
1/2	1/2	1	3	60°	std	AMG-1616-DP60	11669	62.26	51669	71.30
5/8	5/8	1-1/4	3-1/2	60°	std	AMG-2020-DP60	12196	118.98	52196	135.66
3/4	3/4	1-1/2	4	60°	std	AMG-2424-DP60	12197	176.73	52197	201.50

### SERIES: AMG-\_\_-DP82

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DIA	SHK	LOC	OAL	ANGLE	LENGTH	TOOL	BRIGHT EDP	BRIGHT PRICE	ALTIN EDP	ALTIN PRICE
1/8	1/8	1/2	1-1/2	82°	std	AMG-404-DP82	12455	12.85	52455	15.66
1/4	1/4	3/4	2-1/2	82°	std	AMG-808-DP82	16590	22.96	56590	28.43
3/8	3/8	1	2-1/2	82°	std	AMG-1212-DP82	16591	36.33	56591	44.08
1/2	1/2	1	3	82°	std	AMG-1616-DP82	16592	62.26	56592	71.30
5/8	5/8	1-1/4	3-1/2	82°	std	AMG-2020-DP82	16593	118.96	56593	135.66
3/4	3/4	1-1/2	4	82°	std	AMG-2424-DP82	16594	176.73	56594	201.50

### SERIES: AMG-\_\_-DP

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DIA	SHK	LOC	OAL	ANGLE	LENGTH	TOOL	BRIGHT EDP	BRIGHT PRICE	ALTIN EDP	ALTIN PRICE
.015	1/8	.045	1-1/2	90°	std	AMG-.015-DP	13039	23.43	53039	26.68
.020	1/8	.060	1-1/2	90°	std	AMG-.020-DP	13029	23.43	53029	26.68
.025	1/8	.075	1-1/2	90°	std	AMG-.025-DP	13031	23.43	53031	26.68
.030	1/8	.090	1-1/2	90°	std	AMG-.030-DP	13033	21.95	53033	25.03
.045	1/8	.105	1-1/2	90°	std	AMG-.045-DP	13035	18.93	53035	21.73
.060	1/8	.180	1-1/2	90°	std	AMG-.060-DP	13037	18.93	53037	21.73
1/16	1/8	3/16	1-1/2	90°	std	AMG-402-DP	11623	13.39	51623	16.17
3/32	1/8	3/8	1-1/2	90°	std	AMG-403-DP	11625	13.39	51625	16.17
1/8	1/8	1/2	1-1/2	90°	std	AMG-404-DP	16083	12.85	56083	15.66
1/8	1/8	1/2	1-1/2	90°	std	AMG-404-DP-1	16703	12.85	56703	15.66
3/16	3/16	5/8	2	90°	std	AMG-606-DP	16084	18.34	56084	21.22
3/16	3/16	5/8	2	90°	std	AMG-606-DP-1	16704	18.34	56704	21.22
1/4	1/4	3/4	2-1/2	90°	std	AMG-808-DP	16085	22.96	56085	28.43
1/4	1/4	3/4	2-1/2	90°	std	AMG-808-DP-1	16712	22.96	56712	28.43
5/16	5/16	13/16	2-1/2	90°	std	AMG-1010-DP	16086	28.90	56086	35.84
5/16	5/16	13/16	2-1/2	90°	std	AMG-1010-DP-1	16705	28.90	56705	35.84
3/8	3/8	1	2-1/2	90°	std	AMG-1212-DP	16087	36.33	56087	44.08
3/8	3/8	1	2-1/2	90°	std	AMG-1212-DP-1	16462	36.33	56462	44.08
7/16	7/16	1	2-3/4	90°	std	AMG-1414-DP	16088	50.79	56088	59.85
1/2	1/2	1	3	90°	std	AMG-1616-DP	16089	62.26	56089	71.30
1/2	1/2	1	3	90°	std	AMG-1616-DP-1	16707	62.26	56707	71.30
5/8	5/8	1-1/4	3-1/2	90°	std	AMG-2020-DP	16090	118.96	56090	135.66
5/8	5/8	1-1/4	3-1/2	90°	std	AMG-2020-DP-1	16706	118.96	56706	135.66
3/4	3/4	1-1/2	4	90°	std	AMG-2424-DP	16091	176.73	56091	201.50

Tool names with "-1" have a .005 sharp point for groove milling

# SPECIAL USE CARBIDE END MILLS

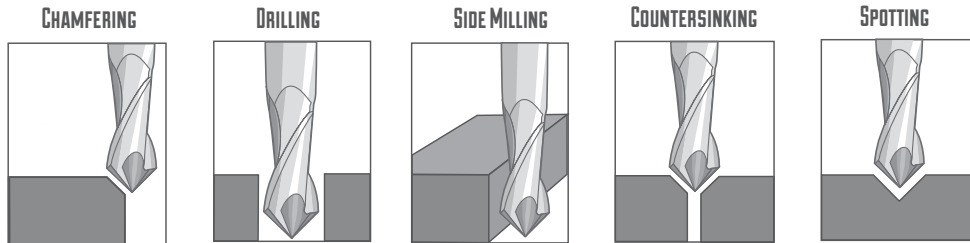
## 2 FLUTE • 90° DRILL POINT END MILLS

Carbide	2	30°	Bright ALTIN	+0.0005 -0.0005 <1/8	+0.0000 -0.0020 ≥1/8	Drill Pt.	HRC <48	P M K S N
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SERIES: AMG-\_\_-DP

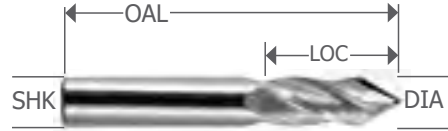
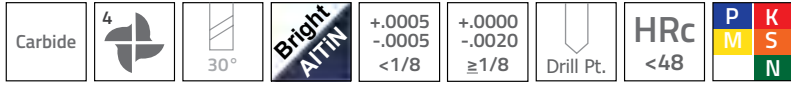
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DIA	SHK	LOC	OAL	ANGLE	LENGTH	TOOL	BRIGHT EDP	BRIGHT PRICE	ALTIN EDP	ALTIN PRICE
0.5mm	3mm	2.0mm	38mm	90°	std	AMG-M3M0.5-DP	13364	19.53	53364	22.27
0.6mm	3mm	2.5mm	38mm	90°	std	AMG-M3M0.6-DP	13365	18.65	53365	21.48
0.7mm	3mm	2.5mm	38mm	90°	std	AMG-M3M0.7-DP	13366	18.65	53366	21.48
0.8mm	3mm	3.0mm	38mm	90°	std	AMG-M3M0.8-DP	13367	18.27	53367	21.12
0.9mm	3mm	3.5mm	38mm	90°	std	AMG-M3M0.9-DP	13368	17.59	53368	20.41
1.0mm	3mm	4.0mm	38mm	90°	std	AMG-M3M1-DP	13369	17.59	53369	20.39
1.2mm	3mm	4.5mm	38mm	90°	std	AMG-M3M1.2-DP	13370	17.59	53370	20.41
1.4mm	3mm	5.5mm	38mm	90°	std	AMG-M3M1.4-DP	13371	17.59	53371	20.60
1.5mm	3mm	6.0mm	38mm	90°	std	AMG-M3M1.5-DP	13372	17.59	53372	20.39
1.8mm	3mm	7.0mm	38mm	90°	std	AMG-M3M1.8-DP	13373	17.59	53373	20.39
2.0mm	3mm	8.0mm	38mm	90°	std	AMG-M3M2-DP	13374	17.59	53374	20.39
2.5mm	3mm	10mm	38mm	90°	std	AMG-M3M2.5-DP	13375	17.59	53375	20.39
3.0mm	3mm	12mm	38mm	90°	std	AMG-M3M3-DP	13376	24.03	53376	27.40
4.0mm	4mm	14mm	51mm	90°	std	AMG-M4M4-DP	13377	26.63	53377	30.38
5.0mm	5mm	20mm	51mm	90°	std	AMG-M5M5-DP	13378	33.92	53378	38.62
6.0mm	6mm	20mm	63mm	90°	std	AMG-M6M6-DP	13379	36.40	53379	42.85
8.0mm	8mm	20mm	63mm	90°	std	AMG-M8M8-DP	13380	49.64	53380	57.37
10.0mm	10mm	25mm	70mm	90°	std	AMG-M10M10-DP	13381	61.70	53381	70.35
12.0mm	12mm	25mm	76mm	90°	std	AMG-M12M12-DP	13382	72.69	53382	82.84
16.0mm	16mm	32mm	89mm	90°	std	AMG-M16M16-DP	13383	116.84	53383	133.24
20.0mm	20mm	38mm	100mm	90°	std	AMG-M20M20-DP	13384	205.93	53384	235.56



# SPECIAL USE CARBIDE END MILLS

## 4 FLUTE • 60°, 82°, 90° DRILL POINT END MILLS



### SERIES: CCMG-\_\_-DP60

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DIA	SHK	LOC	OAL	ANGLE	LENGTH	TOOL	BRIGHT EDP	BRIGHT PRICE	ALTiN EDP	ALTiN PRICE
1/16	1/8	3/16	1-1/2	60°	std	CCMG-402-DP60	19764	13.27	59764	16.58
3/32	1/8	3/8	1-1/2	60°	std	CCMG-403-DP60	19765	13.27	59765	16.58
1/8	1/8	1/2	1-1/2	60°	std	CCMG-404-DP60	19766	12.73	59766	15.96
3/16	3/16	5/8	2	60°	std	CCMG-606-DP60	19767	18.34	59767	22.97
1/4	1/4	3/4	2-1/2	60°	std	CCMG-808-DP60	19768	22.96	59768	28.74
5/16	5/16	13/16	2-1/2	60°	std	CCMG-1010-DP60	19769	28.90	59769	36.15
3/8	3/8	1	2-1/2	60°	std	CCMG-1212-DP60	19770	36.33	59770	45.42
7/16	7/16	1	2-3/4	60°	std	CCMG-1414-DP60	19771	50.79	59771	63.52
1/2	1/2	1	3	60°	std	CCMG-1616-DP60	19772	62.26	59772	71.30
5/8	5/8	1-1/4	3-1/2	60°	std	CCMG-2020-DP60	19773	118.96	59773	135.66

### SERIES: CCMG-\_\_-DP82

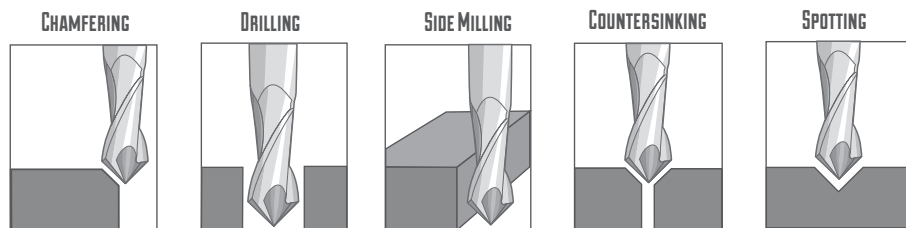
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DIA	SHK	LOC	OAL	ANGLE	LENGTH	TOOL	BRIGHT EDP	BRIGHT PRICE	ALTiN EDP	ALTiN PRICE
1/16	1/8	3/16	1-1/2	82°	std	CCMG-402-DP82	19775	13.00	59775	16.58
3/32	1/8	3/8	1-1/2	82°	std	CCMG-403-DP82	19776	13.00	59776	16.58
1/8	1/8	1/2	1-1/2	82°	std	CCMG-404-DP82	19777	12.48	59777	15.96
3/16	3/16	5/8	2	82°	std	CCMG-606-DP82	19778	18.34	59778	22.97
1/4	1/4	3/4	2-1/2	82°	std	CCMG-808-DP82	19779	22.96	59779	28.74
5/16	5/16	13/16	2-1/2	82°	std	CCMG-1010-DP82	19780	28.90	59780	36.15
3/8	3/8	1	2-1/2	82°	std	CCMG-1212-DP82	19781	36.33	59781	45.42
1/2	1/2	1	3	82°	std	CCMG-1616-DP82	19783	62.26	59783	71.30
5/8	5/8	1-1/4	3-1/2	82°	std	CCMG-2020-DP82	19784	118.96	59784	135.66
3/4	3/4	1-1/2	4	82°	std	CCMG-2424-DP82	19785	176.73	59785	201.50

### SERIES: CCMG-\_\_-DP

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DIA	SHK	LOC	OAL	ANGLE	LENGTH	TOOL	BRIGHT EDP	BRIGHT PRICE	ALTiN EDP	ALTiN PRICE
1/16	1/8	3/16	1-1/2	90°	std	CCMG-402-DP	11629	13.39	51629	16.17
3/32	1/8	3/8	1-1/2	90°	std	CCMG-403-DP	11631	13.39	51631	16.17
1/8	1/8	1/2	1-1/2	90°	std	CCMG-404-DP	11633	12.85	51633	15.66
3/16	3/16	5/8	2	90°	std	CCMG-606-DP	11635	18.34	51635	21.22
1/4	1/4	3/4	2-1/2	90°	std	CCMG-808-DP	11637	22.96	51637	28.43
5/16	5/16	13/16	2-1/2	90°	std	CCMG-1010-DP	11639	28.90	51639	35.84
3/8	3/8	1	2-1/2	90°	std	CCMG-1212-DP	11640	36.33	51640	44.08
7/16	7/16	1	2-3/4	90°	std	CCMG-1414-DP	11641	50.79	51641	59.85
1/2	1/2	1	3	90°	std	CCMG-1616-DP	11642	62.26	51642	71.30
5/8	5/8	1-1/4	3-1/2	90°	std	CCMG-2020-DP	11643	118.96	51643	135.66
3/4	3/4	1-1/2	4	90°	std	CCMG-2424-DP	11644	176.73	51644	201.50



# SPECIAL USE CARBIDE END MILLS



## BLANKS • CENTERLESS GROUND BLANKS

Carbide

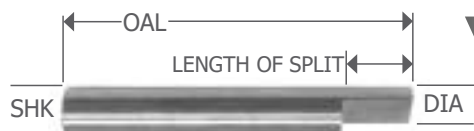
BRIGHT

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-0.0000

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SIZE	CENTERLESS GROUND EDP	GROUND PRICE
1/8 x 1-1/2	10455	4.29
1/8 x 2	10457	6.01
1/8 x 3	10459	9.93
3/16 x 2	10461	8.09
3/16 x 3	10463	13.65
1/4 x 2	10465	11.15
1/4 x 2-1/2	10467	12.99
1/4 x 3	10469	16.09
1/4 x 4	10471	21.45
5/16 x 2-1/2	10473	19.08
5/16 x 3	10475	26.42
5/16 x 4	10477	34.48
3/8 x 2-1/2	10479	24.12
3/8 x 3	10481	30.25
3/8 x 3-1/2	10483	35.43
3/8 x 4	10485	38.01
3/8 x 6	10487	50.58

SIZE	CENTERLESS GROUND EDP	GROUND PRICE
7/16 x 2-1/2	10489	33.30
7/16 x 2-3/4	10491	37.03
7/16 x 3	10493	37.44
7/16 x 4	10495	59.61
1/2 x 3	10499	41.87
1/2 x 4	10501	61.37
1/2 x 6	10503	96.44
9/16 x 3-1/2	10505	77.02
5/8 x 3-1/2	10507	79.28
5/8 x 6	10509	147.64
3/4 x 4	10511	122.21
3/4 x 6	10513	234.54
7/8 x 4	10515	177.56
1 x 4	10517	212.73
1 x 6	10519	350.03



## BLANKS • ENGRAVING BLANKS

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DIA	SHK	LENGTH OF SPLIT	OAL	SINGLE END EDP	SINGLE END PRICE	DOUBLE END EDP	DOUBLE END PRICE
1/8	1/8	3/8	1-1/2	10521	5.41	10565	8.33
1/8	1/8	3/8	2	10523	6.71	10567	9.62
1/8	1/8	3/8	3	10525	9.65	10569	12.59
3/16	3/16	1/2	2	10527	8.48	10571	11.15
3/16	3/16	1/2	3	10529	12.99	10573	16.39
1/4	1/4	1/2	2	10531	11.08	10575	14.48
1/4	1/4	1/2	2-1/2	10533	12.48	10577	15.88
1/4	1/4	1/2	3	10535	14.86	10579	18.24
1/4	1/4	1/2	4	10537	18.97	10581	22.36
5/16	5/16	1/2	2-1/2	10539	17.40	10583	20.83
5/16	5/16	1/2	3	10541	23.10	10585	26.53
5/16	5/16	1/2	4	10543	29.36	10587	32.77
3/8	3/8	1/2	2-1/2	10545	22.03	10589	26.32
3/8	3/8	1/2	3	10547	26.79	10591	31.08
3/8	3/8	1/2	4	10549	32.80	10593	37.12
3/8	3/8	1/2	6	10551	42.57	10595	46.85
7/16	7/16	5/8	2-1/2	10553	30.50	10597	35.41
7/16	7/16	5/8	3	10555	33.84	10599	38.74
7/16	7/16	5/8	4	10557	51.62	10601	56.51
1/2	1/2	5/8	3	10559	37.77	10603	43.10
1/2	1/2	5/8	4	10561	53.41	10605	58.75
1/2	1/2	5/8	6	10563	81.55	10607	86.89

# SPECIAL USE CARBIDE END MILLS

## BLANKS • HALF ROUND - RELIEVED FOR RIGHT HAND CUT



Carbide	BRIGHT	+0.0010 -0.0000	
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DIA	SHK	LENGTH OF SPLIT	OAL	HALF ROUND BALL	HALF ROUND PRICE
1/8	1/8	3/16	1-1/2	91073	12.10
5/32	5/32	3/16	1-1/2	91074	13.51
3/16	3/16	1/4	1-1/2	91075	17.22
1/4	1/4	3/8	2	91076	22.04
5/16	5/16	3/8	2	91077	32.36
3/8	3/8	1/2	2	91078	50.24
7/16	7/16	1/2	2	91079	68.62
1/2	1/2	9/16	2	91080	78.59

## BLANKS • HALF ROUND 60° CONICAL- RELIEVED FOR RIGHT HAND CUT

Carbide	BRIGHT	+0.0010 -0.0000	
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DIA	SHK	LENGTH OF SPLIT	OAL	HALF ROUND 60° CONICAL	HALF ROUND PRICE
1/8	1/8	3/16	1-1/2	91081	12.10
5/32	5/32	3/16	1-1/2	91082	13.51
3/16	3/16	1/4	1-1/2	91083	17.22
1/4	1/4	3/8	2	91084	22.04
5/16	5/16	3/8	2	91085	32.36
3/8	3/8	1/2	2	91086	50.24
7/16	7/16	1/2	2	91087	68.62
1/2	1/2	1/2	2	91088	78.59

## BLANKS • HALF ROUND SQUARE - RELIEVED FOR RIGHT HAND CUT

Carbide	BRIGHT	+0.0010 -0.0000	
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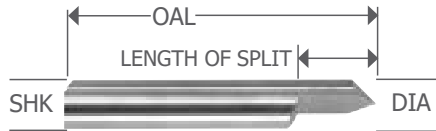
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DIA	SHK	LENGTH OF SPLIT	OAL	HALF ROUND SQUARE	HALF ROUND PRICE
1/8	1/8	3/16	1-1/2	91089	9.03
5/32	5/32	3/16	1-1/2	91090	10.26
3/16	3/16	1/4	1-1/2	91091	12.28
1/4	1/4	3/8	2	91092	15.38
5/16	5/16	3/8	2	91093	21.91
3/8	3/8	1/2	2	91094	37.67
7/16	7/16	1/2	2	91095	54.90
1/2	1/2	1/2	2	91096	60.28



# SPECIAL USE CARBIDE END MILLS

## BLANKS • 30°, 60°, 90° CONICAL - RELIEVED FOR RIGHT HAND CUT



Carbide	BRIGHT	+0.0010 -0.0000	
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DIA	SHK	LENGTH OF SPLIT	OAL	30°	30° PRICE	60°	60° PRICE	90°	90° PRICE
1/8	1/8	3/8	1-1/2	91001	12.37	91013	12.37	91025	12.37
1/8	1/8	3/8	3	91002	14.95	91014	14.95	91026	14.95
3/16	3/16	7/16	2	91003	16.03	91015	16.03	91027	16.03
3/16	3/16	7/16	3	91004	17.51	91016	17.51	91028	17.51
1/4	1/4	1/2	2	91005	19.04	91017	19.04	91029	19.04
1/4	1/4	1/2	4	91006	23.59	91018	23.59	91030	23.59
5/16	5/16	1/2	2-1/2	91007	29.80	91019	29.80	91031	29.80
5/16	5/16	1/2	4	91008	37.55	91020	37.55	91032	37.55
3/8	3/8	1/2	2-1/2	91009	40.80	91021	40.80	91033	40.80
3/8	3/8	1/2	4	91010	53.01	91022	53.01	91034	53.01
1/2	1/2	5/8	3	91011	64.05	91023	64.05	91035	64.05
1/2	1/2	5/8	4	91012	86.81	91024	86.81	91036	86.81

## BLANKS • 30°, 60°, 90° DOUBLE END CONICAL - RELIEVED FOR RIGHT HAND CUT



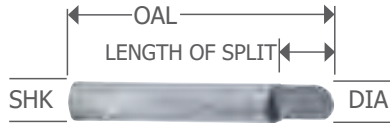
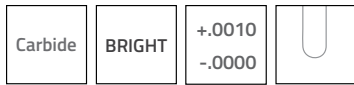
Carbide	BRIGHT	+0.0010 -0.0000	
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DIA	SHK	LENGTH OF SPLIT	OAL	30°	30° PRICE	60°	60° PRICE	90°	90° PRICE
1/8	1/8	3/8	2	91037	15.56	91049	15.56	91061	15.56
1/8	1/8	3/8	3	91038	18.23	91050	18.23	91062	18.23
3/16	3/16	7/16	2	91039	19.75	91051	19.75	91063	19.75
3/16	3/16	7/16	3	91040	22.07	91052	22.07	91064	22.07
1/4	1/4	1/2	2-1/2	91041	23.11	91053	23.11	91065	23.11
1/4	1/4	1/2	4	91042	30.23	91054	30.23	91066	30.23
5/16	5/16	1/2	2-1/2	91043	36.38	91055	36.38	91067	36.38
5/16	5/16	1/2	4	91044	44.23	91056	44.23	91068	44.23
3/8	3/8	1/2	2-1/2	91045	50.17	91057	50.17	91069	50.17
3/8	3/8	1/2	4	91046	61.24	91058	61.24	91070	61.24
1/2	1/2	5/8	3	91047	75.62	91059	75.62	91071	75.62
1/2	1/2	5/8	4	91048	98.36	91060	98.36	91072	98.36

# SPECIAL USE CARBIDE END MILLS

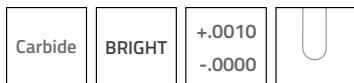
## BLANKS • SPLIT BALL NOSE - RELIEVED FOR RIGHT HAND CUT



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DIA	SHK	LENGTH OF SPLIT	OAL	SINGLE END	SINGLE END PRICE
1/8	1/8	3/8	1-1/2	12344	15.33
1/8	1/8	3/8	3	12345	17.23
3/16	3/16	3/8	2	12346	18.90
3/16	3/16	3/8	3	12347	19.64
1/4	1/4	3/8	2-1/2	12348	22.98
1/4	1/4	3/8	4	12349	28.50
5/16	5/16	1/2	2-1/2	12350	34.93
3/8	3/8	1/2	2-1/2	12351	50.27
1/2	1/2	5/8	3	12352	82.16

## BLANKS • Double End SPLIT BALL NOSE - RELIEVED FOR RIGHT HAND CUT



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DIA	SHK	LENGTH OF SPLIT	OAL	DOUBLE END	DOUBLE END PRICE
1/8	1/8	3/8	1-1/2	12353	19.59
1/8	1/8	3/8	3	12354	21.72
3/16	3/16	3/8	2	12355	24.26
3/16	3/16	3/8	3	12356	24.95
1/4	1/4	3/8	2-1/2	12357	28.91
1/4	1/4	3/8	4	12358	34.89
5/16	5/16	1/2	2-1/2	12359	43.64
3/8	3/8	1/2	2-1/2	12360	56.22
1/2	1/2	5/8	3	12361	82.05
1/2	1/2	5/8	4	12363	107.34

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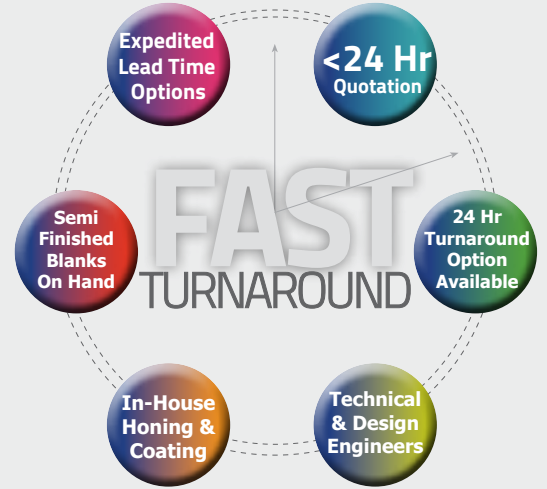


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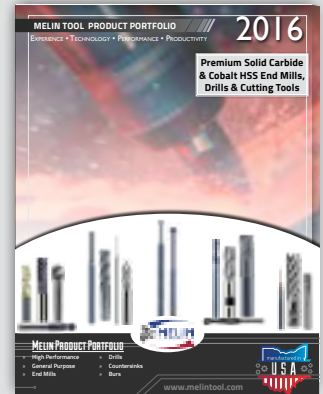
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# GENERAL PURPOSE POWDERED METAL END MILLS

## MULTI FLUTE • FINE PITCH CC ROUGHING END MILLS



### SERIES: CCFPM

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DIA	SHK	LOC	OAL	LENGTH	FLUTE	TOOL	BRIGHT EDP	BRIGHT PRICE	ALTIN EDP	ALTIN PRICE
3/8	3/8	3/4	2-1/2	std	4	CCFPM-1212	12893	30.83	52893	35.86
3/8	3/8	1-1/2	3-1/4	long	4	CCFPM-1212-L	12895	39.68	52895	46.12
1/2	1/2	5/8	2-5/8	stub	4	CCFPM-1616-S	12897	33.50	52897	40.41
1/2	1/2	1-1/4	3-1/4	std	4	CCFPM-1616	12899	37.99	52899	46.45
1/2	1/2	2	4	long	4	CCFPM-1616-L	12901	51.73	52901	62.04
5/8	5/8	3/4	2-7/8	stub	4	CCFPM-2020-S	12903	37.40	52903	45.71
5/8	5/8	1-5/8	3-3/4	std	4	CCFPM-2020	12905	52.57	52905	64.69
5/8	5/8	2-1/2	4-5/8	long	4	CCFPM-2020-L	12907	68.80	52907	83.63
3/4	3/4	3/4	3	stub	4	CCFPM-2424-S	12909	57.87	52909	69.63
3/4	3/4	1-5/8	3-7/8	std	4	CCFPM-2424	12911	56.99	52911	72.02
3/4	3/4	2-1/4	4-1/2	med	4	CCFPM-2424-M	12913	68.84	52913	86.21
3/4	3/4	3	5-1/4	long	4	CCFPM-2424-L	12915	83.07	52915	103.25
1	1	2	4-1/2	std	5	CCFPM-3232	12917	86.65	52917	112.71
1	1	3	5-1/2	med	5	CCFPM-3232-M	12919	106.35	52919	157.73
1	1	4	6-1/2	long	5	CCFPM-3232-L	12921	124.16	52921	161.52
1-1/4	1-1/4	2	4-1/2	std	6	CCFPM-4040	12923	116.06	52923	148.65
1-1/4	1-1/4	4	6-1/2	long	6	CCFPM-4040-L	12925	178.01	52925	224.76

## MULTI FLUTE • COARSE PITCH CC ROUGHING END MILLS



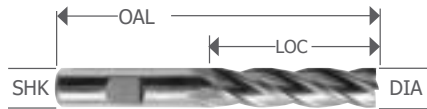
### SERIES: CCRPM

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DIA	SHK	LOC	OAL	LENGTH	FLUTE	TOOL	BRIGHT EDP	BRIGHT PRICE	ALTIN EDP	ALTIN PRICE
3/8	3/8	3/4	2-1/2	std	4	CCRPM-1212	12927	30.83	52927	35.86
3/8	3/8	1-1/2	3-1/4	long	4	CCRPM-1212-L	12929	39.68	52929	46.12
1/2	1/2	5/8	2-5/8	stub	4	CCRPM-1616-S	12931	33.50	52931	40.41
1/2	1/2	1-1/4	3-1/4	std	4	CCRPM-1616	12933	37.99	52933	46.45
1/2	1/2	2	4	long	4	CCRPM-1616-L	12935	51.73	52935	62.04
5/8	5/8	3/4	2-7/8	stub	4	CCRPM-2020-S	12937	37.40	52937	45.71
5/8	5/8	1-5/8	3-3/4	std	4	CCRPM-2020	12939	52.57	52939	64.69
5/8	5/8	2-1/2	4-5/8	long	4	CCRPM-2020-L	12941	68.80	52941	83.63
3/4	3/4	3/4	3	stub	4	CCRPM-2424-S	12943	57.87	52943	69.63
3/4	3/4	1-5/8	3-7/8	std	4	CCRPM-2424	12945	56.99	52945	72.02
3/4	3/4	2-1/4	4-1/2	med	4	CCRPM-2424-M	12947	68.84	52947	86.21
3/4	3/4	3	5-1/4	long	4	CCRPM-2424-L	12949	83.07	52949	103.25
1	1	2	4-1/2	std	5	CCRPM-3232	12951	86.65	52951	112.71
1	1	3	5-1/2	med	5	CCRPM-3232-M	12953	106.35	52953	138.06
1	1	4	6-1/2	long	5	CCRPM-3232-L	12955	124.16	52955	161.52
1-1/4	1-1/4	2	4-1/2	std	6	CCRPM-4040	12959	116.06	52959	138.51
1-1/4	1-1/4	4	6-1/2	long	6	CCRPM-4040-L	12961	178.01	52961	202.32

# GENERAL PURPOSE POWDERED METAL END MILLS

## 4 FLUTE • CC FINISHING END MILLS



HSSCo PM
4
30°
Bright ALTiN
+0.0015  
-0.0000
Square
HRC <48
P M K S

### SERIES: CCPM

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DIA	SHK	LOC	OAL	LENGTH	TOOL	BRIGHT EDP	BRIGHT PRICE	ALTiN EDP	ALTiN PRICE
3/8	3/8	3/4	2-1/2	std	CCPM-1212	12969	16.29	52969	21.00
3/8	3/8	1-1/2	3-1/4	long	CCPM-1212-L	12971	21.35	52971	26.12
1/2	1/2	5/8	2-5/8	stub	CCPM-1616-S	12973	22.43	52973	30.40
1/2	1/2	1-1/4	3-1/4	std	CCPM-1616	12975	23.73	52975	31.56
1/2	1/2	2	4	long	CCPM-1616-L	12977	29.33	52977	38.17
5/8	5/8	3/4	2-7/8	stub	CCPM-2020-S	12979	33.50	52979	43.21
5/8	5/8	1-5/8	3-3/4	std	CCPM-2020	12981	34.90	52981	42.09
5/8	5/8	2-1/2	4-5/8	long	CCPM-2020-L	12983	45.39	52983	55.07
3/4	3/4	3/4	3	stub	CCPM-2424-S	12985	44.53	52985	59.21
3/4	3/4	1-5/8	3-7/8	std	CCPM-2424	12987	46.51	52987	55.88
3/4	3/4	2-1/4	4-1/2	med	CCPM-2424-M	12989	57.38	52989	72.85
3/4	3/4	3	5-1/4	long	CCPM-2424-L	12991	67.99	52991	86.69
1	1	2	4-1/2	std	CCPM-3232	12993	76.74	52993	97.87
1	1	3	5-1/2	med	CCPM-3232-M	12995	101.40	52995	121.94
1	1	4	6-1/2	long	CCPM-3232-L	12997	113.59	52997	150.77
1-1/4	1-1/4	2	4-1/2	std	CCPM-4040	12999	120.92	52999	142.71
1-1/4	1-1/4	4	6-1/2	long	CCPM-4040-L	13001	171.91	53001	209.39

## 4 FLUTE • CC VARIABLE FLUTE END MILLS



HSSCo PM
4
Variable
nAco
+0.0015  
-0.0000
Radius
HRC <48
P M K S

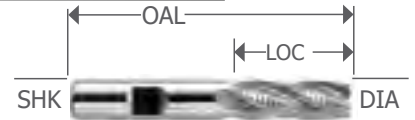
### SERIES: VHPPM

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DIA	SHK	LOC	OAL	RADIUS	LENGTH	TOOL	NACO EDP	NACO PRICE
3/8	3/8	3/4	2-1/2	0.015-0.020	std	VHPPM-1212	13003	31.19
1/2	1/2	5/8	2-5/8	0.025-0.030	stub	VHPPM-1616-S	13005	44.27
1/2	1/2	1-1/4	3-1/4	0.025-0.030	std	VHPPM-1616	13007	46.49
5/8	5/8	3/4	2-7/8	0.030-0.035	stub	VHPPM-2020-S	13009	62.25
5/8	5/8	1-5/8	3-3/4	0.030-0.035	std	VHPPM-2020	13011	65.91
3/4	3/4	3/4	3	0.030-0.035	stub	VHPPM-2424-S	13013	85.05
3/4	3/4	1-5/8	3-7/8	0.030-0.035	std	VHPPM-2424	13015	95.59
1	1	2	4-1/2	0.030-0.035	std	VHPPM-3232	13017	144.17
1-1/4	1-1/4	2	4-1/2	0.030-0.035	std	VHPPM-4040	13019	212.88

# COBALT & HSS ROUGHING END MILLS

## MULTI FLUTE • FINE PITCH CENTER CUTTING ROUGHING END MILLS



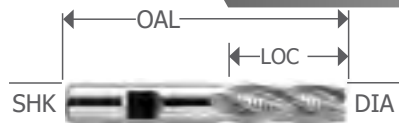
### SERIES: CCFP

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DIA	SHK	LOC	OAL	FLUTE	LENGTH	TOOL	BRIGHT EDP	BRIGHT PRICE	TICN EDP	TICN PRICE
3/16	3/8	1/2	2-3/8	4	std	CCFP-1206	17672	24.61	47672	29.43
1/4	3/8	5/8	2-7/16	4	std	CCFP-1208	17673	26.16	47673	31.08
1/4	3/8	1-1/8	3-1/16	4	long	CCFP-1208-L	17674	30.67	47674	36.65
5/16	3/8	3/4	2-1/2	4	std	CCFP-1210	17675	27.94	47675	32.99
5/16	3/8	1-3/8	3-1/8	4	long	CCFP-1210-L	17676	34.20	47676	40.40
3/8	3/8	3/8	2-1/8	4	stub	CCFPS-1212	16453	27.94	46453	32.28
3/8	3/8	3/4	2-1/2	4	std	CCFP-1212	17677	28.67	47677	33.72
3/8	3/8	1-1/2	3-1/4	4	long	CCFP-1212-L	17678	36.91	47678	43.35
7/16	3/8	1	2-11/16	4	std	CCFP-1214	17679	33.93	47679	40.31
1/2	1/2	1/2	2-1/2	4	stub	CCFPS-1616	16454	30.42	46454	37.02
1/2	1/2	5/8	2-5/8	4	stub	CCFP-1616-2	17680	31.16	47680	38.07
1/2	1/2	1	3	4	std	CFPS-1616	15536	31.88	45536	39.72
1/2	1/2	1-1/4	3-1/4	4	std	CCFP-1616	17681	35.34	47681	43.80
1/2	1/2	1-5/8	3-5/8	4	med	CCFP-1616-M	17682	40.53	47682	49.91
1/2	1/2	2	4	4	long	CCFP-1616-L	16031	48.12	46031	58.43
1/2	1/2	2-1/2	4-1/2	4	long	CFP-1616-LL	15682	52.63	45682	64.17
1/2	1/2	3	5	4	xl	CFP-1616-E	15684	59.54	45684	72.32
9/16	1/2	1-3/8	3-3/8	4	std	CFP-1618	15540	41.35	45540	51.17
5/8	5/8	5/8	2-3/4	4	stub	CCFPS-2020	16455	33.65	46455	42.67
5/8	5/8	3/4	2-7/8	4	stub	CFPS-2020	15544	34.79	45544	44.21
5/8	5/8	1-1/4	3-3/4	4	std	CFP-2020-2	15686	44.67	45686	56.79
5/8	5/8	1-5/8	3-3/4	4	std	CCFP-2020	17683	48.89	47683	61.02
5/8	5/8	2-1/8	4-1/4	4	med	CFP-2020-M	15688	53.48	45688	67.15
5/8	5/8	2-1/2	4-5/8	4	long	CCFP-2020-L	16032	64.01	46032	78.84
5/8	5/8	3-1/8	5-1/4	4	xl	CFP-2020-E	15692	72.77	45692	89.55
3/4	5/8	1-5/8	3-3/4	4	std	CCFP-2024	17684	58.34	47684	72.90
3/4	3/4	3/4	3	4	stub	CCFPS-2424	16456	53.84	46456	65.59
3/4	3/4	1-5/8	3-7/8	4	std	CCFP-2424	17685	53.01	47685	68.04
3/4	3/4	2-1/4	4-1/2	4	med	CCFP-2424-M	17686	64.55	47686	82.15
3/4	3/4	3	5-1/4	4	long	CCFP-2424-L	16033	77.28	46033	97.46
7/8	3/4	1-7/8	4-1/8	5	std	CCFP-2428	12324	65.39	42324	85.75
1	3/4	2	4-1/4	5	med	CCFP-2432-M	17687	78.91	47687	103.55
1	1	2	4-1/2	5	std	CCFP-3232	17688	80.60	47688	106.66
1	1	3	5-1/2	5	med	CCFP-3232-M	17689	98.93	47689	130.63
1	1	4	6-1/2	5	long	CCFP-3232-L	16034	115.50	46034	152.85
1-1/4	1-1/4	1-3/8	3-7/8	6	stub	CCFPS-4040	11319	103.46	41319	136.04
1-1/4	1-1/4	2	4-1/2	6	std	CCFP-4040	10733	107.97	40733	140.55
1-1/4	1-1/4	3	5-1/2	6	med	CCFP-4040-M	16035	139.44	46035	179.10
1-1/4	1-1/4	4	6-1/2	6	long	CCFP-4040-L	16036	165.60	46036	212.34
1-1/2	1-1/4	2	4-1/2	6	std	CCFP-4048	12568	137.73	42568	178.94
1-1/2	1-1/4	3	5-1/2	6	med	CCFP-4048-M	12781	177.06	42781	227.25
1-1/2	1-1/4	4	6-1/2	6	long	CCFP-4048-L	12323	216.40	42323	275.56



## MULTI FLUTE • FINE PITCH NON-CENTER CUTTING ROUGHING END MILLS



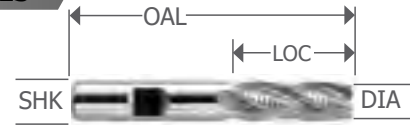
### SERIES: CFP

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DIA	SHK	LOC	OAL	FLUTE	LENGTH	TOOL	BRIGHT EDP	BRIGHT PRICE	TICN EDP	TICN PRICE
* All roughers 5/8 and under are only available center cutting. See table on page 134										
11/16	5/8	1-5/8	3-3/4	4	std	CFP-2022	15694	49.30	45694	63.25
3/4	3/4	3/4	3	4	stub	CFPS-2424	15548	49.53	45548	61.29
3/4	3/4	1-1/4	3-1/2	4	std	CFP-2424-2	15698	47.42	45698	61.06
3/4	5/8	1-5/8	3-3/4	4	std	CFP-2024	15696	54.19	45696	69.22
3/4	3/4	1-5/8	3-7/8	4	std	CFP-2424	15546	48.77	45546	63.80
3/4	3/4	2-1/2	4-3/4	4	med	CFP-2424-M	15550	62.97	45550	81.28
3/4	3/4	3	5-1/4	4	long	CFP-2424-L	15552	71.13	45552	91.27
3/4	3/4	4-1/8	6-3/8	4	xl	CFP-2424-E	15700	84.47	45700	108.85
13/16	3/4	1-7/8	4-1/8	5	std	CFP-2426	15702	65.43	45702	85.13
7/8	3/4	1-1/8	3-3/8	5	stub	CFPS-2428	15706	51.16	45706	67.93
7/8	3/4	1-7/8	4-1/8	5	std	CFP-2428	15704	60.16	45704	80.51
7/8	7/8	1-7/8	4-1/8	5	std	CFP-2828	15738	60.16	45738	80.51
7/8	3/4	3-1/2	5-3/4	5	long	CFP-2428-L	15708	87.81	45708	115.96
7/8	7/8	3-1/2	5-3/4	5	long	CFP-2828-L	15740	87.81	45740	115.96
1	3/4	1-1/8	3-3/8	5	stub	CFPS-2432	15554	63.02	45554	82.71
1	1	1-1/8	3-5/8	5	stub	CFPS-3232-2	15742	61.24	45742	82.36
1	3/4	1-1/2	3-3/4	5	std	CFP-2432	15794	68.58	45794	90.40
1	1	1-5/8	4-1/8	5	stub	CFPS-3232	15560	73.33	45560	97.27
1	3/4	2	4-1/4	5	med	CFP-2432-M	15556	72.60	45556	97.25
1	1	2	4-1/2	5	std	CFP-3232	15558	74.16	45558	100.22
1	1	3	5-1/2	5	med	CFP-3232-M	15562	91.01	45562	122.72
1	3/4	4	6-1/4	5	long	CFP-2432-L	15710	107.88	45710	143.83
1	1	4	6-1/2	5	long	CFP-3232-L	15744	106.26	45744	143.62
1	1	6	8-1/2	5	xl	CFP-3232-E	15746	138.38	45746	187.02
1-1/8	3/4	1-1/8	3-3/8	6	stub	CFPS-2436	CALL		CALL	
1-1/8	3/4	2	4-1/4	6	std	CFP-2436	15712	85.05	45712	111.08
1-1/8	1	2	4-1/2	6	std	CFP-3236	15748	87.03	45748	114.54
1-1/8	1	3-1/2	6	6	long	CFP-3236-L	15750	125.48	45750	161.94
1-1/4	3/4	1-1/8	3-3/8	6	stub	CFPS-2440	15716	79.50	45716	90.77
1-1/4	3/4	2	4-1/4	6	med	CFP-2440-M	15718	99.33	45718	131.91
1-1/4	1-1/4	2	4-1/2	6	std	CFP-4040	15564	99.33	45564	131.91
1-1/4	1-1/4	3	5-1/2	6	med	CFP-4040-M	15566	128.29	45566	167.95
1-1/4	1-1/4	4	6-1/2	6	long	CFP-4040-L	15568	152.35	45568	199.09
1-1/4	1-1/4	6	8-1/2	6	xl	CFP-4040-E	15570	207.32	45570	268.22
1-3/8	3/4	1-1/8	3-3/8	6	stub	CFPS-2444	15722	90.21	45722	120.23
1-3/8	3/4	2	4-1/4	6	std	CFP-2444	15720	121.78	45720	159.38
1-1/2	3/4	1-1/8	3-3/8	6	stub	CFPS-2448	15728	107.68	45728	130.30
1-1/2	3/4	1-1/2	3-3/4	6	std	CFP-2448	15724	123.65	45724	158.14
1-1/2	3/4	2	4-1/4	6	std	CFP-2448-2	15726	144.94	45726	183.91
1-1/2	1-1/4	2	4-1/2	6	std	CFP-4048	15752	126.70	45752	167.92
1-1/2	1-1/4	3	5-1/2	6	med	CFP-4048-M	15754	162.89	45754	213.09
1-1/2	1-1/4	4	6-1/2	6	long	CFP-4048-L	15756	199.08	45756	258.24
1-1/2	1-1/4	6	8-1/2	6	xl	CFP-4048-E	15758	271.46	45758	348.57
1-3/4	3/4	1-1/8	3-3/8	6	stub	CFPS-2456	15732	159.71	45732	208.31
1-3/4	3/4	2	4-1/4	6	std	CFP-2456	15730	190.01	45730	235.44
2	3/4	1-1/8	3-3/8	8	stub	CFPS-2464	CALL		CALL	
2	3/4	2	4-1/4	8	std	CFP-2464	15734	217.29	45734	268.26
2	1-1/4	2	4-1/2	8	std	CFP-4064	15760	217.29	45760	268.26
2	2	4	7-3/4	8	med	CFP-6464-M	15764	335.72	45764	325.72

# COBALT & HSS ROUGHING END MILLS

## MULTI FLUTE • FINE PITCH CENTER CUTTING ROUGHING END MILLS



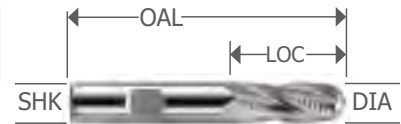
### SERIES: CCFP

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DIA	SHK	LOC	OAL	FLUTE	LENGTH	TOOL	BRIGHT EDP	BRIGHT PRICE	TICN EDP	TICN PRICE
6mm	6mm	13mm	57mm	3	std	CCFP-M6M6	16391	23.93	46391	29.57
7mm	10mm	16mm	69mm	3	std	CCFP-M10M7	16392	29.59	46392	37.73
8mm	10mm	19mm	69mm	3	std	CCFP-M10M8	16393	29.27	46393	37.41
9mm	10mm	19mm	69mm	4	std	CCFP-M10M9	16394	28.94	46394	37.07
10mm	10mm	22mm	72mm	4	std	CCFP-M10M10	16395	28.88	46395	37.10
11mm	12mm	22mm	79mm	4	std	CCFP-M12M11	16396	32.24	46396	41.23
12mm	12mm	26mm	83mm	4	std	CCFP-M12M12	16397	31.56	46397	39.81
13mm	12mm	26mm	83mm	4	std	CCFP-M12M13	16398	34.50	46398	41.23
14mm	12mm	26mm	83mm	4	std	CCFP-M12M14	16399	35.93	46399	44.73
15mm	12mm	26mm	83mm	4	std	CCFP-M12M15	16400	37.37	46400	43.15
16mm	16mm	32mm	92mm	4	std	CCFP-M16M16	16401	40.96	46401	51.44
18mm	16mm	32mm	92mm	4	std	CCFP-M16M18	16402	47.79	46402	58.27
20mm	20mm	38mm	104mm	4	std	CCFP-M20M20	16403	56.78	46403	74.04
22mm	20mm	38mm	104mm	5	std	CCFP-M20M22	16404	57.96	46404	70.08
24mm	25mm	45mm	121mm	5	std	CCFP-M25M24	16405	76.78	46405	101.10
25mm	25mm	45mm	121mm	5	std	CCFP-M25M25	16406	74.52	46406	98.87
28mm	25mm	45mm	121mm	6	std	CCFP-M25M28*	16407	88.64	46407	102.67
32mm	32mm	53mm	133mm	6	std	CCFP-M32M32*	16409	129.27	46409	167.10

\*=Non-Centercutting

## MULTI FLUTE • FINE PITCH CENTER CUTTING BALL NOSE ROUGHING END MILLS



### SERIES: CCFP-\_\_-B

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DIA	SHK	LOC	OAL	FLUTE	LENGTH	TOOL	BRIGHT EDP	BRIGHT PRICE	TICN EDP	TICN PRICE
1/4	3/8	5/8	2-7/16	4	std	CCFP-1208-B	15840	31.39	45840	36.31
3/8	3/8	3/4	2-1/2	4	std	CCFP-1212-B	15842	34.41	45842	39.46
1/2	1/2	1-1/4	3-1/4	4	std	CCFP-1616-B	15844	42.41	45844	50.86
5/8	5/8	1-5/8	3-3/4	4	std	CCFP-2020-B	15846	58.67	45846	70.80
3/4	3/4	1-5/8	3-7/8	4	std	CCFP-2424-B	15848	63.60	45848	78.64
1	1	2	4-1/2	5	std	CCFP-3232-B	15850	96.72	45850	122.78

# COBALT & HSS ROUGHING END MILLS

## MULTI FLUTE • COARSE PITCH NON-CENTER CUTTING ROUGHING END MILL

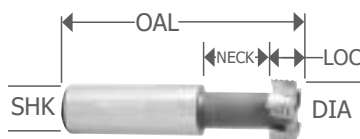


### SERIES: CR

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DIA	SHK	LOC	OAL	FLUTE	LENGTH	TOOL	BRIGHT EDP	BRIGHT PRICE	TICN EDP	TICN PRICE
3/8	3/8	3/4	2-1/2	4	std	CR-1212	16510	28.67	46510	33.72
3/8	3/8	1-1/2	3-1/4	4	long	CR-1212-L	16601	33.22	46601	36.19
7/16	3/8	1	2-11/16	4	std	CR-1214	16698	31.55	46698	38.15
1/2	1/2	1-1/4	3-1/4	4	std	CR-1616	16511	31.81	46511	40.26
1/2	1/2	1	3	4	stub	CRS-1616	16512	29.65	46512	37.48
1/2	1/2	2	4	4	long	CR-1616-L	16513	44.76	46513	55.06
5/8	5/8	1-5/8	3-3/4	4	std	CR-2020	16514	44.01	46514	56.13
5/8	5/8	2-1/2	4-5/8	4	long	CR-2020-L	16515	57.61	46515	72.44
3/4	5/8	1-5/8	3-3/4	4	std	CR-2024	16602	53.01	46602	68.04
3/4	3/4	1-5/8	3-7/8	4	std	CR-2424	16516	48.77	46516	63.80
3/4	3/4	3/4	3	4	stub	CRS-2424	16603	48.46	46603	58.71
3/4	3/4	3	5-1/4	4	long	CR-2424-L	16517	71.10	46517	91.27
7/8	3/4	1-1/8	3-3/8	5	std	CR-2428	16518	51.72	46518	68.48
7/8	3/4	3-1/2	5-3/4	5	long	CR-2428-L	16519	85.90	46519	92.01
1	3/4	1-1/2	3-3/4	5	std	CR-2432	16699	67.08	46699	83.74
1	3/4	1-1/8	3-3/8	5	stub	CRS-2432	16520	63.70	46520	85.03
1	3/4	1-7/8	4-1/8	5	med	CR-2432-M	16521	71.48	46521	97.53
1	3/4	4	6-1/4	5	long	CR-2432-L	16522	105.54	46522	115.36
1-1/8	3/4	1-1/8	3-3/8	6	stub	CRS-2436	16523	68.07	46523	76.26
1-1/4	3/4	1-1/2	3-3/4	6	std	CR-2440	16700	91.57	46700	118.84
1-1/4	3/4	1-1/8	3-3/8	6	stub	CRS-2440-2	16524	77.78	46524	95.24
1-1/4	3/4	2	4-1/2	6	med	CR-2440-M	16525	97.17	46525	129.75
1-1/2	3/4	1-1/2	3-3/4	6	std	CR-2448	16605	120.96	46605	156.96
1-1/2	3/4	2-1/4	4-1/2	6	std	CR-2448-2	16526	128.08	46526	191.59
1-1/2	3/4	1-1/8	3-3/8	6	stub	CRS-2448-2	16527	108.85	46527	158.27
2	3/4	1-1/8	3-3/8	8	stub	CRS-2464-2	16528	187.17	46528	252.64
1	1	2	4-1/2	5	std	CR-3232	16529	72.55	46529	91.17
1	1	3	5-1/2	5	med	CR-3232-M	16530	89.03	46530	100.10
1	1	4	6-1/2	5	long	CR-3232-L	16531	103.95	46531	101.72
1-1/8	1	2	4-1/2	6	std	CR-3236	16701	85.14	46701	100.00
1-1/4	1-1/4	2	4-1/2	6	std	CR-4040	16532	97.17	46532	114.69
1-1/4	1-1/4	3	5-1/2	6	med	CR-4040-M	CALL		CALL	
1-1/4	1-1/4	4	6-1/2	6	long	CR-4040-L	16534	149.04	46534	167.19
1-1/2	1-1/4	2	4-1/2	6	std	CR-4048	16535	128.08	46535	169.68
1-1/2	1-1/4	3	5-1/2	6	med	CR-4048-M	CALL		CALL	
1-1/2	1-1/4	4	6-1/2	6	long	CR-4048-L	16537	194.76	46537	219.52

## MULTI FLUTE • COARSE PITCH T-SLOT ROUGHING END MILLS



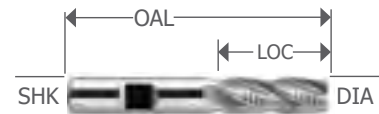
### SERIES: CRPN

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DIA	SHK	LOC	NECK	OAL	BOLT SIZE	FLUTE	LENGTH	TOOL	BRIGHT EDP	BRIGHT PRICE	TICN EDP	TICN PRICE
0.9588	3/4	.3856	1.019	3-7/16	1/2	5	std	CRPN-2431	12757	112.25	42757	132.49
1.2400	1	.4790	1.117	3-15/16	5/8	6	std	CRPN-3240	12759	155.04	42759	182.95
1.4590	1	.6200	1.537	4-7/16	3/4	6	std	CRPN-3247	12761	175.39	42761	212.51
1.8338	1-1/4	.8230	1.706	4-13/16	1	8	std	CRPN-4059	12763	245.50	42763	315.96
2.2090	1-1/4	1.088	2.006	5-3/8	1-1/4	8	std	CRPN-4071	12765	382.34	42765	479.94
2.6460	1-1/4	1.339	2.296	5-29/32	1-1/2	8	std	CRPN-4085	12767	513.52	42767	645.90

# COBALT & HSS ROUGHING END MILLS

## MULTI FLUTE • COARSE PITCH CENTER CUTTING ROUGHING END MILL



### SERIES: CCRP

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DIA	SHK	LOC	OAL	FLUTE	LENGTH	TOOL	BRIGHT EDP	BRIGHT PRICE	TICN EDP	TICN PRICE
3/16	3/8	1/2	2-3/8	4	std	CCRP-1206	15600	24.61	45600	29.43
1/4	3/8	5/8	2-7/16	4	std	CCRP-1208	15602	26.16	45602	31.08
1/4	3/8	1-1/8	3-1/16	4	long	CCRP-1208-L	15604	30.67	45604	36.65
1/4	3/8	1-1/4	3-1/16	4	long	CRP-1208-LL	15766	31.80	45766	37.89
5/16	3/8	3/4	2-1/2	4	std	CCRP-1210	15606	27.94	45606	32.99
5/16	3/8	1-3/8	3-1/8	4	long	CCRP-1210-L	15608	34.20	45608	40.40
3/8	3/8	3/4	2-1/2	4	std	CCRP-1212	15610	28.67	45610	33.72
3/8	3/8	1-1/2	3-1/4	4	long	CCRP-1212-L	15612	36.91	45612	43.35
7/16	3/8	1	2-11/16	4	std	CCRP-1214	15614	33.93	45614	40.31
1/2	1/2	5/8	2-5/8	4	std	CCRP-1616-2	15796	31.16	45796	38.07
1/2	1/2	1	3	4	stub	CCRPS-1616	15616	31.88	45616	39.72
1/2	1/2	1-1/4	3-1/4	4	std	CCRP-1616	12664	35.34	42664	43.80
1/2	1/2	1-5/8	3-5/8	4	med	CCRP-1616-M	15618	40.53	45618	49.91
1/2	1/2	2	4	4	long	CCRP-1616-L	12678	48.12	42678	58.43
9/16	1/2	1-3/8	3-3/8	4	std	CRP-1618	15584	41.35	45584	51.17
5/8	5/8	3/4	2-7/8	4	stub	CRPS-2020	15586	34.79	45586	44.21
5/8	5/8	1-5/8	3-3/4	4	std	CCRP-2020	12666	48.89	42666	61.02
5/8	5/8	2-1/2	4-5/8	4	long	CCRP-2020-L	12680	64.01	42680	78.84
3/4	5/8	1-5/8	3-3/4	4	std	CCRP-2024	15620	58.34	45620	72.90
3/4	3/4	1-5/8	3-7/8	4	std	CCRP-2424	12668	53.01	42668	68.04
3/4	3/4	2-1/4	4-1/2	4	med	CCRP-2424-M	15622	64.04	45622	81.41
3/4	3/4	3	5-1/4	4	long	CCRP-2424-L	12682	77.28	42682	97.46
7/8	3/4	1-7/8	4-1/8	5	std	CCRP-2428	12451	65.39	42451	85.75
1	3/4	2	4-1/4	5	med	CCRP-2432-M	15624	78.91	45624	103.55
1	1	2	4-1/2	5	std	CCRP-3232	12670	80.60	42670	106.66
1	1	3	5-1/2	5	med	CCRP-3232-M	15626	98.93	45626	130.63
1	1	4	6-1/2	5	long	CCRP-3232-L	12684	115.50	42684	152.85
1-1/4	3/4	2	4-1/4	6	med	CCRP-2440-M	13055	107.97	43055	140.55
1-1/4	1-1/4	2	4-1/2	6	std	CCRP-4040	12672	107.97	42672	140.55
1-1/4	1-1/4	3	5-1/2	6	med	CCRP-4040-M	12457	139.44	42457	179.10
1-1/4	1-1/4	4	6-1/2	6	long	CCRP-4040-L	12686	165.60	42686	212.34
1-1/2	1-1/4	2	4-1/2	6	std	CCRP-4048	12674	137.73	42674	178.94
1-1/2	1-1/4	3	5-1/2	6	med	CCRP-4048-M	12459	177.06	42459	227.25
1-1/2	1-1/4	4	6-1/2	6	long	CCRP-4048-L	12688	216.40	42688	275.56

## MULTI FLUTE • COARSE PITCH NON-CENTER CUTTING ROUGHING END MILL



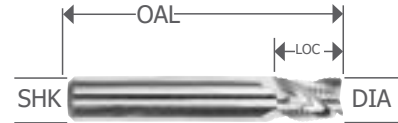
### SERIES: CRP

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DIA	SHK	LOC	OAL	FLUTE	LENGTH	TOOL	BRIGHT EDP	B R I G H T PRICE	TICN EDP	TICN PRICE
* All roughers 5/8 and under are only available center cutting. See table on page 138										
11/16	5/8	1-5/8	3-3/4	4	std	CRP-2022	15588	49.30	45588	63.25
3/4	3/4	3/4	3	4	stub	CRPS-2424	12588	49.53	42588	61.29
3/4	5/8	1-5/8	3-3/4	4	std	CRP-2024	12584	54.19	42584	69.22
3/4	3/4	1-5/8	3-7/8	4	std	CRP-2424	12586	48.77	42586	63.80
3/4	3/4	2-1/2	4-3/4	4	med	CRP-2424-M	15590	62.97	45590	81.28
3/4	3/4	3	5-1/4	4	long	CRP-2424-L	12624	71.10	42624	91.27
13/16	3/4	1-7/8	4-1/8	4	std	CRP-2426	15592	63.78	45592	83.47
7/8	3/4	1-7/8	4-1/8	5	std	CRP-2428	12590	60.16	42590	80.51
7/8	7/8	1-7/8	4-1/8	5	std	CRP-2828	12606	60.16	42606	80.51
7/8	3/4	3-1/2	5-3/4	5	long	CRP-2428-L	12626	87.81	42626	115.96
7/8	7/8	3-1/2	5-3/4	5	long	CRP-2828-L	CALL		CALL	
1	3/4	3/4	3	5	stub	CRPS-2432	12594	50.45	42594	68.03
1	3/4	1-1/2	3-3/4	5	std	CRP-2432	12592	68.58	42592	90.40
1	1	1-5/8	4-1/8	5	stub	CRPS-3232	15598	73.33	45598	97.27
1	3/4	2	4-1/4	5	med	CRP-2432-M	15594	72.60	45594	97.25
1	1	2	4-1/2	5	std	CRP-3232	12608	74.16	42608	100.22
1	1	3	5-1/2	5	med	CRP-3232-M	12630	91.01	42630	122.72
1	1	4	6-1/2	5	long	CRP-3232-L	12632	106.26	42632	143.62
1	1	6	8-1/2	5	xl	CRP-3232-E	12634	138.38	42634	187.02
1-1/8	1	2	4-1/2	6	std	CRP-3236	12610	87.03	42610	114.54
1-1/4	3/4	3/4	3	6	stub	CRPS-2440	CALL		CALL	
1-1/4	3/4	1-1/2	3-3/4	6	std	CRP-2440	12596	91.57	42596	118.84
1-1/4	3/4	2	4-1/2	6	med	CRP-2440-M	15596	99.33	45596	131.91
1-1/4	1-1/4	2	4-1/2	6	std	CRP-4040	12612	99.33	42612	131.91
1-1/4	1-1/4	3	5-1/2	6	med	CRP-4040-M	12636	128.29	42636	167.95
1-1/4	1-1/4	4	6-1/2	6	long	CRP-4040-L	12638	152.35	42638	199.09
1-1/4	1-1/4	6	8-1/2	6	xl	CRP-4040-E	12640	207.32	42640	268.22
1-1/2	3/4	3/4	3	6	stub	CRPS-2448	12602	91.72	42602	119.47
1-1/2	3/4	1-1/2	3-3/4	6	std	CRP-2448	12600	123.65	42600	158.14
1-1/2	1-1/4	2	4-1/2	6	std	CRP-4048	12614	126.70	42614	167.92
1-1/2	1-1/4	3	5-1/2	6	med	CRP-4048-M	12642	162.89	42642	213.09
1-1/2	1-1/4	4	6-1/2	6	long	CRP-4048-L	12644	199.08	42644	258.24
1-1/2	1-1/4	5	7-1/2	6	xl	CRP-4048-E	12646	235.27	42646	303.41
1-1/2	1-1/4	8	10-1/2	6	xxl	CRP-4048-EE	12648	343.84	42648	438.90
1-3/4	1-1/4	2-1/2	5-1/4	6	std	CRP-4056	12616	205.17	42616	261.07
1-3/4	1-1/4	4	6-1/2	6	long	CRP-4056-L	12650	287.48	42650	356.47
2	3/4	3/4	3	8	stub	CRPS-2464	12604	158.45	42604	192.78
2	1-1/4	2	4-1/2	8	std	CRP-4064	12618	217.29	42618	268.26
2	2	4	7-3/4	8	med	CRP-6464-M	15882	335.72	45882	422.75
2	2	6	9-3/4	8	long	CRP-6464-L	12658	444.69	42658	553.92

# COBALT & HSS ROUGHING END MILLS

## 3 FLUTE • FINE PITCH ROUGHERS WITH 35° HIGH HELIX FOR ALUMINUM



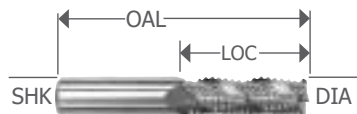
### SERIES: EFP

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DIA	SHK	LOC	OAL	LENGTH	TOOL	BRIGHT EDP	BRIGHT PRICE	TICN EDP	TICN PRICE
1/4	3/8	1/4	2-1/8	stub	<b>EFPS-1208</b>	15784	26.16	45784	31.08
1/4	3/8	5/8	2-1/2	std	<b>EFP-1208</b>	15786	26.16	45786	31.08
5/16	3/8	3/4	2-1/2	std	<b>EFP-1210</b>	10993	27.94	40993	34.16
3/8	3/8	3/8	2-1/8	stub	<b>EFPS-1212</b>	15788	27.94	45788	32.28
3/8	3/8	3/4	2-1/2	std	<b>EFP-1212</b>	15884	28.67	45884	33.72
1/2	1/2	1/2	2-9/16	stub	<b>EFPS-1616-2</b>	15790	31.16	45790	38.07
1/2	1/2	1-1/4	3-1/4	std	<b>EFP-1616</b>	15886	35.34	45886	43.80
1/2	1/2	2	4	long	<b>EFP-1616-L</b>	16458	48.12	46458	58.43
5/8	5/8	1-5/8	3-3/4	std	<b>EFP-2020</b>	15888	48.89	45888	61.02
3/4	3/4	3/4	3	stub	<b>EFPS-2424</b>	15792	53.84	45792	65.59
3/4	3/4	1-5/8	3-7/8	std	<b>EFP-2424</b>	15890	53.01	45890	68.04
3/4	3/4	2-1/4	4-1/2	med	<b>EFPS-2424-M</b>	10268	64.55	40268	65.07
3/4	3/4	3	5-1/4	long	<b>EFP-2424-L</b>	16460	77.28	46460	97.46
1	1	2	4-1/2	std	<b>EFP-3232</b>	15892	80.60	45892	106.66



## 3 FLUTE • COARSE PITCH ROUGHERS WITH 35° HIGH HELIX FOR ALUMINUM

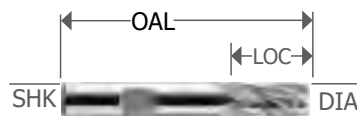


### SERIES: ERP

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DIA	SHK	LOC	OAL	LENGTH	TOOL	BRIGHT EDP	BRIGHT PRICE	TICN EDP	TICN PRICE
3/16	3/8	1/2	2-3/8	std	ERP-1206	15628	24.61	45628	29.43
1/4	3/8	5/8	2-7/16	std	ERP-1208	15630	26.16	45630	31.08
1/4	3/8	1-1/8	2-15/16	long	ERP-1208-L	15632	30.67	45632	36.65
5/16	3/8	3/4	2-1/2	std	ERP-1210	15634	27.94	45634	32.99
5/16	3/8	1-3/8	3-1/8	long	ERP-1210-L	15636	34.20	45636	40.40
3/8	3/8	3/4	2-1/2	std	ERP-1212	15638	28.67	45638	33.72
3/8	3/8	1-1/2	3-1/4	long	ERP-1212-L	15640	36.91	45640	43.35
7/16	3/8	1	2-11/16	std	ERP-1214	15642	33.93	45642	40.31
1/2	1/2	1/2	2-9/16	stub	ERPS-1616-2	15780	31.16	45780	38.07
1/2	1/2	1	3	stub	ERPS-1616	15646	31.88	45646	39.72
1/2	1/2	1-1/4	3-1/4	std	ERP-1616	15644	35.34	45644	43.80
1/2	1/2	1-5/8	3-5/8	med	ERP-1616-M	15648	40.53	45648	49.91
1/2	1/2	2	4	long	ERP-1616-L	15650	48.12	45650	58.43
5/8	5/8	3/4	2-7/8	stub	ERPS-2020	15654	34.79	45654	44.21
5/8	5/8	1-5/8	3-3/4	std	ERP-2020	15652	48.89	45652	61.02
5/8	5/8	2-1/2	4-5/8	long	ERP-2020-L	15656	64.01	45656	78.84
3/4	3/4	3/4	3	stub	ERPS-2424	15660	51.35	45660	63.89
3/4	3/4	1-5/8	3-7/8	std	ERP-2424	15658	53.01	45658	68.04
3/4	3/4	2	4-1/4	std	ERP-2424-2	15798	54.28	45798	69.32
3/4	3/4	2-1/2	4-3/4	med	ERP-2424-M	15662	63.87	45662	78.91
3/4	3/4	3	5-1/4	long	ERP-2424-L	15664	77.28	45664	97.46
1	3/4	1-1/8	3-3/8	stub	ERPS-2432	15782	67.31	45782	91.48
1	3/4	1-1/2	3-3/4	std	ERP-2432	15778	73.86	45778	98.03
1	1	2	4-1/2	std	ERP-3232	15666	80.60	45666	106.66
1	1	3	5-1/2	med	ERP-3232-M	15668	98.93	45668	130.63
1	1	4	6-1/2	long	ERP-3232-L	13089	115.50	43089	152.85

## 3 FLUTE • FINE PITCH ROUGHER/FINISHERS WITH 35° HIGH HELIX FOR ALUMINUM



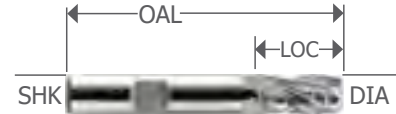
### SERIES: ERFP

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DIA	SHK	LOC	OAL	LENGTH	TOOL	BRIGHT EDP	BRIGHT PRICE	TICN EDP	TICN PRICE
3/16	3/8	1/2	2-3/8	std	ERFP-1206	17691	24.61	47691	29.32
1/4	3/8	5/8	2-7/16	std	ERFP-1208	17692	26.16	47692	29.32
3/8	3/8	3/4	2-1/2	std	ERFP-1212	17693	28.67	47693	34.67
1/2	1/2	1-1/4	3-1/4	std	ERFP-1616	17694	35.34	47694	43.80
5/8	5/8	1-5/8	3-3/4	std	ERFP-2020	16711	48.89	46711	50.84
3/4	3/4	1-5/8	3-7/8	std	ERFP-2424	17695	58.89	47695	73.93
1	1	2	4-1/2	std	ERFP-3232	17696	80.60	47696	106.66

# COBALT & HSS ROUGHING END MILLS

## MULTI FLUTE • CENTER CUTTING ROUGHER/FINISHER



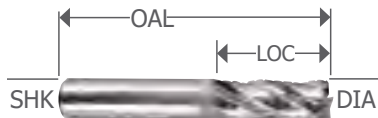
### SERIES: CCRFP

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DIA	SHK	LOC	OAL	FLUTE	LENGTH	TOOL	BRIGHT EDP	BRIGHT PRICE	TICN EDP	TICN PRICE
3/16	3/8	1/2	2-3/8	4	std	CCRFP-1206	13101	24.61	43101	29.43
1/4	3/8	5/8	2-7/16	4	std	CCRFP-1208	13103	26.16	43103	31.08
5/16	3/8	3/4	2-1/2	4	std	CCRFP-1210	11907	27.94	41907	32.99
5/16	3/8	1-3/8	3-1/8	4	long	CCRFP-1210-L	11839	34.20	41839	40.40
3/8	3/8	3/4	2-1/2	4	std	CCRFP-1212	11841	28.67	41841	33.72
7/16	3/8	1	2-11/16	4	std	CCRFP-1214	12281	33.93	42281	40.31
1/2	1/2	1	3	4	stub	CRFPS-1616	15510	31.88	45510	39.72
1/2	1/2	1-1/4	3-1/4	4	std	CCRFP-1616	11873	35.34	41873	43.80
1/2	1/2	1-5/8	3-5/8	4	med	CRFP-1616-M	15512	40.53	45512	49.91
1/2	1/2	2	4	4	long	CCRFP-1616-L	12236	48.12	42236	58.43
1/2	1/2	3	5	4	xl	CCRFP-1616-E	11843	59.54	41843	72.32
9/16	1/2	1-3/8	3-3/8	4	std	CCRFP-1618	11875	41.35	41875	51.17
5/8	5/8	1-1/4	3-3/4	4	std	CRFP-2020-2	11255	44.67	41255	56.79
5/8	5/8	1-5/8	3-3/4	4	std	CCRFP-2020	11877	48.89	41877	61.02
5/8	5/8	2-1/2	4-5/8	4	long	CCRFP-2020-L	11879	64.01	41879	78.84
11/16	5/8	1-5/8	3-3/4	4	std	CCRFP-2022	11845	53.58	41845	67.53
3/4	5/8	1-5/8	3-3/4	4	std	CCRFP-2024	11847	58.34	41847	72.90
3/4	3/4	1-5/8	3-7/8	4	std	CCRFP-2424	11849	58.89	41849	73.93
3/4	3/4	3	5-1/4	4	long	CCRFP-2424-L	11851	77.28	41851	97.46
3/4	3/4	4-1/8	6-3/8	4	xl	CCRFP-2424-E	11853	91.81	41853	116.20
13/16	3/4	1-7/8	4-1/8	5	std	CCRFP-2426	11855	71.13	41855	90.81
7/8	3/4	1-7/8	4-1/8	5	std	CCRFP-2428	11857	65.39	41857	85.75
1	3/4	2	4-1/4	5	med	CCRFP-2432-M	12539	78.91	42539	103.55
1-1/8	3/4	2	4-1/4	6	std	CCRFP-2436	11913	92.45	41913	118.48
1-1/2	3/4	2	4-1/4	6	std	CCRFP-2448	11911	162.03	41911	203.24
1	1	2	4-1/2	5	std	CCRFP-3232	11861	80.60	41861	106.66
1	1	3	5-1/2	5	med	CCRFP-3232-M	11865	98.93	41865	130.63
1	1	4	6-1/2	5	long	CCRFP-3232-L	11863	115.50	41863	152.85
1	1	6	8-1/2	5	xl	CCRFP-3232-E	11909	150.41	41909	199.06
1-1/4	3/4	2	4-1/2	6	med	CCRFP-2440-M	10987	107.97	40987	140.55
1-1/4	1-1/4	2	4-1/2	6	std	CCRFP-4040	13053	107.97	43053	140.55
1-1/4	1-1/4	3	5-1/2	6	med	CCRFP-4040-M	12891	139.44	42891	145.80
1-1/4	1-1/4	4	6-1/2	6	long	CCRFP-4040-L	12331	165.60	42331	212.34
1-1/4	1-1/4	6	8-1/2	6	xl	CCRFP-4040-E	11867	225.35	41867	286.25
1-1/2	1-1/4	2	4-1/2	6	std	CCRFP-4048	11869	137.73	41869	178.94
1-1/2	1-1/4	3	5-1/2	6	med	CCRFP-4048-M	10262	177.06	40262	184.78
1-1/2	1-1/4	4	6-1/2	6	long	CCRFP-4048-L	11915	216.40	41915	275.56
1-1/2	1-1/4	6	8-1/2	6	xl	CCRFP-4048-E	12332	295.07	42332	372.17

# COBALT & HSS ROUGHING END MILLS

## MULTI FLUTE • NON-CENTER CUTTING ROUGHER/FINISHER



HSSCo  
M42

MULTI  
FLUTES

Non-  
Center  
Cutting

30°

Bright  
TICN

+0.05  
-0.05

Chamfer

Rough/Finish



HRc  
<48

P  
M  
K  
S

### SERIES: CRFP

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DIA	SHK	LOC	OAL	FLUTE	LENGTH	TOOL	BRIGHT EDP	BRIGHT PRICE	TICN EDP	TICN PRICE
* All rougher/finishers 5/8 and under are only available center cutting. See table on page 144										
3/4	3/4	3/4	3	4	stub	CRFPS-2424	11259	49.53	41259	61.29
3/4	3/4	1-1/4	3-1/2	4	std	CRFP-2424-2	11257	47.42	41257	61.06
3/4	3/4	1-5/8	3-7/8	4	std	CRFP-2424	15514	48.77	45514	63.80
3/4	3/4	2-1/2	4-3/4	4	med	CRFP-2424-M	15516	62.97	45516	81.28
3/4	3/4	3	5-1/4	4	long	CRFP-2424-L	15518	71.10	45518	91.27
1	3/4	2	4-1/4	5	med	CRFP-2432-M	11261	72.60	41261	97.25
1	1	2	4-1/2	5	std	CRFP-3232	15520	74.16	45520	100.22
1	1	3	5-1/2	5	med	CRFP-3232-M	15522	91.01	45522	122.72
1	1	4	6-1/2	5	long	CRFP-3232-L	11263	106.26	41263	143.62
1-1/4	1-1/4	6	8-1/2	6	xl	CRFP-4040-E	11265	207.32	41265	268.22

# GENERAL PURPOSE COBALT & HSS END MILLS

## 2 FLUTE • CENTER CUTTING END MILLS



M42 - HSS
2
30°
Bright TiCN
+0.0015  
-0.0000
Square
HRC <48

P	K
M	S
	N

### SERIES: A

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DIA	SHK	LOC	OAL	LENGTH	MAT	TOOL	BRIGHT EDP	BRIGHT PRICE	TICN EDP	TICN PRICE
1/32	3/16	3/32	1-1/2	std	M42	A-601	10002	10.67	40002	14.21
3/64	3/16	9/64	1-1/2	std	M42	A-601-1/2	10004	10.67	40004	14.21
1/16	3/16	3/16	1-1/2	std	M42	A-602	10006	10.67	40006	14.21
5/64	3/16	15/64	1-1/2	std	M42	A-602-1/2	10008	10.67	40008	14.21
3/32	3/16	9/32	1-1/2	std	M42	A-603	10010	10.67	40010	14.21
7/64	3/16	21/64	1-1/2	std	M42	A-603-1/2	10012	10.67	40012	14.21
1/8	3/16	3/8	1-1/2	std	M42	A-604	10014	10.67	40014	14.21
9/64	3/16	27/64	1-1/2	std	M42	A-604-1/2	10016	10.67	40016	14.21
5/32	3/16	7/16	1-1/2	std	M42	A-605	10018	10.67	40018	14.21
11/64	3/16	1/2	1-1/2	std	M42	A-605-1/2	10020	10.67	40020	14.21
3/16	3/16	1/2	1-1/2	std	M42	A-606	10022	10.67	40022	14.21
1/4	1/4	3/4	2-1/2	std	M42	A-808	10024	14.72	40024	18.39

If shank and mill diameters are the same, tolerance is +.0000/-0.0025

DIA	SHK	LOC	OAL	LENGTH	MAT	TOOL	BRIGHT EDP	BRIGHT PRICE	TICN EDP	TICN PRICE
3/32	3/8	5/16	2-1/4	std	M42	A-1203	10026	14.32	40026	19.12
1/8	3/8	3/16	2-1/8	stub	M42	AS-1204	10030	13.90	40030	18.50
1/8	3/8	3/8	2-5/16	std	M42	A-1204	10028	13.90	40028	18.50
1/8	3/8	1/2	2-3/8	med	M42	A-1204-M	12802	17.00	42802	21.94
1/8	3/8	3/4	2-5/8	long	M42	A-1204-L	12804	18.58	42804	23.51
5/32	3/8	3/16	2-1/16	stub	M42	AS-1205	10034	14.32	40034	19.07
5/32	3/8	7/16	2-5/16	std	M42	A-1205	10032	14.66	40032	19.54
5/32	3/8	5/8	2-1/2	med	M42	A-1205-M	12806	17.00	42806	21.94
5/32	3/8	3/4	2-5/8	long	M42	A-1205-L	12808	18.58	42808	23.51
3/16	3/8	3/16	2-1/16	stub	M42	AS-1206	10038	12.87	40038	17.14
3/16	3/8	7/16	2-5/16	std	M42	A-1206	10036	12.87	40036	17.14
3/16	3/8	5/8	2-1/2	med	M42	A-1206-M	12810	15.49	42810	20.38
3/16	3/8	3/4	2-5/8	long	M42	A-1206-L	10474	19.26	40474	24.24
3/16	3/8	1-1/4	3-1/8	xl	M42	A-1206-E	12812	29.72	42812	35.11
7/32	3/8	1/4	2-1/8	stub	M42	AS-1207	10042	14.66	40042	19.44
7/32	3/8	1/2	2-3/8	std	M42	A-1207	10040	14.66	40040	19.54
7/32	3/8	7/8	2-3/4	med	M42	A-1207-M	12814	17.90	42814	22.78
7/32	3/8	1-1/4	3-1/8	long	M42	A-1207-L	10476	20.23	40476	25.08
7/32	3/8	1-1/2	3-3/8	xl	M42	A-1207-E	12816	29.72	42816	35.11
1/4	3/8	1/4	2-1/16	stub	M42	AS-1208	10046	13.07	40046	17.35
1/4	3/8	1/2	2-5/16	std	M42	A-1208	10044	13.07	40044	17.35
1/4	3/8	7/8	2-3/4	med	M42	A-1208-M	12818	16.24	42818	21.11
1/4	3/8	1-1/4	3-1/16	long	M42	A-1208-L	10478	20.23	40478	25.08
1/4	3/8	1-3/4	3-9/16	xl	M42	A-1208-E	12820	29.72	42820	36.78
9/32	3/8	5/16	2-1/8	stub	M42	AS-1209	10050	14.94	40050	19.84
9/32	3/8	9/16	2-3/8	std	M42	A-1209	10048	14.66	40048	19.54
9/32	3/8	1	2-3/4	med	M42	A-1209-M	12822	17.90	42822	22.78
9/32	3/8	1-3/8	3-1/8	long	M42	A-1209-L	10480	20.23	40480	25.08
9/32	3/8	1-3/4	3-5/8	xl	M42	A-1209-E	12824	29.72	42824	35.11
19/64	3/8	9/16	2-5/16	std	M42	A-1209-1/2	14414	18.04	44414	22.92
5/16	3/8	5/16	2-1/16	stub	M42	AS-1210	10054	13.07	40054	17.35
5/16	3/8	9/16	2-5/16	std	M42	A-1210	10052	13.07	40052	17.35
5/16	3/8	1	2-3/4	med	M42	A-1210-M	12826	16.24	42826	21.11
5/16	3/8	1-3/8	3-1/8	long	M42	A-1210-L	10482	20.23	40482	25.08
5/16	3/8	2	3-3/4	xl	M42	A-1210-E	12828	29.72	42828	36.78
11/32	3/8	3/8	2-3/16	stub	M42	AS-1211	10058	14.94	40058	19.86
11/32	3/8	3/4	2-1/2	std	M42	A-1211	10056	14.66	40056	19.54
11/32	3/8	1	2-3/4	med	M42	A-1211-M	12830	17.90	42830	22.78
11/32	3/8	1-1/2	3-1/4	long	M42	A-1211-L	10484	20.23	40484	25.08
11/32	3/8	2	3-3/4	xl	M42	A-1211-E	12832	29.72	42832	36.78

sizes continued on next page



# GENERAL PURPOSE COBALT & HSS END MILLS

## 2 FLUTE • CENTER CUTTING END MILLS

**SERIES: A**

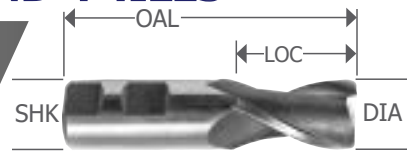
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DIA	SHK	LOC	OAL	LENGTH	MAT	TOOL	BRIGHT EDP	BRIGHT PRICE	TICN EDP	TICN PRICE
3/8	3/8	3/8	2-1/8	stub	M42	AS-1212	10062	13.07	40062	17.35
3/8	3/8	9/16	2-5/16	std	M42	A-1212	10060	13.07	40060	17.35
3/8	3/8	1	2-3/4	med	M42	A-1212-M	10486	16.24	40486	21.11
3/8	3/8	1-1/2	3-1/4	long	M42	A-1212-L	10488	18.79	40488	23.72
3/8	3/8	2-1/2	4-1/4	xl	M42	A-1212-E	10490	27.25	40490	34.80
13/32	3/8	13/16	2-1/2	std	M42	A-1213	10064	20.00	40064	26.65
7/16	3/8	7/16	2-1/8	stub	M42	AS-1214	12794	20.41	42794	27.17
7/16	3/8	13/16	2-1/2	std	M42	A-1214	10066	20.00	40066	26.65
7/16	1/2	13/16	2-13/16	std	M42	A-1614	10070	21.76	40070	28.95
7/16	3/8	1-1/4	3-1/4	med	M42	A-1214-M	12834	24.94	42834	32.81
7/16	1/2	1-3/4	3-3/4	long	M42	A-1614-L	10492	29.04	40492	38.14
7/16	3/8	2-3/4	4-3/4	xl	M42	A-1214-E	12836	32.41	42836	42.22
15/32	1/2	1	3	std	M42	A-1615	10072	21.76	40072	28.95
1/2	3/8	1/2	2-3/16	stub	M42	AS-1216	12796	21.34	42796	28.42
1/2	3/8	13/16	2-1/2	std	M42	A-1216	10068	21.34	40068	28.42
1/2	1/2	1	3	std	M42	A-1616	10074	18.76	40074	24.98
1/2	1/2	1-1/2	3-1/2	med	M42	A-1616-M	10494	26.54	40494	35.32
1/2	1/2	2	4	long	M42	A-1616-L	10496	27.39	40496	36.47
1/2	1/2	3	5	xl	M42	A-1616-E	10498	34.26	40498	43.68
17/32	1/2	1-1/8	3-1/8	std	M42	A-1617	10076	27.41	40076	35.68
9/16	1/2	1-1/8	3-1/8	std	M42	A-1618	10078	24.58	40078	32.70
19/32	1/2	1-1/8	3-1/8	std	M42	A-1619	10080	30.67	40080	39.40
5/8	1/2	5/8	2-3/4	stub	M42	AS-1620	12798	27.63	42798	36.32
5/8	1/2	1-1/8	3-1/8	std	M42	A-1620	10082	27.63	40082	36.32
5/8	5/8	1-5/16	3-7/16	std	M42	A-2020	10108	28.12	40108	37.38
5/8	5/8	2	4-1/8	med	M42	A-2020-M	10500	37.88	40500	47.92
5/8	5/8	2-1/2	4-5/8	long	M42	A-2020-L	10502	45.05	40502	55.06
5/8	5/8	4	6-1/8	xl	M42	A-2020-E	12838	59.43	42838	76.37
21/32	1/2	1-5/16	3-5/16	std	M42	A-1621	10084	33.44	40084	44.52
11/16	1/2	1-5/16	3-5/16	std	M42	A-1622	10086	33.65	40086	44.02
11/16	5/8	1-5/16	3-7/16	std	M42	A-2022	10110	34.29	40110	44.06
23/32	1/2	1-5/16	3-5/16	std	M42	A-1623	10088	39.09	40088	50.18
3/4	1/2	5/8	2-5/8	stub	M42	AS-1624	16470	34.19	46470	44.69
3/4	1/2	1-5/16	3-5/16	std	M42	A-1624	10090	34.83	40090	44.72
3/4	5/8	1-5/16	3-7/16	std	M42	A-2024	10112	34.83	40112	44.72
3/4	3/4	3/4	3	stub	M42	AS-2424	12800	34.21	42800	44.20
3/4	3/4	1-5/16	3-9/16	std	M42	A-2424	10122	31.89	40122	42.39
3/4	3/4	2-1/4	4-1/2	med	M42	A-2424-M	10504	45.83	40504	60.92
3/4	3/4	3	5-1/4	long	M42	A-2424-L	10506	59.53	40506	77.88
3/4	3/4	4	6-1/4	xl	M42	A-2424-E	12840	74.34	42840	97.22
25/32	1/2	1-1/2	3-1/2	std	M42	A-1625	10092	44.21	40092	58.79
13/16	1/2	1-1/2	3-1/2	std	M42	A-1626	10094	44.21	40094	58.79
13/16	5/8	1-1/2	3-5/8	std	M42	A-2026	10114	44.62	40114	57.36
13/16	3/4	1-1/2	3-3/4	std	M42	A-2426	10124	46.11	40124	59.27
27/32	1/2	1-1/2	3-1/2	std	M42	A-1627	10096	47.82	40096	62.56
27/32	7/8	1-1/2	3-3/4	std	M42	A-2827	14416	45.90	44416	60.01
7/8	1/2	5/8	2-5/8	stub	M42	AS-1628	16471	45.75	46471	60.85
7/8	1/2	1-1/2	3-1/2	std	M42	A-1628	10098	45.75	40098	60.81
7/8	5/8	1-1/2	3-5/8	std	M42	A-2028	10116	43.98	40116	56.49
7/8	3/4	1-1/2	3-3/4	std	M42	A-2428	10126	45.90	40126	60.01
7/8	7/8	1-1/2	3-3/4	std	M42	A-2828	10152	48.88	40152	62.25
7/8	7/8	2-1/2	4-3/4	med	M42	A-2828-M	10508	59.00	40508	77.17
7/8	7/8	3-1/2	5-3/4	long	M42	A-2828-L	10510	70.18	40510	90.15
29/32	1/2	1-1/2	3-1/2	std	M42	A-1629	10100	54.95	40100	71.87
29/32	7/8	1-5/8	3-3/4	std	M42	A-2829	14418	58.10	44418	69.28
15/16	1/2	1-1/2	3-1/2	std	M42	A-1630	10102	54.95	40102	71.87
15/16	5/8	1-1/2	3-5/8	std	M42	A-2030	10118	54.42	40118	66.37

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# GENERAL PURPOSE COBALT & HSS END MILLS

## 2 FLUTE • CENTER CUTTING END MILLS



### SERIES: A

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DIA	SHK	LOC	OAL	LENGTH	MAT	TOOL	BRIGHT EDP	BRIGHT PRICE	TICN EDP	TICN PRICE
15/16	3/4	1-1/2	3-3/4	std	M42	A-2430	10128	52.72	40128	67.71
15/16	7/8	1-1/2	3-3/4	std	M42	A-2830	10154	54.21	40154	65.47
31/32	1/2	1-1/2	3-1/2	std	M42	A-1631	10104	56.02	40104	73.34
31/32	1	1-5/8	4-1/8	std	M42	A-3231	14417	62.94	44417	80.40
1	1/2	3/4	2-3/4	stub	M42	AS-1632	16472	56.02	46472	69.60
1	1/2	1-1/2	3-1/2	std	M42	A-1632	10106	56.02	40106	73.34
1	5/8	3/4	2-7/8	stub	M42	AS-2032	16474	51.76	46474	64.24
1	5/8	1-1/2	3-5/8	std	M42	A-2032	10120	51.76	40120	67.68
1	3/4	3/4	3	stub	M42	AS-2432	16476	51.76	46476	67.68
1	3/4	1-1/2	3-3/4	std	M42	A-2432	10130	52.72	40130	67.71
1	7/8	1-1/2	3-3/4	std	M42	A-2832	10156	57.62	40156	74.02
1	1	1-5/8	4-1/8	std	M42	A-3232	10162	56.55	40162	74.01
1	1	3	5-1/2	med	M42	A-3232-M	10512	73.80	40512	94.65
1	1	4	6-1/2	long	M42	A-3232-L	10514	90.42	40514	116.20
1-1/16	3/4	1-1/2	3-3/4	std	M42	A-2434	10132	85.16	40132	107.14
1-1/16	1	1-5/8	4-1/8	std	M42	A-3234	10164	85.16	40164	107.14
1-1/8	3/4	3/4	3	stub	M42	AS-2436	16477	83.18	46477	99.68
1-1/8	3/4	1-5/8	3-7/8	std	M42	A-2436	10134	83.18	40134	105.21
1-1/8	7/8	1-5/8	3-7/8	std	M42	A-2836	10158	86.37	40158	107.33
1-1/8	1	1-5/8	4-1/8	std	M42	A-3236	10166	83.18	40166	105.21
1-1/8	1	3	5-1/2	med	M42	A-3236-M	10516	101.39	40516	123.86
1-3/16	3/4	1-5/8	3-7/8	std	M42	A-2438	10136	104.69	40136	127.54
1-3/16	1	1-5/8	4-1/8	std	M42	A-3238	10168	104.69	40168	127.54
1-1/4	1/2	3/4	2-3/4	stub	M42	AS-1640	16473	89.12	46473	112.04
1-1/4	5/8	3/4	2-7/8	stub	M42	AS-2040	16475	89.12	46475	112.04
1-1/4	3/4	3/4	3	stub	M42	AS-2440	16478	89.12	46478	112.04
1-1/4	3/4	1-5/8	3-7/8	std	M42	A-2440	10138	89.12	40138	112.04
1-1/4	7/8	1-5/8	3-7/8	std	M42	A-2840	10160	88.40	40160	109.96
1-1/4	1	1-5/8	4-1/8	std	M42	A-3240	10170	86.22	40170	108.31
1-1/4	1-1/4	1-5/8	4-1/8	std	M42	A-4040	10180	86.22	40180	108.31
1-1/4	1	3	5-1/2	med	M42	A-3240-M	10518	114.67	40518	136.96
1-1/4	1-1/4	3	5-1/2	med	M42	A-4040-M	10522	111.19	40522	131.34
1-1/4	1-1/4	4	6-1/2	long	M42	A-4040-L	10524	149.74	40524	188.73
1-5/16	1	1-5/8	4-1/8	std	HSS	A-3242	10172	98.54	40172	131.10
1-3/8	3/4	3/4	3	stub	HSS	AS-2444	16479	92.34	46479	114.74
1-3/8	3/4	1-5/8	3-7/8	std	HSS	A-2444	10140	92.34	40140	120.76
1-3/8	1	1-5/8	4-1/8	std	HSS	A-3244	10174	92.34	40174	120.76
1-3/8	1	3	5-1/2	med	HSS	A-3244-M	10520	109.89	40520	146.15
1-7/16	1	1-5/8	4-1/8	std	HSS	A-3246	10176	118.85	40176	144.20
1-1/2	3/4	1-5/8	3-7/8	std	HSS	A-2448	10142	105.54	40142	138.14
1-1/2	1	1-5/8	4-1/8	std	HSS	A-3248	10178	101.60	40178	132.97
1-1/2	1-1/4	1-5/8	4-1/8	std	HSS	A-4048	10184	105.54	40184	138.14
1-1/2	3/4	3/4	3	stub	HSS	AS-2448	16480	105.54	46480	131.15
1-1/2	3/4	1-5/8	3-7/8	std	M42	AP-2448	15278	131.10	45278	162.89
1-1/2	1-1/4	1-5/8	4-1/8	std	M42	AP-4048	10792	144.52	40792	189.05
1-1/2	1-1/4	3	5-1/2	med	HSS	A-4048-M	10526	129.93	40526	169.98
1-1/2	1-1/4	4	6-1/2	long	HSS	A-4048-L	10528	168.80	40528	215.94
1-9/16	1-1/4	1-5/8	4-1/8	std	HSS	A-4050	10186	127.91	40186	167.33
1-5/8	3/4	1-5/8	3-7/8	std	HSS	A-2452	10144	112.14	40144	146.71
1-5/8	1-1/4	1-5/8	4-1/8	std	HSS	A-4052	10188	114.27	40188	149.48
1-3/4	3/4	1-5/8	3-7/8	std	HSS	A-2456	10146	124.71	40146	163.16
1-3/4	1-1/4	1-5/8	4-1/8	std	HSS	A-4056	10190	124.71	40190	163.16
1-3/4	1-1/4	1-5/8	4-1/8	std	M42	AP-4056	CALL		CALL	
1-3/4	1-1/4	3	5-1/2	med	HSS	A-4056-M	10532	173.81	40532	222.30
1-7/8	3/4	1-5/8	3-7/8	std	HSS	A-2460	10148	146.65	40148	176.29
1-7/8	1-1/4	1-5/8	4-1/8	std	HSS	A-4060	10192	139.83	40192	173.79

sizes continued on next page



# GENERAL PURPOSE COBALT & HSS END MILLS

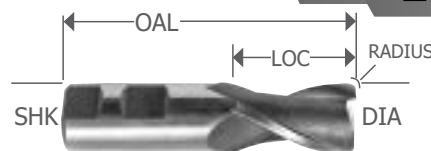
## 2 FLUTE • CENTER CUTTING END MILLS

SERIES: A

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DIA	SHK	LOC	OAL	LENGTH	MAT	TOOL	BRIGHT EDP	BRIGHT PRICE	TICN EDP	TICN PRICE
1-7/8	1-1/4	3	5-1/2	med	HSS	A-4060-M	CALL		CALL	
2	3/4	1-5/8	3-7/8	std	HSS	A-2464	10150	150.91	40150	193.06
2	1-1/4	1-5/8	4-1/8	std	HSS	A-4064	10194	155.17	40194	203.06
2	3/4	1-5/8	3-7/8	std	M42	AP-2464	15286	174.23	45286	227.97
2	1-1/4	3	5-1/2	med	HSS	A-4064-M	10538	198.30	40538	253.67
2-1/8	1-1/4	1-5/8	4-1/8	std	HSS	A-4068	10198	178.28	40198	228.01
2-1/4	1-1/4	1-5/8	4-1/8	std	HSS	A-4072	10200	203.31	40200	260.03
2-1/4	1-1/4	3	5-1/2	med	HSS	A-4072-M	10542	261.46	40542	331.48
2-1/2	1-1/4	1-5/8	4-1/8	std	HSS	A-4080	10202	256.13	40202	324.78
2-1/2	1-1/4	3	5-1/2	med	HSS	A-4080-M	10544	318.33	40544	403.62

## 2 FLUTE • CORNER RADIUS CENTER CUTTING END MILLS



HSSCo M42
2
30°
Bright TICN
+0.015
-0.0000
Radius
HRc <48

P	K
M	S
N	N

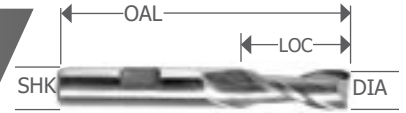
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DIA	SHK	LOC	OAL	RADIUS	LENGTH	MAT	TOOL	BRIGHT EDP	BRIGHT PRICE	TICN EDP	TICN PRICE
1/8	3/8	3/8	2-5/16	0.015	std	M42	A-1204-R015	15146	17.69	45146	22.57
3/16	3/8	7/16	2-5/16	0.020	std	M42	A-1206-R020	15148	17.69	45148	22.57
3/16	3/8	7/16	2-5/16	0.030	std	M42	A-1206-R030	15150	17.69	45150	22.57
1/4	3/8	1/2	2-5/16	0.020	std	M42	A-1208-R020	15152	18.30	45152	23.20
1/4	3/8	1/2	2-5/16	0.030	std	M42	A-1208-R030	15154	18.30	45154	23.20
1/4	3/8	1/2	2-5/16	0.045	std	M42	A-1208-R045	15156	18.37	45156	23.30
5/16	3/8	9/16	2-5/16	0.020	std	M42	A-1210-R020	15158	20.10	45158	24.98
5/16	3/8	9/16	2-5/16	0.030	std	M42	A-1210-R030	15160	20.23	45160	25.08
5/16	3/8	9/16	2-5/16	0.045	std	M42	A-1210-R045	15162	20.44	45162	25.29
3/8	3/8	9/16	2-5/16	0.020	std	M42	A-1212-R020	15164	20.10	45164	24.98
3/8	3/8	9/16	2-5/16	0.030	std	M42	A-1212-R030	15166	20.23	45166	25.08
3/8	3/8	9/16	2-5/16	0.045	std	M42	A-1212-R045	15168	20.44	45168	25.29
1/2	1/2	1	3	0.020	std	M42	A-1616-R020	15170	28.22	45170	36.05
1/2	1/2	1	3	0.030	std	M42	A-1616-R030	15172	28.42	45172	36.26
1/2	1/2	1	3	0.045	std	M42	A-1616-R045	15174	28.70	45174	36.58
1/2	1/2	1	3	0.060	std	M42	A-1616-R060	15176	29.04	45176	36.89
5/8	5/8	1-5/16	3-7/16	0.020	std	M42	A-2020-R020	15178	38.87	45178	48.78
5/8	5/8	1-5/16	3-7/16	0.030	std	M42	A-2020-R030	15180	39.10	45180	48.99
5/8	5/8	1-5/16	3-7/16	0.045	std	M42	A-2020-R045	15182	39.44	45182	49.42
5/8	5/8	1-5/16	3-7/16	0.060	std	M42	A-2020-R060	15184	39.95	45184	49.95
5/8	5/8	1-5/16	3-7/16	0.090	std	M42	A-2020-R090	15186	40.95	45186	50.91
3/4	3/4	1-5/16	3-9/16	0.020	std	M42	A-2424-R020	15188	48.38	45188	64.33
3/4	3/4	1-5/16	3-9/16	0.030	std	M42	A-2424-R030	15190	48.72	45190	64.86
3/4	3/4	1-5/16	3-9/16	0.045	std	M42	A-2424-R045	15192	49.00	45192	65.18
3/4	3/4	1-5/16	3-9/16	0.060	std	M42	A-2424-R060	15194	49.50	45194	65.82
3/4	3/4	1-5/16	3-9/16	0.090	std	M42	A-2424-R090	15196	50.43	45196	67.10
3/4	3/4	1-5/16	3-9/16	0.125	std	M42	A-2424-R125	15198	51.35	45198	68.27
1	1	1-5/8	4-1/8	0.020	std	M42	A-3232-R020	15200	72.60	45200	93.72
1	1	1-5/8	4-1/8	0.030	std	M42	A-3232-R030	15202	72.79	45202	93.93
1	1	1-5/8	4-1/8	0.045	std	M42	A-3232-R045	15204	73.17	45204	94.25
1	1	1-5/8	4-1/8	0.060	std	M42	A-3232-R060	15206	73.66	45206	94.78
1	1	1-5/8	4-1/8	0.090	std	M42	A-3232-R090	15208	74.65	45208	95.74
1	1	1-5/8	4-1/8	0.125	std	M42	A-3232-R125	15210	75.85	45210	96.92

# GENERAL PURPOSE COBALT & HSS END MILLS

## 2 FLUTE • CENTER CUTTING METRIC/INCH END MILLS



HSSCo M42	2	30°	Bright TiCN	+0.015 -0.000	Square				HRC <48	P M K S N
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SERIES: AP- \_M\_

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DIA	SHK	LOC	OAL	LENGTH	MAT	TOOL	BRIGHT EDP	BRIGHT PRICE	TICN EDP	TICN PRICE
3mm	3/8	3/8	2-5/16	std	M42	AP-12M3	10812	17.95	40812	22.89
3.5mm	3/8	7/16	2-5/16	std	M42	AP-12M3.5	11813	17.95	41813	22.84
4mm	3/8	7/16	2-5/16	std	M42	AP-12M4	10814	17.95	40814	22.89
4.5mm	3/8	7/16	2-5/16	std	M42	AP-12M4.5	10815	17.95	40815	22.84
5mm	3/8	1/2	2-5/16	std	M42	AP-12M5	10816	17.95	40816	22.89
5.5mm	3/8	1/2	2-3/8	std	M42	AP-12M5.5	10817	18.44	40817	23.32
6mm	3/8	1/2	2-5/16	std	M42	AP-12M6	10818	18.44	40818	23.30
6.5mm	3/8	9/16	2-3/8	std	M42	AP-12M6.5	10819	18.44	40819	23.32
7mm	3/8	9/16	2-3/8	std	M42	AP-12M7	10820	18.44	40820	23.30
7.5mm	3/8	9/16	2-5/16	std	M42	AP-12M7.5	10821	18.44	40821	23.30
8mm	3/8	9/16	2-5/16	std	M42	AP-12M8	10822	18.44	40822	23.30
8.5mm	3/8	9/16	2-5/16	std	M42	AP-12M8.5	10823	18.44	40823	23.30
9mm	3/8	9/16	2-5/16	std	M42	AP-12M9	10824	18.44	40824	23.32
9.5mm	3/8	9/16	2-5/16	std	M42	AP-12M9.5	10825	23.20	40825	27.38
10mm	3/8	13/16	2-1/2	std	M42	AP-12M10	10826	23.43	40826	31.14
10.5mm	3/8	13/16	2-1/2	std	M42	AP-12M10.5	10827	24.88	40827	32.71
11mm	3/8	13/16	2-1/2	std	M42	AP-12M11	10828	24.88	40828	32.71
11.5mm	3/8	13/16	2-1/2	std	M42	AP-12M11.5	10829	26.41	40829	34.17
12mm	3/8	13/16	2-1/2	std	M42	AP-12M12	10830	26.41	40830	34.17
12.5mm	1/2	1	3	std	M42	AP-16M12.5	10831	28.22	40831	35.78
13mm	1/2	1-1/8	3-1/8	std	M42	AP-16M13	10832	28.76	40832	36.47
13.5mm	1/2	1-1/8	3-1/8	std	M42	AP-16M13.5	10833	31.31	40833	39.60
14mm	1/2	1-1/8	3-1/8	std	M42	AP-16M14	10834	31.31	40834	39.62
14.5mm	1/2	1-1/8	3-1/8	std	M42	AP-16M14.5	10835	32.94	40835	41.19
15mm	1/2	1-1/8	3-1/8	std	M42	AP-16M15	10836	32.94	40836	41.64
16mm	5/8	1-5/16	3-7/16	std	M42	AP-20M16	10838	38.10	40838	48.14
17mm	5/8	1-5/16	3-7/16	std	M42	AP-20M17	10840	41.29	40840	54.95
18mm	5/8	1-5/16	3-7/16	std	M42	AP-20M18	10842	45.08	40842	59.96
19mm	3/4	1-5/8	3-7/8	std	M42	AP-24M19	10844	47.87	40844	63.67
20mm	3/4	1-1/2	3-3/4	std	M42	AP-24M20	10846	55.49	40846	72.55
21mm	3/4	1-1/2	3-3/4	std	M42	AP-24M21	10848	60.39	40848	79.03
22mm	3/4	1-1/2	3-3/4	std	M42	AP-24M22	10850	63.37	40850	82.61
23mm	7/8	1-7/8	4-1/8	std	M42	AP-28M23	10852	74.55	40852	89.30
24mm	1	2	4-1/2	std	M42	AP-32M24	10854	78.70	40854	95.15
25mm	1	2	4-1/2	std	M42	AP-32M25	10856	81.79	40856	103.00
28mm	1	2	4-1/2	std	M42	AP-32M28	10858	89.99	40858	111.96
32mm	1	2	4-1/2	std	M42	AP-32M32	10860	111.72	40860	144.24
35mm	1	2	4-1/2	std	M42	AP-32M35	10862	130.78	40862	159.47
36mm	1	2	4-1/2	std	M42	AP-32M36	10864	128.33	40864	159.47
40mm	1-1/4	2	4-1/2	std	M42	AP-40M40	10866	152.19	40866	185.59
45mm	1-1/4	2	4-1/2	std	M42	AP-40M45	10868	187.12	40868	225.98
50mm	1-1/4	2	4-1/2	std	M42	AP-40M50	CALL		CALL	

# GENERAL PURPOSE COBALT & HSS END MILLS



## 2 FLUTE • CENTER CUTTING END MILLS

HSSCo  
M42



Bright  
TiCN

+0.040mm  
-0.0000

Square



HRC  
<48



### SERIES: A-M\_M\_M\_

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DIA	SHK	LOC	OAL	LENGTH	MAT	TOOL	BRIGHT EDP	BRIGHT PRICE	TICN EDP	TICN PRICE
2mm	6mm	7mm	57mm	std	M42	A-M6M2	16339	19.61	46339	25.71
3mm	6mm	8mm	57mm	std	M42	A-M6M3	16340	19.27	46340	25.29
4mm	6mm	11mm	57mm	std	M42	A-M6M4	16341	18.95	46341	24.98
5mm	6mm	13mm	57mm	std	M42	A-M6M5	16342	18.61	46342	24.66
6mm	6mm	13mm	57mm	std	M42	A-M6M6	16343	18.29	46343	24.35
7mm	10mm	16mm	69mm	std	M42	A-M10M7	16344	21.28	46344	28.30
8mm	10mm	19mm	69mm	std	M42	A-M10M8	16345	20.95	46345	27.90
9mm	10mm	19mm	69mm	std	M42	A-M10M9	16346	20.62	46346	27.38
10mm	10mm	22mm	72mm	std	M42	A-M10M10	16347	21.49	46347	28.53
11mm	12mm	22mm	79mm	std	M42	A-M12M11	16348	24.17	46348	32.14
12mm	12mm	26mm	83mm	std	M42	A-M12M12	16349	23.84	46349	31.66
13mm	12mm	26mm	83mm	std	M42	A-M12M13	16350	25.30	46350	33.65
14mm	12mm	26mm	83mm	std	M42	A-M12M14	16351	26.01	46351	34.38
15mm	12mm	26mm	83mm	std	M42	A-M12M15	16352	26.69	46352	35.06
16mm	16mm	32mm	92mm	std	M42	A-M16M16	16353	28.74	46353	38.23
17mm	16mm	32mm	92mm	std	M42	A-M16M17	16354	30.12	46354	40.09
18mm	16mm	32mm	92mm	std	M42	A-M16M18	16355	32.86	46355	42.82
19mm	16mm	32mm	92mm	std	M42	A-M16M19	16356	34.22	46356	44.20
20mm	20mm	38mm	104mm	std	M42	A-M20M20	16357	42.49	46357	55.61
21mm	20mm	38mm	104mm	std	M42	A-M20M21	16358	43.24	46358	53.70
22mm	20mm	38mm	104mm	std	M42	A-M20M22	16359	43.98	46359	54.60
23mm	20mm	38mm	104mm	std	M42	A-M20M23	16360	45.48	46360	56.43
24mm	25mm	45mm	121mm	std	M42	A-M25M24	16361	56.44	46361	70.08
25mm	25mm	45mm	121mm	std	M42	A-M25M25	16362	58.58	46362	72.81
30mm	25mm	45mm	121mm	std	M42	A-M25M30	16363	85.73	46363	103.82
32mm	32mm	53mm	133mm	std	M42	A-M32M32	16364	92.87	46364	110.86

# GENERAL PURPOSE COBALT & HSS END MILLS

## 2 FLUTE • CENTER CUTTING BALL NOSE END MILL



M42 - HSS	2	30°	Bright TiCN	+0.0005 -0.0005 ≤5/8	+0.0010 -0.0010 >5/8	Ball					HRC <48	P M K S N
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### SERIES: A-\_\_-B

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DIA	SHK	LOC	OAL	LENGTH	MAT	TOOL	BRIGHT EDP	BRIGHT PRICE	TICN EDP	TICN PRICE
3/32	3/8	5/16	2-1/4	std	M42	A-1203-B	10350	17.90	40350	22.05
1/8	3/8	3/8	2-5/16	std	M42	A-1204-B	10352	18.58	40352	23.51
5/32	3/8	7/16	2-5/16	std	M42	A-1205-B	10354	20.30	40354	25.18
3/16	3/8	1/2	2-3/8	std	M42	A-1206-B	10356	17.48	40356	22.36
3/16	3/8	3/4	2-5/8	long	M42	A-1206-LB	10546	26.16	40546	31.04
7/32	3/8	9/16	2-3/8	std	M42	A-1207-B	10358	20.93	40358	25.92
7/32	3/8	1-1/4	3-1/8	long	M42	A-1207-LB	10548	27.63	40548	32.60
1/4	3/8	5/8	2-7/16	std	M42	A-1208-B	10360	17.95	40360	22.89
1/4	3/8	1-1/4	3-1/16	long	M42	A-1208-LB	10550	26.16	40550	31.04
9/32	3/8	9/16	2-3/8	std	M42	A-1209-B	10362	23.13	40362	28.11
9/32	3/8	1-3/8	3-1/8	long	M42	A-1209-LB	10552	28.92	40552	34.17
5/16	3/8	3/4	2-1/2	std	M42	A-1210-B	10364	21.21	40364	26.12
5/16	3/8	1-3/8	3-1/8	long	M42	A-1210-LB	10554	26.16	40554	31.04
11/32	3/8	3/4	2-1/2	std	M42	A-1211-B	10366	23.13	40366	28.11
11/32	3/8	1-1/2	3-1/4	long	M42	A-1211-LB	10556	28.92	40556	34.12
3/8	3/8	3/4	2-1/2	std	M42	A-1212-B	10368	21.55	40368	26.44
3/8	3/8	1	2-3/4	med	M42	A-1212-MB	10558	24.16	40558	29.05
3/8	3/8	1-1/2	3-1/4	long	M42	A-1212-LB	10560	25.12	40560	30.10
13/32	3/8	13/16	2-1/2	std	M42	A-1213-B	10370	29.81	40370	37.62
7/16	3/8	13/16	2-1/2	std	M42	A-1214-B	10372	29.81	40372	37.62
7/16	1/2	1	3	std	M42	A-1614-B	10376	29.81	40376	37.62
7/16	1/2	1-3/4	3-3/4	long	M42	A-1614-LB	10562	41.20	40562	50.16
15/32	1/2	1	3	std	M42	A-1615-B	10378	30.37	40378	38.25
1/2	3/8	13/16	2-1/2	std	M42	A-1216-B	10374	33.06	40374	40.86
1/2	1/2	1	3	std	M42	A-1616-B	10380	30.10	40380	37.83
1/2	1/2	1-1/2	3-1/2	med	M42	A-1616-MB	10564	38.14	40564	47.13
1/2	1/2	2	4	long	M42	A-1616-LB	10566	40.44	40566	49.53
17/32	1/2	1-1/8	3-1/8	std	M42	A-1617-B	10382	40.36	40382	48.67
9/16	1/2	1-1/8	3-1/8	std	M42	A-1618-B	10384	37.18	40384	45.48
19/32	1/2	1-1/8	3-1/8	std	M42	A-1619-B	10386	46.39	40386	55.06
5/8	1/2	1-1/8	3-1/8	std	M42	A-1620-B	10388	40.59	40388	49.42
5/8	5/8	1-3/8	3-1/2	std	M42	A-2020-B	10414	40.59	40414	50.59
5/8	5/8	2	4-1/8	med	M42	A-2020-MB	10568	55.08	40568	64.96
5/8	5/8	2-1/2	4-5/8	long	M42	A-2020-LB	10570	59.27	40570	69.97
21/32	1/2	1-5/16	3-5/16	std	M42	A-1621-B	10390	53.12	40390	65.60
11/16	1/2	1-5/16	3-5/16	std	M42	A-1622-B	10392	53.12	40392	65.60
11/16	5/8	1-5/16	3-7/16	std	M42	A-2022-B	10416	53.12	40416	69.01
23/32	1/2	1-5/16	3-5/16	std	M42	A-1623-B	10394	54.33	40394	67.73
3/4	1/2	1-5/16	3-5/16	std	M42	A-1624-B	10396	47.89	40396	61.24
3/4	5/8	1-5/16	3-7/16	std	M42	A-2024-B	10418	48.79	40418	64.86
3/4	3/4	1-5/8	3-7/8	std	M42	A-2424-B	10428	50.21	40428	66.78
3/4	3/4	2-1/4	4-1/2	med	M42	A-2424-MB	10572	65.39	40572	83.56
3/4	3/4	3	5-1/4	long	M42	A-2424-LB	10574	74.66	40574	89.02
25/32	1/2	1-1/2	3-1/2	std	M42	A-1625-B	10398	67.65	40398	87.22
13/16	1/2	1-1/2	3-1/2	std	M42	A-1626-B	10400	68.69	40400	88.32
13/16	5/8	1-1/2	3-5/8	std	M42	A-2026-B	10420	66.78	40420	86.40
27/32	1/2	1-1/2	3-1/2	std	M42	A-1627-B	10402	69.17	40402	88.93
7/8	1/2	1-1/2	3-1/2	std	M42	A-1628-B	10404	65.69	40404	85.31
7/8	3/4	2	4-1/4	std	M42	A-2428-B	10430	62.68	40430	81.90
7/8	7/8	2	4-1/4	std	M42	A-2828-B	10434	62.68	40434	81.90
29/32	1/2	1-1/2	3-1/2	std	M42	A-1629-B	10406	91.90	40406	111.54

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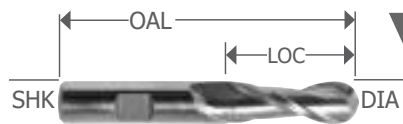
# GENERAL PURPOSE COBALT & HSS END MILLS

## 2 FLUTE • CENTER CUTTING BALL NOSE END MILL

SERIES: A-\_\_-B

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DIA	SHK	LOC	OAL	LENGTH	MAT	TOOL	BRIGHT EDP	BRIGHT PRICE	TICN EDP	TICN PRICE
15/16	1/2	1-1/2	3-1/2	std	M42	A-1630-B	10408	83.09	40408	102.77
15/16	5/8	1-1/2	3-5/8	std	M42	A-2030-B	10424	80.78	40424	100.43
15/16	7/8	1-1/2	3-3/4	std	M42	A-2830-B	10436	80.78	40436	100.42
31/32	1/2	1-1/2	3-1/2	std	M42	A-1631-B	10410	93.65	40410	115.55
1	1/2	1-1/2	3-1/2	std	M42	A-1632-B	10412	81.52	40412	102.67
1	5/8	1-1/2	3-5/8	std	M42	A-2032-B	10426	82.30	40426	104.26
1	3/4	2-1/4	4-1/2	std	M42	A-2432-B	10432	79.24	40432	100.32
1	1	2-1/4	4-3/4	std	M42	A-3232-B	10444	79.24	40444	100.32
1	1	3	5-1/2	med	M42	A-3232-MB	10580	93.70	40580	114.81
1	1	4	6-1/2	long	M42	A-3232-LB	10582	111.60	40582	148.46
1-1/16	1	1-5/8	4-1/8	std	M42	A-3234-B	10446	105.89	40446	127.80
1-1/8	1	2-1/4	4-3/4	std	M42	A-3236-B	10448	94.17	40448	116.19
1-3/16	1	1-5/8	4-1/8	std	M42	A-3238-B	10450	125.87	40450	148.57
1-1/4	7/8	1-5/8	3-7/8	std	M42	A-2840-B	10442	116.83	40442	139.30
1-1/4	1	1-5/8	4-1/8	std	M42	A-3240-B	10452	112.90	40452	135.47
1-1/4	1-1/4	2-1/2	5	std	M42	A-4040-B	10462	118.35	40462	141.96
1-5/16	1	1-5/8	4-1/8	std	HSS	A-3242-B	10454	126.52	40454	168.27
1-3/8	1	1-5/8	4-1/8	std	HSS	A-3244-B	10456	115.87	40456	154.11
1-7/16	1	1-5/8	4-1/8	std	HSS	A-3246-B	10458	145.31	40458	193.30
1-1/2	1	1-5/8	4-1/8	std	HSS	A-3248-B	10460	130.91	40460	174.13
1-1/2	1-1/4	2-1/2	5	std	HSS	A-4048-B	10464	134.62	40464	179.04
1-5/8	1-1/4	1-5/8	4-1/8	std	HSS	A-4052-B	10466	156.98	40466	205.33
1-3/4	1-1/4	1-5/8	4-1/8	std	HSS	A-4056-B	10468	175.51	40468	224.51
1-7/8	1-1/4	1-5/8	4-1/8	std	HSS	A-4060-B	10470	184.92	40470	245.94
2	1-1/4	1-5/8	4-1/8	std	HSS	A-4064-B	CALL		CALL	



## 2 FLUTE • CENTER CUTTING BALL NOSE END MILL

HSSCo M42	2	30°	Bright TICN	+0.0005 -0.0005	Ball					HRC <48	<table border="1"><tr><td>P</td><td>K</td></tr><tr><td>M</td><td>S</td></tr><tr><td></td><td>N</td></tr></table>	P	K	M	S		N
P	K																
M	S																
	N																

SERIES: AP-\_\_M\_\_-B

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DIA	SHK	LOC	OAL	LENGTH	MAT	TOOL	BRIGHT EDP	BRIGHT PRICE	TICN EDP	TICN PRICE
3mm	3/8	5/16	2-5/16	std	M42	AP-12M3-B	12898	27.03	42898	31.90
4mm	3/8	7/16	2-5/16	std	M42	AP-12M4-B	12900	27.03	42900	31.90
5mm	3/8	1/2	2-5/16	std	M42	AP-12M5-B	12902	27.03	42902	31.90
6mm	3/8	1/2	2-5/16	std	M42	AP-12M6-B	12904	27.94	42904	33.02
7mm	3/8	9/16	2-3/8	std	M42	AP-12M7-B	12906	27.94	42906	33.02
8mm	3/8	9/16	2-5/16	std	M42	AP-12M8-B	12908	27.94	42908	32.98
9mm	3/8	9/16	2-5/16	std	M42	AP-12M9-B	12910	28.48	42910	33.65
10mm	3/8	13/16	2-1/2	std	M42	AP-12M10-B	12912	33.71	42912	41.59
11mm	3/8	13/16	2-1/2	std	M42	AP-12M11-B	12914	35.70	42914	43.70
12mm	3/8	13/16	2-1/2	std	M42	AP-12M12-B	12916	36.56	42916	44.41
13mm	1/2	1-1/8	3-1/8	std	M42	AP-16M13-B	12918	41.95	42918	49.84
14mm	1/2	1-1/8	3-1/8	std	M42	AP-16M14-B	12920	44.61	42920	53.04

# GENERAL PURPOSE COBALT & HSS END MILLS

## 2 FLUTE • CENTER CUTTING BALL NOSE END MILL



HSSCo M42
2
30°
Bright TiCN
+0.015mm  
-0.015mm
Ball
HRC <48
P M K S N

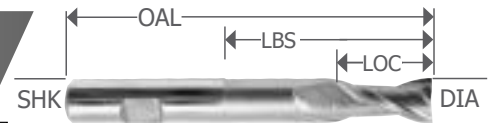
### SERIES: A-M\_M\_-B

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DIA	SHK	LOC	OAL	LENGTH	MAT	TOOL	BRIGHT EDP	BRIGHT PRICE	TICN EDP	TICN PRICE
2mm	6mm	7mm	57mm	std	M42	A-M6M2-B	16411	31.39	46411	37.43
3mm	6mm	8mm	57mm	std	M42	A-M6M3-B	16412	30.85	46412	36.89
4mm	6mm	11mm	57mm	std	M42	A-M6M4-B	16413	30.33	46413	36.37
5mm	6mm	13mm	57mm	std	M42	A-M6M5-B	16414	29.79	46414	35.83
6mm	6mm	13mm	57mm	std	M42	A-M6M6-B	16415	29.27	46415	35.29
7mm	10mm	16mm	69mm	std	M42	A-M10M7-B	16416	34.05	46416	42.20
8mm	10mm	19mm	69mm	std	M42	A-M10M8-B	16417	33.50	46417	41.65
9mm	10mm	19mm	69mm	std	M42	A-M10M9-B	16418	32.99	46418	41.12
10mm	10mm	22mm	72mm	std	M42	A-M10M10-B	16419	34.38	46419	42.64
11mm	12mm	22mm	79mm	std	M42	A-M12M11-B	16420	38.68	46420	46.89
12mm	12mm	26mm	83mm	std	M42	A-M12M12-B	16421	38.13	46421	46.35
13mm	12mm	26mm	83mm	std	M42	A-M12M13-B	16422	40.51	46422	48.89
14mm	12mm	26mm	83mm	std	M42	A-M12M14-B	16423	41.60	46423	49.97
15mm	12mm	26mm	83mm	std	M42	A-M12M15-B	16424	42.70	46424	51.08
16mm	16mm	32mm	92mm	std	M42	A-M16M16-B	16425	45.98	46425	55.96
17mm	16mm	32mm	92mm	std	M42	A-M16M17-B	16426	48.17	46426	58.15
18mm	16mm	32mm	92mm	std	M42	A-M16M18-B	16427	52.57	46427	62.54
19mm	16mm	32mm	92mm	std	M42	A-M16M19-B	16428	54.74	46428	64.60
20mm	20mm	38mm	104mm	std	M42	A-M20M20-B	16429	63.51	46429	83.71
21mm	20mm	38mm	104mm	std	M42	A-M20M21-B	CALL		CALL	
22mm	20mm	38mm	104mm	std	M42	A-M20M22-B	14631	65.69	44631	85.96
23mm	20mm	38mm	104mm	std	M42	A-M20M23-B	CALL		CALL	
24mm	25mm	45mm	121mm	std	M42	A-M25M24-B	16433	84.31	46433	106.40
25mm	25mm	45mm	121mm	std	M42	A-M25M25-B	16434	87.59	46434	109.70
30mm	25mm	45mm	121mm	std	M42	A-M25M30-B	16435	128.10	46435	151.85
32mm	32mm	53mm	133mm	std	M42	A-M32M32-B	16436	138.81	46436	163.80

Note: under 20mm shank will not have flat

## 2 FLUTE • CENTER CUTTING EXTENDED NECK



HSSCo M42
2
30°
Bright TiCN
+0.0015  
-0.0000
Square
HRC <48
P M K S N

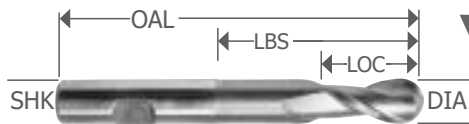
### SERIES: AN

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DIA	SHK	LOC	LBS	OAL	LENGTH	MAT	TOOL	BRIGHT EDP	BRIGHT PRICE	TICN EDP	TICN PRICE
1/8	3/8	3/8	1	2-9/16	std	M42	AN-1204	10734	16.93	40734	21.32
3/16	3/8	1/2	1-1/8	2-11/16	std	M42	AN-1206	10736	16.93	40736	21.94
1/4	3/8	5/8	1-1/2	3-1/16	std	M42	AN-1208	10738	16.93	40738	21.94
5/16	3/8	3/4	1-3/4	3-5/16	std	M42	AN-1210	10740	17.26	40740	22.31
3/8	3/8	3/4	1-3/4	3-5/16	std	M42	AN-1212	10742	17.17	40742	22.26
1/2	1/2	1	2-1/4	4	std	M42	AN-1616	10744	24.19	40744	32.19
5/8	5/8	1-3/8	2-3/4	4-5/8	std	M42	AN-2020	10746	36.47	40746	46.47
3/4	3/4	1-5/8	3-3/8	5-3/8	std	M42	AN-2424	10748	47.14	40748	62.69
1	1	2-1/2	5	7-1/4	std	M42	AN-3232	10752	83.92	40752	111.61



# GENERAL PURPOSE COBALT & HSS END MILLS



## 2 FLUTE • CENTER CUTTING EXTENDED NECK

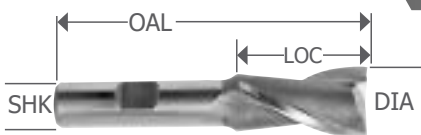
HSSCo M42	2	30°	Bright TiCN	+0.0005 -0.0005 ≤5/8	+0.0010 -0.0010 >5/8	Ball					HRC <48	<table border="1"><tr><td>P</td><td>K</td></tr><tr><td>M</td><td>S</td></tr><tr><td></td><td>N</td></tr></table>	P	K	M	S		N
P	K																	
M	S																	
	N																	

SERIES: AN-\_\_-B

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DIA	SHK	LOC	LBS	OAL	LENGTH	MAT	TOOL	BRIGHT EDP	BRIGHT PRICE	TICN EDP	TICN PRICE
1/8	3/8	3/8	1	2-9/16	std	M42	AN-1204-B	10756	20.59	40756	25.53
3/16	3/8	1/2	1-1/8	2-11/16	std	M42	AN-1206-B	10758	20.59	40758	25.53
1/4	3/8	5/8	1-1/2	3-1/16	std	M42	AN-1208-B	10760	20.59	40760	25.50
5/16	3/8	3/4	1-3/4	3-5/16	std	M42	AN-1210-B	10762	23.99	40762	28.99
3/8	3/8	3/4	1-3/4	3-5/16	std	M42	AN-1212-B	10764	23.53	40764	28.42
1/2	1/2	1	2-1/4	4	std	M42	AN-1616-B	10766	36.62	40766	45.56
3/4	3/4	1-5/8	3-3/8	5-3/8	std	M42	AN-2424-B	10770	60.61	40770	80.62
1	1	2-1/2	5	7-1/4	std	M42	AN-3232-B	10774	108.23	40774	141.22

## 2 FLUTE • CENTER CUTTING KEYWAY TOLERANCES



M42 - HSS	2	30°	Bright TiCN	+0.0000 -0.0015	Square				HRC <48	<table border="1"><tr><td>P</td><td>K</td></tr><tr><td>M</td><td>S</td></tr><tr><td></td><td>N</td></tr></table>	P	K	M	S		N
P	K															
M	S															
	N															

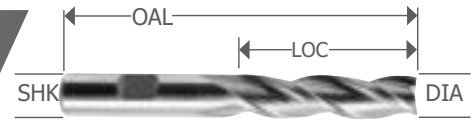
SERIES: AK

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DIA	SHK	LOC	OAL	LENGTH	MAT	TOOL	BRIGHT EDP	BRIGHT PRICE
1/8	3/8	3/8	2-5/16	std	M42	AK-1204	10208	14.16
3/16	3/8	7/16	2-5/16	std	M42	AK-1206	10212	12.87
1/4	3/8	1/2	2-5/16	std	M42	AK-1208	10216	13.07
5/16	3/8	9/16	2-5/16	std	M42	AK-1210	10220	13.07
3/8	3/8	9/16	2-5/16	std	M42	AK-1212	10224	13.07
7/16	3/8	13/16	2-1/2	std	M42	AK-1214	10228	20.00
1/2	3/8	13/16	2-1/2	std	M42	AK-1216	10230	21.34
1/2	1/2	1	3	std	M42	AK-1616	10236	18.76
9/16	1/2	1-1/8	3-1/8	std	M42	AK-1618	10240	25.05
5/8	1/2	1-1/8	3-1/8	std	M42	AK-1620	10244	28.16
5/8	5/8	1-5/16	3-7/16	std	M42	AK-2020	10270	28.12
3/4	5/8	1-5/16	3-7/16	std	M42	AK-2024	10274	35.78
3/4	3/4	1-5/16	3-9/16	std	M42	AK-2424	10284	36.00
7/8	5/8	1-1/2	3-5/8	std	M42	AK-2028	10278	44.84
7/8	7/8	1-1/2	3-3/4	std	M42	AK-2828	10306	47.61
1	5/8	1-1/2	3-5/8	std	M42	AK-2032	10282	50.69
1	1	1-5/8	4-1/8	std	M42	AK-3232	10316	58.26
1-1/4	1	1-5/8	4-1/8	std	M42	AK-3240	10324	94.15
1-1/2	1-1/4	1-5/8	4-1/8	std	HSS	AK-4048	10336	103.62
2	1-1/4	1-5/8	4-1/8	std	HSS	AK-4064	10344	155.28

# GENERAL PURPOSE COBALT & HSS END MILLS

## 3 FLUTE • CENTER CUTTING END MILL



M42 - HSS	3	30°	Bright TiCN	+0.015 -0.0000	Square				HRC <48	P M K S N
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### SERIES: E

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DIA	SHK	LOC	OAL	LENGTH	MAT	TOOL	BRIGHT EDP	BRIGHT PRICE	TICN EDP	TICN PRICE
3/32	3/8	5/16	2-1/4	std	M42	E-1203	12022	17.69	42022	22.57
1/8	3/8	3/8	2-5/16	std	M42	E-1204	12024	15.97	42024	20.90
5/32	3/8	7/16	2-5/16	std	M42	E-1205	12026	17.69	42026	22.57
3/16	3/8	1/2	2-3/8	std	M42	E-1206	12028	15.97	42028	20.90
3/16	3/8	3/4	2-5/8	long	M42	E-1206-L	12266	20.87	42266	25.81
7/32	3/8	1/2	2-3/8	std	M42	E-1207	12030	18.18	42030	23.09
7/32	3/8	1-1/4	3-1/8	long	M42	E-1207-L	12268	21.89	42268	26.86
1/4	3/8	5/8	2-7/16	std	M42	E-1208	12032	16.39	42032	21.32
1/4	3/8	1-1/4	3-1/16	long	M42	E-1208-L	12270	19.26	42270	24.24
9/32	3/8	11/16	2-1/2	std	M42	E-1209	12034	18.18	42034	23.09
9/32	3/8	1-3/8	3-1/8	long	M42	E-1209-L	12272	21.46	42272	26.33
5/16	3/8	3/4	2-1/2	std	M42	E-1210	12036	16.39	42036	21.32
5/16	3/8	1-3/8	3-1/8	long	M42	E-1210-L	12274	20.64	42274	25.90
11/32	3/8	3/4	2-1/2	std	M42	E-1211	12038	18.18	42038	23.06
11/32	3/8	1-1/2	3-1/4	long	M42	E-1211-L	12276	21.46	42276	26.35
3/8	3/8	3/4	2-1/2	std	M42	E-1212	12040	16.39	42040	21.32
3/8	3/8	1-1/2	3-1/4	long	M42	E-1212-L	12278	19.26	42278	24.24
13/32	3/8	1	2-11/16	std	M42	E-1213	12042	24.40	42042	32.19
7/16	3/8	1	2-11/16	std	M42	E-1214	12044	21.82	42044	29.05
7/16	1/2	1-3/4	3-3/4	long	M42	E-1614-L	12280	30.60	42280	40.34
15/32	1/2	1-1/4	3-1/4	std	M42	E-1615	12048	28.75	42048	36.77
1/2	3/8	1	2-11/16	std	M42	E-1216	12046	21.82	42046	29.05
1/2	1/2	1-1/4	3-1/4	std	M42	E-1616	12050	25.77	42050	33.54
1/2	1/2	2	4	long	M42	E-1616-L	12282	28.63	42282	37.62
17/32	1/2	1-3/8	3-3/8	std	M42	E-1617	12052	36.76	42052	46.18
9/16	1/2	1-3/8	3-3/8	std	M42	E-1618	12054	33.29	42054	42.71
19/32	1/2	1-3/8	3-3/8	std	M42	E-1619	12056	36.76	42056	46.58
5/8	1/2	1-3/8	3-3/8	std	M42	E-1620	12058	33.29	42058	43.24
5/8	5/8	1-5/8	3-3/4	std	M42	E-2020	12084	33.29	42084	43.24
5/8	5/8	2-1/2	4-5/8	long	M42	E-2020-L	12284	42.39	42284	51.79
21/32	1/2	1-5/8	3-5/8	std	M42	E-1621	12060	46.11	42060	56.17
11/16	1/2	1-5/8	3-5/8	std	M42	E-1622	12062	45.05	42062	58.89
23/32	1/2	1-5/8	3-5/8	std	M42	E-1623	12064	45.26	42064	55.12
3/4	1/2	1-5/8	3-5/8	std	M42	E-1624	12066	41.00	42066	52.70
3/4	5/8	1-5/8	3-3/4	std	M42	E-2024	12086	41.00	42086	50.89
3/4	3/4	1-5/8	3-7/8	std	M42	E-2424	12096	40.26	42096	52.66
3/4	3/4	3	5-1/4	long	M42	E-2424-L	12286	52.82	42286	69.08
25/32	1/2	1-5/8	3-5/8	std	M42	E-1625	12068	54.95	42068	68.30
13/16	1/2	1-5/8	3-5/8	std	M42	E-1626	12070	51.12	42070	63.48
13/16	5/8	1-7/8	4	std	M42	E-2026	12088	51.12	42088	66.86
13/16	3/4	1-7/8	4-1/8	std	M42	E-2426	12098	58.04	42098	75.92
27/32	1/2	1-5/8	3-5/8	std	M42	E-1627	12072	58.15	42072	70.92
7/8	1/2	1-5/8	3-5/8	std	M42	E-1628	12074	53.46	42074	68.65
7/8	5/8	1-7/8	4	std	M42	E-2028	12090	57.30	42090	74.98
7/8	3/4	1-7/8	4-1/8	std	M42	E-2428	12100	56.55	42100	71.99
7/8	7/8	1-7/8	4-1/8	std	M42	E-2828	12116	53.14	42116	69.47
15/16	1/2	1-7/8	3-7/8	std	M42	E-1630	12078	66.99	42078	81.42
15/16	5/8	1-7/8	4	std	M42	E-2030	12092	65.71	42092	81.42
1	1/2	1-7/8	3-7/8	std	M42	E-1632	CALL		CALL	
1	3/4	1-7/8	4-1/8	std	M42	E-2432	12104	63.90	42104	83.66
1	1	2	4-1/2	std	M42	E-3232	12122	65.50	42122	85.63
1	1	3	5-1/2	med	M42	E-3232-M	12292	85.20	42292	106.71
1	1	4	6-1/2	long	M42	E-3232-L	12294	89.25	42294	113.64

sizes continued on next page

# GENERAL PURPOSE COBALT & HSS END MILLS

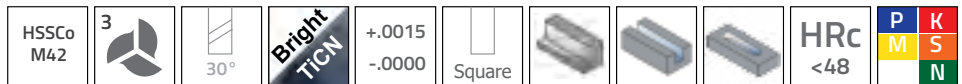
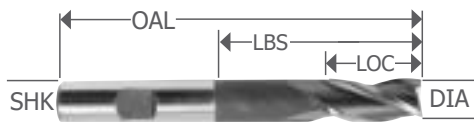
## 3 FLUTE • CENTER CUTTING END MILL

**SERIES: E**

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DIA	SHK	LOC	OAL	LENGTH	MAT	TOOL	BRIGHT EDP	BRIGHT PRICE	TICN EDP	TICN PRICE
1-1/16	3/4	2	4-1/4	std	M42	<b>E-2434</b>	12106	107.14	42106	122.58
1-1/16	1	2	4-1/2	std	M42	<b>E-3234</b>	CALL		CALL	
1-1/8	3/4	2	4-1/4	std	M42	<b>E-2436</b>	12108	95.74	42108	111.47
1-1/8	1	2	4-1/2	std	M42	<b>E-3236</b>	12126	94.25	42126	108.96
1-3/16	3/4	2	4-1/4	std	M42	<b>E-2438</b>	12110	118.11	42110	132.86
1-3/16	1	2	4-1/2	std	M42	<b>E-3238</b>	12128	114.59	42128	127.47
1-1/4	3/4	2	4-1/4	std	M42	<b>E-2440</b>	12112	105.12	42112	127.18
1-1/4	1	2	4-1/2	std	M42	<b>E-3240</b>	12130	103.41	42130	124.05
1-1/4	1-1/4	4	6-1/2	long	M42	<b>E-4040-L</b>	12296	132.70	42296	172.54
1-5/16	1	2	4-1/2	std	HSS	<b>E-3242</b>	12132	111.72	42132	146.20
1-3/8	1	2	4-1/2	std	HSS	<b>E-3244</b>	12134	101.60	42134	126.23
1-1/2	1-1/4	2	4-1/2	std	HSS	<b>E-4048</b>	12144	114.38	42144	149.66
1-3/4	1-1/4	2	4-1/2	std	HSS	<b>E-4056</b>	11660	142.18	41660	184.39
2	1-1/4	2	4-1/2	std	HSS	<b>E-4064</b>	12150	169.97	42150	222.38

## 3 FLUTE • CENTER CUTTING EXTENDED NECK



**SERIES: EN**

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DIA	SHK	LOC	LBS	OAL	LENGTH	MAT	TOOL	BRIGHT EDP	BRIGHT PRICE	TICN EDP	TICN PRICE
1/8	3/8	3/8	1	2-9/16	std	M42	<b>EN-1204</b>	12362	17.52	42362	22.68
3/16	3/8	1/2	1-5/16	2-7/8	std	M42	<b>EN-1206</b>	12366	16.87	42366	21.84
1/4	3/8	5/8	1-1/2	3-1/16	std	M42	<b>EN-1208</b>	12370	17.67	42370	22.68
5/16	3/8	3/4	1-3/4	3-5/16	std	M42	<b>EN-1210</b>	12372	19.15	42372	24.41
3/8	3/8	3/4	1-3/4	3-5/16	std	M42	<b>EN-1212</b>	12374	19.15	42374	24.41
1/2	1/2	1	2-7/32	4-1/16	std	M42	<b>EN-1616</b>	12378	29.25	42378	38.32

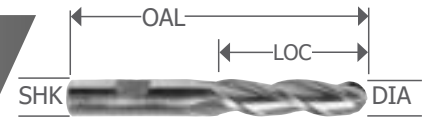
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# GENERAL PURPOSE COBALT & HSS END MILLS

## 3 FLUTE • CENTER CUTTING BALL NOSE END MILLS



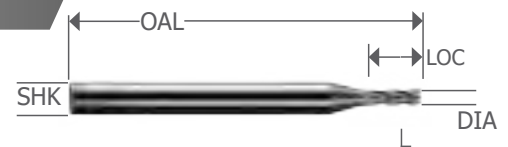
HSSCo M42	3	30°	Bright TiCN	+0.0005 -0.0005 ≤5/8	+0.0010 -0.0010 >5/8	Ball		HRC <48	<table border="1"><tr><td>P</td><td>K</td></tr><tr><td>M</td><td>S</td></tr><tr><td>N</td><td></td></tr></table>	P	K	M	S	N	
P	K														
M	S														
N															

### SERIES: E-\_\_-B

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DIA	SHK	LOC	OAL	LENGTH	MAT	TOOL	BRIGHT EDP	BRIGHT PRICE	TICN EDP	TICN PRICE
1/8	3/8	3/8	2-5/16	std	M42	E-1204-B	12156	22.51	42156	27.48
3/16	3/8	1/2	2-3/8	std	M42	E-1206-B	12160	22.95	42160	28.04
3/16	3/8	3/4	2-5/8	long	M42	E-1206-LB	12306	26.08	42306	30.98
1/4	3/8	5/8	2-1/2	std	M42	E-1208-B	12164	23.66	42164	28.84
1/4	3/8	1-1/4	3-1/16	long	M42	E-1208-LB	12310	26.08	42310	31.04
5/16	3/8	3/4	2-1/2	std	M42	E-1210-B	12168	25.31	42168	30.38
5/16	3/8	1-3/8	3-1/8	long	M42	E-1210-LB	12314	28.66	42314	33.82
3/8	3/8	3/4	2-1/2	std	M42	E-1212-B	12172	25.47	42172	30.52
3/8	3/8	1-1/2	3-1/4	long	M42	E-1212-LB	12318	26.58	42318	31.58
7/16	1/2	1-3/4	3-3/4	long	M42	E-1614-LB	12320	43.39	42320	53.50
1/2	1/2	1-1/4	3-1/4	std	M42	E-1616-B	12182	38.60	42182	46.92
1/2	1/2	2	4	long	M42	E-1616-LB	12322	41.02	42322	50.65
17/32	1/2	1-3/8	3-3/8	std	M42	E-1617-B	CALL		CALL	
9/16	1/2	1-3/8	3-3/8	std	M42	E-1618-B	12186	47.15	42186	56.89
5/8	5/8	1-5/8	3-3/4	std	M42	E-2020-B	12216	54.87	42216	65.25
3/4	1/2	1-5/8	3-5/8	std	M42	E-1624-B	12198	63.60	42198	83.24
3/4	3/4	3	5-1/4	long	M42	E-2424-LB	12326	81.94	42326	103.03
13/16	5/8	1-7/8	4	std	M42	E-2026-B	12220	76.29	42220	96.28
7/8	3/4	1-7/8	4-1/8	std	M42	E-2428-B	CALL		CALL	
1	3/4	1-7/8	4-1/8	std	M42	E-2432-B	12232	96.29	42232	118.28

## 4 FLUTE • CENTER CUTTING END MILLS



HSSCo M42	4	30°	Bright TiCN	+0.0015 -0.0000	Square		HRC <48	<table border="1"><tr><td>P</td><td>K</td></tr><tr><td>M</td><td>S</td></tr><tr><td>N</td><td></td></tr></table>	P	K	M	S	N	
P	K													
M	S													
N														

### SERIES: C

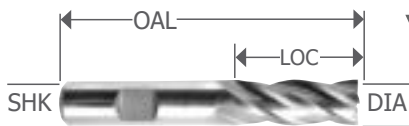
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DIA	SHK	LOC	OAL	LENGTH	MAT	TOOL	BRIGHT EDP	BRIGHT PRICE	TICN EDP	TICN PRICE
1/16	3/16	3/16	1-1/2	std	M42	C-602	11136	10.81	41136	14.21
5/64	3/16	1/4	1-1/2	std	M42	C-602-1/2	11138	10.81	41138	14.21
3/32	3/16	9/32	1-1/2	std	M42	C-603	11140	10.81	41140	14.21
7/64	3/16	21/64	1-1/2	std	M42	C-603-1/2	11142	10.81	41142	14.21
1/8	3/16	3/8	1-1/2	std	M42	C-604	11144	10.81	41144	14.21
9/64	3/16	27/64	1-1/2	std	M42	C-604-1/2	11146	11.01	41146	14.21
5/32	3/16	7/16	1-1/2	std	M42	C-605	11148	10.81	41148	14.21
11/64	3/16	1/2	1-1/2	std	M42	C-605-1/2	11150	10.81	41150	14.24
3/16	3/16	1/2	1-1/2	std	M42	C-606*	11152	11.01	41152	14.53
1/4	1/4	5/8	2-1/2	std	M42	C-808*	11154	16.18	41154	20.06

\* Tolerance is +.000/-0.0025

sizes continued on next page

# GENERAL PURPOSE COBALT & HSS END MILLS



## MULTI FLUTE • CENTER CUTTING END MILLS

HSSCo  
M42



Bright  
TiCN

+0.015  
-0.000

Square



HRC  
<48



### SERIES: CC

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DIA	SHK	LOC	OAL	FLUTE	LENGTH	MAT	TOOL	BRIGHT EDP	BRIGHT PRICE	TICN EDP	TICN PRICE
1/8	3/8	3/16	2-1/8	4	stub	M42	CCS-1204	11434	13.43	41434	16.82
1/8	3/8	3/8	2-5/16	4	std	M42	CC-1204	11432	13.69	41432	17.14
1/8	3/8	1/2	2-3/8	4	med	M42	CC-1204-M	12972	18.76	42972	23.41
1/8	3/8	3/4	2-5/8	4	long	M42	CC-1204-L	12974	19.42	42974	24.24
9/64	3/8	7/16	2-5/16	4	std	M42	CC-1204-1/2	11369	14.17	41369	14.17
5/32	3/8	3/16	2-1/8	4	stub	M42	CCS-1205	11438	13.90	41438	18.50
5/32	3/8	7/16	2-5/16	4	std	M42	CC-1205	11436	13.69	41436	17.14
5/32	3/8	5/8	2-1/2	4	med	M42	CC-1205-M	12976	18.76	42976	23.41
5/32	3/8	3/4	2-5/8	4	long	M42	CC-1205-L	12978	19.42	42978	24.24
11/64	3/8	1/2	2-3/8	4	std	M42	CC-1205-1/2	11389	14.17	41389	17.56
3/16	3/8	3/16	2-1/16	4	stub	M42	CCS-1206	11442	13.43	41442	16.82
3/16	3/8	1/2	2-3/8	4	std	M42	CC-1206	11440	13.69	41440	17.14
3/16	3/8	5/8	2-1/2	4	med	M42	CC-1206-M	12980	18.76	42980	23.41
3/16	3/8	3/4	2-5/8	4	long	M42	CC-1206-L	11582	19.42	41582	24.24
3/16	3/8	1-1/4	3-1/8	4	xl	M42	CC-1206-E	12962	22.67	42962	28.01
3/16	3/8	1-3/4	3-9/16	4	xxl	M42	CC-1206-EE	11273	32.03	41273	37.62
13/64	3/8	1/2	2-3/8	4	std	M42	CC-1206-1/2	11365	14.17	41365	17.56
7/32	3/8	1/4	2-3/16	4	stub	M42	CCS-1207	11446	13.90	41446	18.50
7/32	3/8	1/2	2-3/8	4	std	M42	CC-1207	11444	13.69	41444	17.14
7/32	3/8	7/8	2-3/4	4	med	M42	CC-1207-M	12982	18.76	42982	23.41
7/32	3/8	1-1/4	3-1/8	4	long	M42	CC-1207-L	11584	19.42	41584	24.24
7/32	3/8	1-1/2	3-5/16	4	xl	M42	CC-1207-E	12964	23.66	42964	29.05
7/32	3/8	1-3/4	3-9/16	4	xxl	M42	CC-1207-EE	11339	32.03	41339	37.62
15/64	3/8	5/8	2-7/16	4	std	M42	CC-1207-1/2	11337	14.17	41337	17.56
1/4	3/8	1/4	2-1/8	4	stub	M42	CCS-1208	11450	13.43	41450	16.82
1/4	3/8	5/8	2-7/16	4	std	M42	CC-1208	11448	13.69	41448	17.14
1/4	3/8	7/8	2-11/16	4	med	M42	CC-1208-M	11588	18.76	41588	23.41
1/4	3/8	1-1/4	3-1/16	4	long	M42	CC-1208-L	11586	19.42	41586	24.24
1/4	3/8	1-3/4	3-9/16	4	xl	M42	CC-1208-E	11536	22.01	41536	27.48
1/4	3/8	2-1/4	4-1/8	4	xxl	M42	CC-1208-EE	11538	32.03	41538	39.81
17/64	3/8	11/16	2-1/2	4	std	M42	CC-1208-1/2	11207	14.80	41207	18.39
9/32	3/8	5/16	2-1/8	4	stub	M42	CCS-1209	11454	14.03	41454	17.56
9/32	3/8	11/16	2-1/2	4	std	M42	CC-1209	11452	14.80	41452	19.75
9/32	3/8	1	2-3/4	4	med	M42	CC-1209-M	12984	19.42	42984	24.35
9/32	3/8	1-3/8	3-1/8	4	long	M42	CC-1209-L	11590	19.42	41590	24.24
9/32	3/8	1-3/4	3-1/2	4	xl	M42	CC-1209-E	12966	24.45	42966	30.62
19/64	3/8	3/4	2-1/2	4	std	M42	CC-1209-1/2	11390	14.80	41390	18.39
5/16	3/8	5/16	2-1/16	4	stub	M42	CCS-1210	11458	14.03	41458	17.56
5/16	3/8	3/4	2-1/2	4	std	M42	CC-1210	11456	14.30	41456	17.87
5/16	3/8	1	2-3/4	4	med	M42	CC-1210-M	12986	17.89	42986	22.36
5/16	3/8	1-3/8	3-1/8	4	long	M42	CC-1210-L	11592	18.42	41592	22.99
5/16	3/8	2	3-3/4	4	xl	M42	CC-1210-E	11540	23.97	41540	29.99
21/64	3/8	3/4	2-1/2	4	std	M42	CC-1210-1/2	11367	14.80	41367	18.39
11/32	3/8	3/8	2-1/8	4	stub	M42	CCS-1211	11462	14.03	41462	17.56
11/32	3/8	3/4	2-1/2	4	std	M42	CC-1211	11460	14.30	41460	17.87
11/32	3/8	1	2-3/4	4	med	M42	CC-1211-M	12988	18.76	42988	23.41
11/32	3/8	1-1/2	3-1/4	4	long	M42	CC-1211-L	11594	19.69	41594	24.66
11/32	3/8	2-1/2	4-1/4	4	xl	M42	CC-1211-E	12968	24.84	42968	32.40
23/64	3/8	3/4	2-1/2	4	std	M42	CC-1211-1/2	11340	14.80	41340	18.39
3/8	3/8	3/8	2-1/8	4	stub	M42	CCS-1212	11466	14.03	41466	17.56
3/8	3/8	3/4	2-1/2	4	std	M42	CC-1212	11464	14.30	41464	17.87
3/8	3/8	1	2-3/4	4	med	M42	CC-1212-M	12990	17.89	42990	22.36
3/8	3/8	1-1/2	3-1/4	4	long	M42	CC-1212-L	11596	18.76	41596	23.41
3/8	3/8	2-1/2	4-1/4	4	xl	M42	CC-1212-E	11542	24.00	41542	29.99

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# GENERAL PURPOSE COBALT & HSS END MILLS

## MULTI FLUTE • CENTER CUTTING END MILL



### SERIES: CC

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DIA	SHK	LOC	OAL	FLUTE	LENGTH	MAT	TOOL	BRIGHT EDP	BRIGHT PRICE	TICN EDP	TICN PRICE
25/64	3/8	1	2-11/16	4	std	M42	CC-1212-1/2	11311	20.23	41311	25.08
13/32	3/8	1	2-11/16	4	std	M42	CC-1213	11174	19.55	41174	24.45
27/64	3/8	1	2-11/16	4	std	M42	CC-1213-1/2	11335	20.23	41335	25.08
7/16	3/8	9/16	2-1/4	4	stub	M42	CCS-1214	12956	20.15	42956	26.75
7/16	3/8	1	2-11/16	4	std	M42	CC-1214	11468	19.55	41468	24.45
7/16	3/8	1-3/4	3-3/4	4	long	M42	CC-1214-L	11338	32.62	41338	41.70
7/16	1/2	1-1/4	3-1/4	4	med	M42	CC-1614-M	12992	30.51	42992	38.35
7/16	1/2	1-3/4	3-3/4	4	long	M42	CC-1614-L	12994	32.94	42994	41.90
7/16	1/2	2-3/4	4-3/4	4	xl	M42	CC-1614-E	12970	38.21	42970	47.65
29/64	3/8	1	2-11/16	4	std	M42	CC-1214-1/2	14419	24.41	44419	29.22
15/32	3/8	1	2-11/16	4	std	M42	CC-1215	10310	20.23	40310	25.08
15/32	1/2	1-1/4	3-1/4	4	std	M42	CC-1615	11180	22.44	41180	29.89
31/64	1/2	1-1/4	3-1/4	4	std	M42	CC-1615-1/2	11363	22.44	41363	29.89
1/2	1/2	1/2	2-1/2	4	stub	M42	CCS-1616	12957	21.67	42957	28.84
1/2	3/8	1	2-11/16	4	std	M42	CC-1216	11470	19.55	41470	24.45
1/2	1/2	1-1/4	3-1/4	4	std	M42	CC-1616	11472	18.77	41472	23.51
1/2	1/2	1-1/4	3-1/4	6	std	M42	CC-1616-A	15050	20.90	45050	27.80
1/2	1/2	1-5/8	3-5/8	4	med	M42	CC-1616-M	12996	25.80	42996	32.29
1/2	1/2	2	4	4	long	M42	CC-1616-L	11598	25.16	41598	33.46
1/2	1/2	3	5	4	xl	M42	CC-1616-E	11544	34.38	41544	43.88
1/2	1/2	4	6	4	xxl	M42	CC-1616-EE	11344	43.16	41344	55.43
33/64	1/2	1-1/4	3-1/4	4	std	M42	CC-1616-1/2	12540	27.62	42540	36.65
17/32	1/2	1-3/8	3-3/8	4	std	M42	CC-1617	11184	27.20	41184	36.21
9/16	1/2	1-3/8	3-3/8	4	std	M42	CC-1618	11474	27.20	41474	36.21
9/16	1/2	2-1/2	4-1/2	4	long	M42	CC-1618-L	11392	38.25	41392	48.03
9/16	1/2	3-1/2	5-1/2	4	xl	M42	CC-1618-E	11346	51.01	41346	60.48
19/32	1/2	1-3/8	3-3/8	4	std	M42	CC-1619	11188	30.17	41188	40.15
5/8	5/8	5/8	2-3/4	4	stub	M42	CCS-2020	12958	29.31	42958	37.49
5/8	1/2	1-3/8	3-3/8	4	std	M42	CC-1620	11190	28.76	41190	38.23
5/8	5/8	1-5/8	3-3/4	4	std	M42	CC-2020	11476	28.76	41476	36.00
5/8	5/8	1-5/8	3-3/4	6	std	M42	CC-2020-A	15054	29.30	45054	38.98
5/8	5/8	2	4-1/8	4	med	M42	CC-2020-M	12998	36.45	42998	45.58
5/8	5/8	2-1/2	4-5/8	4	long	M42	CC-2020-L	11600	37.83	41600	47.82
5/8	5/8	4	6-1/8	4	xl	M42	CC-2020-E	11546	50.48	41546	66.04
5/8	5/8	5	7-1/8	4	xxl	M42	CC-2020-EE	11548	70.29	41548	91.38
41/64	5/8	1-5/8	3-3/4	4	std	M42	CC-2020-1/2	14411	39.83	44411	52.16
21/32	5/8	1-5/8	3-3/4	4	std	M42	CC-2021	14412	39.83	44412	52.16
11/16	1/2	1-5/8	3-5/8	4	std	M42	CC-1622	11355	39.83	41355	52.16
11/16	5/8	1-5/8	3-3/4	4	std	M42	CC-2022	11478	39.83	41478	52.16
23/32	3/4	1-5/8	3-7/8	4	std	M42	CC-2423	14409	45.00	44409	45.00
3/4	1/2	1-5/8	3-5/8	4	std	M42	CC-1624	11201	42.17	41201	42.17
3/4	1/2	3	5	4	std	M42	CC-1624-L	14410	67.84	44410	81.53
3/4	3/4	3/4	3	4	stub	M42	CCS-2424	12960	40.15	42960	52.52
3/4	5/8	1-5/8	3-3/4	4	std	M42	CC-2024	15058	41.54	45058	53.40
3/4	3/4	1-5/8	3-7/8	4	std	M42	CC-2424	11480	40.15	41480	49.53
3/4	3/4	1-5/8	3-7/8	6	std	M42	CC-2424-A	15062	43.66	45062	57.12
3/4	3/4	2-1/4	4-1/2	4	med	M42	CC-2424-M	13000	46.88	43000	62.30
3/4	3/4	3	5-1/4	4	long	M42	CC-2424-L	11602	57.19	41602	70.50
3/4	3/4	3	5-1/4	6	long	M42	CC-2424-LA	11383	59.75	41383	69.12
3/4	3/4	4	6-1/4	4	xl	M42	CC-2424-E	11550	69.01	41550	90.30
3/4	3/4	4	6-1/4	6	xl	M42	CC-2424-EA	10805	69.01	40805	85.73
3/4	3/4	6	8-1/4	4	xxl	M42	CC-2424-EE	11552	91.91	41552	120.23
49/64	3/4	1-7/8	4-1/8	4	std	M42	CC-2424-1/2	12541	55.11	42541	69.01
25/32	3/4	1-7/8	4-1/8	4	std	M42	CC-2425	14413	55.11	44413	69.01
13/16	3/4	1-7/8	4-1/8	4	std	M42	CC-2426	11482	47.50	41482	62.17

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# GENERAL PURPOSE COBALT & HSS END MILLS

## MULTI FLUTE • CENTER CUTTING END MILL

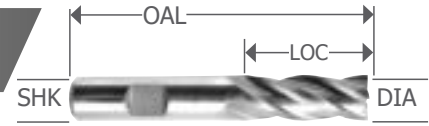
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DIA	SHK	LOC	OAL	FLUTE	LENGTH	MAT	TOOL	BRIGHT EDP	BRIGHT PRICE	TICN EDP	TICN PRICE
27/32	7/8	1-7/8	4-1/8	4	std	M42	CC-2827	12544	57.19	42544	71.94
7/8	1/2	1-5/8	3-5/8	4	std	M42	CC-1628	15854	51.55	45854	66.22
7/8	3/4	1-7/8	4-1/8	4	std	M42	CC-2428	15066	53.04	45066	68.16
7/8	7/8	1-7/8	4-1/8	4	std	M42	CC-2828	11484	53.04	41484	68.16
7/8	7/8	1-7/8	4-1/8	6	std	M42	CC-2828-A	15096	55.91	45096	71.15
7/8	7/8	3-1/2	5-3/4	4	long	M42	CC-2828-L	11604	74.55	41604	97.51
7/8	7/8	5	7-1/4	4	xl	M42	CC-2828-E	11554	94.47	41554	123.63
29/32	7/8	1-7/8	4-1/8	4	std	M42	CC-2829	14421	58.10	44421	77.72
15/16	3/4	1-7/8	4-1/8	4	std	M42	CC-2430	15068	60.92	45068	78.30
15/16	7/8	1-7/8	4-1/8	4	std	M42	CC-2830	11486	59.43	41486	77.72
1	5/8	1-7/8	4	4	std	M42	CC-2032	15060	62.41	45060	81.65
1	3/4	1-7/8	4-1/8	4	std	M42	CC-2432	15070	62.41	45070	81.65
1	1/2	1-7/8	3-7/8	4	std	M42	CC-1632	15856	58.79	45856	75.54
1	1	2	4-1/2	4	std	M42	CC-3232	11488	62.41	41488	76.97
1	1	2	4-1/2	6	std	M42	CC-3232-A	15098	66.03	45098	86.45
1	1	3	5-1/2	4	med	M42	CC-3232-M	11608	84.45	41608	107.42
1	1	4	6-1/2	4	long	M42	CC-3232-L	11606	93.19	41606	121.91
1	1	4	6-1/2	6	long	M42	CC-3232-LA	11385	93.19	41385	121.91
1	1	6	8-1/2	4	xl	M42	CC-3232-E	11556	119.07	41556	155.81
1	1	8	10-1/2	4	xxl	M42	CC-3232-EE	11558	147.29	41558	189.30
1-1/16	3/4	1-5/8	3-7/8	6	std	M42	CC-2434	15072	88.08	45072	110.15
1-1/8	3/4	1-5/8	3-7/8	6	std	M42	CC-2436	15074	88.08	45074	110.15
1-1/8	1	2	4-1/2	4	std	M42	CC-3236	11490	88.08	41490	110.15
1-3/16	3/4	1-5/8	3-7/8	6	std	M42	CC-2438	15076	97.23	45076	119.26
1-1/4	3/4	1-5/8	3-7/8	6	std	M42	CC-2440	15078	97.23	45078	119.26
1-1/4	1	2	4-1/2	6	std	M42	CC-3240	15102	97.23	45102	119.26
1-1/4	1-1/4	2	4-1/2	4	std	M42	CC-4040	11492	97.23	41492	119.26
1-1/4	1-1/4	2	4-1/2	6	std	M42	CC-4040-A	11662	97.23	41662	119.26
1-1/4	1-1/4	4	6-1/2	4	long	M42	CC-4040-L	11610	128.56	41610	168.80
1-1/4	1-1/4	4	6-1/2	6	long	M42	CC-4040-LA	11386	128.56	41386	168.80
1-1/4	1-1/4	6	8-1/2	4	xl	M42	CC-4040-E	11560	167.84	41560	209.49
1-1/4	1-1/4	6	8-1/2	6	xl	M42	CC-4040-EA	11230	165.46	41230	207.14
1-5/16	3/4	2	4-1/4	6	std	M42	CCP-2442	15080	148.18	45080	185.20
1-3/8	3/4	2	4-1/4	6	std	M42	CCP-2444	15082	145.03	45082	192.87
1-7/16	3/4	2	4-1/4	6	std	M42	CCP-2446	15084	157.08	45084	208.95
1-1/2	3/4	2	4-1/4	6	std	M42	CCP-2448	15086	149.57	45086	198.94
1-1/2	1	2	4-1/2	6	std	M42	CCP-3248	15106	155.34	45106	206.61
1-1/2	1	4	6-1/2	4	long	HSS	CC-3248-L	11271	158.47	41271	210.55
1-1/2	1-1/4	2	4-1/2	4	std	HSS	CC-4048	11494	114.27	41494	146.19
1-1/2	1-1/4	2	4-1/2	4	std	M42	CCP-4048	11664	138.17	41664	172.74
1-1/2	1-1/4	2	4-1/2	6	std	HSS	CC-4048-A	11269	111.61	41269	146.04
1-1/2	1-1/4	2	4-1/2	6	std	M42	CCP-4048-A	11666	141.11	41666	174.05
1-1/2	1-1/4	4	6-1/2	4	long	HSS	CC-4048-L	11612	168.80	41612	220.89
1-1/2	1-1/4	8	10-1/2	4	xl	M42	CCP-4048-E	11698	300.54	41698	388.05
1-5/8	3/4	2	4-1/4	6	std	M42	CCP-2452	15088	207.68	45088	258.08
1-5/8	1-1/4	2	4-1/2	6	std	M42	CCP-4052	11673	212.68	41673	236.32
1-3/4	3/4	2	4-1/4	6	std	M42	CCP-2456	15090	212.42	45090	282.54
1-3/4	1-1/4	2	4-1/2	6	std	M42	CCP-4056	15108	212.68	45108	278.27
1-7/8	3/4	2	4-1/4	6	std	M42	CCP-2460	15092	244.86	45092	316.18
2	3/4	2	4-1/4	6	std	M42	CCP-2464	15094	244.86	45094	316.20
2	1-1/4	2	4-1/2	4	std	M42	CCP-4064	11668	206.29	41668	252.74
2	1-1/4	2	4-1/2	6	std	M42	CCP-4064-A	11670	203.42	41670	266.11
2	1-1/4	4	6-1/2	4	long	M42	CCP-4064-L	11712	320.84	41712	426.75

# GENERAL PURPOSE COBALT & HSS END MILLS

## MULTI FLUTE • Non-CENTER CUTTING END MILL



M42 - HSS	MULTI FLUTES	30°	Bright TiCN	+0.0015 -0.0000	Square				HRC <48	P M	K S	N
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DIA	SHK	LOC	OAL	FLUTE	LENGTH	MAT	TOOL	BRIGHT EDP	BRIGHT PRICE	TICN EDP	TICN PRICE
21/32	1/2	1-5/8	3-5/8	4	std	M42	C-1621	11192	34.91	41192	46.43
11/16	1/2	1-5/8	3-5/8	4	std	M42	C-1622	11194	36.24	41194	46.86
11/16	5/8	1-5/8	3-3/4	4	std	M42	C-2022	11218	33.99	41218	44.41
23/32	1/2	1-5/8	3-5/8	4	std	M42	C-1623	11196	37.12	41196	49.42
3/4	1/2	5/8	2-5/8	4	stub	M42	CS-1624	16481	35.45	46481	47.18
3/4	1/2	5/8	2-5/8	6	stub	M42	CS-1624-A	16482	44.47	46482	59.11
3/4	1/2	1-5/8	3-5/8	4	std	M42	C-1624	11198	35.68	41198	45.90
3/4	5/8	1-5/8	3-3/4	4	std	M42	C-2024	11220	38.34	41220	49.25
3/4	3/4	1-1/2	3-7/8	6	std	M42	C-2424-A	16491	51.44	46491	63.44
3/4	3/4	1-5/8	3-7/8	4	std	M42	C-2424	11238	36.32	41238	47.51
3/4	3/4	3	5-1/4	4	long	M42	C-2424-L	11396	49.42	41396	64.65
3/4	3/4	4	6-1/4	4	xl	M42	C-2424-E	11352	64.22	41352	83.99
3/4	3/4	6	8-1/4	4	xxl	M42	C-2424-EE	11354	84.03	41354	109.93
25/32	1/2	1-5/8	3-5/8	4	std	M42	C-1625	11200	52.29	41200	68.36
13/16	1/2	1-5/8	3-5/8	4	std	M42	C-1626	11202	47.50	41202	62.17
13/16	5/8	1-7/8	4	4	std	M42	C-2026	11222	44.20	41222	56.75
13/16	5/8	1-7/8	4	6	std	M42	C-2026-A	11224	48.99	41224	62.98
13/16	3/4	1-7/8	4-1/8	4	std	M42	C-2426	11240	49.31	41240	62.77
27/32	1/2	1-5/8	3-5/8	4	std	M42	C-1627	11204	51.01	41204	66.68
7/8	1/2	5/8	2-5/8	4	stub	M42	CS-1628	16483	48.67	46483	63.67
7/8	1/2	5/8	2-5/8	6	stub	M42	CS-1628-A	16484	57.08	46484	74.71
7/8	1/2	1-5/8	3-5/8	4	std	M42	C-1628	11206	48.67	41206	63.67
7/8	5/8	1-7/8	4	4	std	M42	C-2028	11226	49.10	41226	59.20
7/8	5/8	1-7/8	4	6	std	M42	C-2028-A	11228	47.50	41228	60.50
7/8	3/4	1-7/8	4-1/8	4	std	M42	C-2428	11242	46.11	41242	59.26
7/8	7/8	1-7/8	4-1/8	4	std	M42	C-2828	11268	51.01	41268	65.50
7/8	7/8	3-1/2	5-3/4	4	long	M42	C-2828-L	11398	60.39	41398	74.52
7/8	7/8	5	7-1/4	4	xl	M42	C-2828-E	11356	83.60	41356	109.42
29/32	1/2	1-7/8	3-7/8	4	std	M42	C-1629	11208	59.53	41208	73.86
15/16	1/2	1-7/8	3-7/8	4	std	M42	C-1630	11210	58.36	41210	76.38
15/16	5/8	1-7/8	4	6	std	M42	C-2030-A	11232	54.00	41232	69.42
15/16	3/4	1-7/8	4-1/8	4	std	M42	C-2430	11244	56.34	41244	71.78
31/32	1/2	1-7/8	3-7/8	4	std	M42	C-1631	11212	58.36	41212	75.01
1	1/2	3/4	2-3/4	4	stub	M42	CS-1632	16485	53.89	46485	70.49
1	1/2	3/4	2-3/4	8	stub	M42	CS-1632-A8	16486	56.44	46486	73.84
1	1/2	1-7/8	3-7/8	4	std	M42	C-1632	11214	53.04	41214	68.16
1	5/8	3/4	2-7/8	8	stub	M42	CS-2032-A8	16487	68.05	46487	83.92
1	5/8	1-7/8	4	4	std	M42	C-2032	11234	52.08	41234	68.14
1	5/8	1-7/8	4	6	std	M42	C-2032-A	11236	53.04	41236	68.16
1	3/4	3/4	3	4	stub	M42	CS-2432	16492	53.89	46492	70.49
1	3/4	3/4	3	8	stub	M42	CS-2432-A8	16493	72.85	46493	93.94
1	3/4	1-1/2	3-3/4	8	std	M42	C-2432-A8	16494	69.86	46494	91.03
1	3/4	1-7/8	4-1/8	4	std	M42	C-2432	11246	53.04	41246	68.16
1	7/8	1-7/8	4-1/8	4	std	M42	C-2832	11272	57.72	41272	74.21
1	1	2	4-1/2	4	std	M42	C-3232	11278	56.34	41278	72.41
1	1	3	5-1/2	4	med	M42	C-3232-M	11400	70.40	41400	92.10
1	1	4	6-1/2	4	long	M42	C-3232-L	11402	83.39	41402	107.12
1	1	6	8-1/2	4	xl	M42	C-3232-E	11358	105.44	41358	135.46
1	1	8	10-1/2	4	xxl	M42	C-3232-EE	11360	137.28	41360	176.39
1-1/16	3/4	2	4-1/4	6	std	M42	C-2434	11248	90.31	41248	112.29
1-1/16	1	2	4-1/2	6	std	M42	C-3234	11280	88.08	41280	110.15
1-1/8	5/8	3/4	2-7/8	8	stub	M42	CS-2036-A8	16488	81.47	46488	103.49

sizes continued on next page

# GENERAL PURPOSE COBALT & HSS END MILLS

## MULTI FLUTE • Non-CENTER CUTTING END MILL

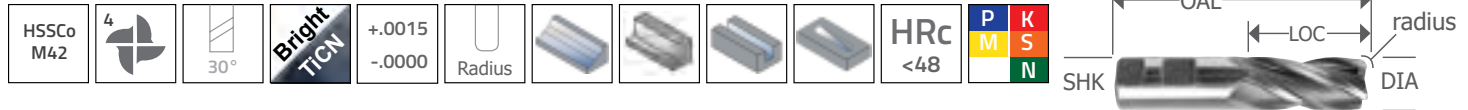
**SERIES: C**

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DIA	SHK	LOC	OAL	FLUTE	LENGTH	MAT	TOOL	BRIGHT EDP	BRIGHT PRICE	TICN EDP	TICN PRICE
1-1/8	3/4	3/4	3	6	stub	M42	CS-2436-A	16495	81.47	46495	103.49
1-1/8	3/4	3/4	3	8	stub	M42	CS-2436-A8	16497	88.08	46497	110.07
1-1/8	3/4	1-1/2	3-3/4	6	std	M42	C-2436-A	16496	81.47	46496	103.49
1-1/8	3/4	1-1/2	3-3/4	8	std	M42	C-2436-A8	16498	93.29	46498	115.30
1-1/8	3/4	2	4-1/4	6	std	M42	C-2436	11250	81.47	41250	103.49
1-1/8	1	2	4-1/2	6	std	M42	C-3236	11282	87.65	41282	109.17
1-1/8	1	4	6-1/2	6	long	M42	C-3236-L	11404	115.66	41404	151.33
1-3/16	3/4	2	4-1/4	6	std	M42	C-2438	11252	98.09	41252	120.24
1-3/16	1	2	4-1/2	6	std	M42	C-3238	11284	95.53	41284	117.59
1-1/4	5/8	3/4	2-7/8	6	stub	M42	CS-2040-A	16489	89.25	46489	111.31
1-1/4	3/4	3/4	3	6	stub	M42	CS-2440-A	16499	89.25	46499	111.31
1-1/4	3/4	1-1/2	3-3/4	6	std	M42	C-2440-A	16500	89.25	46500	111.31
1-1/4	3/4	1-1/2	3-3/4	8	std	M42	C-2440-A8	16501	100.86	46501	116.26
1-1/4	3/4	2	4-1/4	6	std	M42	C-2440	11254	89.25	41254	111.31
1-1/4	1	2	4-1/2	6	std	M42	C-3240	11286	88.50	41286	109.00
1-1/4	1-1/4	2	4-1/2	6	std	M42	C-4040	11296	90.63	41296	105.82
1-1/4	1-1/4	3	5-1/2	4	med	M42	C-4040-M	11412	105.22	41412	128.22
1-1/4	1	4	6-1/2	6	long	M42	C-3240-L	11406	131.00	41406	168.33
1-1/4	1-1/4	4	6-1/2	6	long	M42	C-4040-L	11414	122.05	41414	159.65
1-1/4	1-1/4	6	8-1/2	6	xl	M42	C-4040-E	11362	168.16	41362	208.32
1-5/16	1	2	4-1/2	6	std	HSS	C-3242	11288	107.78	41288	137.82
1-3/8	5/8	3/4	2-7/8	6	stub	HSS	CS-2044-A	16490	98.41	46490	128.76
1-3/8	3/4	3/4	3	6	stub	HSS	CS-2444-A	16502	100.75	46502	122.24
1-3/8	3/4	1-1/2	3-7/8	6	std	HSS	C-2444-A	16503	98.41	46503	128.76
1-3/8	3/4	2	4-1/4	6	std	HSS	C-2444	11256	98.41	41256	128.76
1-3/8	1	2	4-1/2	6	std	HSS	C-3244	11290	88.50	41290	115.82
1-3/8	1-1/4	2	4-1/2	6	std	HSS	C-4044	11298	114.91	41298	158.71
1-3/8	1	4	6-1/2	6	long	HSS	C-3244-L	11408	141.01	41408	184.53
1-7/16	1	2	4-1/2	6	std	HSS	C-3246	11292	112.04	41292	139.13
1-1/2	3/4	3/4	3	6	stub	HSS	CS-2448-A	16504	110.33	46504	144.36
1-1/2	3/4	1-1/2	3-3/4	6	std	HSS	C-2448-A	16505	110.33	46505	144.36
1-1/2	3/4	2	4-1/4	6	std	HSS	C-2448	11258	110.33	41258	144.36
1-1/2	3/4	2	4-1/4	8	std	HSS	C-2448-A8	16506	139.52	46506	172.05
1-1/2	1	2	4-1/2	6	std	HSS	C-3248	11294	100.43	41294	128.50
1-1/2	1	4	6-1/2	6	long	HSS	C-3248-L	CALL		CALL	
1-1/2	1-1/4	2	4-1/2	6	std	HSS	C-4048	11300	90.21	41300	105.33
1-1/2	1-1/4	2	4-1/2	6	std	M42	CP-4048	15046	149.53	45046	185.83
1-1/2	1-1/4	4	6-1/2	6	long	HSS	C-4048-L	11418	142.18	41418	186.01
1-1/2	1-1/4	8	10-1/2	6	xl	HSS	C-4048-E	11364	226.74	41364	296.67
1-9/16	1-1/4	2	4-1/2	6	std	HSS	C-4050	11302	120.24	41302	157.26
1-5/8	3/4	2	4-1/4	6	std	HSS	C-2452	11260	120.03	41260	157.04
1-5/8	1-1/4	2	4-1/2	6	std	HSS	C-4052	11304	117.47	41304	153.73
1-3/4	3/4	1-1/2	3-3/4	6	std	HSS	C-2456-A	16507	135.15	46507	176.76
1-3/4	3/4	2	4-1/4	6	std	HSS	C-2456	11262	138.34	41262	176.92
1-3/4	1-1/4	2	4-1/2	6	std	HSS	C-4056	10978	127.69	40978	173.75
1-3/4	1-1/4	4	6-1/2	6	long	HSS	C-4056-L	11420	180.62	41420	224.43
1-3/4	1-1/4	8	10-1/2	8	xl	HSS	C-4056-E	CALL		CALL	
1-7/8	3/4	2	4-1/4	6	std	HSS	C-2460	11264	136.21	41264	178.23
2	3/4	2	4-1/4	6	std	HSS	C-2464	11266	147.82	41266	182.36
2	1-1/4	2	4-1/2	6	std	HSS	C-4064-A	11312	147.18	41312	182.90
2	3/4	2	4-1/4	8	std	HSS	C-2464-8	10959	155.17	40959	179.56
2	1-1/4	2	4-1/2	8	std	HSS	C-4064	11314	149.31	41314	195.35
2	1-1/4	2	4-1/2	6	std	M42	CP-4064	15048	194.04	45048	253.83
2	1-1/4	4	6-1/2	8	long	HSS	C-4064-L	11426	244.95	41426	304.36
2	2	6	9-3/4	6	long	HSS	C-6464-L	11430	309.38	41430	392.22
2	2	10	13-3/4	6	xxl	HSS	C-6464-EE	11372	471.26	41372	602.79
2-1/8	1-1/4	2	4-1/2	4	std	HSS	C-4068	11316	210.44	41316	253.03
2-1/4	1-1/4	2	4-1/2	4	std	HSS	C-4072	11318	238.99	41318	287.33
2-1/2	1-1/4	2	4-1/2	6	std	HSS	C-4080-A	11322	268.17	41322	343.02

# GENERAL PURPOSE COBALT & HSS END MILLS

## 4 FLUTE • CENTER CUTTING CORNER RADIUS END MILL



**SERIES: CC-\_\_-R**

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DIA	SHK	LOC	OAL	LENGTH	RADIUS	MAT	TOOL	BRIGHT EDP	BRIGHT PRICE	TICN EDP	TICN PRICE
1/8	3/8	3/8	2-5/16	std	0.015	M42	CC-1204-R015	15212	18.67	45212	23.30
3/16	3/8	1/2	2-3/8	std	0.020	M42	CC-1206-R020	15214	18.67	45214	23.30
3/16	3/8	1/2	2-3/8	std	0.030	M42	CC-1206-R030	15216	18.67	45216	23.30
1/4	3/8	5/8	2-7/16	std	0.020	M42	CC-1208-R020	15218	19.99	45218	24.98
1/4	3/8	5/8	2-7/16	std	0.030	M42	CC-1208-R030	15220	19.99	45220	24.98
1/4	3/8	5/8	2-7/16	std	0.045	M42	CC-1208-R045	15222	19.99	45222	24.98
5/16	3/8	3/4	2-1/2	std	0.020	M42	CC-1210-R020	15224	20.61	45224	25.81
5/16	3/8	3/4	2-1/2	std	0.030	M42	CC-1210-R030	15226	20.61	45226	25.81
5/16	3/8	3/4	2-1/2	std	0.045	M42	CC-1210-R045	15228	20.61	45228	25.81
3/8	3/8	3/4	2-1/2	std	0.020	M42	CC-1212-R020	15230	20.61	45230	25.81
3/8	3/8	3/4	2-1/2	std	0.030	M42	CC-1212-R030	15232	20.61	45232	25.81
3/8	3/8	3/4	2-1/2	std	0.045	M42	CC-1212-R045	15234	20.61	45234	25.81
1/2	1/2	1-1/4	3-1/4	std	0.020	M42	CC-1616-R020	15236	27.63	45236	34.59
1/2	1/2	1-1/4	3-1/4	std	0.030	M42	CC-1616-R030	15238	27.63	45238	34.59
1/2	1/2	1-1/4	3-1/4	std	0.045	M42	CC-1616-R045	15240	27.63	45240	34.59
1/2	1/2	1-1/4	3-1/4	std	0.060	M42	CC-1616-R060	15242	27.63	45242	34.59
5/8	5/8	1-5/8	3-3/4	std	0.020	M42	CC-2020-R020	15244	40.95	45244	51.23
5/8	5/8	1-5/8	3-3/4	std	0.030	M42	CC-2020-R030	15246	40.95	45246	51.23
5/8	5/8	1-5/8	3-3/4	std	0.045	M42	CC-2020-R045	15248	40.95	45248	51.23
5/8	5/8	1-5/8	3-3/4	std	0.060	M42	CC-2020-R060	15250	40.95	45250	51.23
5/8	5/8	1-5/8	3-3/4	std	0.090	M42	CC-2020-R090	15252	40.95	45252	51.23
3/4	3/4	1-5/8	3-7/8	std	0.020	M42	CC-2424-R020	15254	49.57	45254	61.98
3/4	3/4	1-5/8	3-7/8	std	0.030	M42	CC-2424-R030	15256	49.57	45256	61.98
3/4	3/4	1-5/8	3-7/8	std	0.045	M42	CC-2424-R045	15258	49.57	45258	61.98
3/4	3/4	1-5/8	3-7/8	std	0.060	M42	CC-2424-R060	15260	49.57	45260	61.98
3/4	3/4	1-5/8	3-7/8	std	0.090	M42	CC-2424-R090	15262	49.57	45262	61.98
3/4	3/4	1-5/8	3-7/8	std	0.125	M42	CC-2424-R125	15264	49.57	45264	61.98
1	1	2	4-1/2	std	0.020	M42	CC-3232-R020	15266	80.61	45266	100.75
1	1	2	4-1/2	std	0.030	M42	CC-3232-R030	15268	80.61	45268	100.75
1	1	2	4-1/2	std	0.045	M42	CC-3232-R045	15270	80.61	45270	100.75
1	1	2	4-1/2	std	0.060	M42	CC-3232-R060	15272	80.61	45272	100.75
1	1	2	4-1/2	std	0.090	M42	CC-3232-R090	15274	80.61	45274	100.75
1	1	2	4-1/2	std	0.125	M42	CC-3232-R125	15276	80.61	45276	100.75

# GENERAL PURPOSE COBALT & HSS END MILLS

## 4 FLUTE • CENTER CUTTING METRIC/INCH END MILL



HSSCo  
M42



Bright  
TiCN

+0.0015  
-0.0000

Square



HRc  
<48



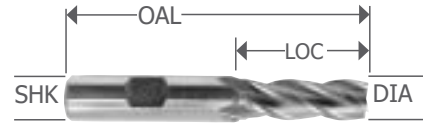
### SERIES: CCP

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DIA	SHK	LOC	OAL	LENGTH	MAT	TOOL	BRIGHT EDP	BRIGHT PRICE	TICN EDP	TICN PRICE
3mm	3/8	3/8	2-5/16	std	M42	CCP-12M3	11740	17.95	41740	22.89
3.5mm	3/8	7/16	2-5/16	std	M42	CCP-12M3.5	11741	17.95	41741	22.89
4mm	3/8	7/16	2-5/16	std	M42	CCP-12M4	11742	17.95	41742	22.89
4.5mm	3/8	7/16	2-5/16	std	M42	CCP-12M4.5	11743	17.95	41743	22.89
5mm	3/8	9/16	2-1/2	std	M42	CCP-12M5	11744	17.95	41744	22.89
5.5mm	3/8	5/8	2-1/2	std	M42	CCP-12M5.5	11745	18.44	41745	23.30
6mm	3/8	5/8	2-1/2	std	M42	CCP-12M6	11746	18.44	41746	23.30
6.5mm	3/8	11/16	2-1/2	std	M42	CCP-12M6.5	11747	18.44	41747	23.30
7mm	3/8	11/16	2-1/2	std	M42	CCP-12M7	11748	18.44	41748	23.30
7.5mm	3/8	3/4	2-1/2	std	M42	CCP-12M7.5	11749	18.44	41749	23.30
8mm	3/8	3/4	2-1/2	std	M42	CCP-12M8	11750	18.44	41750	23.30
8.5mm	3/8	3/4	2-1/2	std	M42	CCP-12M8.5	11751	18.44	41751	23.30
9mm	3/8	3/4	2-1/2	std	M42	CCP-12M9	11752	18.44	41752	23.30
9.5mm	3/8	3/4	2-1/2	std	M42	CCP-12M9.5	11753	23.20	41753	27.38
10mm	3/8	1	2-11/16	std	M42	CCP-12M10	11754	23.43	41754	31.14
10.5mm	3/8	1	2-11/16	std	M42	CCP-12M10.5	11755	24.88	41755	32.71
11mm	3/8	1	2-11/16	std	M42	CCP-12M11	11756	24.88	41756	32.71
11.5mm	3/8	1	2-11/16	std	M42	CCP-12M11.5	11757	27.66	41757	35.43
12mm	3/8	1	2-11/16	std	M42	CCP-12M12	11758	27.66	41758	35.43
12.5mm	1/2	1-1/4	3-1/4	std	M42	CCP-16M12.5	11759	29.53	41759	37.20
13mm	1/2	1-3/8	3-3/8	std	M42	CCP-16M13	11760	30.10	41760	37.91
13.5mm	1/2	1-3/8	3-3/8	std	M42	CCP-16M13.5	11761	32.80	41761	42.77
14mm	1/2	1-3/8	3-3/8	std	M42	CCP-16M14	11762	32.80	41762	42.81
14.5mm	1/2	1-3/8	3-3/8	std	M42	CCP-16M14.5	11763	36.19	41763	44.30
15mm	1/2	1-3/8	3-3/8	std	M42	CCP-16M15	11764	36.19	41764	46.65
16mm	5/8	1-5/8	3-3/4	std	M42	CCP-20M16	11766	36.83	41766	46.65
17mm	5/8	1-5/8	3-3/4	std	M42	CCP-20M17	11768	41.29	41768	54.95
18mm	5/8	1-5/8	3-3/4	std	M42	CCP-20M18	11770	41.45	41770	55.17
19mm	3/4	1-5/8	3-7/8	std	M42	CCP-24M19	11772	44.76	41772	59.53
20mm	3/4	1-7/8	4-1/8	std	M42	CCP-24M20	11774	53.04	41774	69.35
21mm	3/4	1-7/8	4-1/8	std	M42	CCP-24M21	11776	57.72	41776	71.67
22mm	3/4	1-7/8	4-1/8	std	M42	CCP-24M22	11778	63.37	41778	82.61
23mm	7/8	1-7/8	4-1/8	std	M42	CCP-28M23	11780	73.17	41780	92.47
24mm	1	2	4-1/2	std	M42	CCP-32M24	11782	81.05	41782	103.17
25mm	1	2	4-1/2	std	M42	CCP-32M25	11784	81.79	41784	103.00
28mm	1	2	4-1/2	std	M42	CCP-32M28	11786	89.99	41786	111.96
32mm	1	2	4-1/2	std	M42	CCP-32M32	11788	110.12	41788	136.83
35mm	1	2	4-1/2	std	M42	CCP-32M35	11790	141.22	41790	184.76
36mm	1	2	4-1/2	std	M42	CCP-32M36	11792	141.22	41792	184.76
40mm	1-1/4	2	4-1/2	std	M42	CCP-40M40	11794	159.86	41794	209.16
45mm	1-1/4	2	4-1/2	std	M42	CCP-40M45	11796	184.67	41796	241.62
50mm	1-1/4	2	4-1/2	std	M42	CCP-40M50	11798	208.21	41798	258.68

# GENERAL PURPOSE COBALT & HSS END MILLS

## 4 FLUTE • CENTER CUTTING METRIC END MILL



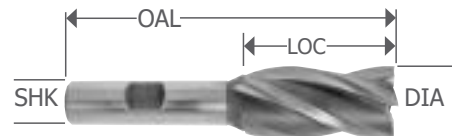
HSSCo M42	4	30°	Bright TiCN	+0.040mm -0.000	Square		HRC <48	P M K S N
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### SERIES: CC-M\_M\_

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DIA	SHK	LOC	OAL	LENGTH	MAT	TOOL	BRIGHT EDP	BRIGHT PRICE	TICN EDP	TICN PRICE
2mm	6mm	7mm	57mm	std	M42	CC-M6M2	16365	21.61	46365	27.69
3mm	6mm	8mm	57mm	std	M42	CC-M6M3	16366	21.28	46366	27.27
4mm	6mm	11mm	57mm	std	M42	CC-M6M4	16367	20.95	46367	26.96
5mm	6mm	13mm	57mm	std	M42	CC-M6M5	16368	20.62	46368	26.65
6mm	6mm	13mm	57mm	std	M42	CC-M6M6	16369	22.27	46369	28.32
7mm	10mm	16mm	69mm	std	M42	CC-M10M7	16370	21.93	46370	29.18
8mm	10mm	19mm	69mm	std	M42	CC-M10M8	16371	21.61	46371	28.74
9mm	10mm	19mm	69mm	std	M42	CC-M10M9	16372	22.95	46372	30.51
10mm	10mm	22mm	72mm	std	M42	CC-M10M10	16373	23.84	46373	31.66
11mm	12mm	22mm	79mm	std	M42	CC-M12M11	16374	28.20	46374	36.42
12mm	12mm	26mm	83mm	std	M42	CC-M12M12	16375	27.86	46375	36.05
13mm	12mm	26mm	83mm	std	M42	CC-M12M13	16376	28.74	46376	37.17
14mm	12mm	26mm	83mm	std	M42	CC-M12M14	16377	29.09	46377	37.49
15mm	12mm	26mm	83mm	std	M42	CC-M12M15	16378	29.44	46378	37.81
16mm	16mm	32mm	92mm	std	M42	CC-M16M16	16379	31.82	46379	41.75
17mm	16mm	32mm	92mm	std	M42	CC-M16M17	16380	33.19	46380	43.13
18mm	16mm	32mm	92mm	std	M42	CC-M16M18	16381	38.87	46381	48.82
19mm	16mm	32mm	92mm	std	M42	CC-M16M19	16382	40.36	46382	47.63
20mm	20mm	38mm	104mm	std	M42	CC-M20M20	16383	46.86	46383	61.32

## 6 FLUTE • Non-CENTER CUTTING METRIC END MILL



HSSCo M42	6	30°	Bright TiCN	+0.040mm -0.000	Square		HRC <48	P M K S N
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### SERIES: C-M\_M\_

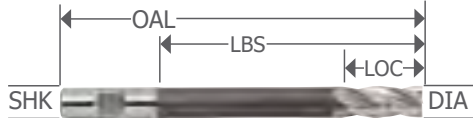
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DIA	SHK	LOC	OAL	LENGTH	MAT	TOOL	BRIGHT EDP	BRIGHT PRICE	TICN EDP	TICN PRICE
21mm	20mm	38mm	104mm	std	M42	C-M20M21	16384	54.21	46384	67.35
22mm	20mm	38mm	104mm	std	M42	C-M20M22	16385	54.95	46385	68.27
23mm	20mm	38mm	104mm	std	M42	C-M20M23	CALL		CALL	
24mm	25mm	45mm	121mm	std	M42	C-M25M24	16387	73.27	46387	95.37
25mm	25mm	45mm	121mm	std	M42	C-M25M25	16388	70.29	46388	91.93
30mm	25mm	45mm	121mm	std	M42	C-M25M30	16389	106.93	46389	130.66
32mm	32mm	53mm	133mm	std	M42	C-M32M32	16390	115.13	46390	131.69



# GENERAL PURPOSE COBALT & HSS END MILLS

## 4 FLUTE • CENTER CUTTING EXTENDED NECK END MILL

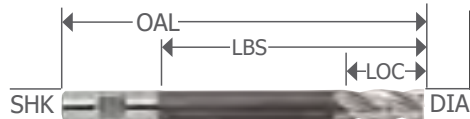


### SERIES: CCN

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DIA	SHK	LOC	LBS	OAL	LENGTH	MAT	TOOL	BRIGHT EDP	BRIGHT PRICE	TICN EDP	TICN PRICE
3/8	3/8	1	3-1/4	5	std	M42	<b>CCN-1212</b>	11235	34.10	41235	42.84
1/2	1/2	1-1/4	4	6	std	HSS	<b>CCN-1616</b>	11237	44.81	41237	56.12
5/8	5/8	1-1/2	5	7-1/8	std	HSS	<b>CCN-2020</b>	11239	69.18	41239	84.14
3/4	3/4	2	6	8-1/4	std	HSS	<b>CCN-2424</b>	11241	87.52	41241	111.56
1	1	2-1/2	8	10-1/4	std	HSS	<b>CCN-3232</b>	11243	142.52	41243	189.57

## MULTI FLUTE • Non-CENTER CUTTING EXTENDED NECK END MILL



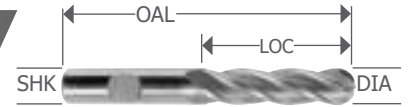
### SERIES: CN

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DIA	SHK	LOC	LBS	OAL	FLUTE	LENGTH	MAT	TOOL	BRIGHT EDP	BRIGHT PRICE	TICN EDP	TICN PRICE
3/8	3/8	1	3	5	4	std	M42	<b>CN-1212</b>	11221	31.01	41221	37.76
1/2	1/2	1-1/4	4	6	4	std	HSS	<b>CN-1616</b>	11223	40.76	41223	51.00
5/8	5/8	1-1/2	5	7-1/8	4	std	HSS	<b>CN-2020</b>	11225	62.90	41225	76.48
3/4	3/4	2	6	8-1/4	4	std	HSS	<b>CN-2424</b>	11227	85.20	41227	101.40
1	1	2-1/2	8	10-1/4	4	std	HSS	<b>CN-3232</b>	11229	138.66	41229	181.42
1-1/4	1-1/4	3-1/2	10	12-1/2	6	std	HSS	<b>CN-4040</b>	11231	243.67	41231	295.18
2	2	4	12	15-1/4	6	std	HSS	<b>CN-6464</b>	11233	466.68	41233	579.95

# GENERAL PURPOSE COBALT & HSS END MILLS

## 4 FLUTE • CENTER CUTTING BALL NOSE END MILL



M42 - HSS			<b>Bright TiCN</b>	+ .0005 - .0005 ≤ 5/8	+ .0010 - .0010 ≥ 5/8						HRC <48	<table border="1"> <tr><td>P</td><td>K</td></tr> <tr><td>M</td><td>S</td></tr> <tr><td>N</td><td></td></tr> </table>	P	K	M	S	N	
P	K																	
M	S																	
N																		

### SERIES: CC-\_\_-B

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DIA	SHK	LOC	OAL	LENGTH	MAT	TOOL	BRIGHT EDP	BRIGHT PRICE	TICN EDP	TICN PRICE
1/8	3/8	3/8	2-5/16	std	M42	CC-1204-B	11496	26.64	41496	31.56
5/32	3/8	7/16	2-5/16	std	M42	CC-1205-B	11498	26.64	41498	31.56
3/16	3/8	1/2	2-3/8	std	M42	CC-1206-B	11500	26.64	41500	31.56
3/16	3/8	3/4	2-5/8	long	M42	CC-1206-LB	11614	30.35	41614	35.84
7/32	3/8	1/2	2-3/8	std	M42	CC-1207-B	11502	26.64	41502	31.56
1/4	3/8	3/4	2-9/16	std	M42	CC-1208-B	11504	26.64	41504	31.56
1/4	3/8	1-1/4	3-1/16	long	M42	CC-1208-LB	11618	31.87	41618	37.62
1/4	3/8	1-3/4	3-9/16	xl	M42	CC-1208-EB	11564	36.82	41564	44.10
9/32	3/8	11/16	2-1/2	std	M42	CC-1209-B	11506	28.71	41506	33.86
9/32	3/8	1-3/8	3-1/8	long	M42	CC-1209-LB	11620	31.85	41620	37.62
5/16	3/8	1	2-3/4	std	M42	CC-1210-B	11508	26.64	41508	31.56
5/16	3/8	1-3/8	3-1/8	long	M42	CC-1210-LB	11622	31.24	41622	36.89
5/16	3/8	2	3-3/4	xl	M42	CC-1210-EB	11566	38.61	41566	46.19
11/32	3/8	3/4	2-1/2	std	M42	CC-1211-B	11510	28.71	41510	33.86
11/32	3/8	1-1/2	3-1/4	long	M42	CC-1211-LB	11624	34.52	41624	40.72
3/8	3/8	1	2-3/4	std	M42	CC-1212-B	11512	28.71	41512	33.86
3/8	3/8	1-1/2	3-1/4	long	M42	CC-1212-LB	11626	31.24	41626	36.89
3/8	3/8	2-1/2	4-1/4	xl	M42	CC-1212-EB	11568	36.82	41568	44.10
7/16	3/8	1	2-11/16	std	M42	CC-1214-B	11514	37.72	41514	45.56
1/2	3/8	1	2-11/16	std	M42	CC-1216-B	11516	37.72	41516	45.56
1/2	1/2	1-1/4	3-1/4	std	M42	CC-1616-B	11518	37.38	41518	45.25
1/2	1/2	2	4	long	M42	CC-1616-LB	11628	41.56	41628	50.58
1/2	1/2	3	5	xl	M42	CC-1616-EB	11570	49.05	41570	57.89
5/8	5/8	1-5/8	3-3/4	std	M42	CC-2020-B	11520	48.23	41520	58.26
5/8	5/8	2-1/2	4-5/8	long	M42	CC-2020-LB	11630	60.57	41630	71.46
5/8	5/8	4	6-1/8	xl	M42	CC-2020-EB	11572	73.45	41572	92.76
11/16	5/8	1-5/8	3-3/4	std	M42	CC-2022-B	11522	61.55	41522	77.43
3/4	3/4	1-5/8	3-7/8	std	M42	CC-2424-B	11524	62.75	41524	82.00
3/4	3/4	3	5-1/4	long	M42	CC-2424-LB	11632	76.06	41632	95.42
3/4	3/4	4	6-1/4	xl	M42	CC-2424-EB	11574	90.16	41574	119.92
7/8	7/8	1-7/8	4-1/8	std	M42	CC-2828-B	11526	89.66	41526	108.95
7/8	7/8	3-1/2	5-3/4	long	M42	CC-2828-LB	11634	108.19	41634	140.47
1	1	2	4-1/2	std	M42	CC-3232-B	11528	107.36	41528	128.55
1	1	4	6-1/2	long	M42	CC-3232-LB	11636	130.79	41636	170.51
1	1	6	8-1/2	xl	M42	CC-3232-EB	11578	150.59	41578	189.57
1-1/8	1	2	4-1/2	std	M42	CC-3236-B	11530	129.34	41530	152.61
1-1/4	1-1/4	2	4-1/2	std	M42	CC-4040-B	11532	138.07	41532	162.94
1-1/4	1-1/4	4	6-1/2	long	M42	CC-4040-LB	11638	196.27	41638	238.88
1-1/4	1-1/4	6	8-1/2	xl	M42	CC-4040-EB	11580	245.81	41580	290.11
1-1/2	1-1/4	2	4-1/2	std	HSS	CC-4048-B	11534	166.40	41534	221.31
1-1/2	1-1/4	4	6-1/2	long	HSS	CC-4048-LB	11333	211.39	41333	272.11



# GENERAL PURPOSE COBALT & HSS END MILLS

## 4 FLUTE • CENTER CUTTING BALL NOSE METRIC/ INCH END MILL



### SERIES: CCP- \_M\_-B

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DIA	SHK	LOC	OAL	LENGTH	MAT	TOOL	BRIGHT EDP	BRIGHT PRICE	TICN EDP	TICN PRICE
3mm	3/8	3/8	2-5/16	std	M42	CCP-12M3-B	13002	23.96	43002	28.83
4mm	3/8	7/16	2-5/16	std	M42	CCP-12M4-B	13004	23.96	43004	28.83
5mm	3/8	9/16	2-1/2	std	M42	CCP-12M5-B	13006	23.96	43006	28.84
6mm	3/8	5/8	2-1/2	std	M42	CCP-12M6-B	13008	24.70	43008	29.68
7mm	3/8	11/16	2-1/2	std	M42	CCP-12M7-B	13010	25.19	43010	30.24
8mm	3/8	3/4	2-1/2	std	M42	CCP-12M8-B	13012	24.70	43012	29.68
9mm	3/8	3/4	2-1/2	std	M42	CCP-12M9-B	13014	25.19	43014	30.24
10mm	3/8	1	2-11/16	std	M42	CCP-12M10-B	13016	33.71	43016	41.59
11mm	3/8	1	2-11/16	std	M42	CCP-12M11-B	13018	35.70	43018	43.70
12mm	3/8	1	2-11/16	std	M42	CCP-12M12-B	13020	36.56	43020	44.41
13mm	1/2	1-1/4	3-1/4	std	M42	CCP-16M13-B	13022	41.95	43022	49.88
14mm	1/2	1-3/8	3-3/8	std	M42	CCP-16M14-B	13024	43.76	43024	53.19

## 4 FLUTE • CENTER CUTTING BALL NOSE METRIC END MILL



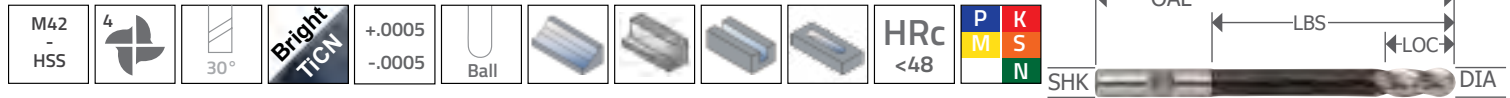
### SERIES: CC-M \_M\_-B

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DIA	SHK	LOC	OAL	LENGTH	MAT	TOOL	BRIGHT EDP	BRIGHT PRICE	TICN EDP	TICN PRICE
2mm	6mm	7mm	57mm	std	M42	CC-M6M2-B	17964	41.90	47964	49.44
3mm	6mm	8mm	57mm	std	M42	CC-M6M3-B	17965	41.04	47965	48.38
4mm	6mm	11mm	57mm	std	M42	CC-M6M4-B	17966	40.38	47966	47.64
5mm	6mm	13mm	57mm	std	M42	CC-M6M5-B	17967	39.63	47967	46.82
6mm	6mm	13mm	57mm	std	M42	CC-M6M6-B	17968	38.91	47968	45.88
7mm	10mm	16mm	69mm	std	M42	CC-M10M7-B	17969	45.22	47969	53.36
8mm	10mm	19mm	69mm	std	M42	CC-M10M8-B	17970	44.56	47970	52.56
9mm	10mm	19mm	69mm	std	M42	CC-M10M9-B	17971	43.90	47971	52.03
10mm	10mm	22mm	72mm	std	M42	CC-M10M10-B	17972	45.66	47972	53.92
11mm	12mm	22mm	79mm	std	M42	CC-M12M11-B	17973	51.42	47973	60.68
12mm	12mm	26mm	83mm	std	M42	CC-M12M12-B	17974	50.69	47974	59.77
13mm	12mm	26mm	83mm	std	M42	CC-M12M13-B	17975	53.92	47975	63.58
14mm	12mm	26mm	83mm	std	M42	CC-M12M14-B	17976	55.36	47976	65.32
15mm	12mm	26mm	83mm	std	M42	CC-M12M15-B	17977	56.80	47977	66.99
16mm	16mm	32mm	92mm	std	M42	CC-M16M16-B	17978	61.05	47978	72.04
17mm	16mm	32mm	92mm	std	M42	CC-M16M17-B	17979	64.11	47979	75.66
18mm	16mm	32mm	92mm	std	M42	CC-M16M18-B	17980	69.80	47980	82.37
19mm	16mm	32mm	92mm	std	M42	CC-M16M19-B	17981	72.79	47981	85.90
20mm	20mm	38mm	104mm	std	M42	CC-M20M20-B	17982	84.51	47982	104.80
21mm	20mm	38mm	104mm	std	M42	CC-M20M21-B	17983	85.87	47983	106.18
22mm	20mm	38mm	104mm	std	M42	CC-M20M22-B	17984	87.37	47984	107.67
23mm	20mm	38mm	104mm	std	M42	CC-M20M23-B	17985	90.32	47985	110.58
24mm	25mm	45mm	121mm	std	M42	CC-M25M24-B	17986	116.33	47986	138.45
25mm	25mm	45mm	121mm	std	M42	CC-M25M25-B	17987	112.22	47987	134.32
30mm	25mm	45mm	121mm	std	M42	CC-M25M30-B	17988	153.29	47988	180.87
32mm	32mm	53mm	133mm	std	M42	CC-M32M32-B	17989	173.53	47989	204.77

# GENERAL PURPOSE COBALT & HSS END MILLS

## 4 FLUTE • CENTER CUTTING BALL NOSE EXTENDED NECK

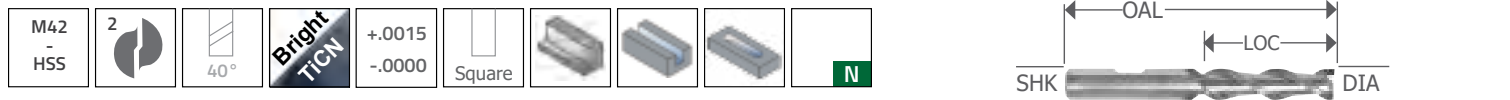


**SERIES: CCN-\_\_-B**

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DIA	SHK	LOC	LBS	OAL	LENGTH	MAT	TOOL	BRIGHT EDP	BRIGHT PRICE	TICN EDP	TICN PRICE
3/8	3/8	1	3	5	std	M42	CCN-1212-B	11245	44.34	41245	52.32
1/2	1/2	1-1/4	4	6	std	HSS	CCN-1616-B	11247	58.26	41247	68.75
5/8	5/8	1-1/2	5	7-1/8	std	HSS	CCN-2020-B	11249	89.94	41249	106.13
3/4	3/4	2	6	8-1/4	std	HSS	CCN-2424-B	11251	113.80	41251	135.68
1	1	2-1/2	8	10-1/4	std	HSS	CCN-3232-B	11253	185.26	41253	232.70

## 2 FLUTE • 40° CENTER CUTTING FOR ALUMINUM END MILL



**SERIES: AA**

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DIA	SHK	LOC	OAL	LENGTH	MAT	TOOL	BRIGHT EDP	BRIGHT PRICE	TICN EDP	TICN PRICE
3/16	3/8	7/16	2-5/16	std	M42	AA-1206	10614	17.74	40614	22.71
3/16	3/8	3/4	2-5/8	long	M42	AA-1206-L	10646	20.98	40646	25.86
3/16	3/8	1-1/4	3-1/8	xl	M42	AA-1206-E	10698	34.32	40698	40.09
1/4	3/8	1/2	2-5/16	std	M42	AA-1208	10616	18.19	40616	23.14
1/4	3/8	5/8	2-7/16	med	M42	AA-1208-M	10648	20.98	40648	25.86
1/4	3/8	3/4	2-5/8	med/med	M42	AA-1208-MM	10650	20.98	40650	24.49
1/4	3/8	1	2-7/8	med/long	M42	AA-1208-ML	10652	21.13	40652	25.02
1/4	3/8	1-1/4	3-1/16	long	M42	AA-1208-L	10654	22.23	40654	27.41
1/4	3/8	1-1/2	3-3/8	long/long	M42	AA-1208-LL	10656	23.35	40656	26.98
1/4	3/8	1-3/4	3-9/16	xl	M42	AA-1208-E	10700	33.51	40700	38.70
5/16	3/8	9/16	2-5/16	std	M42	AA-1210	10618	18.19	40618	23.82
5/16	3/8	3/4	2-1/2	med	M42	AA-1210-M	10658	20.98	40658	25.86
5/16	3/8	1	2-3/4	med/med	M42	AA-1210-MM	10660	20.98	40660	24.49
5/16	3/8	1-3/8	3-1/8	long	M42	AA-1210-L	10662	21.20	40662	26.09
5/16	3/8	2	3-3/4	xl	M42	AA-1210-E	10702	33.37	40702	40.86
3/8	3/8	9/16	2-5/16	std	M42	AA-1212	10620	18.19	40620	23.14
3/8	3/8	3/4	2-1/2	med	M42	AA-1212-M	10664	20.98	40664	25.86
3/8	3/8	1	2-3/4	med/med	M42	AA-1212-MM	10666	20.98	40666	24.49
3/8	3/8	1-1/2	3-1/4	long	M42	AA-1212-L	10668	22.23	40668	27.41
3/8	3/8	2	3-3/4	long/long	M42	AA-1212-LL	10670	24.25	40670	30.15
3/8	3/8	2-1/2	4-1/4	xl	M42	AA-1212-E	10704	30.85	40704	38.28
7/16	3/8	1	2-11/16	std	M42	AA-1214	10622	23.35	40622	30.55
7/16	1/2	1-3/4	3-3/4	long	M42	AA-1614-L	10672	32.11	40672	41.09
1/2	1/2	1	3	std	M42	AA-1616	10624	26.63	40624	34.47
1/2	1/2	1-1/4	3-1/4	med	M42	AA-1616-M	10674	30.04	40674	37.75
1/2	1/2	1-3/4	3-3/4	med/med	M42	AA-1616-MM	10676	31.08	40676	38.14
1/2	1/2	2	4	long	M42	AA-1616-L	10678	33.69	40678	42.72
1/2	1/2	2-1/2	4-1/2	long/long	M42	AA-1616-LL	10680	36.77	40680	46.47
1/2	1/2	3	5	xl	M42	AA-1616-E	10708	41.35	40708	55.11
5/8	5/8	1-3/8	3-1/2	stub	M42	AAS-2020	10628	35.19	40628	43.18
5/8	5/8	1-5/8	3-3/4	std	M42	AA-2020	10626	34.78	40626	44.71
5/8	5/8	2-1/2	4-5/8	long	M42	AA-2020-L	10682	49.99	40682	60.79
5/8	5/8	4	6-1/8	xl	M42	AA-2020-E	10710	62.44	40710	86.83

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# GENERAL PURPOSE COBALT & HSS END MILLS

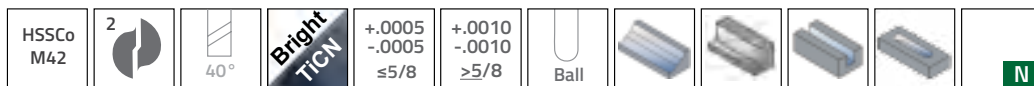
## 2 FLUTE • 40° CENTER CUTTING FOR ALUMINUM END MILL

SERIES: AA

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DIA	SHK	LOC	OAL	LENGTH	MAT	TOOL	BRIGHT EDP	BRIGHT PRICE	TICN EDP	TICN PRICE
3/4	3/4	1-5/8	3-7/8	std	M42	AA-2424	10630	51.54	40630	64.04
3/4	3/4	2	4-1/4	med	M42	AA-2424-M	10684	63.83	40684	80.66
3/4	3/4	3	5-1/4	long	M42	AA-2424-L	10686	76.31	40686	96.41
3/4	3/4	4	6-1/4	xl	M42	AA-2424-E	10712	94.08	40712	124.18
7/8	7/8	1-7/8	4-1/8	std	M42	AA-2828	10634	67.06	40634	97.80
1	3/4	1-7/8	4-1/8	std	M42	AA-2432	10632	80.19	40632	99.48
1	1	2	4-1/2	std	M42	AA-3232	10636	81.62	40636	101.18
1	1	4	6-1/2	long	M42	AA-3232-L	10690	125.09	40690	147.32
1	1	6	8-1/2	xl	M42	AA-3232-E	10716	158.92	40716	197.01
1-1/4	1-1/4	2	4-1/2	std	M42	AA-4040	10638	141.63	40638	134.86
1-1/2	1-1/4	2	4-1/2	std	HSS	AA-4048	CALL		CALL	
1-1/2	1-1/4	4	6-1/2	long	HSS	AA-4048-L	CALL		CALL	

## 2 FLUTE • 40° CENTER CUTTING BALL NOSE FOR ALUMINUM END MILL



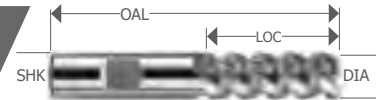
SERIES: AA-\_\_-B

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DIA	SHK	LOC	OAL	LENGTH	MAT	TOOL	BRIGHT EDP	BRIGHT PRICE	TICN EDP	TICN PRICE
1/4	3/8	1/2	2-5/16	std	M42	AA-1208-B	12842	21.83	42842	25.72
1/4	3/8	5/8	2-1/2	med	M42	AA-1208-MB	11713	25.18	41713	31.35
1/4	3/8	1-1/4	3-1/16	long	M42	AA-1208-LB	12844	26.67	42844	31.20
1/4	3/8	1-3/4	3-9/16	xl	M42	AA-1208-EB	12846	40.21	42846	48.82
5/16	3/8	9/16	2-5/16	std	M42	AA-1210-B	12848	21.83	42848	27.77
5/16	3/8	3/4	2-1/2	med	M42	AA-1210-MB	11714	25.18	41714	31.35
5/16	3/8	1-3/8	3-1/8	long	M42	AA-1210-LB	12850	25.45	42850	32.00
5/16	3/8	2	3-3/4	xl	M42	AA-1210-EB	12852	40.04	42852	38.68
3/8	3/8	9/16	2-5/16	std	M42	AA-1212-B	12854	21.83	42854	27.91
3/8	3/8	3/4	2-1/2	med	M42	AA-1212-MB	11715	25.18	41715	31.35
3/8	3/8	1-1/2	3-1/4	long	M42	AA-1212-LB	12856	26.67	42856	32.90
3/8	3/8	2-1/2	4-1/4	xl	M42	AA-1212-EB	12858	37.01	42858	43.51
7/16	3/8	1	2-11/16	std	M42	AA-1214-B	12860	28.02	42860	35.99
7/16	1/2	1-3/4	3-3/4	long	M42	AA-1614-LB	12862	38.54	42862	44.21
7/16	1/2	2-3/4	4-3/4	xl	M42	AA-1614-EB	12864	47.53	42864	57.37
1/2	1/2	1	3	std	M42	AA-1616-B	12866	31.96	42866	41.37
1/2	1/2	2	4	long	M42	AA-1616-LB	12868	40.43	42868	51.27
1/2	1/2	3	5	xl	M42	AA-1616-EB	12870	49.62	42870	63.38
5/8	5/8	1-5/8	3-3/4	std	M42	AA-2020-B	12872	41.74	42872	55.68
5/8	5/8	2-1/2	4-5/8	long	M42	AA-2020-LB	12874	59.99	42874	77.41
5/8	5/8	4	6-1/8	xl	M42	AA-2020-EB	12876	74.93	42876	99.32
3/4	3/4	1-5/8	3-7/8	std	M42	AA-2424-B	12878	61.84	42878	76.85
3/4	3/4	3	5-1/4	long	M42	AA-2424-LB	12880	91.57	42880	115.70
3/4	3/4	4	6-1/4	xl	M42	AA-2424-EB	12882	112.90	42882	140.43
7/8	7/8	1-7/8	4-1/8	std	M42	AA-2828-B	12886	80.47	42886	111.21
7/8	7/8	3-1/2	5-3/4	long	M42	AA-2828-LB	12888	110.20	42888	151.18
1	3/4	1-7/8	4-1/8	std	M42	AA-2432-B	12884	96.23	42884	134.09
1	1	2	4-1/2	std	M42	AA-3232-B	12892	97.95	42892	121.41
1	1	4	6-1/2	long	M42	AA-3232-LB	12894	150.11	42894	209.01
1	1	6	8-1/2	xl	M42	AA-3232-EB	12896	190.70	42896	266.42

# GENERAL PURPOSE COBALT & HSS END MILLS

## 3 FLUTE • 60° HELIX CENTER CUTTING END MILL



HSSCo M42	3	60°	BRIGHT	+0.015 -0.000	Square		HRC <48	
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### SERIES: E60

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DIA	SHK	LOC	OAL	LENGTH	MAT	TOOL	BRIGHT EDP	BRIGHT PRICE
1/4	3/8	5/8	2-7/16	std	M42	E60-1208	15460	16.22
5/16	3/8	3/4	2-1/2	std	M42	E60-1210	15462	16.96
3/8	3/8	3/4	2-1/2	std	M42	E60-1212	15464	16.96
3/8	3/8	1-1/2	3-1/4	long	M42	E60-1212-L	15466	22.21
1/2	1/2	1-1/4	3-1/4	std	M42	E60-1616	15468	21.76
1/2	1/2	2	4	long	M42	E60-1616-L	15470	28.73
1/2	1/2	3	5	xl	M42	E60-1616-E	15472	36.73
5/8	5/8	1-5/8	3-3/4	std	M42	E60-2020	15474	32.86
5/8	5/8	2-1/2	4-5/8	long	M42	E60-2020-L	15476	43.24
3/4	3/4	1-5/8	3-7/8	std	M42	E60-2424	15478	42.83
3/4	3/4	3	5-1/4	long	M42	E60-2424-L	15480	62.48
1	1	2	4-1/2	std	M42	E60-3232	15486	66.57
1	1	4	6-1/2	long	M42	E60-3232-L	15488	99.43

## 3 FLUTE • NON-CENTER CUTTING CORNER ROUNDING END MILL

M42 - HSS	3	Non - Center Cutting	BRIGHT	+0.001 -0.001 radius	Corner Round	HRC <48	
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### SERIES: R

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RADIUS	MINOR DIA	LARGE DIA	SHK	OAL	MAT	TOOL	BRIGHT EDP	BRIGHT PRICE
1/32	5/16	3/8	3/8	2-1/2	M42	R-1201	12694	46.39
1/32	7/16	1/2	1/2	2-5/8	M42	R-1601	12700	46.84
1/16	5/16	7/16	3/8	2-1/2	M42	R-1202	12696	38.91
1/16	3/8	1/2	1/2	2-5/8	M42	R-1602	12702	46.84
3/32	5/16	1/2	3/8	2-1/2	M42	R-1203	12698	41.76
3/32	5/16	1/2	1/2	2-5/8	M42	R-1603	12704	46.84
1/8	3/8	5/8	1/2	2-7/8	M42	R-1604	12706	55.73
5/32	5/16	5/8	1/2	2-7/8	M42	R-1605	12708	60.77
3/16	3/8	3/4	1/2	3	M42	R-1606	12710	68.21
3/16	3/8	3/4	3/4	3-1/8	M42	R-2406	12732	68.21
7/32	7/16	7/8	1/2	3	M42	R-1607	12712	85.84
1/4	3/8	7/8	1/2	3	M42	R-1608	12714	76.49
1/4	3/8	7/8	3/4	3-1/4	M42	R-2408	12734	76.49
9/32	7/16	1	1/2	3	M42	R-1609	12716	74.50
5/16	3/8	1	1/2	3	M42	R-1610	12718	77.56
5/16	3/8	1	3/4	3-1/4	M42	R-2410	12736	89.52
11/32	7/16	1-1/8	1/2	3-1/4	M42	R-1611	12720	115.75
3/8	3/8	1-1/8	1/2	3-1/4	M42	R-1612	12722	101.96
3/8	3/8	1-1/8	3/4	3-1/2	M42	R-2412	12738	108.18
13/32	7/16	1-1/4	1/2	3-1/2	M42	R-1613	12724	128.34
7/16	3/8	1-1/4	1/2	3-1/2	M42	R-1614	12726	113.04
15/32	7/16	1-3/8	1/2	3-1/2	HSS	R-1615	12728	135.07
1/2	3/8	1-3/8	1/2	3-1/2	HSS	R-1616	12730	117.92
1/2	3/8	1-3/8	3/4	3-3/4	HSS	R-2416	12740	117.92
9/16	3/8	1-1/2	3/4	3-3/4	HSS	R-2418	12742	137.36
5/8	3/8	1-5/8	3/4	3-3/4	HSS	R-2420	12744	173.33
3/4	3/8	1-7/8	3/4	3-3/4	HSS	R-2424	12746	210.40
1	3/4	2-3/4	3/4	4-1/2	HSS	R-2432	12748	322.44



# GENERAL PURPOSE COBALT & HSS END MILLS

## 4 FLUTE • NON-CENTER CUTTING CORNER ROUNDING END MILL



### SERIES: RC

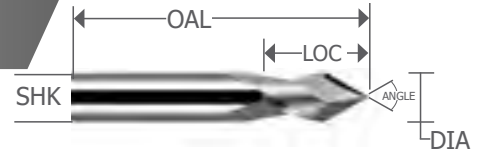
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RADIUS	MINOR DIA	LARGE DIA	SHK	OAL	FLT	MAT	TOOL	BRIGHT EDP	BRIGHT PRICE
1/32	3/8	7/16	3/8	2-1/2	4	M42	RC-1201	13060	46.84
1/16	5/16	7/16	3/8	2-1/2	4	M42	RC-1202	13062	38.91
3/32	5/16	1/2	3/8	2-1/2	4	M42	RC-1203	13064	41.76
1/8	3/8	5/8	1/2	3	4	M42	RC-1604	13066	55.73
5/32	7/16	3/4	1/2	3	4	M42	RC-1605	13068	60.77
3/16	1/2	7/8	1/2	2-15/16	4	M42	RC-1606	13070	68.21
3/16	1/2	7/8	3/4	3-1/8	4	M42	RC-2406	13078	68.21
1/4	1/2	1	1/2	3	4	M42	RC-1608	13072	76.49
1/4	1/2	1	3/4	3-1/4	4	M42	RC-2408	13080	76.49
5/16	1/2	1-1/8	1/2	3-1/2	4	M42	RC-1610	13074	78.30
5/16	1/2	1-1/8	7/8	3-1/2	4	M42	RC-2810	13092	92.12
3/8	1/2	1-1/4	1/2	3-3/4	4	M42	RC-1612	13076	101.96
3/8	1/2	1-1/4	7/8	3-3/4	4	M42	RC-2812	13094	108.18
7/16	1/2	1-3/8	3/4	3-3/4	4	HSS	RC-2414	13082	111.43
7/16	1/2	1-3/8	1	4	4	HSS	RC-3214	13096	113.59
1/2	1/2	1-1/2	3/4	3-7/8	4	HSS	RC-2416	13084	117.92
1/2	1/2	1-1/2	1	4-1/8	4	HSS	RC-3216	13098	117.92
5/8	11/16	1-15/16	3/4	4	4	HSS	RC-2420	13086	173.33
5/8	11/16	1-15/16	1	4-1/4	4	HSS	RC-3220	13100	176.67
3/4	3/4	2-1/4	3/4	4-1/8	4	HSS	RC-2424	13088	210.40
3/4	3/4	2-1/4	1	4-5/16	4	HSS	RC-3224	13102	214.45
1	3/4	2-3/4	3/4	4-1/2	4	HSS	RC-2432	13090	316.33
1	3/4	2-3/4	1	4-3/4	4	HSS	RC-3232	13104	322.44

# GENERAL PURPOSE COBALT & HSS END MILLS

## 2 FLUTE • 60° AND 82° DRILL POINT END MILL

HSSCo M42	2	30°	BRIGHT	+0.015 -0.000	Drill Pt.	HRC <48	P M K S N
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### SERIES: A-\_\_-DP60

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DIA	SHK	LOC	OAL	ANGLE	LENGTH	MAT	TOOL	BRIGHT EDP	BRIGHT PRICE
1/8	3/8	3/8	2-5/16	60°	std	M42	A-1204-DP60	16335	16.80
3/16	3/8	7/16	2-5/16	60°	std	M42	A-1206-DP60	16337	16.80
1/4	3/8	5/8	2-7/16	60°	std	M42	A-1208-DP60	16037	18.35
1/4	3/8	5/8	2-7/16	60°	std	M42	A-1208-DP60-1	16324	18.35
5/16	3/8	23/32	2-15/32	60°	std	M42	A-1210-DP60	16038	18.35
3/8	3/8	3/4	2-1/2	60°	std	M42	A-1212-DP60	16039	18.35
3/8	3/8	3/4	2-1/2	60°	std	M42	A-1212-DP60-1	16327	18.35
1/2	1/2	1-1/4	3-1/4	60°	std	M42	A-1616-DP60	16041	26.40
1/2	1/2	1-1/4	3-1/4	60°	std	M42	A-1616-DP60-1	16329	26.90
5/8	5/8	1-5/8	3-3/4	60°	std	M42	A-2020-DP60	16042	39.46
3/4	3/4	1-11/16	3-15/16	60°	std	M42	A-2424-DP60	16044	47.92
3/4	3/4	1-11/16	3-15/16	60°	std	M42	A-2424-DP60-1	16331	45.56
7/8	3/4	1-15/16	4-3/16	60°	std	M42	A-2428-DP60	16045	60.86
1	3/4	2	4-1/4	60°	std	M42	A-2432-DP60	16047	67.81

Tool names with "-1" have a .005" sharp point for groove milling

### SERIES: A-\_\_-DP82

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DIA	SHK	LOC	OAL	ANGLE	LENGTH	MAT	TOOL	BRIGHT EDP	BRIGHT PRICE
1/8	3/8	3/8	2-5/16	82°	std	M42	A-1204-DP82	16440	16.80
3/16	3/8	7/16	2-5/16	82°	std	M42	A-1206-DP82	16441	16.80
1/4	3/8	5/8	2-7/16	82°	std	M42	A-1208-DP82	16442	14.40
5/16	3/8	23/32	2-15/32	82°	std	M42	A-1210-DP82	16443	14.40
3/8	3/8	3/4	2-1/2	82°	std	M42	A-1212-DP82	16444	14.40
1/2	1/2	1-1/4	3-1/4	82°	std	M42	A-1616-DP82	16446	21.10
9/16	1/2	1-13/32	3-13/32	82°	std	M42	A-1618-DP82	16447	28.33
5/8	5/8	1-5/8	3-3/4	82°	std	M42	A-2020-DP82	16448	31.55

sizes continued on next page

# GENERAL PURPOSE COBALT & HSS END MILLS

## 2 FLUTE • 90°, 100° & 120° DRILL POINT END MILL

HSSCo M42	2	30°	BRIGHT	+0.015 -0.000	Drill Pt.	HRC <48	P M K S N
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### SERIES: A-\_\_-DP

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DIA	SHK	LOC	OAL	ANGLE	LENGTH	MAT	TOOL	BRIGHT EDP	BRIGHT PRICE
1/8	3/8	3/8	2-5/16	90°	std	M42	A-1204-DP	16334	16.80
1/8	3/8	3/8	2-5/16	90°	std	M42	A-1204-DP-1	16710	16.80
3/16	3/8	7/16	2-5/16	90°	std	M42	A-1206-DP	16336	16.80
3/16	3/8	7/16	2-5/16	90°	std	M42	A-1206-DP-1	16452	16.80
1/4	3/8	5/8	2-7/16	90°	std	M42	A-1208-DP	15434	14.39
1/4	3/8	5/8	2-7/16	90°	std	M42	A-1208-DP-1	16323	14.40
5/16	3/8	23/32	2-15/32	90°	std	M42	A-1210-DP	15436	14.39
5/16	3/8	23/32	2-15/32	90°	std	M42	A-1210-DP-1	16325	14.40
3/8	3/8	3/4	2-1/2	90°	std	M42	A-1212-DP	15438	14.39
3/8	3/8	3/4	2-1/2	90°	std	M42	A-1212-DP-1	16326	14.40
7/16	3/8	1-1/32	2-23/32	90°	std	M42	A-1214-DP	15440	22.03
7/16	3/8	1-1/32	2-23/32	90°	std	M42	A-1214-DP-1	16449	22.03
1/2	1/2	1-1/4	3-1/4	90°	std	M42	A-1616-DP	15442	20.71
1/2	1/2	1-1/4	3-1/4	90°	std	M42	A-1616-DP-1	16328	20.70
9/16	1/2	1-13/32	3-13/32	90°	std	M42	A-1618-DP	15444	28.33
9/16	1/2	1-13/32	3-13/32	90°	std	M42	A-1618-DP-1	16450	28.33
5/8	5/8	1-5/8	3-3/4	90°	std	M42	A-2020-DP	15446	30.95
5/8	5/8	1-5/8	3-3/4	90°	std	M42	A-2020-DP-1	16451	30.95
11/16	5/8	1-21/32	3-25/32	90°	std	M42	A-2022-DP	15448	35.92
3/4	3/4	1-11/16	3-15/16	90°	std	M42	A-2424-DP	15450	36.25
3/4	3/4	1-11/16	3-15/16	90°	std	M42	A-2424-DP-1	16330	37.57
13/16	3/4	1-29/32	4-5/32	90°	std	M42	A-2426-DP	15452	46.58
7/8	3/4	1-15/16	4-3/16	90°	std	M42	A-2428-DP	15454	47.73
15/16	3/4	1-31/32	4-7/32	90°	std	M42	A-2430-DP	15456	54.46
1	3/4	2	4-1/4	90°	std	M42	A-2432-DP	15458	54.21
1	3/4	2	4-1/4	90°	std	M42	A-2432-DP-1	16332	54.96

Tool names with "-1" have a .005" sharp point for groove milling

### SERIES: A-\_\_-DP100

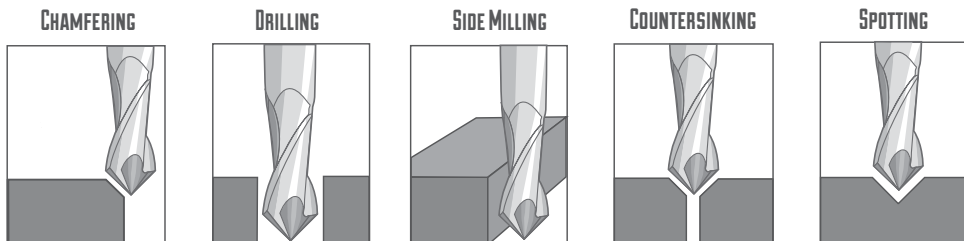
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DIA	SHK	LOC	OAL	ANGLE	LENGTH	MAT	TOOL	BRIGHT EDP	BRIGHT PRICE
1/4	3/8	5/8	2-7/16	100°	std	M42	A-1208-DP100	16596	18.35
3/8	3/8	3/4	2-1/2	100°	std	M42	A-1212-DP100	16597	18.35

### SERIES: A-\_\_-DP120

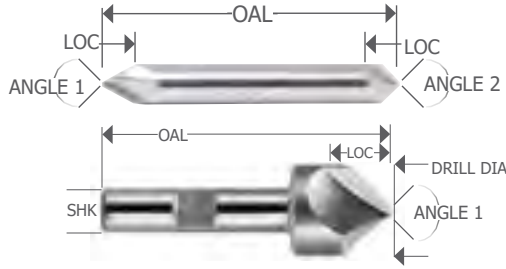
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DIA	SHK	LOC	OAL	ANGLE	LENGTH	MAT	TOOL	BRIGHT EDP	BRIGHT PRICE
1/2	1/2	1-1/4	3-1/4	120°	std	M42	A-1616-DP120	16040	23.82
3/4	3/4	1-11/16	3-15/16	120°	std	M42	A-2424-DP120	16043	40.32
1	3/4	2	4-1/4	120°	std	M42	A-2432-DP120	16046	61.16



# GENERAL PURPOSE COBALT & HSS END MILLS

## 2 FLUTE • SINGLE/DOUBLE END ANGLE END MILLS

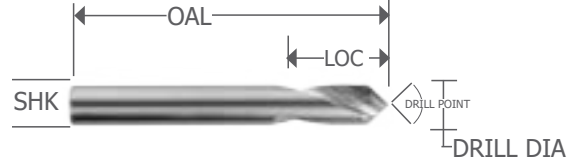
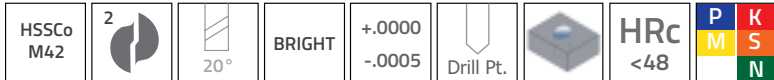


### SERIES: AM

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DIA	SHK	OAL	END	LENGTH	ANGLE 1	ANGLE 2	MAT	TOOL	BRIGHT EDP	BRIGHT PRICE
3/8	3/8	2-3/4	DE	std	60°	90°	M42	AM-3/8-60/90	19242	35.29
3/8	3/8	2-3/4	DE	std	82°	90°	M42	AM-3/8-82/90	19241	35.29
3/8	3/8	2-3/4	DE	std	90°	90°	M42	AM-3/8-90/90	19240	35.29
1/2	1/2	3-3/8	DE	std	60°	90°	M42	AM-1/2-60/90	19247	40.37
1/2	1/2	3-3/16	DE	std	82°	90°	M42	AM-1/2-82/90	19246	40.37
1/2	1/2	3-3/16	DE	std	90°	90°	M42	AM-1/2-90/90	19245	40.37
3/4	3/4	3-3/8	DE	std	60°	90°	M42	AM-3/4-60/90	19252	57.48
3/4	3/4	3-3/16	DE	std	82°	90°	M42	AM-3/4-82/90	19251	57.35
3/4	3/8	2-3/8	SE	std	90°	-	M42	AM-3/4-90	19243	41.98
3/4	3/4	3-3/16	DE	std	90°	90°	M42	AM-3/4-90/90	19250	57.35
1	1/2	2-15/16	SE	std	90°	-	M42	AM-1-90	19248	53.48
1-1/4	3/4	3-3/8	SE	std	90°	-	M42	AM-1-1/4-90	19253	67.79

## 2 FLUTE • 82°, 90° OR 120° NC SPOTTING DRILLS



### SERIES: HSNC

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DRILL DIA	SHK	LOC	OAL	LENGTH	DRILL POINT	MAT	TOOL	BRIGHT EDP	BRIGHT PRICE
4mm	4mm	12mm	52mm	std	82°	M42	HSNC-4M-82	10847	13.43
4mm	4mm	12mm	52mm	std	90°	M42	HSNC-4M-90	10849	13.43
4mm	4mm	12mm	52mm	std	120°	M42	HSNC-4M-120	10851	13.43
1/4	1/4	7/8	2-5/8	std	82°	M42	HSNC-1/4-82	10853	14.25
1/4	1/4	7/8	2-5/8	std	90°	M42	HSNC-1/4-90	10855	14.25
1/4	1/4	7/8	2-5/8	std	120°	M42	HSNC-1/4-120	10857	14.25
8mm	8mm	25mm	79mm	std	82°	M42	HSNC-8M-82	10859	14.63
8mm	8mm	25mm	79mm	std	90°	M42	HSNC-8M-90	10861	14.63
8mm	8mm	25mm	79mm	std	120°	M42	HSNC-8M-120	10863	14.63
3/8	3/8	1	3-1/2	std	82°	M42	HSNC-3/8-82	10865	14.25
3/8	3/8	1	3-1/2	std	90°	M42	HSNC-3/8-90	10867	14.25
3/8	3/8	1	3-1/2	std	120°	M42	HSNC-3/8-120	10869	14.25
1/2	1/2	1-3/8	4	std	82°	M42	HSNC-1/2-82	10871	19.98
1/2	1/2	1-3/8	4	std	90°	M42	HSNC-1/2-90	10873	19.98
1/2	1/2	1-3/8	4	std	120°	M42	HSNC-1/2-120	10875	19.98
5/8	5/8	1-3/8	4-1/2	std	82°	M42	HSNC-5/8-82	10877	28.22
5/8	5/8	1-3/8	4-1/2	std	90°	M42	HSNC-5/8-90	10879	28.22
5/8	5/8	1-3/8	4-1/2	std	120°	M42	HSNC-5/8-120	10881	28.22
3/4	3/4	1-1/2	5-3/16	std	82°	M42	HSNC-3/4-82	10883	34.44
3/4	3/4	1-1/2	5-3/16	std	90°	M42	HSNC-3/4-90	10885	34.44
3/4	3/4	1-1/2	5-3/16	std	120°	M42	HSNC-3/4-120	10887	34.44

# GENERAL PURPOSE COBALT & HSS END MILLS

## 2 FLUTE • DOUBLE END CENTER CUTTING END MILLS



HSSCo  
M42



BRIGHT

+ .0000  
- .0015

Square



HRC  
<48



### SERIES: B

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DIA	SHK	LOC	OAL	LENGTH	MAT	TOOL	BRIGHT EDP	BRIGHT PRICE
1/32	3/16	3/64	2	stub	M42	BS-601	11082	16.88
1/32	3/16	3/32	2-1/4	std	M42	B-601	10872	18.22
3/64	3/16	1/16	2	stub	M42	BS-601-1/2	11084	16.88
3/64	3/16	9/64	2-1/4	std	M42	B-601-1/2	10874	18.22
1/16	3/16	3/32	2	stub	M42	BS-602	11086	14.70
1/16	3/16	3/16	2-1/4	std	M42	B-602	10876	15.90
1/16	3/16	7/32	2-1/2	long	M42	B-602-L	11048	21.53
5/64	3/16	1/8	2	stub	M42	BS-602-1/2	11088	14.70
5/64	3/16	15/64	2-1/4	std	M42	B-602-1/2	10878	15.90
3/32	3/16	9/64	2	stub	M42	BS-603	11090	14.70
3/32	3/16	9/32	2-1/4	std	M42	B-603	10880	15.90
3/32	3/16	1/2	2-5/8	long	M42	B-603-L	11050	21.53
7/64	3/16	5/32	2	stub	M42	BS-603-1/2	11092	14.70
7/64	3/16	21/64	2-1/4	std	M42	B-603-1/2	10882	15.90
1/8	3/16	3/16	2	stub	M42	BS-604	11094	14.70
1/8	3/16	3/8	2-1/4	std	M42	B-604	10884	15.90
1/8	3/16	3/4	3-1/8	long	M42	B-604-L	11052	21.53
9/64	3/16	7/32	2	stub	M42	BS-604-1/2	11096	14.70
9/64	3/16	13/32	2-1/4	std	M42	B-604-1/2	10886	15.90
5/32	3/16	15/64	2	stub	M42	BS-605	11098	14.70
5/32	3/16	7/16	2-1/4	std	M42	B-605	10888	15.90
5/32	3/16	7/8	3-1/4	long	M42	B-605-L	11054	21.53
11/64	3/16	1/4	2	stub	M42	BS-605-1/2	11100	14.70
11/64	3/16	1/2	2-1/4	std	M42	B-605-1/2	10890	15.90
3/16	3/16	9/32	2	stub	M42	BS-606	11102	14.70
3/16	3/16	1/2	2-1/4	std	M42	B-606	10892	15.90
3/16	3/16	1	3-3/8	long	M42	B-606-L	11056	21.53

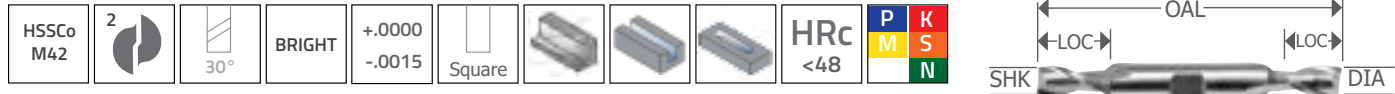
If shank and mill diameters are the same, tolerance is +.0000/-.0025

DIA	SHK	LOC	OAL	LENGTH	MAT	TOOL	BRIGHT EDP	BRIGHT PRICE
5/64	3/8	5/16	3-1/16	std	M42	B-1202-1/2	10894	22.88
3/32	3/8	5/16	3-1/16	std	M42	B-1203	10896	22.88
7/64	3/8	3/8	3-1/16	std	M42	B-1203-1/2	10898	22.88
1/8	3/8	3/16	2-3/4	stub	M42	BS-1204	11104	17.80
1/8	3/8	3/8	3-1/16	std	M42	B-1204	10900	19.95
9/64	3/8	7/16	3-1/8	std	M42	B-1204-1/2	10902	22.88
5/32	3/8	15/64	2-3/4	stub	M42	BS-1205	11106	18.22
5/32	3/8	7/16	3-1/8	std	M42	B-1205	10904	21.53
11/64	3/8	7/16	3-1/8	std	M42	B-1205-1/2	10906	22.88
3/16	3/8	9/32	2-3/4	stub	M42	BS-1206	11108	18.22
3/16	3/8	7/16	3-1/4	std	M42	B-1206	10908	19.95
13/64	3/8	1/2	3-1/4	std	M42	B-1206-1/2	10910	22.88
7/32	3/8	21/64	2-3/4	stub	M42	BS-1207	11110	18.22
7/32	3/8	1/2	3-1/4	std	M42	B-1207	10912	22.05
15/64	3/8	1/2	3-3/8	std	M42	B-1207-1/2	10914	23.63
1/4	3/8	3/8	2-3/4	stub	M42	BS-1208	11112	18.22
1/4	3/8	1/2	3-3/8	std	M42	B-1208	10916	20.56
17/64	3/8	9/16	3-3/8	std	M42	B-1208-1/2	10918	23.63
9/32	3/8	9/16	3-3/8	std	M42	B-1209	10920	22.05
19/64	3/8	9/16	3-1/2	std	M42	B-1209-1/2	10922	23.63
5/16	3/8	9/16	3-1/2	std	M42	B-1210	10924	20.56
21/64	3/8	9/16	3-1/2	std	M42	B-1210-1/2	10926	23.63
11/32	3/8	9/16	3-1/2	std	M42	B-1211	10928	22.51

sizes continued on next page

# GENERAL PURPOSE COBALT & HSS END MILLS

## 2 FLUTE • DOUBLE END CENTER CUTTING END MILLS



### SERIES: B

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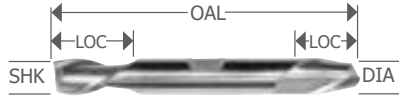
DIA	SHK	LOC	OAL	LENGTH	MAT	TOOL	BRIGHT EDP	BRIGHT PRICE
23/64	3/8	9/16	3-1/2	std	M42	<b>B-1211-1/2</b>	10930	23.63
3/8	3/8	9/16	3-1/2	std	M42	<b>B-1212</b>	10932	20.56
25/64	1/2	13/16	4-1/8	std	M42	<b>B-1612-1/2</b>	10934	37.03
13/32	1/2	13/16	4-1/8	std	M42	<b>B-1613</b>	10936	33.57
27/64	1/2	13/16	4-1/8	std	M42	<b>B-1613-1/2</b>	10938	37.03
7/16	1/2	13/16	4-1/8	std	M42	<b>B-1614</b>	10940	33.57
29/64	1/2	13/16	4-1/8	std	M42	<b>B-1614-1/2</b>	10942	37.03
15/32	1/2	13/16	4-1/8	std	M42	<b>B-1615</b>	10944	33.57
31/64	1/2	13/16	4-1/8	std	M42	<b>B-1615-1/2</b>	10946	37.03
1/2	1/2	13/16	4-1/8	std	M42	<b>B-1616</b>	10948	32.19
17/32	5/8	1-1/8	5	std	M42	<b>B-2017</b>	10950	53.36
9/16	5/8	1-1/8	5	std	M42	<b>B-2018</b>	10952	48.27
19/32	5/8	1-1/8	5	std	M42	<b>B-2019</b>	10954	53.36
5/8	5/8	1-1/8	5	std	M42	<b>B-2020</b>	10956	48.27
21/32	3/4	1-5/16	5	std	M42	<b>B-2421</b>	10958	67.16
11/16	3/4	1-5/16	5	std	M42	<b>B-2422</b>	10960	66.68
23/32	3/4	1-5/16	5	std	M42	<b>B-2423</b>	10962	71.10
3/4	3/4	1-5/16	5	std	M42	<b>B-2424</b>	10964	61.51
25/32	7/8	1-9/16	5-1/2	std	M42	<b>B-2825</b>	10966	91.19
13/16	7/8	1-9/16	5-1/2	std	M42	<b>B-2826</b>	10968	83.69
7/8	7/8	1-9/16	5-1/2	std	M42	<b>B-2828</b>	10972	83.69
15/16	1	1-5/8	5-7/8	std	M42	<b>B-3230</b>	CALL	
1	1	1-5/8	5-7/8	std	M42	<b>B-3232</b>	10980	105.08

If shank and mill diameters are the same, tolerance is +.0000/-.0025



# GENERAL PURPOSE COBALT & HSS END MILLS

## 2 FLUTE • DE CC LEFT HAND SPIRAL, LEFT HAND CUT END MILL



HSSCo M42	2	30°	BRIGHT	+0.0000 -0.0015	Square				HRC <48	<table border="1"><tr><td>P</td><td>K</td></tr><tr><td>M</td><td>S</td></tr><tr><td></td><td>N</td></tr></table>	P	K	M	S		N
P	K															
M	S															
	N															

### SERIES: XB

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DIA	SHK	LOC	OAL	LENGTH	MAT	TOOL	BRIGHT EDP	BRIGHT PRICE
1/8	3/8	3/8	3-1/16	std	M42	<b>XB-1204</b>	12235	33.77
3/16	3/8	7/16	3-1/4	std	M42	<b>XB-1206</b>	12750	33.77
1/4	3/8	1/2	3-3/8	std	M42	<b>XB-1208</b>	12752	33.77
5/16	3/8	9/16	3-1/2	std	M42	<b>XB-1210</b>	12754	35.40
3/8	3/8	9/16	3-1/2	std	M42	<b>XB-1212</b>	12756	34.75
7/16	1/2	13/16	4-1/8	std	M42	<b>XB-1614</b>	12758	48.14
1/2	1/2	13/16	4-1/8	std	M42	<b>XB-1616</b>	12760	46.36

Tolerance +.0000/-.0015. If shank and mill diameters are the same, tolerance is +.0000/-.0025

## 2 FLUTE • DOUBLE END CENTER CUTTING METRIC/INCH END MILL



HSSCo M42	2	30°	BRIGHT	+0.0000 -0.0015	Square				HRC <48	<table border="1"><tr><td>P</td><td>K</td></tr><tr><td>M</td><td>S</td></tr><tr><td></td><td>N</td></tr></table>	P	K	M	S		N
P	K															
M	S															
	N															

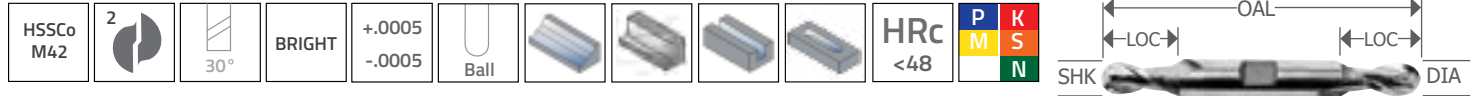
### SERIES: B- \_M\_

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DIA	SHK	LOC	OAL	LENGTH	MAT	TOOL	BRIGHT EDP	BRIGHT PRICE
3mm	3/8	3/8	3-1/16	std	M42	<b>B-12M3</b>	12922	22.88
4mm	3/8	7/16	3-1/8	std	M42	<b>B-12M4</b>	12924	22.88
5mm	3/8	1/2	3-1/4	std	M42	<b>B-12M5</b>	12926	22.88
6mm	3/8	1/2	3-3/8	std	M42	<b>B-12M6</b>	12928	23.63
7mm	3/8	9/16	3-3/8	std	M42	<b>B-12M7</b>	12930	23.63
8mm	3/8	9/16	3-1/2	std	M42	<b>B-12M8</b>	12932	23.63
9mm	3/8	9/16	3-1/2	std	M42	<b>B-12M9</b>	12934	23.63
10mm	1/2	13/16	4-1/8	std	M42	<b>B-16M10</b>	12936	37.03
11mm	1/2	13/16	4-1/8	std	M42	<b>B-16M11</b>	12938	37.77
12mm	1/2	13/16	4-1/8	std	M42	<b>B-16M12</b>	12940	37.03
13mm	5/8	1-1/8	5	std	M42	<b>B-20M13</b>	12942	53.36
14mm	5/8	1-1/8	5	std	M42	<b>B-20M14</b>	12944	53.36
15mm	5/8	1-1/8	5	std	M42	<b>B-20M15</b>	12946	53.36
16mm	3/4	1-5/16	5	std	M42	<b>B-24M16</b>	12948	69.67
18mm	3/4	1-5/16	5	std	M42	<b>B-24M18</b>	12950	69.67
20mm	7/8	1-9/16	5-1/2	std	M42	<b>B-28M20</b>	12952	91.19
22mm	7/8	1-9/16	5-1/2	std	M42	<b>B-28M22</b>	12954	91.19

# GENERAL PURPOSE COBALT & HSS END MILLS

## 2 FLUTE • DOUBLE END BALL NOSE CENTER CUTTING END MILLS



SERIES: B-\_\_-B

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DIA	SHK	LOC	OAL	LENGTH	MAT	TOOL	BRIGHT EDP	BRIGHT PRICE
1/32	3/16	3/64	2	stub	M42	BS-601-B	11114	26.48
1/32	3/16	3/32	2-1/4	std	M42	B-601-B	10982	27.00
3/64	3/16	1/16	2	stub	M42	BS-601-1/2-B	11116	26.48
3/64	3/16	9/64	2-1/4	std	M42	B-601-1/2-B	10984	27.00
1/16	3/16	3/32	2	stub	M42	BS-602-B	11118	24.22
1/16	3/16	3/16	2-1/4	std	M42	B-602-B	10986	25.05
1/16	3/16	7/32	2-1/2	long	M42	B-602-LB	11058	33.42
5/64	3/16	1/8	2	stub	M42	BS-602-1/2-B	11120	24.22
5/64	3/16	15/64	2-1/4	std	M42	B-602-1/2-B	10988	25.05
3/32	3/16	9/64	2	stub	M42	BS-603-B	11122	24.22
3/32	3/16	9/32	2-1/4	std	M42	B-603-B	10990	25.05
3/32	3/16	1/2	2-5/8	long	M42	B-603-LB	11060	33.42
7/64	3/16	5/32	2	stub	M42	BS-603-1/2-B	11124	24.22
7/64	3/16	21/64	2-1/4	std	M42	B-603-1/2-B	10992	25.05
1/8	3/16	3/16	2	stub	M42	BS-604-B	11126	24.22
1/8	3/16	3/8	2-1/4	std	M42	B-604-B	10994	25.05
1/8	3/16	3/4	3-1/8	long	M42	B-604-LB	11062	33.42
9/64	3/16	7/32	2	stub	M42	BS-604-1/2-B	11128	24.22
9/64	3/16	13/32	2-1/4	std	M42	B-604-1/2-B	10996	25.05
5/32	3/16	15/64	2	stub	M42	BS-605-B	11130	24.22
5/32	3/16	7/16	2-1/4	std	M42	B-605-B	10998	25.05
5/32	3/16	7/8	3-1/4	long	M42	B-605-LB	11064	33.42
11/64	3/16	1/4	2	stub	M42	BS-605-1/2-B	11132	24.69
11/64	3/16	1/2	2-1/4	std	M42	B-605-1/2-B	11000	25.05
3/16	3/16	9/32	2	stub	M42	BS-606-B	11134	24.22
3/16	3/16	1/2	2-1/4	std	M42	B-606-B	11002	25.05
3/16	3/16	1	3-3/8	long	M42	B-606-LB	11066	33.42

If shank and mill diameters are the same, tolerance is +.0000/- .0025

DIA	SHK	LOC	OAL	LENGTH	MAT	TOOL	BRIGHT EDP	BRIGHT PRICE
3/32	3/8	5/16	3-1/16	std	M42	B-1203-B	11004	33.91
1/8	3/8	3/8	3-1/16	std	M42	B-1204-B	11006	31.22
5/32	3/8	7/16	3-1/8	std	M42	B-1205-B	11008	31.22
3/16	3/8	7/16	3-1/4	std	M42	B-1206-B	11010	31.22
7/32	3/8	1/2	3-1/4	std	M42	B-1207-B	11012	32.19
1/4	3/8	1/2	3-3/8	std	M42	B-1208-B	11014	32.19
9/32	3/8	9/16	3-3/8	std	M42	B-1209-B	11016	37.66
5/16	3/8	9/16	3-1/2	std	M42	B-1210-B	11018	36.00
11/32	3/8	9/16	3-1/2	std	M42	B-1211-B	11020	37.66
3/8	3/8	9/16	3-1/2	std	M42	B-1212-B	11022	35.27
13/32	1/2	13/16	4-1/8	std	M42	B-1613-B	11024	54.25
7/16	1/2	13/16	4-1/8	std	M42	B-1614-B	11026	54.25
15/32	1/2	13/16	4-1/8	std	M42	B-1615-B	11028	54.25
1/2	1/2	13/16	4-1/8	std	M42	B-1616-B	11030	53.25
9/16	5/8	1-1/8	5	std	M42	B-2018-B	11032	74.89
5/8	5/8	1-1/8	5	std	M42	B-2020-B	11034	69.10
11/16	3/4	1-5/16	5	std	M42	B-2422-B	11036	94.90
3/4	3/4	1-5/16	5	std	M42	B-2424-B	11038	90.25

If shank and mill diameters are the same, tolerance is +.0000/- .0025

# GENERAL PURPOSE COBALT & HSS END MILLS

## 3 FLUTE • DOUBLE END CENTER CUTTING END MILL



HSSCo M42	3	30°	BRIGHT	+0.0005 -0.0015	Square		HRC <48	<table border="1"><tr><td>P</td><td>K</td></tr><tr><td>M</td><td>S</td></tr><tr><td></td><td>N</td></tr></table>	P	K	M	S		N
P	K													
M	S													
	N													

### SERIES: F

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DIA	SHK	LOC	OAL	LENGTH	MAT	TOOL	BRIGHT EDP	BRIGHT PRICE
3/32	3/16	5/32	2	stub	M42	FS-603	12564	18.22
3/32	3/16	5/16	2-1/4	std	M42	F-603	12428	21.93
1/8	3/16	3/16	2	stub	M42	FS-604	12566	18.59
1/8	3/16	3/8	2-1/4	std	M42	F-604	12430	21.93
3/16	3/16	1/2	2-1/4	std	M42	F-606	12434	21.93
5/64	3/8	5/16	3-1/16	std	M42	F-1202-1/2	12436	27.83
3/32	3/8	5/16	3-1/16	std	M42	F-1203	12438	27.83
7/64	3/8	3/8	3-1/16	std	M42	F-1203-1/2	12440	27.83
1/8	3/8	3/8	3-1/16	std	M42	F-1204	12442	24.60
9/64	3/8	7/16	3-1/8	std	M42	F-1204-1/2	12444	27.83
5/32	3/8	7/16	3-1/8	std	M42	F-1205	12446	27.83
11/64	3/8	1/2	3-1/8	std	M42	F-1205-1/2	12448	27.83
3/16	3/8	1/2	3-1/4	std	M42	F-1206	12450	24.60
13/64	3/8	9/16	3-1/4	std	M42	F-1206-1/2	12452	27.83
7/32	3/8	9/16	3-1/4	std	M42	F-1207	12454	27.83
15/64	3/8	5/8	3-3/8	std	M42	F-1207-1/2	12456	27.83
1/4	3/8	5/8	3-3/8	std	M42	F-1208	12458	25.35
17/64	3/8	11/16	3-3/8	std	M42	F-1208-1/2	12460	28.58
9/32	3/8	11/16	3-3/8	std	M42	F-1209	12462	28.58
19/64	3/8	3/4	3-1/2	std	M42	F-1209-1/2	12464	29.12
5/16	3/8	3/4	3-1/2	std	M42	F-1210	12466	25.35
21/64	3/8	3/4	3-1/2	std	M42	F-1210-1/2	12468	29.12
11/32	3/8	3/4	3-1/2	std	M42	F-1211	12470	28.58
23/64	3/8	3/4	3-1/2	std	M42	F-1211-1/2	12472	29.12
3/8	3/8	3/4	3-1/2	std	M42	F-1212	12474	25.35
25/64	1/2	1	4-1/8	std	M42	F-1612-1/2	12476	45.32
13/32	1/2	1	4-1/8	std	M42	F-1613	12478	44.45
27/64	1/2	1	4-1/8	std	M42	F-1613-1/2	12480	45.32
7/16	1/2	1	4-1/8	std	M42	F-1614	12482	40.09
29/64	1/2	1	4-1/8	std	M42	F-1614-1/2	12484	45.32
15/32	1/2	1	4-1/8	std	M42	F-1615	12486	44.45
1/2	1/2	1	4-1/8	std	M42	F-1616	12490	40.09
17/32	5/8	1-3/8	5	std	M42	F-2017	12492	68.15
9/16	5/8	1-3/8	5	std	M42	F-2018	12494	60.92
5/8	5/8	1-3/8	5	std	M42	F-2020	12498	58.35
3/4	3/4	1-5/8	5-5/8	std	M42	F-2424	12506	74.50

If shank and mill diameters are the same, tolerance is +.0000/-0.0025



## 3 FLUTE • DOUBLE END CENTER CUTTING END MILL

HSSCo M42	3	30°	BRIGHT	+0.0005 -0.0015	Ball		HRC <48	<table border="1"><tr><td>P</td><td>K</td></tr><tr><td>M</td><td>S</td></tr><tr><td></td><td>N</td></tr></table>	P	K	M	S		N
P	K													
M	S													
	N													

### SERIES: F-\_\_-B

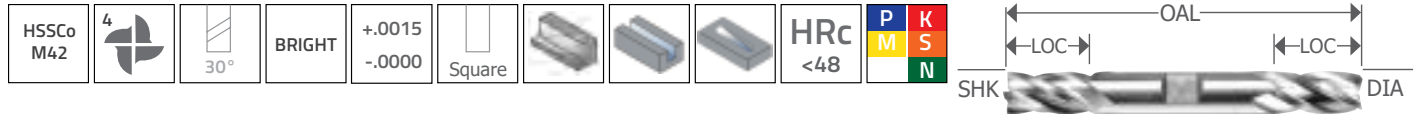
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DIA	SHK	LOC	OAL	LENGTH	MAT	TOOL	BRIGHT EDP	BRIGHT PRICE
3/32	3/8	5/16	3-1/16	std	M42	F-1203-B	12524	36.25
1/8	3/8	3/8	3-1/16	std	M42	F-1204-B	12526	33.19
3/16	3/8	1/2	3-1/4	std	M42	F-1206-B	12530	33.19
1/4	3/8	5/8	3-3/8	std	M42	F-1208-B	12534	34.12
5/16	3/8	3/4	3-1/2	std	M42	F-1210-B	12538	36.47
3/8	3/8	3/4	3-1/2	std	M42	F-1212-B	12542	35.79
1/2	1/2	1	4-1/8	std	M42	F-1616-B	12546	59.07

If shank and mill diameters are the same, tolerance is +.0000/-0.0025

# GENERAL PURPOSE COBALT & HSS END MILLS

## 4 FLUTE • DOUBLE END CENTER CUTTING END MILL



### SERIES: D

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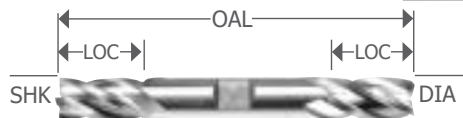
DIA	SHK	LOC	OAL	LENGTH	MAT	TOOL	BRIGHT EDP	BRIGHT PRICE
1/16	3/16	3/32	2	stub	M42	DS-602	11992	14.86
1/16	3/16	3/16	2-1/4	std	M42	D-602	11800	15.90
1/16	3/16	7/32	2-1/2	long	M42	D-602-L	11902	22.05
5/64	3/16	1/8	2	stub	M42	DS-602-1/2	11994	14.86
5/64	3/16	15/64	2-1/4	std	M42	D-602-1/2	11802	15.90
3/32	3/16	9/64	2	stub	M42	DS-603	11996	14.86
3/32	3/16	9/32	2-1/4	std	M42	D-603	11804	15.90
3/32	3/16	1/2	2-5/8	long	M42	D-603-L	11904	22.05
7/64	3/16	5/32	2	stub	M42	DS-603-1/2	11998	14.86
7/64	3/16	21/64	2-1/4	std	M42	D-603-1/2	11806	15.90
1/8	3/16	3/16	2	stub	M42	DS-604	12000	14.86
1/8	3/16	3/8	2-1/4	std	M42	D-604	11808	15.90
1/8	3/16	3/4	3-1/8	long	M42	D-604-L	11906	22.05
9/64	3/16	3/16	2	stub	M42	DS-604-1/2	12002	14.86
9/64	3/16	27/64	2-1/4	std	M42	D-604-1/2	11810	15.90
5/32	3/16	15/64	2	stub	M42	DS-605	12004	14.86
5/32	3/16	7/16	2-1/4	std	M42	D-605	11812	15.90
5/32	3/16	7/8	3-1/4	long	M42	D-605-L	11908	22.05
11/64	3/16	1/4	2	stub	M42	DS-605-1/2	12006	15.13
11/64	3/16	33/64	2-1/4	std	M42	D-605-1/2	11814	15.90
3/16	3/16	9/32	2	stub	M42	DS-606	12008	14.86
3/16	3/16	1/2	2-1/4	std	M42	D-606	11816	15.90
3/16	3/16	1	3-3/8	long	M42	D-606-L	11910	22.05

If shank and mill diameters are the same, tolerance is +.0000/- .0025

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# GENERAL PURPOSE COBALT & HSS END MILLS

## 4 FLUTE • DOUBLE END CENTER CUTTING END MILL



HSSCo  
M42



BRIGHT

+0.0000  
-0.0015

Square



HRC  
<48



### SERIES: DD

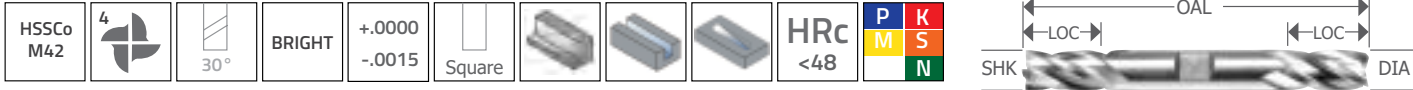
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DIA	SHK	LOC	OAL	LENGTH	MAT	TOOL	BRIGHT EDP	BRIGHT PRICE
7/64	3/8	3/8	3-1/16	std	M42	DD-1203-1/2	11818	22.44
1/8	3/8	3/16	2-3/4	stub	M42	DDS-1204	12010	18.60
1/8	3/8	3/8	3-1/16	std	M42	DD-1204	11820	20.79
1/8	3/8	1/2	3-1/4	med	M42	DD-1204-M	11912	23.55
1/8	3/8	5/8	3-9/16	long	M42	DD-1204-L	11914	25.14
9/64	3/8	7/16	3-1/8	std	M42	DD-1204-1/2	11822	22.44
5/32	3/8	15/64	2-3/4	stub	M42	DDS-1205	12012	18.60
5/32	3/8	7/16	3-1/8	std	M42	DD-1205	11824	22.22
11/64	3/8	1/2	3-1/8	std	M42	DD-1205-1/2	11826	22.44
3/16	3/8	9/32	2-3/4	stub	M42	DDS-1206	12014	18.60
3/16	3/8	1/2	3-1/4	std	M42	DD-1206	11828	20.79
3/16	3/8	7/8	4-1/8	long	M42	DD-1206-L	11916	25.09
13/64	3/8	9/16	3-1/4	std	M42	DD-1206-1/2	11830	22.44
7/32	3/8	21/64	2-3/4	stub	M42	DDS-1207	12016	19.51
7/32	3/8	9/16	3-1/4	std	M42	DD-1207	11832	22.22
15/64	3/8	5/8	3-3/8	std	M42	DD-1207-1/2	11834	22.44
1/4	3/8	3/8	2-3/4	stub	M42	DDS-1208	12018	19.51
1/4	3/8	5/8	3-3/8	std	M42	DD-1208	11836	21.38
17/64	3/8	11/16	3-3/8	std	M42	DD-1208-1/2	11838	22.44
9/32	3/8	11/16	3-3/8	std	M42	DD-1209	11840	22.22
19/64	3/8	3/4	3-1/2	std	M42	DD-1209-1/2	11842	22.44
5/16	3/8	3/4	3-1/2	std	M42	DD-1210	11844	21.38
21/64	3/8	3/4	3-1/2	std	M42	DD-1210-1/2	11846	22.44
11/32	3/8	3/4	3-1/2	std	M42	DD-1211	11848	22.22
23/64	3/8	3/4	3-1/2	std	M42	DD-1211-1/2	11850	22.44
3/8	3/8	3/4	3-1/2	std	M42	DD-1212	11852	21.38
25/64	1/2	1	4-1/8	std	M42	DD-1612-1/2	11854	34.22
13/32	1/2	1	4-1/8	std	M42	DD-1613	11856	34.22
27/64	1/2	1	4-1/8	std	M42	DD-1613-1/2	11858	34.22
7/16	1/2	1	4-1/8	std	M42	DD-1614	11860	34.22
29/64	1/2	1	4-1/8	std	M42	DD-1614-1/2	11862	34.22
15/32	1/2	1	4-1/8	std	M42	DD-1615	11864	34.22
31/64	1/2	1	4-1/8	std	M42	DD-1615-1/2	11866	34.22
1/2	1/2	1	4-1/8	std	M42	DD-1616	11868	34.16
17/32	5/8	1-3/8	5	std	M42	DD-2017	11870	49.17
9/16	5/8	1-3/8	5	std	M42	DD-2018	11872	44.39
19/32	5/8	1-3/8	5	std	M42	DD-2019	11874	49.64
5/8	5/8	1-3/8	5	std	M42	DD-2020	11876	46.56
3/4	3/4	1-5/8	5-5/8	std	M42	DD-2424	11944	59.28
7/8	7/8	1-7/8	6-1/8	std	M42	DD-2828	11946	80.77
1	1	1-7/8	6-3/8	std	M42	DD-3232	11948	102.89

If shank and mill diameters are the same, tolerance is +.0000/-0.0025

# GENERAL PURPOSE COBALT & HSS END MILLS

## 4 FLUTE • DOUBLE END CENTER CUTTING METRIC/INCH END MILL



SERIES: DD- \_M\_

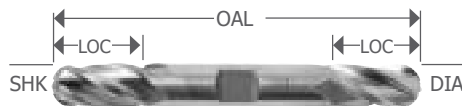
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DIA	SHK	LOC	OAL	LENGTH	MAT	TOOL	BRIGHT EDP	BRIGHT PRICE
3mm	3/8	3/8	3-1/16	std	M42	DD-12M3	13026	23.63
4mm	3/8	7/16	3-1/8	std	M42	DD-12M4	13028	23.63
5mm	3/8	9/16	3-1/4	std	M42	DD-12M5	13030	23.63
6mm	3/8	5/8	3-3/8	std	M42	DD-12M6	13032	24.09
7mm	3/8	11/16	3-3/8	std	M42	DD-12M7	13034	24.54
8mm	3/8	3/4	3-1/2	std	M42	DD-12M8	13036	24.09
9mm	3/8	3/4	3-1/2	std	M42	DD-12M9	13038	24.09
10mm	1/2	1	4-1/8	std	M42	DD-16M10	13040	37.12
11mm	1/2	1	4-1/8	std	M42	DD-16M11	13042	37.12
12mm	1/2	1	4-1/8	std	M42	DD-16M12	13044	37.12
13mm	5/8	1-3/8	5	std	M42	DD-20M13	13046	55.41
14mm	5/8	1-3/8	5	std	M42	DD-20M14	13048	55.41
15mm	5/8	1-3/8	5	std	M42	DD-20M15	13050	55.41
16mm	3/4	1-5/8	5-5/8	std	M42	DD-24M16	13052	69.77
18mm	3/4	1-5/8	5-5/8	std	M42	DD-24M18	13054	69.77
20mm	7/8	1-7/8	6-1/8	std	M42	DD-28M20	13056	91.19
22mm	7/8	1-7/8	6-1/8	std	M42	DD-28M22	13058	91.19



# GENERAL PURPOSE COBALT & HSS END MILLS

## 4 FLUTE • DOUBLE END BALL NOSE END MILL



HSSCo M42			BRIGHT	+0.0005 -0.0005						HRC <48	
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### SERIES: DD-\_\_-B

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DIA	SHK	LOC	OAL	LENGTH	MAT	TOOL	BRIGHT EDP	BRIGHT PRICE
1/8	3/8	3/8	3-1/8	std	M42	DD-1204-B	11950	43.29
5/32	3/8	7/16	3-1/8	std	M42	DD-1205-B	11952	43.29
3/16	3/8	1/2	3-1/4	std	M42	DD-1206-B	11954	43.29
7/32	3/8	9/16	3-1/4	std	M42	DD-1207-B	11956	44.56
1/4	3/8	5/8	3-3/8	std	M42	DD-1208-B	11958	44.56
9/32	3/8	11/16	3-3/8	std	M42	DD-1209-B	11960	44.56
5/16	3/8	3/4	3-1/2	std	M42	DD-1210-B	11962	44.56
11/32	3/8	3/4	3-1/2	std	M42	DD-1211-B	11964	44.56
3/8	3/8	3/4	3-1/2	std	M42	DD-1212-B	11966	44.56
1/2	1/2	1	4-1/8	std	M42	DD-1616-B	11968	63.39
5/8	5/8	1-3/8	5	std	M42	DD-2020-B	11970	86.84
3/4	3/4	1-5/8	5-5/8	std	M42	DD-2424-B	11972	116.88
1	1	1-7/8	6-3/8	std	M42	DD-3232-B	11976	175.51

If shank and mill diameter are the same, tolerance is +.000/-0.0025

## 4 FLUTE • DOUBLE END CENTER CUTTING LEFT HAND SPIRAL/CUT END MILL



HSSCo M42			BRIGHT	+0.0020 -0.0000					HRC <48	
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### SERIES: XD

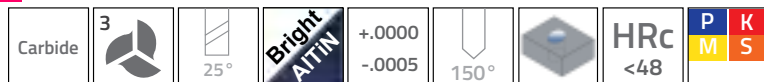
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DIA	SHK	LOC	OAL	LENGTH	MAT	TOOL	BRIGHT EDP	BRIGHT PRICE
1/8	3/8	7/16	3-1/16	std	M42	XD-1204	12543	33.77
3/16	3/8	1/2	3-1/4	std	M42	XD-1206	12772	33.77
1/4	3/8	5/8	3-3/8	std	M42	XD-1208	12774	33.77
5/16	3/8	3/4	3-1/2	std	M42	XD-1210	12776	35.40
3/8	3/8	3/4	3-1/2	std	M42	XD-1212	12778	34.75
7/16	1/2	1	4-1/8	std	M42	XD-1614	12780	48.14
1/2	1/2	1	4-1/8	std	M42	XD-1616	12782	46.36
9/16	5/8	1-3/8	5	std	M42	XD-2018	12784	54.60
5/8	5/8	1-3/8	5	std	M42	XD-2020	12786	59.05
3/4	3/4	1-5/8	5-5/8	std	M42	XD-2424	12790	86.36

Tolerance +.002/-0.000. If shank and mill diameters are the same, tolerance is +.0000/-0.0025

# GENERAL PURPOSE CARBIDE DRILLS

## 3 FLUTE • GENERAL PURPOSE CARBIDE DRILL

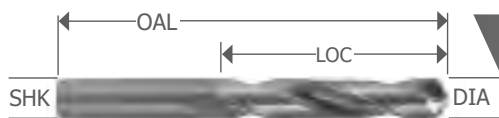


### SERIES: LDR

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DIAMETER		SHK	LOC	OAL	TOOL	BRIGHT EDP	BRIGHT PRICE	ALTIN EDP	ALTIN PRICE
7/64	0.1094	1/8	3/4	2-1/4	LDR-7/64	10341	13.10	50341	16.27
# 33	0.1130	1/8	3/4	2-1/4	LDR-33	10343	13.61	50343	16.89
3mm	0.1181	1/8	20mm	58mm	LDR-3MM	10345	14.34	50345	17.61
1/8	0.1250	1/8	3/4	2-1/4	LDR-1/8	10347	14.03	50347	17.41
# 29	0.1360	4mm	3/4	2-1/4	LDR-29	10349	15.55	50349	19.06
3.5mm	0.1378	4mm	22mm	64mm	LDR-3.5MM	10351	16.91	50351	20.39
9/64	0.1406	4mm	7/8	2-1/2	LDR-9/64	10353	15.52	50353	18.95
5/32	0.1562	4mm	7/8	2-1/2	LDR-5/32	10355	17.36	50355	20.81
4mm	0.1575	4mm	24mm	64mm	LDR-4MM	10357	19.09	50357	22.56
# 21	0.1590	3/16	1	2-1/2	LDR-21	10359	18.14	50359	21.63
11/64	0.1719	3/16	1	2-3/4	LDR-11/64	10361	20.54	50361	24.00
4.5mm	0.1772	3/16	28mm	70mm	LDR-4.5MM	10363	22.54	50363	25.96
3/16	0.1875	3/16	1-1/8	2-3/4	LDR-3/16	10365	21.17	50365	24.62
5mm	0.1969	6mm	30mm	76mm	LDR-5MM	10367	24.53	50367	30.49
# 7	0.2010	6mm	1-1/4	76mm	LDR-7	10369	24.04	50369	29.77
13/64	0.2031	6mm	1-1/4	76mm	LDR-13/64	10371	24.35	50371	30.18
5.5mm	0.2165	6mm	34mm	76mm	LDR-5.5MM	10373	27.86	50373	34.20
7/32	0.2188	6mm	1-1/4	76mm	LDR-7/32	10375	27.06	50375	33.58
15/64	0.2344	6mm	1-3/8	76mm	LDR-15/64	10377	30.62	50377	37.60
6mm	0.2362	6mm	38mm	76mm	LDR-6MM	10379	31.45	50379	38.42
1/4	0.2500	1/4	1-1/2	3	LDR-1/4	10381	32.26	50381	39.24
6.5mm	0.2559	8mm	38mm	76mm	LDR-6.5MM	10383	35.47	50383	42.74
F	0.2570	8mm	1-1/2	76mm	LDR-F	10385	36.14	50385	44.80
17/64	0.2656	8mm	1-1/2	76mm	LDR-17/64	10387	36.72	50387	45.53
I	0.2720	8mm	1-1/2	76mm	LDR-I	10389	39.81	50389	49.34
7mm	0.2756	8mm	42mm	100mm	LDR-7MM	10391	41.52	50391	51.50
9/32	0.2812	8mm	1-3/4	100mm	LDR-9/32	10393	38.16	50393	47.38
7.5mm	0.2953	8mm	45mm	100mm	LDR-7.5MM	10395	45.56	50395	56.14
19/64	0.2969	8mm	1-3/4	100mm	LDR-19/64	10397	42.98	50397	53.46
5/16	0.3125	8mm	1-7/8	100mm	LDR-5/16	10399	45.09	50399	55.62
8mm	0.3150	8mm	48mm	100mm	LDR-8MM	10401	51.56	50401	60.56
21/64	0.3281	3/8	2	4	LDR-21/64	10403	49.20	50403	59.74
Q	0.3320	3/8	2	4	LDR-Q	10405	53.61	50405	64.17
8.5mm	0.3346	3/8	52mm	101mm	LDR-8.5MM	10407	56.52	50407	67.16
11/32	0.3438	3/8	2	4	LDR-11/32	10409	53.78	50409	64.27
9mm	0.3543	3/8	54mm	101mm	LDR-9MM	10411	65.36	50411	75.81
23/64	0.3594	3/8	2-1/4	4-1/4	LDR-23/64	10413	60.17	50413	74.57
U	0.3680	3/8	2-1/4	4-1/4	LDR-U	10415	64.74	50415	80.24
9.5mm	0.3740	3/8	58mm	108mm	LDR-9.5MM	10417	73.59	50417	88.79
3/8	0.3750	3/8	2-1/4	4-1/4	LDR-3/8	10419	63.81	50419	79.31
25/64	0.3906	10mm	2-3/8	4-1/2	LDR-25/64	10421	74.72	50421	92.70
10mm	0.3937	10mm	60mm	114mm	LDR-10MM	10423	85.98	50423	103.82
13/32	0.4062	7/16	2-3/8	4-1/2	LDR-13/32	10425	84.23	50425	104.48
10.5mm	0.4134	7/16	64mm	114mm	LDR-10.5MM	10427	95.11	50427	116.86
27/64	0.4219	7/16	2-1/2	4-1/2	LDR-27/64	10429	91.60	50429	111.82
11mm	0.4331	7/16	68mm	114mm	LDR-11MM	10431	109.74	50431	129.68
7/16	0.4375	7/16	2-1/2	4-1/2	LDR-7/16	10433	91.32	50433	111.51
11.5mm	0.4528	1/2	70mm	127mm	LDR-11.5MM	10435	119.26	50435	138.60
29/64	0.4531	1/2	2-3/4	5	LDR-29/64	10437	111.13	50437	131.25
15/32	0.4688	1/2	2-3/4	5	LDR-15/32	10439	115.76	50439	135.98
12mm	0.4724	1/2	72mm	127mm	LDR-12MM	10441	123.38	50441	143.74
31/64	0.4844	1/2	2-3/4	5	LDR-31/64	10443	119.08	50443	139.23
1/2	0.5000	1/2	2-3/4	5	LDR-1/2	10445	119.08	50445	139.23
9/16	0.5625	9/16	3-1/4	6	LDR-9/16	10447	194.16	50447	221.34
5/8	0.6250	5/8	3-1/2	6	LDR-5/8	10449	223.89	50449	255.26
3/4	0.7500	3/4	3-7/8	6	LDR-3/4	10451	303.96	50451	346.50

# GENERAL PURPOSE CARBIDE DRILLS



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DIAMETER		LOC	OAL	TOOL	BRIGHT EDP	BRIGHT PRICE	ALTiN EDP	ALTiN PRICE
1mm	0.0394	16mm	38mm	HDR-1MM	11197	11.48	51197	13.54
# 60	0.0400	3/4	1-1/2	HDR-60	14415	11.45	54415	13.54
# 58	0.0420	3/4	1-1/2	HDR-58	17114	10.42	57114	13.03
# 57	0.0430	3/4	1-1/2	HDR-57	17113	10.42	57113	13.03
# 56	0.0465	3/4	1-1/2	HDR-56	17112	8.63	57112	10.71
3/64	0.0469	3/4	1-1/2	HDR-3/64	17001	8.30	57001	10.30
# 55	0.0520	3/4	1-1/2	HDR-55	17111	8.63	57111	10.71
# 54	0.0550	3/4	1-1/2	HDR-54	17110	8.63	57110	10.71
1.5mm	0.0591	19mm	38mm	HDR-1.5MM	17393	8.99	57393	11.12
# 53	0.0595	3/4	1-1/2	HDR-53	17109	8.63	57109	10.71
1/16	0.0625	3/4	1-1/2	HDR-1/16	17002	8.40	57002	10.40
# 52	0.0635	3/4	1-1/2	HDR-52	17108	8.40	57108	10.40
# 51	0.0670	3/4	1-1/2	HDR-51	17107	8.40	57107	10.40
# 50	0.0700	7/8	1-3/4	HDR-50	17106	8.69	57106	10.82
# 49	0.0730	7/8	1-3/4	HDR-49	17105	8.69	57105	10.82
# 48	0.0760	7/8	1-3/4	HDR-48	17104	8.92	57104	11.02
5/64	0.0781	7/8	1-3/4	HDR-5/64	17003	8.92	57003	11.02
# 47	0.0785	7/8	1-3/4	HDR-47	17103	8.92	57103	11.02
2mm	0.0787	22mm	44mm	HDR-2MM	17394	9.55	57394	11.84
# 46	0.0810	7/8	1-3/4	HDR-46	17102	9.07	57102	11.23
# 45	0.0820	7/8	1-3/4	HDR-45	17101	9.07	57101	11.23
# 44	0.0860	1	2	HDR-44	17100	9.40	57100	11.64
# 43	0.0890	1	2	HDR-43	17099	9.65	57099	11.95
# 42	0.0935	1	2	HDR-42	17098	9.78	57098	12.15
3/32	0.0938	1	2	HDR-3/32	17004	9.78	57004	12.15
# 41	0.0960	1	2	HDR-41	17097	10.07	57097	12.46
# 40	0.0980	1	2	HDR-40	17096	10.20	57096	12.67
2.5mm	0.0984	25mm	51mm	HDR-2.5MM	17395	10.79	57395	13.39
# 39	0.0995	1-1/4	2-1/4	HDR-39	17095	10.50	57095	12.98
# 38	0.1015	1-1/4	2-1/4	HDR-38	17094	10.50	57094	12.98
# 37	0.1040	1-1/4	2-1/4	HDR-37	17093	10.73	57093	13.29
# 36	0.1065	1-1/4	2-1/4	HDR-36	17092	11.11	57092	13.80
7/64	0.1094	1-1/4	2-1/4	HDR-7/64	17005	11.11	57005	13.80
# 35	0.1100	1-1/4	2-1/4	HDR-35	17091	11.11	57091	13.80
# 34	0.1110	1-1/4	2-1/4	HDR-34	17090	11.11	57090	13.80
# 33	0.1130	1-1/4	2-1/4	HDR-33	17089	11.52	57089	14.32
# 32	0.1160	1-1/4	2-1/4	HDR-32	17088	11.66	57088	14.42
3mm	0.1181	32mm	58mm	HDR-3MM	17396	12.14	57396	15.04
# 31	0.1200	1-1/4	2-1/4	HDR-31	17087	11.56	57087	14.32
1/8	0.1250	1-1/4	2-1/4	HDR-1/8	17006	11.88	57006	14.73
# 30	0.1285	1-1/4	2-1/4	HDR-30	17086	12.44	57086	15.45
# 29	0.1360	1-3/8	2-1/4	HDR-29	17085	13.19	57085	16.38
3.5mm	0.1378	35mm	64mm	HDR-3.5MM	17397	14.33	57397	17.82
# 28	0.1405	1-3/8	2-1/2	HDR-28	17084	13.19	57084	16.38
9/64	0.1406	1-3/8	2-1/2	HDR-9/64	17007	13.14	57007	16.27
# 27	0.1440	1-3/8	2-1/2	HDR-27	17083	13.62	57083	16.89
# 26	0.1470	1-3/8	2-1/2	HDR-26	17082	13.83	57082	17.20
# 25	0.1495	1-3/8	2-1/2	HDR-25	17081	13.83	57081	17.20
# 24	0.1520	1-3/8	2-1/2	HDR-24	17080	14.29	57080	17.82
# 23	0.1540	1-3/8	2-1/2	HDR-23	17079	14.71	57079	18.23
5/32	0.1562	1-3/8	2-1/2	HDR-5/32	17008	14.71	57008	18.23
# 22	0.1570	1-3/8	2-1/2	HDR-22	17078	14.71	57078	18.23
4mm	0.1575	35mm	64mm	HDR-4MM	17398	16.18	57398	19.67
# 21	0.1590	1-3/8	2-1/2	HDR-21	17077	15.37	57077	18.85

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DIAMETER	LOC	OAL	TOOL	BRIGHT EDP	BRIGHT PRICE	ALTIN EDP	ALTIN PRICE	
# 20	0.1610	1-3/8	2-1/2	HDR-20	17076	15.37	57076	18.85
# 19	0.1660	1-5/8	2-3/4	HDR-19	17075	16.05	57075	19.47
# 18	0.1695	1-5/8	2-3/4	HDR-18	17074	16.37	57074	19.88
11/64	0.1719	1-5/8	2-3/4	HDR-11/64	17009	17.41	57009	20.91
# 17	0.1730	1-5/8	2-3/4	HDR-17	17073	17.45	57073	20.91
# 16	0.1770	1-5/8	2-3/4	HDR-16	17072	18.26	57072	21.73
4.5mm	0.1772	41mm	70mm	HDR-4.5MM	17399	19.10	57399	22.58
# 15	0.1800	1-5/8	2-3/4	HDR-15	17071	18.26	57071	21.73
#14	0.1820	1-5/8	2-3/4	HDR-14	17070	18.63	57070	22.14
# 13	0.1850	1-5/8	2-3/4	HDR-13	17069	19.03	57069	22.56
3/16	0.1875	1-5/8	2-3/4	HDR-3/16	17010	17.92	57010	21.42
# 12	0.1890	1-5/8	2-3/4	HDR-12	17068	19.36	57068	24.00
# 11	0.1910	1-5/8	2-3/4	HDR-11	17067	19.36	57067	24.00
# 10	0.1935	1-5/8	2-3/4	HDR-10	17066	19.60	57066	24.31
# 9	0.1960	1-3/4	3	HDR-9	17065	19.85	57065	24.62
5mm	0.1969	44mm	76mm	HDR-5MM	17400	20.78	57400	25.75
# 8	0.1990	1-3/4	3	HDR-8	17064	20.13	57064	24.93
# 7	0.2010	1-3/4	3	HDR-7	17063	20.35	57063	25.24
13/64	0.2031	1-3/4	3	HDR-13/64	17011	20.62	57011	25.54
# 6	0.2040	1-3/4	3	HDR-6	17062	20.93	57062	25.96
# 5	0.2055	1-3/4	3	HDR-5	17061	20.93	57061	25.96
# 4	0.2090	1-3/4	3	HDR-4	17060	21.39	57060	26.57
# 3	0.2130	1-3/4	3	HDR-3	17059	22.65	57059	28.12
5.5mm	0.2165	44mm	76mm	HDR-5.5MM	17401	23.61	57401	29.25
7/32	0.2188	1-3/4	3	HDR-7/32	17012	22.92	57012	28.43
# 2	0.2210	1-3/4	3	HDR-2	17058	23.68	57058	29.36
# 1	0.2280	1-3/4	3	HDR-1	17057	24.58	57057	30.49
A	0.2340	2	3-1/4	HDR-A	17031	26.17	57031	32.44
15/64	0.2344	2	3-1/4	HDR-15/64	17013	25.95	57013	32.14
6mm	0.2362	51mm	83mm	HDR-6MM	17402	26.65	57402	33.06
B	0.2380	2	3-1/4	HDR-B	17032	27.30	57032	33.89
C	0.2420	2	3-1/4	HDR-C	17033	27.48	57033	34.09
D	0.2460	2	3-1/4	HDR-D	17034	27.80	57034	34.50
E	0.2500	2	3-1/4	HDR-E	17035	27.33	57035	33.89
1/4	0.2500	2	3-1/4	HDR-1/4	17014	27.33	57014	33.89
6.5mm	0.2559	51mm	83mm	HDR-6.5MM	17403	29.77	57403	36.90
F	0.2570	2	3-1/4	HDR-F	17036	30.32	57036	37.60
G	0.2610	2-1/8	3-1/2	HDR-G	17037	32.15	57037	39.86
17/64	0.2656	2-1/8	3-1/2	HDR-17/64	17015	30.81	57015	38.21
H	0.2660	2-1/8	3-1/2	HDR-H	17038	25.44	57038	31.52
I	0.2720	2-1/8	3-1/2	HDR-I	17039	33.41	57039	41.41
7mm	0.2756	54mm	90mm	HDR-7MM	17404	34.83	57404	43.20
J	0.2770	2-1/8	3-1/2	HDR-J	17040	34.28	57040	42.54
K	0.2810	2-1/8	3-1/2	HDR-K	17041	23.51	57041	29.15
9/32	0.2812	2-1/8	3-1/2	HDR-9/32	17016	32.02	57016	39.76
L	0.2900	2-1/8	3-1/2	HDR-L	17042	36.59	57042	45.32
M	0.2950	2-3/8	3-3/4	HDR-M	17043	37.30	57043	46.25
7.5mm	0.2953	60mm	95mm	HDR-7.5MM	17405	38.23	57405	47.40
19/64	0.2969	2-3/8	3-3/4	HDR-19/64	17017	36.07	57017	44.70
N	0.3020	2-3/8	3-3/4	HDR-N	17044	39.67	57044	49.23
5/16	0.3125	2-3/8	3-3/4	HDR-5/16	17018	37.83	57018	46.97
8mm	0.3150	60mm	95mm	HDR-8MM	17406	43.27	57406	53.66
O	0.3160	2-3/8	3-3/4	HDR-O	17045	41.84	57045	51.91
P	0.3230	2-3/8	3-3/4	HDR-P	17046	43.32	57046	53.77
21/64	0.3281	2-1/2	4	HDR-21/64	17019	41.28	57019	51.19
Q	0.3320	2-1/2	4	HDR-Q	17047	44.98	57047	55.41

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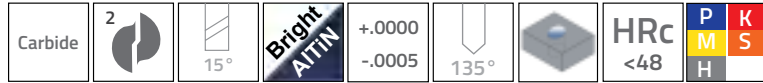
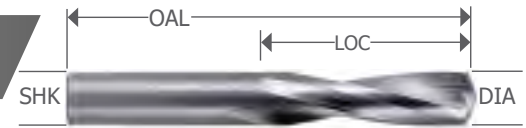
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DIAMETER		LOC	OAL	TOOL	BRIGHT EDP	BRIGHT PRICE	ALTIN EDP	ALTIN PRICE
8.5mm	0.3346	64mm	102mm	HDR-8.5MM	17407	47.42	57407	57.89
R	0.3390	2-1/2	4	HDR-R	17048	46.95	57048	57.37
11/32	0.3438	2-1/2	4	HDR-11/32	17020	45.14	57020	55.62
S	0.3480	2-1/2	4	HDR-S	17049	50.07	57049	60.46
9mm	0.3543	64mm	102mm	HDR-9MM	17408	54.85	57408	65.28
T	0.3580	2-3/4	4-1/4	HDR-T	17050	51.76	57050	64.17
23/64	0.3594	2-3/4	4-1/4	HDR-23/64	17021	50.51	57021	62.62
U	0.3680	2-3/4	4-1/4	HDR-U	17051	54.30	57051	67.36
9.5mm	0.3740	70mm	108mm	HDR-9.5MM	17409	61.76	57409	76.58
3/8	0.3750	2-3/4	4-1/4	HDR-3/8	17022	53.55	57022	66.44
V	0.3770	2-3/4	4-1/4	HDR-V	17052	60.18	57052	74.68
W	0.3860	2-7/8	4-1/2	HDR-W	17053	64.74	57053	80.24
25/64	0.3906	2-7/8	4-1/2	HDR-25/64	17023	62.68	57023	77.76
10mm	0.3937	73mm	114mm	HDR-10MM	17410	72.15	57410	89.48
X	0.3970	2-7/8	4-1/2	HDR-X	17054	70.75	57054	87.76
Y	0.4040	2-7/8	4-1/2	HDR-Y	17055	73.14	57055	90.74
13/32	0.4062	2-7/8	4-1/2	HDR-13/32	17024	70.33	57024	87.24
Z	0.4130	2-7/8	4-1/2	HDR-Z	17056	79.15	57056	98.15
10.5mm	0.4134	73mm	114mm	HDR-10.5MM	17411	79.40	57411	98.46
27/64	0.4219	2-7/8	4-1/2	HDR-27/64	17025	76.48	57025	94.86
11mm	0.4331	73mm	114mm	HDR-11MM	17412	91.58	57412	111.48
7/16	0.4375	2-7/8	4-1/2	HDR-7/16	17026	77.72	57026	96.39
11.5mm	0.4528	76mm	121mm	HDR-11.5MM	17413	101.46	57413	121.74
29/64	0.4531	3	4-3/4	HDR-29/64	17027	94.56	57027	114.87
15/32	0.4688	3	4-3/4	HDR-15/32	17028	98.51	57028	118.76
12mm	0.4724	76mm	121mm	HDR-12MM	17414	104.98	57414	125.24
31/64	0.4844	3	4-3/4	HDR-31/64	17029	101.34	57029	116.97
1/2	0.5000	3	4-3/4	HDR-1/2	17030	101.34	57030	121.59
17/32 (SHK 9/16)	0.5313	3-1/4	6	HDR-17/32	17447	174.28	57447	198.66
9/16	0.5625	3-1/4	6	HDR-9/16	17990	174.28	57990	198.66
19/32 (SHK 5/8)	0.5938	3-1/2	6	HDR-19/32	17448	199.58	57448	227.54
5/8	0.6250	3-1/2	6	HDR-5/8	17991	199.58	57991	227.54
21/32 (SHK 3/4)	0.6563	3-5/8	6	HDR-21/32	17449	272.33	57449	310.48
11/16 (SHK 3/4)	0.6875	3-5/8	6	HDR-11/16	17450	272.33	57450	310.44
23/32 (SHK 3/4)	0.7188	3-7/8	6	HDR-23/32	17451	272.33	57451	310.44
3/4	0.7500	3-7/8	6	HDR-3/4	17992	272.33	57992	310.44

\*Shank diameter is equal to cutting diameter unless specified.

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DIAMETER	LOC	OAL	TOOL	BRIGHT EDP	BRIGHT PRICE	ALTiN EDP	ALTiN PRICE	
# 56	0.0465	1/2	1-1/2	IDR-56	17249	8.96	57249	11.12
3/64	0.0469	1/2	1-1/2	IDR-3/64	17138	8.96	57138	11.12
# 55	0.0520	1/2	1-1/2	IDR-55	17248	8.96	57248	11.12
# 54	0.0550	1/2	1-1/2	IDR-54	17247	9.07	57247	11.23
1.5mm	0.0591	13mm	38mm	IDR-1.5MM	17415	9.24	57415	11.43
# 53	0.0595	1/2	1-1/2	IDR-53	17246	9.07	57246	11.23
1/16	0.0625	5/8	1-5/8	IDR-1/16	17139	9.17	57139	11.43
# 52	0.0635	11/16	1-11/16	IDR-52	17245	9.27	57245	11.54
# 51	0.0670	11/16	1-11/16	IDR-51	17244	9.27	57244	11.54
# 50	0.0700	11/16	1-11/16	IDR-50	17243	9.40	57243	11.64
# 49	0.0730	11/16	1-11/16	IDR-49	17242	9.49	57242	11.74
# 48	0.0760	11/16	1-11/16	IDR-48	17241	9.65	57241	11.95
5/64	0.0781	11/16	1-11/16	IDR-5/64	17140	9.65	57140	11.95
# 47	0.0785	3/4	1-3/4	IDR-47	17240	9.65	57240	11.95
2mm	0.0787	19mm	45mm	IDR-2MM	17416	9.81	57416	12.15
# 46	0.0810	3/4	1-3/4	IDR-46	17239	9.65	57239	11.95
# 45	0.0820	3/4	1-3/4	IDR-45	17238	10.07	57238	12.49
# 44	0.0860	3/4	1-3/4	IDR-44	17237	10.23	57237	12.67
# 43	0.0890	3/4	1-3/4	IDR-43	17236	10.33	57236	12.77
# 42	0.0935	3/4	1-3/4	IDR-42	17235	10.50	57235	12.98
3/32	0.0938	3/4	1-3/4	IDR-3/32	17141	9.73	57141	12.05
# 41	0.0960	13/16	1-13/16	IDR-41	17234	10.66	57234	13.18
# 40	0.0980	13/16	1-13/16	IDR-40	17233	10.96	57233	13.60
2.5mm	0.0984	21mm	46mm	IDR-2.5MM	17417	11.08	57417	13.73
# 39	0.0995	13/16	1-13/16	IDR-39	17232	10.96	57232	13.60
# 38	0.1015	13/16	1-13/16	IDR-38	17231	11.40	57231	14.11
# 37	0.1040	13/16	1-13/16	IDR-37	17230	11.43	57230	14.21
# 36	0.1065	13/16	1-13/16	IDR-36	17229	11.66	57229	14.52
7/64	0.1094	13/16	1-13/16	IDR-7/64	17142	11.63	57142	14.42
# 35	0.1100	7/8	1-7/8	IDR-35	17228	11.86	57228	14.73
# 34	0.1110	7/8	1-7/8	IDR-34	17227	12.18	57227	15.04
# 33	0.1130	7/8	1-7/8	IDR-33	17226	12.23	57226	15.04
# 32	0.1160	7/8	1-7/8	IDR-32	17225	12.29	57225	15.14
3mm	0.1181	22mm	48mm	IDR-3MM	17418	12.48	57418	15.35
# 31	0.1200	7/8	1-7/8	IDR-31	17224	12.39	57224	15.24
1/8	0.1250	7/8	1-7/8	IDR-1/8	17143	11.63	57143	14.42
# 30	0.1285	15/16	1-15/16	IDR-30	17223	13.89	57223	16.69
# 29	0.1360	15/16	1-15/16	IDR-29	17222	14.08	57222	16.89
3.5mm	0.1378	24mm	52mm	IDR-3.5MM	17419	14.72	57419	18.19
# 28	0.1405	15/16	1-15/16	IDR-28	17221	14.78	57221	17.61
9/64	0.1406	15/16	1-15/16	IDR-9/64	17144	13.46	57144	16.27
# 27	0.1440	1	2-1/16	IDR-27	17220	14.95	57220	18.44
# 26	0.1470	1	2-1/16	IDR-26	17219	15.14	57219	18.64
# 25	0.1495	1	2-1/16	IDR-25	17218	15.34	57218	18.85
# 24	0.1520	1	2-1/16	IDR-24	17217	15.88	57217	19.36
# 23	0.1540	1	2-1/16	IDR-23	17216	16.25	57216	19.78
5/32	0.1562	1	2-1/16	IDR-5/32	17145	13.89	57145	17.20
# 22	0.1570	1-1/16	2-1/8	IDR-22	17215	16.37	57215	19.88
4mm	0.1575	27mm	53mm	IDR-4MM	17420	16.62	57420	20.08
# 21	0.1590	1-1/16	2-1/8	IDR-21	17214	16.80	57214	20.29
# 20	0.1610	1-1/16	2-1/8	IDR-20	17213	17.70	57213	21.22
# 19	0.1660	1-1/16	2-1/8	IDR-19	17212	18.92	57212	22.35
18	0.1695	1-1/16	2-1/8	IDR-18	17211	18.92	57211	22.35
11/64	0.1719	1-1/16	2-1/8	IDR-11/64	17146	17.54	57146	21.01

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DIAMETER	LOC	OAL	TOOL	BRIGHT EDP	BRIGHT PRICE	ALTIM EDP	ALTIM PRICE	
# 17	0.1730	1-1/8	2-3/16	IDR-17	17210	19.22	57210	22.66
# 16	0.1770	1-1/8	2-3/16	IDR-16	17209	19.49	57209	22.97
4.5mm	0.1772	29mm	55mm	IDR-4.5MM	17421	19.61	57421	23.07
# 15	0.1800	1-1/8	2-3/16	IDR-15	17208	19.60	57208	23.07
# 14	0.1820	1-1/8	2-3/16	IDR-14	17207	19.69	57207	23.18
# 13	0.1850	1-1/8	2-3/16	IDR-13	17206	20.03	57206	23.48
3/16	0.1875	1-1/8	2-3/16	IDR-3/16	17147	17.54	57147	21.01
# 12	0.1890	1-3/16	2-1/4	IDR-12	17205	20.29	57205	25.13
# 11	0.1910	1-3/16	2-1/4	IDR-11	17204	20.62	57204	23.48
# 10	0.1935	1-3/16	2-1/4	IDR-10	17203	20.62	57203	25.54
# 9	0.1960	1-3/16	2-1/4	IDR-9	17202	21.36	57202	26.47
5mm	0.1969	30mm	57mm	IDR-5MM	17422	21.34	57422	26.47
# 8	0.1990	1-3/16	2-1/4	IDR-8	17201	21.86	57201	27.09
# 7	0.2010	1-3/16	2-1/4	IDR-7	17200	22.25	57200	27.60
13/64	0.2031	1-3/16	2-1/4	IDR-13/64	17148	21.03	57148	26.06
# 6	0.2040	1-1/4	2-3/8	IDR-6	17199	23.36	57199	28.94
# 5	0.2055	1-1/4	2-3/8	IDR-5	17198	23.36	57198	28.94
# 4	0.2090	1-1/4	2-3/8	IDR-4	17197	23.74	57197	29.46
# 3	0.2130	1-1/4	2-3/8	IDR-3	17196	25.45	57196	31.52
5.5mm	0.2165	32mm	60mm	IDR-5.5MM	17423	24.24	57423	30.06
7/32	0.2188	1-1/4	2-3/8	IDR-7/32	17149	21.03	57149	26.06
# 2	0.2210	1-5/16	2-7/16	IDR-2	17195	26.18	57195	32.44
# 1	0.2280	1-5/16	2-7/16	IDR-1	17194	26.75	57194	33.17
A	0.2340	1-5/16	2-7/16	IDR-A	17168	26.87	57168	33.37
15/64	0.2344	1-5/16	2-7/16	IDR-15/64	17150	26.87	57150	33.37
6mm	0.2362	33mm	61mm	IDR-6MM	17424	27.36	57424	33.89
B	0.2380	1-3/8	2-1/2	IDR-B	17169	28.24	57169	35.03
C	0.2420	1-3/8	2-1/2	IDR-C	17170	28.36	57170	35.12
D	0.2460	1-3/8	2-1/2	IDR-D	17171	28.36	57171	35.12
E	0.2500	1-3/8	2-1/2	IDR-E	17172	25.28	57172	31.34
1/4	0.2500	1-3/8	2-1/2	IDR-1/4	17151	25.28	57151	31.31
6.5mm	0.2559	35mm	63mm	IDR-6.5MM	17425	30.57	57425	37.90
F	0.2570	1-7/16	2-5/8	IDR-F	17173	33.29	57173	41.30
G	0.2610	1-7/16	2-5/8	IDR-G	17174	34.96	57174	43.36
17/64	0.2656	1-7/16	2-5/8	IDR-17/64	17152	35.06	57152	43.47
H	0.2660	1-1/2	2-11/16	IDR-H	17175	35.85	57175	44.29
I	0.2720	1-1/2	2-11/16	IDR-I	17176	35.85	57176	44.29
7mm	0.2756	38mm	68mm	IDR-7MM	17426	35.76	57426	44.17
J	0.2770	1-1/2	2-11/16	IDR-J	17177	36.59	57177	45.01
K	0.2810	1-1/2	2-11/16	IDR-K	17178	40.31	57178	48.73
9/32	0.2812	1-1/2	2-11/16	IDR-9/32	17153	36.47	57153	44.91
L	0.2900	1-9/16	2-3/4	IDR-L	17179	41.91	57179	50.37
M	0.2950	1-9/16	2-3/4	IDR-M	17180	42.69	57180	51.09
7.5mm	0.2953	40mm	70mm	IDR-7.5MM	17427	39.24	57427	47.69
19/64	0.2969	1-9/16	2-3/4	IDR-19/64	17154	40.66	57154	49.03
N	0.3020	1-5/8	2-13/16	IDR-N	17181	43.32	57181	51.71
5/16	0.3125	1-5/8	2-13/16	IDR-5/16	17155	36.47	57155	44.91
8mm	0.3150	41mm	71mm	IDR-8MM	17428	44.43	57428	52.84
O	0.3160	1-11/16	2-15/16	IDR-O	17182	44.65	57182	53.04
P	0.3230	1-11/16	2-15/16	IDR-P	17183	45.02	57183	53.46
21/64	0.3281	1-11/16	2-15/16	IDR-21/64	17156	42.82	57156	51.19
Q	0.3320	1-11/16	3	IDR-Q	17184	46.72	57184	53.25
8.5mm	0.3346	24mm	76mm	IDR-8.5MM	17429	48.69	57429	57.10
R	0.3390	1-11/16	3	IDR-R	17185	47.03	57185	55.41
11/32	0.3438	1-11/16	3	IDR-11/32	17157	47.57	57157	56.03
S	0.3480	1-3/4	3-1/16	IDR-S	17186	50.77	57186	61.18
9mm	0.3543	44mm	78mm	IDR-9MM	17430	56.33	57430	66.74
T	0.3580	1-3/4	3-1/16	IDR-T	17187	55.77	57187	66.23

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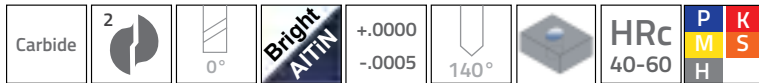


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DIAMETER		LOC	OAL	TOOL	BRIGHT EDP	BRIGHT PRICE	ALTIN EDP	ALTIN PRICE
23/64	0.3594	1-3/4	3-1/16	IDR-23/64	17158	54.61	57158	65.10
U	0.3680	1-13/16	3-1/8	IDR-U	17188	58.36	57188	68.80
9.5mm	0.3740	46mm	79mm	IDR-9.5MM	17431	63.68	57431	74.16
3/8	0.3750	1-13/16	3-1/8	IDR-3/8	17159	59.24	57159	69.73
V	0.3770	1-7/8	3-1/4	IDR-V	17189	59.24	57189	72.00
W	0.3860	1-7/8	3-1/4	IDR-W	17190	60.45	57190	73.23
25/64	0.3906	1-7/8	3-1/4	IDR-25/64	17160	63.73	57160	76.43
10mm	0.3937	48mm	83mm	IDR-10MM	17432	74.09	57432	86.83
X	0.3970	1-15/16	3-5/16	IDR-X	17191	65.73	57191	78.49
Y	0.4040	1-15/16	3-5/16	IDR-Y	17192	72.31	57192	85.06
13/32	0.4062	1-15/16	3-5/16	IDR-13/32	17161	72.36	57161	85.39
Z	0.4130	2	3-3/8	IDR-Z	17193	74.13	57193	86.83
10.5mm	0.4134	51mm	86mm	IDR-10.5MM	17433	81.52	57433	94.57
27/64	0.4219	2	3-3/8	IDR-27/64	17162	80.75	57162	93.83
11mm	0.4331	52mm	87mm	IDR-11MM	17434	94.04	57434	94.04
7/16	0.4375	2-1/16	3-7/16	IDR-7/16	17163	77.61	57163	90.93
11.5mm	0.4528	54mm	90mm	IDR-11.5MM	17435	104.17	57435	118.76
29/64	0.4531	2-1/8	3-9/16	IDR-29/64	17164	98.67	57164	112.46
15/32	0.4688	2-1/8	3-5/8	IDR-15/32	17165	103.65	57165	118.12
12mm	0.4724	54mm	92mm	IDR-12MM	17436	107.78	57436	122.85
31/64	0.4844	2-3/16	3-11/16	IDR-31/64	17166	103.65	57166	118.13
1/2	0.5000	2-1/4	3-3/4	IDR-1/2	17167	96.06	57167	109.52
9/16	0.5625	2-1/2	4	IDR-9/16	17993	147.23	57993	167.90
5/8	0.6250	2-3/4	5	IDR-5/8	17994	184.65	57994	210.52
3/4	0.7500	3	5	IDR-3/4	17995	247.59	57995	282.24

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DIAMETER		LOC	OAL	TOOL	BRIGHT EDP	BRIGHT PRICE	ALTIN EDP	ALTIN PRICE
# 56	0.0465	1/2	1-1/2	JDR-56	17361	8.96	57361	11.11
3/64	0.0469	1/2	1-1/2	JDR-3/64	17250	8.96	57250	11.12
# 55	0.0520	1/2	1-1/2	JDR-55	17360	8.96	57360	11.11
# 54	0.0550	1/2	1-1/2	JDR-54	17359	9.07	57359	11.23
1.5mm	0.0591	13mm	38mm	JDR-1.5MM	17371	9.24	57371	11.43
# 53	0.0595	1/2	1-1/2	JDR-53	17358	9.07	57358	11.23
1/16	0.0625	5/8	1-5/8	JDR-1/16	17251	9.27	57251	11.54
# 52	0.0635	11/16	1-11/16	JDR-52	17357	9.27	57357	12.28
# 51	0.0670	11/16	1-11/16	JDR-51	17356	9.27	57356	11.54
# 50	0.0700	11/16	1-11/16	JDR-50	17355	9.40	57355	11.64
# 49	0.0730	11/16	1-11/16	JDR-49	17354	9.49	57354	11.75
# 48	0.0760	11/16	1-11/16	JDR-48	17353	9.65	57353	11.95
5/64	0.0781	11/16	1-11/16	JDR-5/64	17252	9.73	57252	12.05
# 47	0.0785	3/4	1-3/4	JDR-47	17352	9.65	57352	11.97
2mm	0.0787	19mm	45mm	JDR-2MM	17372	9.81	57372	12.15

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DIAMETER	LOC	OAL	TOOL	BRIGHT EDP	BRIGHT PRICE	ALTIN EDP	ALTIN PRICE	
# 46	0.0810	3/4	1-3/4	JDR-46	17351	9.65	57351	11.95
# 45	0.0820	3/4	1-3/4	JDR-45	17350	10.07	57350	12.46
# 44	0.0860	3/4	1-3/4	JDR-44	17349	10.23	57349	12.67
# 43	0.0890	3/4	1-3/4	JDR-43	17348	10.33	57348	12.81
# 42	0.0935	3/4	1-3/4	JDR-42	17347	10.50	57347	13.01
3/32	0.0938	3/4	1-3/4	JDR-3/32	17253	9.85	57253	12.26
# 41	0.0960	13/16	1-13/16	JDR-41	17346	10.66	57346	13.18
# 40	0.0980	13/16	1-13/16	JDR-40	17345	10.96	57345	13.60
2.5mm	0.0984	21mm	46mm	JDR-2.5MM	17373	11.08	57373	13.70
# 39	0.0995	13/16	1-13/16	JDR-39	17344	10.96	57344	13.60
# 38	0.1015	13/16	1-13/16	JDR-38	17343	11.40	57343	14.14
# 37	0.1040	13/16	1-13/16	JDR-37	17342	11.43	57342	14.21
# 36	0.1065	13/16	1-13/16	JDR-36	17341	11.66	57341	14.50
7/64	0.1094	13/16	1-13/16	JDR-7/64	17254	11.63	57254	14.42
# 35	0.1100	7/8	1-7/8	JDR-35	17340	11.86	57340	14.70
# 34	0.1110	7/8	1-7/8	JDR-34	17339	12.18	57339	15.04
# 33	0.1130	7/8	1-7/8	JDR-33	17338	12.23	57338	15.06
# 32	0.1160	7/8	1-7/8	JDR-32	17337	12.29	57337	15.14
3mm	0.1181	22mm	48mm	JDR-3MM	17374	12.48	57374	15.45
# 31	0.1200	7/8	1-7/8	JDR-31	17336	12.39	57336	15.24
1/8	0.1250	5/8	1-1/2	JDR-1/8-S	17437	11.90	57437	14.73
1/8	0.1250	7/8	1-7/8	JDR-1/8	17255	11.88	57255	14.73
# 30	0.1285	15/16	1-15/16	JDR-30	17335	13.89	57335	16.69
# 29	0.1360	15/16	1-15/16	JDR-29	17334	14.08	57334	16.89
3.5mm	0.1378	24mm	52mm	JDR-3.5MM	17375	14.72	57375	18.23
# 28	0.1405	15/16	1-15/16	JDR-28	17333	14.78	57333	17.61
9/64	0.1406	15/16	1-15/16	JDR-9/64	17256	14.14	57256	16.98
# 27	0.1440	1	2-1/16	JDR-27	17332	14.95	57332	18.44
# 26	0.1470	1	2-1/16	JDR-26	17331	15.14	57331	18.64
# 25	0.1495	1	2-1/16	JDR-25	17330	15.34	57330	18.81
# 24	0.1520	1	2-1/16	JDR-24	17329	15.88	57329	19.35
# 23	0.1540	1	2-1/16	JDR-23	17328	16.25	57328	19.72
5/32	0.1562	1	2-1/16	JDR-5/32	17257	14.84	57257	18.33
# 22	0.1570	1-1/16	2-1/8	JDR-22	17327	16.37	57327	19.84
4mm	0.1575	27mm	53mm	JDR-4MM	17376	16.62	57376	20.10
# 21	0.1590	1-1/16	2-1/8	JDR-21	17326	16.80	57326	20.29
# 20	0.1610	1-1/16	2-1/8	JDR-20	17325	17.70	57325	21.18
# 19	0.1660	1-1/16	2-1/8	JDR-19	17324	18.92	57324	22.39
# 18	0.1695	1-1/16	2-1/8	JDR-18	17323	18.92	57323	22.39
11/64	0.1719	1-1/16	2-1/8	JDR-11/64	17258	19.25	57258	22.72
# 17	0.1730	1-1/8	2-3/16	JDR-17	17322	19.22	57322	22.66
# 16	0.1770	1-1/8	2-3/16	JDR-16	17321	19.49	57321	22.97
4.5mm	0.1772	29mm	55mm	JDR-4.5MM	17377	19.61	57377	23.09
# 15	0.1800	1-1/8	2-3/16	JDR-15	17320	19.60	57320	23.07
# 14	0.1820	1-1/8	2-3/16	JDR-14	17319	19.69	57319	23.18
# 13	0.1850	1-1/8	2-3/16	JDR-13	17318	20.03	57318	23.51
3/16	0.1875	5/8	2	JDR-3/16-S	17438	17.59	57438	21.01
3/16	0.1875	1-1/8	2-3/16	JDR-3/16	17259	17.59	57259	21.01
# 12	0.1890	1-3/16	2-1/4	JDR-12	17317	20.29	57317	25.13
# 11	0.1910	1-3/16	2-1/4	JDR-11	17316	20.62	57316	25.57
# 10	0.1935	1-3/16	2-1/4	JDR-10	17315	20.85	57315	25.86
# 9	0.1960	1-3/16	2-1/4	JDR-9	17314	21.36	57314	26.48
5mm	0.1969	30mm	57mm	JDR-5MM	17378	21.34	57378	26.46
# 8	0.1990	1-3/16	2-1/4	JDR-8	17313	21.86	57313	27.09
# 7	0.2010	1-3/16	2-1/4	JDR-7	17312	22.25	57312	27.60
13/64	0.2031	1-3/16	2-1/4	JDR-13/64	17260	22.47	57260	27.91

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# 6	0.2040	1-1/4	2-3/8	JDR-6	17311	23.36	57311	28.94
# 5	0.2055	1-1/4	2-3/8	JDR-5	17310	23.36	57310	28.97
# 4	0.2090	1-1/4	2-3/8	JDR-4	17309	23.74	57309	29.44
# 3	0.2130	1-1/4	2-3/8	JDR-3	17308	25.45	57308	31.52
5.5mm	0.2165	32mm	60mm	JDR-5.5MM	17379	24.24	57379	30.06
7/32	0.2188	1-1/4	2-3/8	JDR-7/32	17261	22.47	57261	27.91
# 2	0.2210	1-5/16	2-7/16	JDR-2	17307	26.18	57307	32.28
# 1	0.2280	1-5/16	2-7/16	JDR-1	17306	26.75	57306	33.17
A	0.2340	1-5/16	2-7/16	JDR-A	17280	28.48	57280	35.43
15/64	0.2344	1-5/16	2-7/16	JDR-15/64	17262	28.07	57262	34.81
6mm	0.2362	33mm	61mm	JDR-6MM	17380	27.36	57380	33.93
B	0.2380	1-3/8	2-1/2	JDR-B	17281	29.36	57281	36.32
C	0.2420	1-3/8	2-1/2	JDR-C	17282	30.32	57282	37.29
D	0.2460	1-3/8	2-1/2	JDR-D	17283	31.43	57283	38.38
E	0.2500	1-3/8	2-1/2	JDR-E	17284	25.34	57284	31.42
1/4	0.2500	3/4	2	JDR-1/4-S	17439	25.34	57439	31.42
1/4	0.2500	1-3/8	2-1/2	JDR-1/4	17263	25.34	57263	31.42
6.5mm	0.2559	35mm	63mm	JDR-6.5MM	17381	30.57	57381	37.90
F	0.2570	1-7/16	2-5/8	JDR-F	17285	34.96	57285	43.36
G	0.2610	1-7/16	2-5/8	JDR-G	17286	36.73	57286	45.14
17/64	0.2656	1-7/16	2-5/8	JDR-17/64	17264	35.76	57264	44.19
H	0.2660	1-1/2	2-11/16	JDR-H	17287	36.98	57287	45.36
I	0.2720	1-1/2	2-11/16	JDR-I	17288	38.32	57288	46.73
7mm	0.2756	38mm	68mm	JDR-7MM	17382	35.76	57382	44.35
J	0.2770	1-1/2	2-11/16	JDR-J	17289	39.17	57289	47.59
K	0.2810	1-1/2	2-11/16	JDR-K	17290	39.33	57290	47.73
9/32	0.2812	1-1/2	2-11/16	JDR-9/32	17265	37.17	57265	45.63
L	0.2900	1-9/16	2-3/4	JDR-L	17291	42.65	57291	51.09
M	0.2950	1-9/16	2-3/4	JDR-M	17292	42.65	57292	51.04
7.5mm	0.2953	40mm	70mm	JDR-7.5MM	17383	39.24	57383	48.66
19/64	0.2969	1-9/16	2-3/4	JDR-19/64	17266	40.66	57266	49.06
N	0.3020	1-5/8	2-13/16	JDR-N	17293	44.23	57293	52.61
5/16	0.3125	3/4	2-1/2	JDR-5/16-S	17440	37.17	57440	45.63
5/16	0.3125	1-5/8	2-13/16	JDR-5/16	17267	37.17	57267	45.63
8mm	0.3150	41mm	71mm	JDR-8MM	17384	44.43	57384	54.86
O	0.3160	1-11/16	2-15/16	JDR-O	17294	44.76	57294	53.15
P	0.3230	1-11/16	2-15/16	JDR-P	17295	45.77	57295	54.17
21/64	0.3281	1-11/16	2-15/16	JDR-21/64	17268	45.92	57268	54.30
Q	0.3320	1-11/16	3	JDR-Q	17296	47.36	57296	55.75
8.5mm	0.3346	24mm	76mm	JDR-8.5MM	17385	48.69	57385	59.11
R	0.3390	1-11/16	3	JDR-R	17297	48.79	57297	57.21
11/32	0.3438	1-11/16	3	JDR-11/32	17269	50.73	57269	59.12
S	0.3480	1-3/4	3-1/16	JDR-S	17298	51.76	57298	62.19
9mm	0.3543	44mm	78mm	JDR-9MM	17386	56.33	57386	66.74
T	0.3580	1-3/4	3-1/16	JDR-T	17299	57.10	57299	67.53
23/64	0.3594	1-3/4	3-1/16	JDR-23/64	17270	56.10	57270	66.53
U	0.3680	1-13/16	3-1/8	JDR-U	17300	58.36	57300	68.78
9.5mm	0.3740	46mm	79mm	JDR-9.5MM	17387	63.68	57387	79.04
3/8	0.3750	1	2-1/2	JDR-3/8-S	17441	59.26	57441	69.73
3/8	0.3750	1-13/16	3-1/8	JDR-3/8	17271	59.24	57271	69.73
V	0.3770	1-7/8	3-1/4	JDR-V	17301	61.24	57301	73.95
W	0.3860	1-7/8	3-1/4	JDR-W	17302	62.47	57302	75.21
25/64	0.3906	1-7/8	3-1/4	JDR-25/64	17272	63.73	57272	76.47
10mm	0.3937	48mm	83mm	JDR-10MM	17388	74.09	57388	91.88
X	0.3970	1-15/16	3-5/16	JDR-X	17303	67.06	57303	79.80
Y	0.4040	1-15/16	3-5/16	JDR-Y	17304	67.06	57304	79.80

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# GENERAL PURPOSE CARBIDE DRILLS

## 2 FLUTE • STRAIGHT FLUTE CARBIDE DRILLS

### SERIES: JDR

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DIAMETER		LOC	OAL	TOOL	BRIGHT EDP	BRIGHT PRICE	ALTIN EDP	ALTIN PRICE
13/32	0.4062	1-15/16	3-5/16	JDR-13/32	17273	72.33	57273	85.39
Z	0.4130	2	3-3/8	JDR-Z	17305	75.60	57305	88.35
10.5mm	0.4134	51mm	86mm	JDR-10.5MM	17389	81.52	57389	101.38
27/64	0.4219	2	3-3/8	JDR-27/64	17274	79.27	57274	92.29
11mm	0.4331	52mm	87mm	JDR-11MM	17390	94.04	57390	113.91
7/16	0.4375	1	2-3/4	JDR-7/16-S	17442	87.97	57442	101.27
7/16	0.4375	2-1/16	3-7/16	JDR-7/16	17275	87.97	57275	101.32
11.5mm	0.4528	54mm	90mm	JDR-11.5MM	17391	104.17	57391	122.08
29/64	0.4531	2-1/8	3-9/16	JDR-29/64	17276	98.58	57276	112.38
15/32	0.4688	2-1/8	3-5/8	JDR-15/32	17277	102.75	57277	117.18
12mm	0.4724	54mm	92mm	JDR-12MM	17392	107.78	57392	128.03
31/64	0.4844	2-3/16	3-11/16	JDR-31/64	17278	103.93	57278	118.44
1/2	0.5000	1	3	JDR-1/2-S	17443	95.19	57443	108.52
1/2	0.5000	2-1/4	3-3/4	JDR-1/2	17279	95.19	57279	108.57
9/16	0.5625	1-1/8	3-1/2	JDR-9/16	17444	104.92	57444	120.64
5/8	0.6250	1-1/4	3-1/2	JDR-5/8	17445	119.11	57445	135.76
3/4	0.7500	1-1/2	4	JDR-3/4	17446	221.83	57446	252.94

## 2 FLUTE • 60° DOUBLE END COMBINED DRILL & COUNTERSINK



### SERIES: KDR(CARBIDE) HSCD(HSS)

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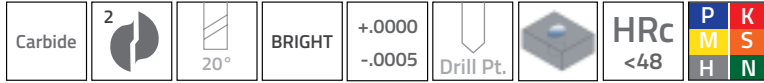
SIZE	SHK	DRILL DIA	DRILL LENGTH	OAL	CARBIDE TOOL	BRIGHT EDP	BRIGHT PRICE	HSS TOOL	BRIGHT EDP	BRIGHT PRICE
00	1/8	0.025	0.030	1-1/2	KDR-00	17362	17.97	HSCD-00*	11587	8.79
0	1/8	1/32	0.038	1-1/2	KDR-0	17363	16.85	HSCD-0*	11589	8.79
1	1/8	3/64	3/64	1-1/2	KDR-1	17364	13.81	HSCD-1*	11591	6.57
2	3/16	5/64	5/64	2	KDR-2	17365	21.88	HSCD-2**	11593	7.00
3	1/4	7/64	7/64	2	KDR-3	17366	26.11	HSCD-3	11595	7.24
4	5/16	1/8	1/8	2-1/8	KDR-4	17367	35.80	HSCD-4	11597	7.54
5	7/16	3/16	3/16	2-3/4	KDR-5	17368	55.52	HSCD-5	11599	12.59
6	1/2	7/32	7/32	3	KDR-6	17369	75.77	HSCD-6	11601	18.94
7	5/8	1/4	1/4	3-1/4	KDR-7	10611	147.56	HSCD-7	11603	34.18
8	3/4	5/16	5/16	3-1/2	KDR-8	10613	197.31	HSCD-8	11605	42.26

\* = 1-1/4 OAL

\*\* = 1-7/8 OAL

# GENERAL PURPOSE CARBIDE DRILLS

## 2 FLUTE • 60°, 90°, 120° NC CARBIDE SPOTTING DRILL



### SERIES: HDRNC

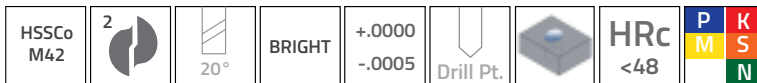
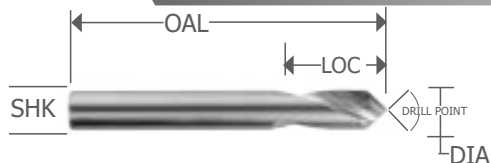
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DIA	SHK	LOC	OAL	ANGLE DEGREE	TOOL	BRIGHT EDP	BRIGHT PRICE
3mm	3mm	12mm	38mm	60°	HDRNC-3MM-60	19491	13.64
3mm	3mm	12mm	38mm	90°	HDRNC-3MM-90	19492	13.64
3mm	4mm	12mm	38mm	120°	HDRNC-3MM-120	19493	13.64
1/8	1/8	5/8	2	60°	HDRNC-1/8-60	19257	12.28
1/8	1/8	5/8	2	90°	HDRNC-1/8-90	17711	12.28
1/8	1/8	5/8	2	120°	HDRNC-1/8-120	17716	12.28
4mm	4mm	14mm	51mm	60°	HDRNC-4MM-60	19494	16.44
4mm	4mm	14mm	51mm	90°	HDRNC-4MM-90	19498	16.44
4mm	5mm	14mm	51mm	120°	HDRNC-4MM-120	19499	16.44
3/16	3/16	3/4	2	60°	HDRNC-3/16-60	19486	17.96
3/16	3/16	3/4	2	90°	HDRNC-3/16-90	17712	17.96
3/16	3/16	3/4	2	120°	HDRNC-3/16-120	17717	17.96
5mm	5mm	20mm	51mm	60°	HDRNC-5MM-60	19501	17.72
5mm	5mm	20mm	51mm	90°	HDRNC-5MM-90	19502	17.72
5mm	6mm	20mm	51mm	120°	HDRNC-5MM-120	19503	17.72
6mm	6mm	20mm	63mm	60°	HDRNC-6MM-60	19504	20.67
6mm	6mm	20mm	63mm	90°	HDRNC-6MM-90	19505	20.67
6mm	8mm	20mm	63mm	120°	HDRNC-6MM-120	19506	20.67
1/4	1/4	3/4	2-1/2	60°	HDRNC-1/4-60	19259	21.61
1/4	1/4	3/4	2-1/2	90°	HDRNC-1/4-90	17713	21.61
1/4	1/4	3/4	2-1/2	120°	HDRNC-1/4-120	17718	21.61
5/16	5/16	1	2-1/2	60°	HDRNC-5/16-60	19487	27.34
5/16	5/16	1	2-1/2	90°	HDRNC-5/16-90	19488	27.34
5/16	5/16	1	2-1/2	120°	HDRNC-5/16-120	19489	27.34
8mm	8mm	20mm	63mm	60°	HDRNC-8MM-60	19507	25.29
8mm	8mm	20mm	63mm	90°	HDRNC-8MM-90	19508	25.29
8mm	10mm	20mm	63mm	120°	HDRNC-8MM-120	19509	25.29
3/8	3/8	1	3	60°	HDRNC-3/8-60	19261	30.75
3/8	3/8	1	3	90°	HDRNC-3/8-90	17714	30.75
3/8	3/8	1	3	120°	HDRNC-3/8-120	17719	30.75
10mm	10mm	25mm	70mm	60°	HDRNC-10MM-60	19525	41.70
10mm	10mm	25mm	70mm	90°	HDRNC-10MM-90	19526	41.70
10mm	12mm	25mm	70mm	120°	HDRNC-10MM-120	19553	41.70
7/16	7/16	1-1/4	3	60°	HDRNC-7/16-60	19264	50.37
7/16	7/16	1-1/4	3	90°	HDRNC-7/16-90	19262	50.37
7/16	7/16	1-1/4	3	120°	HDRNC-7/16-120	19263	50.37
12mm	12mm	25mm	76mm	60°	HDRNC-12MM-60	19555	58.14
12mm	12mm	25mm	76mm	90°	HDRNC-12MM-90	19579	58.14
12mm	12mm	25mm	76mm	120°	HDRNC-12MM-120	19580	58.14
1/2	1/2	1	3	60°	HDRNC-1/2-60	19266	48.47
1/2	1/2	1	3	90°	HDRNC-1/2-90	17715	48.47
1/2	1/2	1	3	120°	HDRNC-1/2-120	17720	48.47
5/8	5/8	1-1/4	3	60°	HDRNC-5/8-60	19269	90.97
5/8	5/8	1-1/4	3	90°	HDRNC-5/8-90	19267	90.97
5/8	5/8	1-1/4	3	120°	HDRNC-5/8-120	19268	90.97
3/4	3/4	1-3/4	4	60°	HDRNC-3/4-60	19272	123.07
3/4	3/4	1-3/4	4	90°	HDRNC-3/4-90	19270	123.07
3/4	3/4	1-3/4	4	120°	HDRNC-3/4-120	19271	123.07
7/8	7/8	1-3/4	4	60°	HDRNC-7/8-60	19490	235.11
7/8	7/8	1-3/4	4	90°	HDRNC-7/8-90	19273	235.11
7/8	7/8	1-3/4	4	120°	HDRNC-7/8-120	19274	235.11
1	1	1-3/4	4	60°	HDRNC-1-60	19277	270.33
1	1	1-3/4	4	90°	HDRNC-1-90	19275	270.33
1	1	1-3/4	4	120°	HDRNC-1-120	19276	270.33



# GENERAL PURPOSE CARBIDE DRILLS

## 2 FLUTE • 82°, 90°, 120° NC HSSCo M42 SPOTTING DRILL



### SERIES: HSNC

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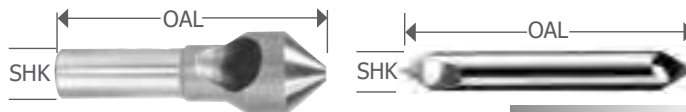
DIA	SHK	LOC	OAL	ANGLE DEGREE	MAT	TOOL	BRIGHT EDP	BRIGHT PRICE
4mm	4mm	12mm	52mm	82°	M42	HSNC-4M-82	10847	13.43
4mm	4mm	12mm	52mm	90°	M42	HSNC-4M-90	10849	13.43
4mm	4mm	12mm	52mm	120°	M42	HSNC-4M-120	10851	13.43
1/4	1/4	7/8	2-5/8	82°	M42	HSNC-1/4-82	10853	14.25
1/4	1/4	7/8	2-5/8	90°	M42	HSNC-1/4-90	10855	14.25
1/4	1/4	7/8	2-5/8	120°	M42	HSNC-1/4-120	10857	14.25
8mm	8mm	25mm	79mm	82°	M42	HSNC-8M-82	10859	14.63
8mm	8mm	25mm	79mm	90°	M42	HSNC-8M-90	10861	14.63
8mm	8mm	25mm	79mm	120°	M42	HSNC-8M-120	10863	14.63
3/8	3/8	1	3-1/2	82°	M42	HSNC-3/8-82	10865	14.25
3/8	3/8	1	3-1/2	90°	M42	HSNC-3/8-90	10867	14.25
3/8	3/8	1	3-1/2	120°	M42	HSNC-3/8-120	10869	14.25
1/2	1/2	1-3/8	4	82°	M42	HSNC-1/2-82	10871	19.98
1/2	1/2	1-3/8	4	90°	M42	HSNC-1/2-90	10873	19.98
1/2	1/2	1-3/8	4	120°	M42	HSNC-1/2-120	10875	19.98
5/8	5/8	1-3/8	4-1/2	82°	M42	HSNC-5/8-82	10877	28.22
5/8	5/8	1-3/8	4-1/2	90°	M42	HSNC-5/8-90	10879	28.22
5/8	5/8	1-3/8	4-1/2	120°	M42	HSNC-5/8-120	10881	28.22
3/4	3/4	1-1/2	5-3/16	82°	M42	HSNC-3/4-82	10883	34.44
3/4	3/4	1-1/2	5-3/16	90°	M42	HSNC-3/4-90	10885	34.44
3/4	3/4	1-1/2	5-3/16	120°	M42	HSNC-3/4-120	10887	34.44

# COUNTERSINKS

## 0 FLUTE • SINGLE EDGE DOUBLE AND SINGLE END COUNTERSINK



### SERIES: HSO



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SIZE	SHK	OAL	ENDS	TOOL	EDP	EDP PRICE
3/16	3/16	1-1/2	DE	<b>HSO-3/16-82</b>	19166	12.80
1/4	1/4	2	DE	<b>HSO-1/4-82</b>	19165	13.94
7/16	1/4	2-1/32	SE	<b>HSO-7/16-82</b>	19171	18.24
9/16	1/4	2	SE	<b>HSO-9/16-82</b>	19172	23.58
13/16	1/2	2-5/8	SE	<b>HSO-13/16-82</b>	19173	41.95
1-1/8	1/2	2-7/8	SE	<b>HSO-1-1/8-82</b>	19174	68.30
1-1/2	1/2	3-1/2	SE	<b>HSO-1-1/2-82</b>	19175	159.93

- Designed with a radial relieved single edge for fast removal without chatter.
- 3/16" and 1/4" are double end.

## 0 FLUTE • SINGLE EDGE DOUBLE AND SINGLE END COUNTERSINK



### SERIES: HSP0



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SIZE	SHK	OAL	ENDS	TOOL	ANGLE/EDP#					
					60°	60° PRICE	82°	82° PRICE	90°	90° PRICE
1/4	1/4	1-1/2	DE	<b>HSP0-1/4</b>	19210	17.51	19211	17.51	19212	17.51
7/16	1/4	2-1/32	SE	<b>HSP0-7/16</b>	19213	23.14	19214	23.14	19215	23.14
9/16	1/4	2	SE	<b>HSP0-9/16</b>	19216	29.47	19217	29.47	19218	29.47
13/16	1/2	2-5/8	SE	<b>HSP0-13/16</b>	19219	53.21	19220	53.21	19221	53.21
1-1/8	1/2	2-7/8	SE	<b>HSP0-1-1/8</b>	19222	87.43	19223	87.43	19224	87.43

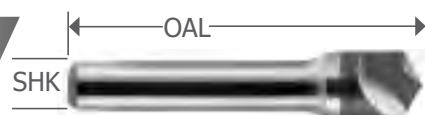
- Designed with a radial relieved single edge for fast removal without chatter.
- Higher heat and abrasion resistance for use on high-tensile alloys, stainless steel, and other hard to machine abrasive materials.

To order countersinks: Use the EDP # listed or add the angle to the end of the tool name (i.e. HSP0-1/4-90).

## 1 FLUTE • CARBIDE COUNTERSINK



### SERIES: C1



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SIZE	SHK	OAL	TOOL	ANGLE/EDP#									
				60°	60° PRICE	82°	82° PRICE	90°	90° PRICE	100°	100° PRICE	120°	120° PRICE
1/8	1/8	1-1/2	<b>C1-1/8</b>	18328	13.59	18329	13.59	18330	13.59	18331	13.59	18332	13.59
3/16	3/16	1-1/2	<b>C1-3/16</b>	18333	17.39	18334	17.39	18335	17.39	18336	17.39	18337	17.39
1/4	1/4	2	<b>C1-1/4</b>	18338	20.94	18339	20.94	18340	20.94	18341	20.94	18342	20.94
5/16	1/4	2-1/2	<b>C1-5/16</b>	18343	32.33	18344	32.33	18345	32.33	18346	32.33	18347	32.33
3/8	1/4	2-1/2	<b>C1-3/8</b>	18348	40.90	18349	40.90	18350	40.90	18351	40.90	18352	40.90
1/2	3/8	2-1/2	<b>C1-1/2</b>	18353	58.75	18354	58.75	18355	58.75	18356	58.75	18357	58.75
5/8	3/8	2-5/8	<b>C1-5/8</b>	18358	76.92	18359	76.92	18360	76.92	18361	76.92	18362	76.92
3/4	1/2	2-3/4	<b>C1-3/4</b>	18363	109.10	18364	109.10	18365	109.10	18366	109.10	18367	109.10
1	1/2	3	<b>C1-1</b>	18493	179.01	18494	179.01	18495	179.01	18496	179.01	18497	179.01

- For highly abrasive and hard to machine materials. Applications in **cast iron, alloy steel, or glass reinforced plastics**.
- Carbide eliminates the high cost of tool changes in production situations.
- Rigid set up is a must - not suited for hand held applications.
- Tools 3/8" and larger have solid carbide heads on hardened steel shanks.

To order countersinks: Use the EDP # listed or add the angle to the end of the tool name (i.e. C1-1/4-90).



## 1 FLUTE • SINGLE FLUTE COUNTERSINKS



### SERIES: HS1

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SIZE	SHK	OAL	TOOL	ANGLE/EDP#									
				60°	60° PRICE	82°	82° PRICE	90°	90° PRICE	100°	100° PRICE	120°	120° PRICE
1/8	1/8	1-1/2	HS1-1/8	18000	8.74	18001	8.74	18002	8.74	18003	8.74	18004	8.74
3/16	3/16	1-1/2	HS1-3/16	18005	8.87	18006	8.87	18007	8.87	18008	8.87	18009	8.87
1/4	1/4	2	HS1-1/4	18010	9.25	18011	9.25	18012	9.25	18013	9.25	18014	9.25
5/16	1/4	2	HS1-5/16	19201	10.32	19202	10.32	19203	10.32	19204	10.32	19186	10.32
3/8	1/4	2	HS1-3/8	18015	10.39	18016	10.39	18017	10.39	18018	10.39	18019	10.39
1/2	3/8	2	HS1-1/2	18020	12.67	18021	12.67	18022	12.67	19100	12.67	18024	12.67
1/2	1/4	2	HS1-1/2 (1/4)	19095	12.67	19097	12.67	19099	12.67	18023	12.67	19191	12.67
5/8	3/8	2-1/4	HS1-5/8	19188	17.56	19200	17.56	10967	17.56	19205	17.56	19209	17.56
5/8	1/4	2-1/4	HS1-5/8 (1/4)	18026	17.56	18027	17.56	18028	17.56	19098	17.56	18030	17.56
5/8	1/2	2-1/4	HS1-5/8 (1/2)	19074	17.56	19088	17.56	19101	17.56	18029	17.56	N/A	
3/4	1/2	2-3/4	HS1-3/4	18031	25.29	18032	25.29	18033	25.29	18034	25.29	18035	25.29
7/8	1/2	2-3/4	HS1-7/8	19206	39.76	19207	39.76	19208	39.76	19198	39.76	19187	39.76
1	1/2	2-3/4	HS1-1	18036	42.21	18037	42.21	18038	42.21	18039	42.21	18040	42.21
1-1/4	1/2	3	HS1-1-1/4	18041	83.41	18042	83.41	18043	83.41	19193	83.41	19192	83.41
1-1/2	3/4	3-1/2	HS1-1-1/2 **	18044	112.09	18045	112.09	18046	112.09	19176	112.09	19189	112.09
1-3/4	3/4	4-1/4	HS1-1-3/4 **	19194	179.87	19195	179.87	19197	179.87	19199	179.87	19185	179.87
2	3/4	3-3/4	HS1-2 **	18047	203.33	18048	203.33	18049	203.33	19184	203.33	19183	203.33
2-1/2	3/4	4-3/4	HS1-2-1/2 **	19182	521.34	18050	521.34	18051	521.34	19181	521.34	N/A	N/A
3	3/4	5	HS1-3 **	19179	612.57	19178	612.57	19177	612.57	N/A	N/A	N/A	N/A

- Radial relief ensures smooth, chatter-free cutting without overfeeding and makes the tool self-centering.
- Black oxide surface treatment enhances tool life and prevents galling.
- Excellent countersink for use in hand held applications.

To order countersinks: Use the EDP # listed or add the angle to the end of the tool name (i.e. HS1-1/4-90).

## 1 FLUTE • EXTENDED LENGTH COUNTERSINKS



### SERIES: HS1EL

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SIZE	SHK	OAL	CORNER	TOOL	EDP	EDP PRICE
1/8	1/8	4	82°	HS1EL-1/8-82	11945	18.58
3/16	3/16	4	82°	HS1EL-3/16-82	11947	20.82
1/4	1/4	6	82°	HS1EL-1/4-82	11949	25.48
5/16	5/16	6	82°	HS1EL-5/16-82	11951	26.05
3/8	3/8	6	82°	HS1EL-3/8-82	11953	31.31
1/2	3/8	6	82°	HS1EL-1/2-82	11955	42.64
5/8	3/8	6	82°	HS1EL-5/8-82	11979	51.26
3/4	1/2	6	82°	HS1EL-3/4-82	11975	57.25
1	1/2	6	82°	HS1EL-1-82	11977	85.86

- Extended length for hard to reach applications.

# COUNTERSINKS

## 1 FLUTE • SINGLE FLUTE COUNTERSINK



### SERIES: HSP1

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SIZE	SHK	OAL	TOOL	ANGLE/EDP#									
				60°	60° PRICE	82°	82° PRICE	90°	90° PRICE	100°	100° PRICE	120°	120° PRICE
1/8	1/8	1-1/2	HSP1-1/8	11141	9.67	11143	9.67	11145	9.67	19674	9.67	19675	9.67
3/16	3/16	1-1/2	HSP1-3/16	11147	10.37	11149	10.37	11151	10.37	10260	10.37	19676	10.37
1/4	1/4	2	HSP1-1/4	11153	10.64	11155	10.64	11156	10.64	10314	11.02	19677	10.64
3/8	1/4	2	HSP1-3/8	11157	14.29	11158	14.29	11159	14.29	11675	13.08	10326	13.08
1/2	3/8	2	HSP1-1/2	11160	19.66	11161	19.66	11162	19.66	10248	16.92	10246	16.92
5/8	3/8	2-1/4	HSP1-5/8	11163	27.54	11164	27.54	11165	27.54	10440	23.88	10422	23.88
3/4	1/2	2-3/4	HSP1-3/4	11166	39.76	11167	39.76	11168	39.76	11677	32.93	10340	32.93
1	1/2	2-3/4	HSP1-1	11169	57.62	11170	57.62	11171	57.62	19678	66.17	19679	57.62
1-1/4	1/2	3	HSP1-1-1/4	11172	88.60	11173	88.60	11175	88.60	19680	88.60	19681	88.60
1-1/2	3/4	3-1/2	HSP1-1-1/2 **	19682	126.80	19683	126.80	19684	126.80	N/A	N/A	19686	88.60
1-3/4	3/4	3-1/2	HSP1-1-3/4 **	19687	200.88	19688	200.88	19689	200.88	N/A	N/A	N/A	N/A
2	3/4	3-3/4	HSP1-2 **	19692	231.51	19693	231.51	19694	231.51	N/A	N/A	N/A	N/A

\*\* = Drive Tang.

Excellent for countersinking abrasive, high strength, heat resistant, exotic, and other difficult to machine materials.

To order countersinks: Use the EDP # listed or add the angle to the end of the tool name (i.e. HSP1-1/4-90).

## 1 FLUTE • SINGLE FLUTE COUNTERSINK - TiN COATED



### SERIES: HSP1-\_\_-T

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SIZE	SHK	OAL	TOOL	ANGLE/EDP#									
				60°	60° PRICE	82°	82° PRICE	90°	90° PRICE	100°	100° PRICE	120°	120° PRICE
1/8	1/8	1-1/2	HSP1-1/8-T	18136	11.61	18137	11.61	18138	11.61	18139	11.61	18140	11.61
3/16	3/16	1-1/2	HSP1-3/16-T	18141	12.23	18142	12.23	18143	12.23	18144	12.23	18145	12.23
1/4	1/4	2	HSP1-1/4-T	18146	12.60	18147	12.60	18148	12.60	18149	12.60	18150	12.60
3/8	1/4	2	HSP1-3/8-T	18151	16.11	18152	16.11	18153	16.11	18154	16.11	18155	16.11
1/2	3/8	2	HSP1-1/2-T	18156	22.96	18157	22.96	18158	22.96	18159	22.96	18160	22.96
5/8	3/8	2-1/4	HSP1-5/8-T	18161	31.31	18162	31.31	18163	31.31	18164	31.31	18165	31.31
3/4	1/2	2-3/4	HSP1-3/4-T	18166	47.46	18167	47.46	18168	47.46	18169	47.46	18170	47.46
1	1/2	2-3/4	HSP1-1-T	18171	66.17	18172	66.17	18173	66.17	18174	66.17	18175	66.17
1-1/4	1/2	3	HSP1-1-1/4-T	18176	99.35	18177	99.35	18178	99.35	18179	99.35	18181	99.35
1-1/2	3/4	3-1/2	HSP1-1-1/2-T *	19630	142.51	19631	142.51	19632	142.51	19633	142.51	19634	142.51
1-3/4	3/4	4-1/4	HSP1-1-3/4-T *	19635	224.18	19636	224.18	19637	224.18	19638	224.18	19639	224.18
2	3/4	3-3/4	HSP1-2-T *	19640	269.46	19641	269.46	19642	269.46	19643	269.46	N/A	N/A

\* = Drive Tang.

Coating can also help enhance productivity and extend tool life.

To order countersinks: Use the EDP # listed or add the angle to the end of the tool name (i.e. HSP1-1/4-90T).



## 3 FLUTE • CARBIDE COUNTERSINK



### SERIES: C3

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SIZE	SHK	OAL	TOOL	ANGLE/EDP#					
				60°	60° PRICE	82°	82° PRICE	90°	90° PRICE
1/8	1/8	1-1/2	<b>C3-1/8</b>	11393	13.60	11394	13.60	11395	13.60
3/16	3/16	1-1/2	<b>C3-3/16</b>	11399	17.39	11416	17.39	11424	17.39
1/4	1/4	2	<b>C3-1/4</b>	11410	20.94	11422	20.94	11487	20.94
5/16	1/4	2-1/2	<b>C3-5/16</b>	11491	32.33	11519	32.33	11525	32.33
3/8	1/4	2-1/2	<b>C3-3/8</b>	11527	40.90	11531	40.90	11533	40.90
1/2	3/8	2-1/2	<b>C3-1/2</b>	11535	58.75	11537	58.75	11539	58.75
5/8	3/8	2-5/8	<b>C3-5/8</b>	11541	76.92	11543	76.92	11545	76.92
3/4	1/2	2-3/4	<b>C3-3/4</b>	11547	109.10	11549	109.10	11553	109.10
7/8	1/2	3	<b>C3-7/8</b>	11555	179.01	11557	179.01	11559	180.72
1	1/2	3	<b>C3-1</b>	11561	180.72	11562	180.72	11563	180.72

To order countersinks: Use the EDP # listed or add the angle to the end of the tool name (i.e. C3-1/4-90).



## 3 FLUTE • HSS COUNTERSINKS



### SERIES: HS3

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SIZE	SHK	OAL	TOOL	ANGLE/EDP#									
				60°	60° PRICE	82°	82° PRICE	90°	90° PRICE	100°	100° PRICE	120°	120° PRICE
1/4	1/4	2	<b>HS3-1/4-T</b>	19600	10.67	19601	10.67	19602	10.67	19603	10.67	19604	10.67
3/8	1/4	2	<b>HS3-3/8-T</b>	19605	15.08	19606	15.08	19607	15.08	19608	15.08	19609	15.08
1/2	3/8	2	<b>HS3-1/2-T</b>	19610	21.05	19611	21.05	19612	21.05	19613	21.05	19614	21.05
5/8	3/8	2-1/4	<b>HS3-5/8-T</b>	19615	27.48	19616	27.48	19617	27.48	19618	27.48	19619	27.48
3/4	1/2	2-3/4	<b>HS3-3/4-T</b>	19620	42.92	19621	42.92	19622	42.92	19623	42.92	19624	42.92
1	1/2	2-3/4	<b>HS3-1-T</b>	19625	60.31	19626	60.31	19627	60.31	19628	60.31	19629	60.31

- Used for countersinking holes for centers or enlarging existing holes.
  - Radial relief on the angle contributes to smooth, chatter-free operation.
- To order countersinks: Use the EDP # listed or add the angle to the end of the tool name (i.e. HS3-1/4-90T).



## 3 FLUTE • HSSCo M42 COUNTERSINKS



### SERIES: HSP3

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SIZE	SHK	OAL	TOOL	ANGLE/EDP#									
				60°	60° PRICE	82°	82° PRICE	90°	90° PRICE	100°	100° PRICE	120°	120° PRICE
1/4	1/4	2	<b>HSP3-1/4</b>	19697	10.64	19698	10.64	19699	10.64	19700	10.64	19701	10.64
3/8	1/4	2	<b>HSP3-3/8</b>	19702	14.29	19703	14.29	19704	14.29	19705	14.29	19706	14.29
1/2	3/8	2	<b>HSP3-1/2</b>	19707	19.66	19708	19.66	19709	19.66	19710	19.66	19711	19.66
5/8	3/8	2-1/4	<b>HSP3-5/8</b>	19712	27.54	19713	27.54	19714	27.54	19715	27.54	19716	27.54
3/4	1/2	2-3/4	<b>HSP3-3/4</b>	19717	39.76	19718	39.76	19719	39.76	19720	39.76	19721	39.76
1	1/2	2-3/4	<b>HSP3-1</b>	19722	57.62	19723	57.62	19724	57.62	19725	57.62	19726	66.17

To order countersinks: Use the EDP # listed or add the angle to the end of the tool name (i.e. HSP3-1/4-90).

# COUNTERSINKS

## 3 FLUTE • HSSCo M42 TiN COATED COUNTERSINKS



- Used for countersinking holes for centers or enlarging existing holes.
- Radial relief on the angle contributes to smooth, chatter-free operations.



SERIES: HSP3-\_\_-T

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SIZE	SHK	OAL	TOOL	ANGLE/EDP#									
				60°	60° PRICE	82°	82° PRICE	90°	90° PRICE	100°	100° PRICE	120°	120° PRICE
1/4	1/4	2	HSP3-1/4-T	19645	12.60	19646	12.60	19647	12.60	19648	12.60	19649	12.60
3/8	1/4	2	HSP3-3/8-T	19650	16.11	19651	16.11	19652	16.11	19653	16.11	19654	16.11
1/2	3/8	2	HSP3-1/2-T	19655	22.96	19656	22.96	10810	22.96	19657	22.96	19658	22.96
5/8	3/8	2-1/4	HSP3-5/8-T	19659	31.31	19660	31.31	19661	31.31	19662	31.31	19663	31.31
3/4	1/2	2-3/4	HSP3-3/4-T	19664	47.46	19665	47.46	19666	47.46	19667	47.46	19668	47.46
1	1/2	2-3/4	HSP3-1-T	19669	66.17	19670	66.17	19671	66.17	19672	66.17	19673	66.17

To order countersinks: Use the EDP # listed or add the angle to the end of the tool name (i.e. HSP3-1/4-90T).

## MULTI FLUTE • CENTER REAMER



SERIES: HSCR

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SIZE	SHK	OAL	FLUTE	TOOL	ANGLE/EDP#							
					60°	60° PRICE	82°	82° PRICE	90°	90° PRICE	100°	100° PRICE
1/4	1/4	2	3	HSCR-1/4	19076	10.01	19078	10.01	19080	10.01	19082	10.01
3/8	1/4	2	3	HSCR-3/8	19084	12.92	19086	12.92	19075	12.92	19090	12.92
1/2	3/8	2	3	HSCR-1/2	19092	16.21	19094	16.21	19096	16.21	19093	16.21
5/8	3/8	2-1/4	3	HSCR-5/8	19091	23.48	19089	23.48	19087	23.48	19085	23.48
3/4	1/2	2-3/4	3	HSCR-3/4	19083	31.62	19081	31.62	19079	31.62	19077	31.62
1	1/2	2-3/4	3	HSCR-1	19227	48.39	19225	48.39	19226	48.39	12073	48.39
1-1/4	1/2	3	4	HSCR-1-1/4	19233	83.41	19232	83.41	19231	83.41	N/A	
1-1/2	3/4	3-1/4	4	HSCR-1-1/2	19236	112.09	19235	112.09	19234	112.09	N/A	
1-3/4	3/4	3-1/2	4	HSCR-1-3/4	19230	179.87	19229	179.87	N/A		N/A	
2	3/4	3-3/4	4	HSCR-2	19237	203.33	19238	203.33	19239	203.33	N/A	

To order countersinks: Use the EDP # listed or add the angle to the end of the tool name (i.e. HSCR-1/4-T-90).

## 4 FLUTE • CARBIDE COUNTERSINK



- For highly abrasive and hard to machine materials.
- Applications in **cast iron, alloy steel, or glass reinforced plastics.**
- Carbide eliminates the high cost of tool changes in production situations.
- Rigid set up is a must - not suited for hand held applications.
- Tools 3/8" and larger have solid carbide heads on hardened steel shanks.
- See page 147 for Nose Diameter



SERIES: C4

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SIZE	SHK	OAL	TOOL	ANGLE/EDP#											
				60°	60° PRICE	82°	82° PRICE	90°	90° PRICE	100°	100° PRICE	110°	110° PRICE	120°	120° PRICE
1/8	1/8	1-1/2	C4-1/8	18956	13.59	18823	13.59	18957	13.59	18958	13.59	18959	13.59	18960	13.59
3/16	3/16	1-1/2	C4-3/16	N/A		18824	13.35	N/A		N/A		N/A		N/A	
1/4	1/4	2	C4-1/4	18961	20.94	18825	20.94	18962	20.94	18963	20.94	18964	20.94	18965	20.94
5/16	1/4	2-1/2	C4-5/16	N/A		18826	23.06	N/A		N/A		N/A		N/A	
3/8	1/4	2-1/2	C4-3/8	18966	40.90	18827	40.90	18967	40.90	18968	40.90	18969	40.90	18970	40.90
1/2	3/8	2-1/2	C4-1/2	18971	58.75	18828	58.75	18972	58.75	18973	58.75	18974	58.75	18975	58.75
5/8	3/8	2-5/8	C4-5/8	18976	76.92	18829	76.92	18977	76.92	18978	76.92	18979	76.92	18980	76.92
3/4	1/2	2-3/4	C4-3/4	18981	109.10	18830	109.10	18982	109.10	18983	109.10	18984	109.10	18985	109.10
1	1/2	3	C4-1	18986	179.01	18831	179.01	18987	179.01	18988	179.01	N/A		18990	179.01

To order countersinks: Use the EDP # listed or add the angle to the end of the tool name (i.e. C4-1/4-90).





• See page 147 for Nose Diameter

## 4 FLUTE • HSS COUNTERSINK

HSS
4
MULTI°
Black Oxide
HRC <52
P M H
K S N

### SERIES: HS4

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SIZE	SHK	OAL	TOOL	ANGLE/EDP#											
				60°	60° PRICE	82°	82° PRICE	90°	90° PRICE	100°	100° PRICE	110°	110° PRICE	120°	120° PRICE
1/8	1/8	1-1/2	HS4-1/8	18567	9.44	18569	9.44	18571	9.44	18573	9.44	18575	9.44	18577	9.44
3/16	3/16	1-1/2	HS4-3/16	18579	9.62	18581	9.62	18583	9.62	18585	9.62	18587	9.62	18589	9.62
1/4	1/4	2	HS4-1/4	18591	10.01	18593	10.01	18595	10.01	18597	10.01	18599	10.01	18601	10.01
5/16	1/4	2	HS4-5/16	18603	11.60	18605	11.60	18607	11.60	18609	11.60	18611	11.60	18613	11.60
3/8	1/4	2	HS4-3/8	18615	12.92	18617	12.92	18619	12.92	18621	12.92	18623	12.92	18625	12.92
1/2	3/8	2	HS4-1/2	18627	16.21	18629	16.21	18631	16.21	18633	16.21	18635	16.21	18637	16.21
5/8	3/8	2-1/4	HS4-5/8	18639	23.48	18641	23.48	18643	23.48	18645	23.48	18647	23.48	18649	23.48
3/4	1/2	2-3/4	HS4-3/4	18651	31.62	18653	31.62	18655	31.62	18657	31.62	18659	31.62	18661	31.62
7/8	1/2	2-3/4	HS4-7/8	18663	41.95	18665	41.95	18667	41.95	18669	41.95	18671	41.95	18673	41.95
1	1/2	2-3/4	HS4-1	18675	48.39	18677	48.39	18679	48.39	18681	48.39	N/A		18685	48.39
1-1/4	1/2	3	HS4-1-1/4	18687	83.41	18692	83.41	18688	83.41	18689	83.41	N/A		18691	83.41
1-1/2	3/4	3-1/2	HS4-1-1/2 **	18693	112.09	18694	112.09	18695	112.09	18696	112.09	N/A		18698	112.09
2	3/4	3-3/4	HS4-2 **	18699	203.33	18700	203.33	18701	203.33	18702	203.33	N/A		18704	203.33
2-1/2	3/4	5	HS4-2-1/2 **	18705	462.69	18706	462.69	18707	462.69	10897	462.69	N/A		10901	462.69
3	3/4	5-1/4	HS4-3 **	18708	573.47	18709	573.47	18710	573.47	10899	573.47	N/A		10903	573.47

To order countersinks: Use the EDP # listed or add the angle to the end of the tool name (i.e. HS4-1/4-90).

\*\* = Drive tang



## 4 FLUTE • DRILL POINT COUNTERSINK

HSS
4
MULTI°
Black Oxide
HRC <52
P M H
K S N

### SERIES: HS4DP

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SIZE	SHK	OAL	TOOL	ANGLE/EDP#											
				60°	60° PRICE	82°	82° PRICE	90°	90° PRICE	100°	100° PRICE	110°	110° PRICE	120°	120° PRICE
1/8	1/8	1-1/2	HS4DP-1/8	18568	12.67	18570	12.67	18572	12.67	18574	12.67	18576	12.67	18578	12.67
3/16	3/16	1-1/2	HS4DP-3/16	18580	13.42	18582	13.42	18584	13.42	18586	13.42	18588	13.42	18590	13.42
1/4	1/4	2	HS4DP-1/4	18592	14.13	18594	14.13	18596	14.13	18598	14.13	18600	14.13	18602	14.13
5/16	1/4	2	HS4DP-5/16	18604	16.57	18606	16.57	18608	16.57	18610	16.57	18612	16.57	18614	16.57
3/8	1/4	2	HS4DP-3/8	18616	19.37	18618	19.37	18620	19.37	18622	19.37	18624	19.37	18626	19.37
1/2	3/8	2	HS4DP-1/2	18628	24.84	18630	24.84	18632	24.84	18634	24.84	18636	24.84	18638	24.84
5/8	3/8	2-1/4	HS4DP-5/8	18640	35.78	18642	35.78	18644	35.78	18646	35.78	18648	35.78	18650	35.78
3/4	1/2	2-3/4	HS4DP-3/4	18652	48.18	18654	48.18	18656	48.18	18658	48.18	18660	48.18	18662	48.18
7/8	1/2	2-3/4	HS4DP-7/8	18664	60.48	18666	60.48	18668	60.48	18670	60.48	18672	60.48	18674	60.48
1	1/2	2-3/4	HS4DP-1	18676	74.05	18678	74.05	18680	74.05	18682	74.05	18684	74.05	18686	74.05

To order countersinks: Use the EDP # listed or add the angle to the end of the tool name (i.e. HS4DP-1/4-90).



## 4 FLUTE • MACHINE STYLE COUNTERSINK

HSS
4
MULTI°
Black Oxide
HRC <52
P M H
K S N

### SERIES: HSMC

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SIZE	SHK	OAL	TOOL	ANGLE/EDP#					
				60°	60° PRICE	82°	82° PRICE	90°	90° PRICE
1/2	1/2	3-7/8	HSMC-1/2	19102	19.75	19103	19.75	12055	19.76
5/8	1/2	4	HSMC-5/8	19104	29.31	19105	29.31	N/A	
3/4	1/2	4-1/4	HSMC-3/4	19106	40.28	19107	40.28	12783	40.28
7/8	1/2	4-1/4	HSMC-7/8	19108	55.24	19109	55.24	19154	55.24
1	1/2	4-3/8	HSMC-1	19110	61.57	19111	61.57	19255	61.57

• Has radial clearance & added shank length for use in turret lathes and screw machine work.

To order countersinks: Use the EDP # listed or add the angle to the end of the tool name (i.e. HSMC-1/2-90).

# COUNTERSINKS

## 6 FLUTE • CARBIDE COUNTERSINK



Carbide MULTI°

**P** **K**  
**M** **S**  
**H** **N**

- For highly abrasive and hard to machine materials. Applications in **cast iron, alloy steel, or glass reinforced plastics**.
- Carbide eliminates the high cost of tool changes in production situations.
- Rigid set up is a must - not suited for hand held applications.
- Tools 3/8" and larger have solid carbide heads on hardened steel shanks.
- See page 147 for Nose Diameter

### SERIES: C6

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SIZE	SHK	OAL	TOOL	ANGLE/EDP#									
				60°	60° PRICE	82°	82° PRICE	90°	90° PRICE	100°	100° PRICE	120°	120° PRICE
1/8	1/8	1-1/2	C6-1/8	18368	13.59	18369	13.59	18370	13.59	18371	13.59	18372	13.59
3/16	3/16	1-1/2	C6-3/16	18373	17.39	18374	17.39	18375	17.39	18376	17.39	18377	17.39
1/4	1/4	2	C6-1/4	18378	20.94	18379	20.94	18380	20.94	18381	20.94	18382	20.94
5/16	1/4	2-1/2	C6-5/16	18383	32.33	18384	32.33	18385	32.33	18386	32.33	18387	32.33
3/8	1/4	2-1/2	C6-3/8	18388	40.90	18389	40.90	18390	40.90	18391	40.90	18392	40.90
1/2	3/8	2-1/2	C6-1/2	18393	58.75	18394	58.75	18395	58.75	18396	58.75	18397	58.75
5/8	3/8	2-5/8	C6-5/8	18398	76.92	18399	76.92	18400	76.92	18401	76.92	18402	76.92
3/4	1/2	2-3/4	C6-3/4	18403	109.10	18404	109.10	18405	109.10	18406	109.10	18407	109.10
7/8	1/2	3	C6-7/8	11565	179.01	11567	179.01	11569	179.01	N/A		N/A	
1	1/2	3	C6-1	18488	179.01	18489	179.01	18490	179.01	18491	179.01	18492	179.01
1 1/4	3/4	3 3/8	C6-1 1/4	10891	248.62	10893	248.62	10895	248.62	N/A		N/A	

To order countersinks: Use the EDP # listed or add the angle to the end of the tool name (i.e. C6-1/4-90).

## 6 FLUTE • NC - CARBIDE CNC PRECISION COUNTERSINK

Carbide MULTI°

**P** **K**  
**M** **S**  
**H** **N**

- 2 + 2 staggered flute design for smooth, chatter-free cutting.
- Abundant chip clearance to work well in non-ferrous applications such as **aluminum and plastic**.
- See page 147 for Nose Diameter



### SERIES: C6NC

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SIZE	SHK	OAL	TOOL	ANGLE/EDP#											
				60°	60° PRICE	82°	82° PRICE	90°	90° PRICE	100°	100° PRICE	110°	110° PRICE	120°	120° PRICE
3/16	3/16	1-1/2	C6NC-3/16	N/A		18807	15.36	N/A		N/A		N/A		N/A	
1/4	1/4	2	C6NC-1/4	18886	28.00	18808	28.00	18887	28.00	18888	28.00	18889	28.00	18890	28.00
5/16	1/4	2-1/2	C6NC-5/16	N/A		18809	26.50	N/A		N/A		N/A		N/A	
3/8	1/4	2-1/2	C6NC-3/8	18891	50.42	19070	50.42	18892	50.42	18893	50.42	18894	50.42	18895	50.42
1/2	3/8	2-1/2	C6NC-1/2	18896	70.21	18810	70.21	18897	70.21	18898	70.21	18899	70.21	18900	70.21
5/8	3/8	2-5/8	C6NC-5/8	18901	99.45	18811	99.45	18902	99.45	18903	99.45	18904	99.45	18905	99.45
3/4	1/2	2-3/4	C6NC-3/4	18906	133.98	18812	133.98	18907	133.98	18908	133.98	18909	133.98	18910	133.98
7/8	1/2	3	C6NC-7/8	11441	148.31	N/A		N/A		N/A		N/A		N/A	
1	1/2	3	C6NC-1	18911	222.37	18813	222.37	18912	222.37	18913	222.37	18914	222.37	N/A	

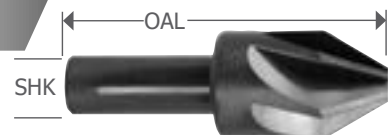
To order countersinks: Use the EDP # listed or add the angle to the end of the tool name (i.e. C6NC-1/4-90).

## 6 FLUTE • NC - HSS CNC PRECISION COUNTERSINK

HSS MULTI°

**P** **K**  
**M** **S**  
**H** **N**

- Drill and countersink with one tool.
- A thin web drill point is blended into 2 flutes of a 4 flute countersink to spot drill and countersink in one operation.
- See page 147 for Nose Diameter



### SERIES: HS6NC

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SIZE	SHK	OAL	TOOL	ANGLE/EDP#											
				60°	60° PRICE	82°	82° PRICE	90°	90° PRICE	100°	100° PRICE	110°	110° PRICE	120°	120° PRICE
3/16	3/16	1-1/2	HS6NC-3/16	18498	12.16	18499	12.16	18500	12.16	18501	12.16	18502	12.16	18503	12.16
1/4	1/4	2	HS6NC-1/4	18504	12.43	18505	12.43	18506	12.43	18507	12.43	18508	12.43	18509	12.43
5/16	1/4	2	HS6NC-5/16	18510	14.19	18511	14.19	18512	14.19	18513	14.19	18515	14.19	18516	14.19
3/8	1/4	2	HS6NC-3/8	18517	15.71	18518	15.71	18520	15.71	18521	15.71	18522	15.71	18523	15.71
1/2	3/8	2	HS6NC-1/2	18524	20.01	18525	20.01	18526	20.01	18527	20.01	18528	20.01	18529	20.01
5/8	3/8	2-1/4	HS6NC-5/8	18530	29.55	18531	29.55	18532	29.55	18534	29.55	18535	29.55	18536	29.55
3/4	1/2	2-1/4	HS6NC-3/4	18537	41.05	18538	41.05	18539	41.05	18540	41.05	18541	41.05	18542	41.05
7/8	1/2	2-3/4	HS6NC-7/8	18543	56.27	18544	56.27	18545	56.27	18547	56.27	18548	56.27	18549	56.27
1	1/2	2-3/4	HS6NC-1	18550	62.69	18551	62.69	18552	62.69	18553	62.69	18554	62.69	18555	62.69

To order countersinks: Use the EDP # listed or add the angle to the end of the tool name (i.e. HS6NC-1/4-90).



## 6 FLUTE • HSS COUNTERSINK

• See page 147 for Nose Diameter

HSS
6
MULTI°
Black Oxide
HRC <52
P M K S N

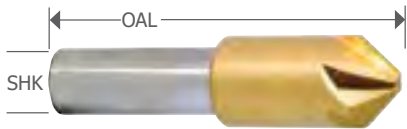
### SERIES: HS6

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SIZE	SHK	OAL	TOOL	ANGLE/EDP#											
				60°	60° PRICE	82°	82° PRICE	90°	90° PRICE	100°	100° PRICE	110°	110° PRICE	120°	120° PRICE
1/8	1/8	1-1/2	HS6-1/8	18052	9.44	18053	9.44	18054	9.44	18055	9.44	18056	9.44	18057	9.44
3/16	3/16	1-1/2	HS6-3/16	18058	9.62	18059	9.62	18060	9.62	18061	9.62	18062	9.62	18063	9.62
1/4	1/4	2	HS6-1/4	18064	10.01	18065	10.01	18066	10.01	18067	10.01	18068	10.01	18069	10.01
5/16	1/4	2	HS6-5/16	18070	11.08	18071	11.08	18072	11.08	18073	11.08	18074	11.08	18075	11.08
3/8	1/4	2	HS6-3/8	18076	11.40	18077	11.40	18078	11.40	18079	11.40	18080	11.40	18081	11.40
1/2	3/8	2	HS6-1/2	18082	13.94	18083	13.94	18084	13.94	18085	13.94	18086	13.94	18087	13.94
1/2	1/4	2	HS6-1/2 (1/4)	19310	13.94	19311	13.94	19312	13.94	N/A		N/A		N/A	
5/8	1/4	2-1/4	HS6-5/8 (1/4)	N/A		13041	20.39	N/A		N/A		N/A		N/A	
5/8	3/8	2-1/4	HS6-5/8	18088	20.39	18089	20.39	18090	20.39	18091	20.39	18092	20.39	18093	20.39
5/8	1/2	2-1/4	HS6-5/8 (1/2)	19313	20.39	19314	20.39	19315	20.39	N/A		N/A		N/A	
3/4	1/2	2-3/4	HS6-3/4	18094	28.15	18095	28.15	18096	28.15	18097	28.15	18098	28.15	18099	28.15
7/8	1/2	2-3/4	HS6-7/8	18100	41.95	18101	41.95	18102	41.95	18103	41.95	18104	41.95	18105	41.95
1	1/2	2-3/4	HS6-1	18106	45.82	18107	45.82	18108	45.82	18109	45.82	18110	45.82	18111	45.82
1-1/4	1/2	3	HS6-1-1/4	18112	83.41	18113	83.41	18114	83.41	18115	83.41	N/A		18117	83.41
1-1/4	3/4	3	HS6-1-1/4 (3/4)	19316	83.41	19317	83.41	19318	83.41	N/A		N/A		N/A	
1-1/2	3/4	3-1/2	HS6-1-1/2 **	18118	112.09	18119	112.09	18120	112.09	18121	112.09	N/A		18123	112.09
1-3/4	1	4-1/4	HS6-1-3/4	19319	179.87	19320	179.87	19321	179.87	N/A		N/A		N/A	
2	3/4	3-3/4	HS6-2 **	18124	203.33	18125	203.33	18126	203.33	18127	203.33	N/A		18129	203.33
2-1/2	3/4	5	HS6-2-1/2 **	N/A		18131	462.69	18132	462.69	N/A		N/A		N/A	
3	3/4	5-1/4	HS6-3 **	N/A		N/A		18135	573.47	N/A		N/A		N/A	

To order countersinks: Use the EDP # listed or add the angle to the end of the tool name (i.e. HS6-1/4-90).

\*\*= Drive Tang



## 6 FLUTE • HSSCo M42 COUNTERSINK

• See page 147 for Nose Diameter

HSSCo M42
6
MULTI°
TiN
HRC <52
P M K S N

### SERIES: HSP6-\_\_-T

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SIZE	SHK	OAL	TOOL	ANGLE/EDP#											
				60°	60° PRICE	82°	82° PRICE	90°	90° PRICE	100°	100° PRICE	110°	110° PRICE	120°	120° PRICE
1/8	1/8	1-1/2	HSP6-1/8-T	18182	13.19	18183	13.19	18184	13.19	18185	13.19	18186	13.19	18187	13.19
3/16	3/16	1-1/2	HSP6-3/16-T	18188	13.94	18189	13.94	18190	13.94	18191	13.94	18192	13.94	18193	13.94
1/4	1/4	2	HSP6-1/4-T	18194	14.92	18195	14.92	18196	14.92	18197	14.92	18198	14.92	18199	14.92
5/16	1/4	2	HSP6-5/16-T	18200	17.43	18201	17.43	18202	17.43	18203	17.43	18204	17.43	18205	17.43
3/8	1/4	2	HSP6-3/8-T	18206	19.09	18207	19.09	18208	19.09	18209	19.09	18210	19.09	18211	19.09
1/2	3/8	2	HSP6-1/2-T	18212	26.02	18213	26.02	18214	26.02	18215	26.02	18216	26.02	18217	26.02
5/8	3/8	2-1/4	HSP6-5/8-T	18218	36.67	18219	36.67	18220	36.67	18221	36.67	18222	36.67	18223	36.67
3/4	1/2	2-3/4	HSP6-3/4-T	18224	48.56	18225	48.56	18226	48.56	18227	48.56	18228	48.56	18229	48.56
7/8	1/2	2-3/4	HSP6-7/8-T	18230	65.58	18231	65.58	18232	65.58	18233	65.58	18234	65.58	18235	65.58
1	1/2	2-3/4	HSP6-1-T	18236	74.03	18237	74.03	18238	74.03	18239	74.03	18240	74.03	18241	74.03
1-1/4	1/2	3	HSP6-1-1/4-T	18242	120.99	18243	120.99	18244	120.99	N/A		N/A		N/A	

• Excellent for countersinking abrasive, high-strength, heat resistant, exotic, and other difficult to machine materials.

To order countersinks: Use the EDP # listed or add the angle to the end of the tool name (i.e. HSP6-1/4-90T).

# COUNTERSINKS

## 6 FLUTE • EXTENDED LENGTH COUNTERSINK



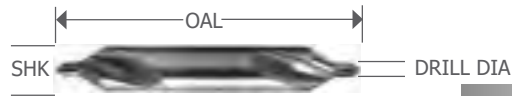
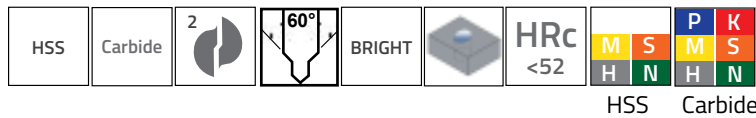
### SERIES: HS6EL

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SIZE	SHK	OAL	CORNER	TOOL	EDP	EDP PRICE
1/8	1/8	4	82°	HS6EL-1/8-82	11961	20.62
3/16	3/16	4	82°	HS6EL-3/16-82	11963	22.83
1/4	1/4	6	82°	HS6EL-1/4-82	11965	27.47
5/16	5/16	6	82°	HS6EL-5/16-82	11967	29.09
3/8	3/8	6	82°	HS6EL-3/8-82	11969	34.36
1/2	3/8	6	82°	HS6EL-1/2-82	11971	45.58
5/8	3/8	6	82°	HS6EL-5/8-82	11973	56.41
3/4	1/2	6	82°	HS6EL-3/4-82	11957	62.40
1	1/2	6	82°	HS6EL-1-82	11959	91.01

• Extended length for hard to reach applications.

## 2 FLUTE • 60° DOUBLE END COMBINED DRILL COUNTERSINK

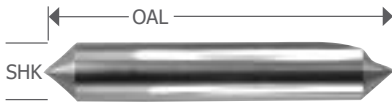


### SERIES: HSCD OR KDR

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SIZE	SHK	DRILL DIA	DRILL LENGTH	OAL	HSS TOOL	HSS BRIGHT EDP	HSS PRICE	CARBIDE TOOL	CARBIDE BRIGHT EDP	CARBIDE PRICE
00	1/8	0.025	0.030	1-1/2	HSCD-00*	11587	8.79	KDR-00	17362	18.51
0	1/8	1/32	0.038	1-1/2	HSCD-0*	11589	8.79	KDR-0	17363	17.36
1	1/8	3/64	3/64	1-1/2	HSCD-1*	11591	6.57	KDR-1	17364	14.22
2	3/16	5/64	5/64	2	HSCD-2**	11593	7.00	KDR-2	17365	22.54
3	1/4	7/64	7/64	2	HSCD-3	11595	7.24	KDR-3	17366	26.89
4	5/16	1/8	1/8	2-1/8	HSCD-4	11597	7.54	KDR-4	17367	36.87
5	7/16	3/16	3/16	2-3/4	HSCD-5	11599	12.59	KDR-5	17368	58.30
6	1/2	7/32	7/32	3	HSCD-6	11601	18.94	KDR-6	17369	79.56
7	5/8	1/4	1/4	3-1/4	HSCD-7	11603	34.18	KDR-7	10611	154.94
8	3/4	5/16	5/16	3-1/2	HSCD-8	11605	42.26	KDR-8	10613	207.18

• For centering and spot drilling applications when high accuracy is necessary  
 \* = 1-1/4 OAL  
 \*\* = 1-7/8 OAL



## 1 FLUTE • DOUBLE END CARBIDE COUNTERSINK

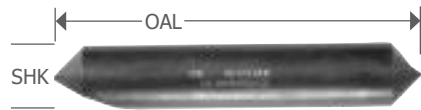


### SERIES: DC1

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SIZE	SHK	OAL	TOOL	ANGLE/EDP#											
				60°	60° PRICE	82°	82° PRICE	90°	90° PRICE	100°	100° PRICE	110°	110° PRICE	120°	120° PRICE
1/8	1/8	1-1/2	DC1-1/8	18408	23.77	18409	23.77	18410	23.77	18411	23.77	10919	23.77	18412	23.77
3/16	3/16	2	DC1-3/16	18413	30.58	18414	30.58	18415	30.58	18416	30.58	10921	30.58	18417	30.58
1/4	1/4	2	DC1-1/4	18418	38.59	18419	38.59	18420	38.59	18421	38.59	10923	38.59	18422	38.59
5/16	5/16	2-1/2	DC1-5/16	18423	61.83	18424	61.83	18425	61.83	18426	61.83	10925	61.83	18427	61.83
3/8	3/8	2-1/2	DC1-3/8	18428	73.39	18429	73.39	18430	73.39	18431	73.39	10927	73.39	18432	73.39
1/2	1/2	3	DC1-1/2	18433	103.35	18434	103.35	18435	103.35	18436	103.35	10929	103.35	18437	103.35
5/8	5/8	3-1/2	DC1-5/8	18438	137.07	18439	137.07	18440	137.07	18441	137.07	10931	137.07	18442	137.07
3/4	3/4	4	DC1-3/4	18443	195.79	18444	195.79	18445	195.79	18446	195.79	10933	195.79	18447	195.79

To order countersinks: Use the EDP # listed or add the angle to the end of the tool name (i.e. DC1-1/4-90).



## 1 FLUTE • DOUBLE END HSS COUNTERSINK



### SERIES: DHS1

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SIZE	SHK	OAL	TOOL	ANGLE/EDP#											
				60°	60° PRICE	82°	82° PRICE	90°	90° PRICE	100°	100° PRICE	110°	110° PRICE	120°	120° PRICE
1/8	1/8	1-1/2	DHS1-1/8	18248	13.42	18249	13.42	18250	13.42	18251	13.42	10905	13.42	18252	13.42
3/16	3/16	2	DHS1-3/16	18253	14.46	18254	14.46	18255	14.46	18256	14.46	10907	14.46	18257	14.46
1/4	1/4	2	DHS1-1/4	18258	14.94	18259	14.94	18260	14.94	18261	14.94	10909	14.94	18262	14.94
5/16	5/16	2-1/2	DHS1-5/16	18263	16.97	18264	16.97	18265	16.97	18266	16.97	10911	16.97	18267	16.97
3/8	3/8	2-1/2	DHS1-3/8	18268	19.00	18269	19.00	18270	19.00	18271	19.00	10913	19.00	18272	19.00
1/2	1/2	3	DHS1-1/2	18273	23.69	18274	23.69	18275	23.69	18276	23.69	19163	23.69	18277	23.69
5/8	5/8	3-1/2	DHS1-5/8	18278	34.22	18279	34.22	18280	34.22	18281	34.22	10915	34.22	18282	34.22
3/4	3/4	4	DHS1-3/4	18283	49.05	18284	49.05	18285	49.05	18286	49.05	10917	49.05	18287	49.05

To order countersinks: Use the EDP # listed or add the angle to the end of the tool name (i.e. DHS1-1/4-90).

## 4 FLUTE • DOUBLE END CARBIDE DRILL POINT COUNTERSINK



### SERIES: DC4DP

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SIZE	SHK	OAL	TOOL	ANGLE/EDP#											
				60°	60° PRICE	82°	82° PRICE	90°	90° PRICE	100°	100° PRICE	110°	110° PRICE	120°	120° PRICE
1/8	1/8	1-1/2	DC4DP-1/8	18992	30.14	18833	30.14	18994	30.14	18996	30.14	18998	30.14	19000	30.14
3/16	3/16	2	DC4DP-3/16	19002	39.68	18835	39.68	19004	39.68	19006	39.68	19008	39.68	19010	39.68
1/4	1/4	2	DC4DP-1/4	19012	50.27	18837	50.27	19014	50.27	19016	50.27	19018	50.27	19020	50.27
5/16	5/16	2-1/2	DC4DP-5/16	19022	78.34	19071	78.34	19024	78.34	19026	78.34	19028	78.34	19030	78.34
3/8	3/8	2-1/2	DC4DP-3/8	19032	94.57	18840	94.57	19034	94.57	19036	94.57	19038	94.57	19040	94.57
1/2	1/2	3	DC4DP-1/2	19042	129.23	18842	129.23	19044	129.23	19046	129.23	19048	129.23	19050	129.23
5/8	5/8	3-1/2	DC4DP-5/8	19052	181.24	18843	181.24	19054	181.24	19056	181.24	19058	181.24	19060	181.24
3/4	3/4	4	DC4DP-3/4	19061	242.34	18845	242.34	19063	242.34	19065	242.34	19067	242.34	19069	242.34

- Drill and countersink with one tool.
  - Can save setup and production time by combining two operations into one.
- To order countersinks: Use the EDP # listed or add the angle to the end of the tool name (i.e. DHS1-1/4-90).

# COUNTERSINKS

## 4 FLUTE • DOUBLE END CARBIDE COUNTERSINK



Carbide MULTI° BRIGHT HRC <52

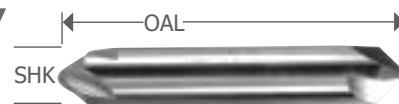
### SERIES: DC4

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SIZE	SHK	OAL	TOOL	ANGLE/EDP#											
				60°	60° PRICE	82°	82° PRICE	90°	90° PRICE	100°	100° PRICE	110°	110° PRICE	120°	120° PRICE
1/8	1/8	1-1/2	DC4-1/8	18991	23.77	18832	23.77	18993	23.77	18995	23.77	18997	23.77	18999	23.77
3/16	3/16	2	DC4-3/16	19001	30.58	18834	30.58	19003	30.58	19005	30.58	N/A		19009	30.58
1/4	1/4	2	DC4-1/4	19011	38.59	18836	38.59	19013	38.59	19015	38.59	19017	38.59	19019	38.59
5/16	5/16	2-1/2	DC4-5/16	19021	61.83	18838	61.83	19023	61.83	19025	61.83	19027	61.83	19029	61.83
3/8	3/8	2-1/2	DC4-3/8	19031	73.39	18839	73.39	19033	73.39	19035	73.39	19037	73.39	19039	73.39
1/2	1/2	3	DC4-1/2	19041	103.35	18841	103.35	19043	103.35	19045	103.35	19047	103.35	19049	103.35
5/8	5/8	3-1/2	DC4-5/8	19051	137.07	18479	137.07	19053	137.07	19055	137.07	19057	137.07	19059	137.07
3/4	3/4	4	DC4-3/4	19072	195.79	18844	195.79	19062	195.79	19064	195.79	19066	195.79	19068	195.79

To order countersinks: Use the EDP # listed or add the angle to the end of the tool name (i.e. DC4-1/4-90).

## 4 FLUTE • DOUBLE END HSS COUNTERSINK



HSS MULTI° BRIGHT HRC <52

### SERIES: DHS4

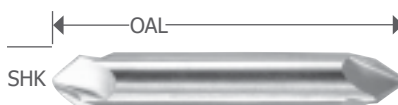
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SIZE	SHK	OAL	TOOL	ANGLE/EDP#											
				60°	60° PRICE	82°	82° PRICE	90°	90° PRICE	100°	100° PRICE	110°	110° PRICE	120°	120° PRICE
1/8	1/8	1-1/2	DHS4-1/8	18711	14.85	18713	14.85	18715	14.85	18717	14.85	18719	14.85	18721	14.85
3/16	3/16	2	DHS4-3/16	18723	15.18	18725	15.18	18727	15.18	18729	15.18	18731	15.18	18733	15.18
1/4	1/4	2	DHS4-1/4	18735	15.76	18737	15.76	18739	15.76	18741	15.76	18743	15.76	18745	15.76
5/16	5/16	2-1/2	DHS4-5/16	18747	18.28	18749	18.28	18751	18.28	18753	18.28	18755	18.28	18757	18.28
3/8	3/8	2-1/2	DHS4-3/8	18759	20.36	18761	20.36	18763	20.36	18765	20.36	18767	20.36	18769	20.36
1/2	1/2	3	DHS4-1/2	18771	25.54	18773	25.54	18775	25.54	18777	25.54	18779	25.54	18781	25.54
5/8	5/8	3-1/2	DHS4-5/8	18783	37.01	18785	37.01	18787	37.01	18789	37.01	18791	37.01	18793	37.01
3/4	3/4	4	DHS4-3/4	18795	51.50	18797	51.50	18799	51.50	18801	51.50	18803	51.50	18805	51.50

To order countersinks: Use the EDP # listed or add the angle to the end of the tool name (i.e. DHS4-1/4-90).

## 4 FLUTE • DOUBLE END HSS DRILL POINT COUNTERSINK

HSS BRIGHT HRC <52



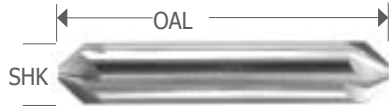
### SERIES: DHS4DP

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SIZE	SHK	OAL	TOOL	ANGLE/EDP#											
				60°	60° PRICE	82°	82° PRICE	90°	90° PRICE	100°	100° PRICE	110°	110° PRICE	120°	120° PRICE
1/8	1/8	1-1/2	DHS4DP-1/8	18712	19.00	18714	19.00	18716	19.00	18718	19.00	18720	19.00	18722	19.00
3/16	3/16	2	DHS4DP-3/16	18724	20.14	18726	20.14	18728	20.14	18730	20.14	18732	20.14	18734	20.14
1/4	1/4	2	DHS4DP-1/4	18736	21.20	18738	21.20	18740	21.20	18742	21.20	18744	21.20	18746	21.20
5/16	5/16	2-1/2	DHS4DP-5/16	18748	24.84	18750	24.84	18752	24.84	18754	24.84	18756	24.84	18758	24.84
3/8	3/8	2-1/2	DHS4DP-3/8	18760	29.07	18762	29.07	18764	29.07	18766	29.07	18768	29.07	18770	29.07
1/2	1/2	3	DHS4DP-1/2	18772	37.28	18774	37.28	18776	37.28	18778	37.28	18780	37.28	18782	37.28
5/8	5/8	3-1/2	DHS4DP-5/8	18784	53.68	18786	53.68	18788	53.68	18790	53.68	18792	53.68	18794	53.68
3/4	3/4	4	DHS4DP-3/4	18796	72.26	18798	72.26	18800	72.26	18802	72.26	18804	72.26	18806	72.26

To order countersinks: Use the EDP # listed or add the angle to the end of the tool name (i.e. DHS4DP-1/4-90).





## 6 FLUTE • DOUBLE END CARBIDE COUNTERSINK

• See page 147 for Nose Diameter

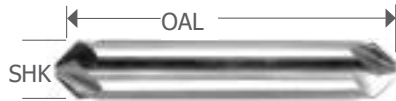
Carbide MULTI BRIGHT HRC <52 P M H K S N

### SERIES: DC6

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SIZE	SHK	OAL	TOOL	ANGLE/EDP#											
				60°	60° PRICE	82°	82° PRICE	90°	90° PRICE	100°	100° PRICE	110°	110° PRICE	120°	120° PRICE
1/8	1/8	1-1/2	DC6-1/8	18448	23.77	18449	23.77	18450	23.77	18451	23.77	N/A		18452	23.77
3/16	3/16	2	DC6-3/16	18453	30.58	18454	30.58	18455	30.58	18456	30.58	N/A		18457	30.58
1/4	1/4	2	DC6-1/4	18458	38.59	18459	38.59	18460	38.59	18461	38.59	19073	38.59	18462	38.59
5/16	5/16	2-1/2	DC6-5/16	18463	61.83	18464	61.83	18465	61.83	18466	61.83	N/A		18467	61.83
3/8	3/8	2-1/2	DC6-3/8	18468	73.39	18469	73.39	18470	73.39	18471	73.39	N/A		18472	73.39
1/2	1/2	3	DC6-1/2	18473	103.35	18474	103.35	18475	103.35	18476	103.35	N/A		18477	103.35
5/8	5/8	3-1/2	DC6-5/8	18478	137.07	18820	137.07	18480	137.07	18481	137.07	N/A		18482	137.07
3/4	3/4	4	DC6-3/4	18483	195.79	18484	195.79	18485	195.79	18486	195.79	N/A		18487	195.79

To order countersinks: Use the EDP # listed or add the angle to the end of the tool name (i.e. DC6-1/4-90).



## 4 FLUTE • DOUBLE END HSS COUNTERSINK

HSS MULTI BRIGHT HRC <52 P M H K S N

### SERIES: DHS6

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SIZE	SHK	OAL	TOOL	ANGLE/EDP#											
				60°	60° PRICE	82°	82° PRICE	90°	90° PRICE	100°	100° PRICE	110°	110° PRICE	120°	120° PRICE
1/8	1/8	1-1/2	DHS6-1/8	18288	14.85	18289	14.85	18290	14.85	18291	14.85	19162	14.85	18292	14.85
3/16	3/16	2	DHS6-3/16	18293	15.18	18294	15.18	18295	15.18	18296	15.18	18558	15.18	18297	15.18
1/4	1/4	2	DHS6-1/4	18298	15.76	18299	15.76	18300	15.76	18301	15.76	18560	15.76	18302	15.76
5/16	5/16	2-1/2	DHS6-5/16	18303	18.28	18304	18.28	18305	18.28	18306	18.28	18562	18.28	18307	18.28
3/8	3/8	2-1/2	DHS6-3/8	18308	20.36	18309	20.36	18310	20.36	18311	20.36	N/A		18312	20.36
1/2	1/2	3	DHS6-1/2	18313	25.54	18314	25.54	18315	25.54	18316	25.54	N/A		18317	25.54
5/8	5/8	3-1/2	DHS6-5/8	18318	37.01	18319	37.01	18320	37.01	18321	37.01	N/A		18322	37.01
3/4	3/4	4	DHS6-3/4	18323	51.50	18324	51.50	18325	51.50	18326	51.50	N/A		18327	51.50

To order countersinks: Use the EDP # listed or add the angle to the end of the tool name (i.e. DHS6-1/4-90).



## COUNTERSINK SETS

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HSS						
PCS	ANGLE	FLT	MATERIAL	SIZES	EDP	EDP PRICE
4	82	0	HSS	1/4, 7/16, 9/16, 13/16"	19170	71.11
5	82	1	HSS	1/4 to 1"	19169	72.54
5	90	1	HSS	1/4 to 1"	19168	72.54
6	82	6	HSS	1/4 to 1"	19167	100.47
8	60	6	HSS	1/4 to 1"	90022	184.55
8	82	6	HSS	1/4 to 1"	90023	184.55
8	90	6	HSS	1/4 to 1"	90021	184.55
10	60	6	HSS	1/4 to 1-1/2"	90024	379.16
10	82	6	HSS	1/4 to 1-1/2"	90025	379.16
10	90	6	HSS	1/4 to 1-1/2"	90020	379.16

CARBIDE						
PCS	ANGLE	FLT	MATERIAL	SIZES	EDP	EDP PRICE
5	60	1	CARBIDE	1/4 to 1"	90026	410.50
5	82	1	CARBIDE	1/4 to 1"	90027	410.50
5	90	1	CARBIDE	1/4 to 1"	90028	410.50
5	60	6	CARBIDE	1/4 to 1"	15545	410.50
5	82	6	CARBIDE	1/4 to 1"	15547	410.50
5	90	6	CARBIDE	1/4 to 1"	15549	410.50
8	60	6	CARBIDE	1/4 to 1"	90029	699.70
8	82	6	CARBIDE	1/4 to 1"	90030	699.70
8	90	6	CARBIDE	1/4 to 1"	90031	699.70

## MULTIPLE SHAPE • GENERAL PURPOSE CARBIDE BURS

**Series: SA** - DOUBLE CUT  
CYLINDRICAL NO ENDCUT



DIA	SHK	LOC	OAL	TOOL	BRIGHT EDP	BRIGHT PRICE
3/32	1/8	7/16	1-1/2	SA-42DC	13489	5.42
1/8	1/8	9/16	1-1/2	SA-43DC	13490	5.42
1/4	1/8	1/2	2	SA-51DC	13491	9.28
1/4	1/4	5/8	2	SA-1DC	13492	10.11
3/8	1/4	3/4	2-1/2	SA-3DC	13493	13.77
1/2	1/4	1	2-3/4	SA-5DC	13494	22.11
5/8	1/4	1	2-3/4	SA-6DC	13495	27.98
3/4	1/4	1	2-3/4	SA-7DC	13496	41.79
1	1/4	1	2-3/4	SA-9DC	13497	60.30

**Series: SB** - DOUBLE CUT  
CYLINDRICAL WITH ENDCUT



DIA	SHK	LOC	OAL	TOOL	BRIGHT EDP	BRIGHT PRICE
1/8	1/8	9/16	1-1/2	SB-43DC	13498	5.42
1/4	1/8	3/16	2-15/16	SB-51DC	13499	9.28
1/4	1/4	5/8	2	SB-1DC	13500	10.96
3/8	1/4	3/4	2-1/2	SB-3DC	13501	15.12
1/2	1/4	1	2-3/4	SB-5DC	13502	24.56
5/8	1/4	1	2-3/4	SB-6DC	13503	30.63
3/4	1/4	1	2-3/4	SB-7DC	13504	44.67
1	1/4	1	2-3/4	SB-9DC	13505	67.00

**Series: SC** - DOUBLE CUT  
RADIUS CYLINDRICAL



DIA	SHK	LOC	OAL	TOOL	BRIGHT EDP	BRIGHT PRICE
3/32	1/8	7/16	1-1/2	SC-41DC	13506	5.42
1/8	1/8	9/16	1-1/2	SC-42DC	13507	5.42
1/4	1/8	1/2	2	SC-51DC	13508	9.28
1/4	1/4	5/8	2	SC-1DC	13509	11.59
3/8	1/4	3/4	2-1/2	SC-3DC	13510	15.34
1/2	1/4	1	2-3/4	SC-5DC	13511	24.56
5/8	1/4	1	2-3/4	SC-6DC	13512	31.26
3/4	1/4	1	2-3/4	SC-7DC	13513	44.67

**Series: SD** - DOUBLE CUT  
BALL SHAPE



DIA	SHK	LOC	OAL	TOOL	BRIGHT EDP	BRIGHT PRICE
1/8	1/8	1/8	1-1/2	SD-42DC	13514	5.42
1/4	1/8	7/32	2	SD-51DC	13515	9.28
1/4	1/4	7/32	2	SD-1DC	13516	11.15
3/8	1/4	5/16	2-1/8	SD-3DC	13517	13.68
1/2	1/4	7/16	2-1/4	SD-5DC	13518	17.86
5/8	1/4	9/16	2-3/8	SD-6DC	13519	22.33
3/4	1/4	11/16	2-1/2	SD-7DC	13520	30.42
1	1/4	15/16	2-3/4	SD-9DC	13521	49.97

**Series: SE** - DOUBLE CUT  
OVAL SHAPE



DIA	SHK	LOC	OAL	TOOL	BRIGHT EDP	BRIGHT PRICE
1/8	1/8	7/32	1-1/2	SE-41DC	13522	5.42
1/4	1/8	3/8	1-3/4	SE-51DC	13523	9.28
1/4	1/4	3/8	2	SE-1DC	13524	13.77
3/8	1/4	5/8	2-3/8	SE-3DC	13525	17.00
1/2	1/4	7/8	2-5/8	SE-5DC	13526	24.56
5/8	1/4	1	2-3/4	SE-6DC	13527	34.78
3/4	1/4	1	2-3/4	SE-7DC	13528	44.67

**Series: SF** - DOUBLE CUT  
TREE SHAPE



DIA	SHK	LOC	OAL	TOOL	BRIGHT EDP	BRIGHT PRICE
1/8	1/8	1/4	1-1/2	SF-41DC	13529	5.42
1/8	1/8	1/2	1-1/2	SF-42DC	13530	5.42
1/4	1/4	5/8	2	SF-1DC	13531	12.52
3/8	1/4	3/4	2-1/2	SF-3DC	13532	15.77
1/2	1/4	1	2-3/4	SF-5DC	13533	22.75
5/8	1/4	1	2-3/4	SF-6DC	13534	32.64
3/4	1/4	1	2-3/4	SF-7DC	13535	43.07

**Series: SG** - DOUBLE CUT  
POINTED TREE SHAPE



DIA	SHK	LOC	OAL	TOOL	BRIGHT EDP	BRIGHT PRICE
1/8	1/8	1/4	1-1/2	SG-41DC	13536	5.42
1/8	1/8	3/8	1-1/2	SG-43DC	13537	5.42
1/4	1/8	1/2	2	SG-51DC	13538	9.28
1/4	1/4	5/8	2	SG-1DC	13539	12.52
3/8	1/4	3/4	2-1/2	SG-3DC	13540	15.77
1/2	1/4	1	2-3/4	SG-5DC	13541	22.75
5/8	1/4	1	2-3/4	SG-6DC	13542	32.64
3/4	1/4	1	2-3/4	SG-7DC	13543	43.07

**Series: SH** - DOUBLE CUT  
FLAME SHAPE



DIA	SHK	LOC	OAL	TOOL	BRIGHT EDP	BRIGHT PRICE
1/8	1/8	1/4	1-1/2	SH-41DC	13544	5.42
1/4	1/4	1/2	2	SH-1DC	13545	13.77
1/2	1/4	1-1/4	3	SH-5DC	13546	32.11
5/8	1/4	1-7/16	3-3/16	SH-6DC	13547	46.25
3/4	1/4	1-5/8	3-3/8	SH-7DC	13548	67.00

# GENERAL PURPOSE CARBIDE END MILL

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## MULTIPLE SHAPE • GENERAL PURPOSE CARBIDE BURS

**Series: SJ** - SINGLE CUT  
60° INCLUDED CONE



DIA	SHK	LOC	OAL	TOOL	BRIGHT EDP	BRIGHT PRICE
1/8	1/8	3/32	1-1/2	<b>SJ-42SC</b>	13586	5.11
1/4	1/4	3/16	2	<b>SJ-1SC</b>	13549	10.84
3/8	1/4	5/16	2-1/16	<b>SJ-3SC</b>	13550	13.35
1/2	1/4	7/16	2-3/16	<b>SJ-5SC</b>	13551	16.81
5/8	1/4	9/16	2-5/16	<b>SJ-6SC</b>	13552	22.11
3/4	1/4	11/16	2-7/16	<b>SJ-7SC</b>	13553	29.65
1	1/4	15/16	2-9/16	<b>SJ-9SC</b>	13554	46.79

**Series: SK** - SINGLE CUT  
90° INCLUDED CONE



DIA	SHK	LOC	OAL	TOOL	BRIGHT EDP	BRIGHT PRICE
1/8	1/8	1/16	1-1/2	<b>SK-42SC</b>	13555	5.11
1/4	1/4	1/8	2	<b>SK-1SC</b>	13556	10.84
3/8	1/4	3/16	1-15/16	<b>SK-3SC</b>	13557	13.35
1/2	1/4	1/4	2	<b>SK-5SC</b>	13558	16.81
5/8	1/4	5/16	2-1/16	<b>SK-6SC</b>	13559	22.11
3/4	1/4	3/8	2-1/8	<b>SK-7SC</b>	13560	29.65
1	1/4	1/2	2-1/4	<b>SK-9SC</b>	13561	46.79

**Series: SL** - DOUBLE CUT  
8° OR 14° INCLUDED CONE



DIA	SHK	LOC	OAL	TOOL	BRIGHT EDP	BRIGHT PRICE
1/8	1/8	3/8	1-1/2	<b>SL-41DC</b>	13562	5.42
1/8	1/8	1/2	1-1/2	<b>SL-42DC</b>	13563	5.42
1/4	1/4	5/8	2	<b>SL-1DC</b>	13564	12.62
3/8	1/4	1-1/16	2-13/16	<b>SL-3DC</b>	13565	19.10
1/2	1/4	1-1/8	2-7/8	<b>SL-4DC</b>	13566	24.78
5/8	1/4	1-5/16	3-1/16	<b>SL-6DC</b>	13567	43.49
3/4	1/4	1-1/2	3-1/4	<b>SL-7DC</b>	13568	62.53

**Series: SM** - DOUBLE CUT  
POINTED CONE SHAPE



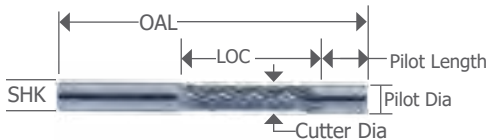
DIA	SHK	LOC	OAL	TOOL	BRIGHT EDP	BRIGHT PRICE
1/8	1/8	11/32	1-1/2	<b>SM-41DC</b>	13569	5.42
1/8	1/8	7/16	1-1/2	<b>SM-42DC</b>	13570	5.42
1/8	1/8	5/8	1-1/2	<b>SM-43DC</b>	13571	5.42
1/4	1/8	1/2	2-1/8	<b>SM-51DC</b>	13572	12.21
1/4	1/4	1/2	2	<b>SM-1DC</b>	13573	13.14
1/4	1/4	3/4	2	<b>SM-2DC</b>	13574	13.98
1/4	1/4	1	2	<b>SM-3DC</b>	13575	18.77
3/8	1/4	5/8	2-3/8	<b>SM-4DC</b>	13576	18.77
1/2	1/4	7/8	2-5/8	<b>SM-5DC</b>	13577	24.56
5/8	1/4	1	2-3/4	<b>SM-6DC</b>	13578	38.17

**Series: SN** - DOUBLE CUT  
INVERTED CONE SHAPE



DIA	SHK	LOC	OAL	ANGLE	TOOL	BRIGHT EDP	BRIGHT PRICE
1/8	1/8	3/16	1-1/2	10°	<b>SN-42DC</b>	13579	5.42
1/4	1/8	1/4	1-3/4	10°	<b>SN-51DC</b>	13580	9.28
1/4	1/4	5/16	2	10°	<b>SN-1DC</b>	13581	11.26
1/2	1/4	1/2	2-1/4	16°	<b>SN-3DC</b>	13582	21.90
1/2	1/4	1/2	2-1/4	28°	<b>SN-4DC</b>	13583	22.75
5/8	1/4	3/4	2-1/2	18°	<b>SN-6DC</b>	13584	32.64
3/4	1/4	5/8	2-3/8	30°	<b>SN-7DC</b>	13585	38.40

## DOUBLE CUT • CYLINDRICAL PILOT DIE TRIMMERS



PILOT DIA	CUTTER DIA	SHK	LOC	OAL	PILOT LENGTH	TOOL	BRIGHT EDP	BRIGHT PRICE
1/8	1/8	1/8	1	2-1/2	1/2	<b>PDM-1/8</b>	H7315	29.20
1/8	1/8	1/8	1	3	1/2	<b>PDM-1/8-L</b>	H7429	30.75
3/16	3/16	3/16	1	2-1/2	1/2	<b>PDM-3/16</b>	H7430	32.27
1/4	1/4	1/4	1	2-1/2	1/2	<b>PDM-1/4</b>	H7316	32.99
1/4	1/4	1/4	1	3	1/2	<b>PDM-1/4-L</b>	H7431	34.68
3/8	3/8	3/8	1	2-1/2	1/2	<b>PDM-3/8</b>	H7432	39.63
1/2	1/2	1/2	1	2-1/2	1/2	<b>PDM-1/2</b>	H7433	51.16

## General Purpose Carbide End Mills

### SERIES: General Purpose Carbide End Mills

MATERIAL	CONDITIONS	CUTTING DIAMETER											
		1/8"	1/4"	5/16"	3/8"	1/2"	5/8"	3/4"	1"	CHIP PER TOOTH			
		Under 32 HRc	Over 32 HRc										
<b>STAINLESS STEELS ISO-M</b>													
<b>Precipitation</b> 13-8, 15-5, 17-4PH	Slotting .5 x Dia.	110-200	80-115	0.0005	0.0010	0.0012	0.0014	0.0020	0.0025	0.0030	0.0040		
	Profiling ≤ .5 x Dia.	110-200	80-115	0.0006	0.0012	0.0015	0.0018	0.0025	0.0031	0.0038	0.0050		
<b>Austenitic</b> 302, 303, 304L, 316L	Slotting .5 x Dia.	150-275	80-180	0.0005	0.0011	0.0014	0.0016	0.0023	0.0029	0.0035	0.0046		
	Profiling ≤ .5 x Dia.	150-275	80-180	0.0007	0.0014	0.0018	0.0021	0.0030	0.0038	0.0045	0.0060		
<b>Martensitic</b> 403, 410, 416	Slotting .5 x Dia.	200-400	80-160	0.0005	0.0011	0.0014	0.0016	0.0023	0.0029	0.0035	0.0046		
	Profiling ≤ .5 x Dia.	200-400	80-160	0.0007	0.0014	0.0018	0.0021	0.0030	0.0038	0.0045	0.0060		
<b>HIGH TEMP ALLOYS ISO-S</b>													
<b>Cobalt Base</b> Stellite, Haynes 25, 188, X-40, L-605	Slotting .5 x Dia.	60-125	60-125	0.0004	0.0007	0.0009	0.0011	0.0015	0.0019	0.0023	0.0030		
	Profiling ≤ .5 x Dia.	60-125	60-125	0.0005	0.0010	0.0012	0.0014	0.0020	0.0025	0.0030	0.0040		
<b>Nickel Base</b> Inconel 600, 625, 718, Nickel 200, 270, Invar, Monel 400, 405, K-Monel, PermaNickel 300, Incoly 600	Slotting .5 x Dia.	60-125	60-125	0.0004	0.0007	0.0009	0.0011	0.0015	0.0019	0.0023	0.0030		
	Profiling ≤ .5 x Dia.	60-125	60-125	0.0005	0.0010	0.0012	0.0014	0.0020	0.0025	0.0030	0.0040		
<b>Iron Base</b> Incoloy 800-802, Multimet N-155, Timken 16-26-6	Slotting .5 x Dia.	60-125	60-125	0.0004	0.0007	0.0009	0.0011	0.0015	0.0019	0.0023	0.0030		
	Profiling ≤ .5 x Dia.	60-125	60-125	0.0005	0.0010	0.0012	0.0014	0.0020	0.0025	0.0030	0.0040		
<b>STEELS ISO-P</b>													
<b>High Strength Steels</b> 4140, 4340, 52100	Slotting .5 x Dia.	150-300	80-180	0.0005	0.0010	0.0012	0.0014	0.0020	0.0025	0.0030	0.004		
	Profiling ≤ .5 x Dia.	150-300	80-180	0.0006	0.0010	0.0012	0.0018	0.0025	0.0031	0.0038	0.005		
<b>High Alloy Steels - Mold &amp; Die</b> A-2, P20, 01, 02, D2, H-13	Slotting .5 x Dia.	150-275	80-185	0.0005	0.0010	0.0012	0.0014	0.0020	0.0025	0.0030	0.004		
	Profiling ≤ .5 x Dia.	150-275	80-185	0.0006	0.0010	0.0012	0.0018	0.0025	0.0031	0.0038	0.005		
<b>Medium Alloy Steels</b> 200, 250, 300	Slotting .5 x Dia.	175-350	100-225	0.0005	0.0010	0.0012	0.0014	0.0020	0.0025	0.0030	0.004		
	Profiling ≤ .5 x Dia.	175-350	100-225	0.0006	0.0010	0.0012	0.0018	0.0025	0.0031	0.0038	0.005		
<b>Low Alloy Steels-Maraging</b> 10XX, 11XX, 13XX	Slotting .5 x Dia.	200-450	100-250	0.0006	0.0012	0.0015	0.0018	0.0025	0.0031	0.0038	0.005		
	Profiling ≤ .5 x Dia.	200-450	100-250	0.0007	0.0014	0.0018	0.0021	0.0030	0.0038	0.0045	0.006		
<b>CAST IRONS ISO-K</b>													
<b>Ductile Iron</b> Ductile Cast Iron	Slotting .5 x Dia.	120-325	80-140	0.0005	0.0010	0.0012	0.0014	0.0020	0.0025	0.0030	0.0040		
	Profiling ≤ .5 x Dia.	120-325	80-140	0.0006	0.0012	0.0015	0.0018	0.0025	0.0031	0.0038	0.0050		
<b>Cast Iron</b> Grey Cast Iron	Slotting .5 x Dia.	250-425	125-285	0.0005	0.0010	0.0012	0.0014	0.0020	0.0025	0.0030	0.0040		
	Profiling ≤ .5 x Dia.	250-425	125-285	0.0006	0.0012	0.0015	0.0018	0.0025	0.0031	0.0038	0.0050		
<b>TITANIUMS ISO-S</b>													
<b>Titanium Alloys</b> 6AL-4V, ASTM 1, 2, 3, 6AL-2S For 5553, decrease SFM and IPM by 25%	Slotting .5 x Dia.	140-200	90-145	0.0005	0.0010	0.0012	0.0014	0.0020	0.0025	0.0030	0.0040		
	Profiling ≤ .5 x Dia.	140-200	90-145	0.0006	0.0012	0.0015	0.0018	0.0025	0.0031	0.0038	0.0050		
<b>ALUMINUM ISO-N</b>													
<b>Aluminum Alloys</b> 6061-T6, 7075	Slotting .5 x Dia.	600-1000	NA	0.0006	0.0012	0.0015	0.0018	0.003	0.005	0.006	0.0080		
	Profiling ≤ .5 x Dia.	600-1000	NA	0.0007	0.0014	0.0018	0.0025	0.0035	0.006	0.0068	0.0100		

All technical data provided are suggested starting points. They may be increased or decreased depending on machine condition, depth of cut, finish required, coolant, etc. Call our TECHNICAL SERVICE TEAM with questions.

### SERIES: CCFPM, CCRPM, CCPM

MATERIAL	CONDITION	SFM		CUTTING DIAMETER						
				1/8-3/16"	1/4-3/8"	1/2-3/4"	7/8-1-1/8"	1-1/4-1-1/2"	1-5/8-2"	
		Uncoated	Coated	CHIP PER TOOTH						
<b>STAINLESS STEELS ISO-M</b>										
	Slotting	30-100	40-140	.0007-.0010	.0010-.0015	.0020-.0032	.0036-.0042	.0050-.0068	.0070-.0090	
	Heavy Profiling	30-100	40-140	.0008-.0013	.0015-.0020	.0022-.0032	.0034-.0047	.0052-.0072	.0073-.0097	
<b>HIGH TEMP ALLOYS ISO-S</b>										
	Slotting	15-50	20-65	.0005-.0007	.0008-.0011	.0015-.0019	.0019-.0027	.0030-.0040	.0043-.0054	
	Heavy Profiling	15-50	20-65	.0005-.0007	.0008-.0011	.0015-.0019	.0019-.0027	.0030-.0040	.0043-.0054	
<b>STEELS ISO-P</b>										
	Slotting	40-120	50-170	.0006-.0009	.0010-.0015	.0020-.0026	.0026-.0038	.0046-.0060	.0072-.0100	
	Heavy Profiling	40-120	50-170	.0007-.0013	.0013-.0019	.0023-.0030	.0032-.0042	.0048-.0062	.0076-.0120	
<b>TITANIUM ISO-S</b>										
	Slotting	40-85	50-115	.0007-.0010	.0013-.0019	.0025-.0037	.0039-.0042	.0043-.0050	.0052-.0060	
	Heavy Profiling	40-85	50-115	.0007-.0013	.0015-.0021	.0027-.0039	.0042-.0045	.0046-.0052	.0053-.0064	
<b>ALUMINUM ISO-N</b>										
	Slotting	450-650	550-775	.0010-.0020	.0024-.0038	.0042-.0070	.0072-.0110	.0115-.0190	.0195-.0220	
	Heavy Profiling	450-650	550-775	.0014-.0022	.0027-.0040	.0046-.0080	.0080-.0130	.0135-.021	.0220-.0300	

### SERIES: VHPM

MATERIAL	CONDITION	SFM		CUTTING DIAMETER						
				3/8"	1/2"	5/8"	3/4"	1"	1-1/4"	
				CHIP PER TOOTH						
<b>STAINLESS STEELS ISO-M</b>										
	Slotting	40-150		0.0016	0.0022	0.0026	0.0033	0.0046	0.0057	
	Heavy Profiling	40-150		0.0020	0.0026	0.0031	0.0037	0.0052	0.0063	
<b>HIGH TEMP ALLOYS ISO-S</b>										
	Slotting	20-80		0.0011	0.0017	0.0019	0.0021	0.0028	0.0037	
	Heavy Profiling	20-80		0.0011	0.0017	0.002	0.0022	0.0032	0.0041	
<b>STEELS ISO-P</b>										
	Slotting	50-200		0.0015	0.0021	0.0024	0.0027	0.0037	0.0047	
	Heavy Profiling	50-200		0.0015	0.0021	0.0026	0.0030	0.0040	0.0052	
<b>TITANIUM ISO-S</b>										
	Slotting	50-115		0.0016	0.0021	0.0025	0.0030	0.0042	0.0054	
	Heavy Profiling	50-115		0.0018	0.0024	0.0029	0.0034	0.0047	0.0059	

All technical data provided are suggested starting points. They may be increased or decreased depending on machine condition, depth of cut, finish required, coolant, etc. Call our TECHNICAL SERVICE TEAM with questions.

# SPEED & FEED INFORMATION

## Roughing End Mills

### SERIES: Cobalt/HSS Roughing End Mills

MATERIAL	CONDITIONS	START- ING SFM	START- ING SFM	CUTTING DIAMETER						
				1/4"	1/2"	3/4"	1.00"	1-1/4"	1-1/2"	2.00"
		UNCOATED	COATED	CHIP PER TOOTH						
<b>STAINLESS STEELS ISO-M</b>										
<b>Precipitation</b>										
13-8, 15-5, 17-4PH	Slotting Axial 1 x D	60-80	100-150	0.0015	0.0020	0.0026	0.0036	0.0046	0.0054	0.0070
	Heavy Profiling			0.0015	0.0020	0.0029	0.0040	0.0050	0.0060	0.0075
<b>Austenitic</b>										
302, 303, 304L, 316L	Slotting 1 x D	60-80	100-150	0.0015	0.0020	0.003	0.0045	0.0056	0.0067	0.0090
	Heavy Profiling			0.0019	0.0025	0.0034	0.0049	0.0061	0.0074	0.0098
<b>Martensitic</b>										
403, 410, 416	Slotting Axial 1 x D	60-100	100-170	0.0015	0.0020	0.0030	0.0045	0.0056	0.0067	0.0090
	Heavy Profiling			0.0019	0.0025	0.0034	0.0049	0.0061	0.0074	0.0098
<b>HIGH TEMP ALLOYS ISO-S</b>										
<b>Cobalt Base</b>										
Stellite, Haynes 25, 188, X-40, L-605	Slotting 1 x D	5-25	10-40	0.0011	0.0014	0.0018	0.0026	0.0033	0.0040	0.0053
	Heavy Profiling			0.0011	0.0014	0.0020	0.0029	0.0037	0.0045	0.0059
<b>Nickel Base</b>										
Inconel 600, 625, 718, Nickel 200, 270, Invar, Monel 400, 405, K-Monel, PermaNickel 300, Incoly 600	Slotting Axial 1 x D	10-20	20-40	0.0011	0.0014	0.0018	0.0026	0.0033	0.0040	0.0053
	Heavy Profiling			0.0011	0.0014	0.0020	0.0029	0.0037	0.0045	0.0059
<b>Iron Base</b>										
Incoloy 800-802, Multimet N-155, Timken 16-26-6	Slotting 1 x D	15-35	30-60	0.0011	0.0014	0.0018	0.0026	0.0033	0.0040	0.0053
	Heavy Profiling			0.0011	0.0014	0.0020	0.0029	0.0037	0.0045	0.0059
<b>STEELS ISO-P</b>										
<b>High Strength Steels</b>										
4140, 4340, 52100	Slotting Axial 1 x D	50-80	100-150	0.0015	0.0020	0.0025	0.0035	0.0045	0.0053	0.0071
	Heavy Profiling			0.0015	0.0020	0.0028	0.0039	0.0050	0.0059	0.0079
<b>High Alloy Steels - Mold &amp; Die</b>										
A-2, P20, 01, 02, D2, H-13	Slotting 1 x D	40-65	80-115	0.0015	0.0020	0.0025	0.0035	0.0045	0.0053	0.0071
	Heavy Profiling			0.0015	0.0020	0.0028	0.0039	0.005	0.0059	0.0079
<b>Medium Alloy Steels</b>										
200, 250, 300	Slotting Axial 1 x D	60-120	100-180	0.0016	0.0023	0.0033	0.0050	0.0062	0.0075	0.0093
	Heavy Profiling			0.0020	0.0027	0.0040	0.0054	0.007	0.0082	0.0110
<b>Low Alloy Steels-Maraging</b>										
10XX, 11XX, 13XX	Slotting 1 x D	70-150	130-200	0.0018	0.0025	0.0037	0.0053	0.0068	0.0080	0.0100
	Heavy Profiling			0.0022	0.0029	0.0042	0.0059	0.0074	0.0090	0.0115
<b>CAST IRONS ISO-K</b>										
<b>Ductile Iron</b>										
Ductile Cast Iron	Slotting Axial 1 x D	40-80	70-130	0.0015	0.0019	0.0030	0.0042	0.0056	0.0065	0.0087
	Heavy Profiling			0.0018	0.0024	0.0034	0.0048	0.0061	0.0073	0.0093
<b>Cast Iron</b>										
Grey Cast Iron	Slotting 1 x D	60-150	120-200	0.0014	0.0018	0.0024	0.0034	0.0044	0.0053	0.0070
	Heavy Profiling			0.0014	0.0018	0.0027	0.0038	0.0050	0.0058	0.0078
<b>TITANIUMS ISO-S</b>										
<b>Titanium Alloys</b>										
6AL-4V, ASTM 1, 2, 3, 6AL-2S For 5553, decrease SFM and IPM by 25%	Slotting Axial 1 x D	50-90	75-150	0.0015	0.0020	0.0028	0.0040	0.0052	0.0062	0.0080
	Heavy Profiling			0.0017	0.0022	0.0032	0.0045	0.0057	0.0067	0.0090
<b>ALUMINUM ISO-N</b>										
<b>Aluminum Alloys</b>										
6061-T6, 7075	Slotting Axial 1 x D	400-650	650-950	0.0024	0.0058	0.0067	0.0103	0.0112	0.0180	0.0210
	Heavy Profiling			0.0027	0.0058	0.0076	0.0110	0.0120	0.0205	0.0260

For Light Periphery Profiling increase above profiling chip load by 25 - 35 %

All technical data provided are suggested starting points. They may be increased or decreased depending on machine condition, depth of cut, finish required, coolant, etc. Call our TECHNICAL SERVICE TEAM with questions.





# SPEED & FEED INFORMATION

## Carbide Drills

SERIES: HDR, IDR, JDR, LDR, HDRNC

MATERIAL	ISO	CARBIDE SFM	HSSCO SFM	FEED RATE PER TOOTH (IPR)			
				1/16"	1/8"	1/4"	1/2"
Stainless Steels-Soft	M	80-300	20-40	0.0005	0.0005	0.0020	0.0040
Stainless Steels-Hard (PH)	M	40-100	15-25	0.0005	0.0005	0.0010	0.0015
Nickel Base Alloys	S	75-200	15-25	0.0005	0.0006	0.0010	0.0015
Inconel/Monel/Hastelloy	S	75-200	15-25	0.0005	0.0005	0.0010	0.0015
Titanium-Soft	S	80-350	20-25	0.0005	0.0020	0.0040	0.0050
Titanium-Hard	S	40-100	20-25	0.0005	0.0008	0.0020	0.0040
Low Carbon Steels	P	150-300	75-130	0.0005	0.0010	0.0020	0.0040
Die Steels	P	60-130	30-45	0.0005	0.0005	0.0020	0.0040
Hardened Steels > HRc 50	H	25-75	-	0.0005	0.0010	0.0020	0.0030
Cast Iron	K	100-300	60-110	0.0010	0.0020	0.0030	0.0050
Malleable Iron	K	65-200	40-80	0.0010	0.0020	0.0030	0.0050
Aluminium Alloys	N	100-400	150-250	0.0010	0.0020	0.0030	0.0050
Brass & Bronze	N	150-300	100-150	0.0005	0.0010	0.0020	0.0040
Copper	N	150-300	75-150	0.0010	0.0030	0.0050	0.0060
Magnesium	N	300-600	200-350	0.0015	0.0030	0.0050	0.0080
Plastics	N	150-450	70-150	0.0015	0.0030	0.0040	0.0060

## Countersinks

MATERIAL	ISO	HSS SFM	COUNTERSINK TYPE	
			M42 8% COBALT WITH <b>TIN</b> SFM	CARBIDE SFM
Stainless Steels - Free Machining	M	30-80	40-100	80-125
Stainless Steels - Others	M	15-50	20-65	50-75
Inconels/Monels	S	30-50	40-65	50-75
Titaniums (6Al4V)	S	50-60	60-75	60-90
Steels Annealed	P	40-50	50-65	50-80
Steels HRc 18-24	P	30-40	40-50	40-60
Steels HRc 25-37	P	25-35	30-45	35-55
Mild Steels	P	70-100	85-125	80-170
Cast Iron	K	75-125	95-150	125-225
Malleable Iron	K	80-90	100-115	90-150
Aluminums Alloys	N	150-250	180-300	300-500
Brass (Bronze)	N	75-125	95-150	150-250
Magnesium	N	125-250	150-300	250-400
Plastics	N	100-250	125-300	250-400

► Multiple flute countersinks are designed for increased feed rates. A controlled feed rate will result in better surface finish.

► All Melin countersinks are manufactured on CNC grinders to ensure consistent and accurate flute spacing. Carbide countersinks should be used in rigid tool holders to maximize tool life.

All technical data provided are suggested starting points. They may be increased or decreased depending on machine condition, depth of cut, finish required, coolant, etc. Call our TECHNICAL SERVICE TEAM with questions.

## Countersinks

### Nose Diameter for Pre-Setting CNC Precision Countersinks

SIZE	NC POINT DIAMETER					
	60°	82°	90°	100°	110°	120°
0.188	0.058	0.032	0.032	0.032	0.032	0.032
0.250	0.078	0.046	0.046	0.046	0.046	0.046
0.313	0.080	0.047	0.047	0.047	0.047	0.047
0.375	0.125	0.078	0.078	0.078	0.062	0.062
0.438	0.140	0.096	0.096	0.096	0.070	0.070
0.500	0.156	0.109	0.109	0.109	0.078	0.078
0.625	0.203	0.125	0.125	0.125	0.109	0.109
0.750	0.250	0.156	0.156	0.156	0.125	0.125
0.875	0.281	0.172	0.172	0.172	0.140	0.140
1.000	0.328	0.203	0.203	0.203	0.171	0.171

## Carbide Burs

### SERIES: Carbide Burs

Bur Diameter	RPM
1/8 Solid Carbide	45,000-50,000
3/16 Solid Carbide	35,000-40,000
3/16 Carbide Head Brazed to 1/8 Steel Shank	30,000-35,000
1/4 Solid Carbide	30,000-35,000
Carbide Head Brazed to 1/8 Steel Shank	25,000-30,000
5/16 Carbide Head Brazed to 1/4 Steel Shank	25,000-30,000
3/8 Carbide Head Brazed to 1/4 Steel Shank	25,000-30,000
7/16 Carbide Head Brazed to 1/4 Steel Shank	20,000-25,000
1/2 Carbide Head Brazed to 1/4 Steel Shank	20,000-25,000
5/8 Carbide Head Brazed to 1/4 Steel Shank	15,000-20,000
3/4 Carbide Head Brazed to 1/4 Steel Shank	15,000-20,000
1 Carbide Head Brazed to 1/4 Steel Shank	12,000-18,000

All technical data provided are suggested starting points. They may be increased or decreased depending on machine condition, depth of cut, finish required, coolant, etc. Call our TECHNICAL SERVICE TEAM with questions.

# SPEED & FEED INFORMATION

## Calculations

End mill speed & feed formulas are the various individual equations that determine the proper overall machining setup or more specifically the speed of the cutting tool and the rate which it is fed into the work piece. Each individual formula is distinct in what it determines but coordinates with the others to ensure successful cutting tool application. You can visit the TECHNICAL section on [www.melintool.com](http://www.melintool.com) for more information.

### INCH

$$\text{RPM} = \frac{\text{Revolutions Per Minute}}{3.82 \times \text{SFM} / \text{Tool Dia}}$$

$$\text{SFM} = \frac{\text{Surface Foot Per Minute}}{.262 \times \text{RPM} \times \text{Tool Dia}}$$

$$\text{CPT or IPT} = \frac{\text{Chip-Load Per Tooth}}{\text{IPM} / \text{RPM} / \text{No. Of Flutes}}$$

$$\text{IPM} = \frac{\text{Inches Per Minute}}{\text{CPT} \times \text{RPM} \times \text{No. Of Flutes}}$$

$$\text{MRRCI} = \frac{\text{Metal Removal Rate Cubic Inches}}{\text{IPM} \times \text{Axial Doc} \times \text{Radial Woc}}$$

$$\text{IPR} = \frac{\text{Inches Per Revolution}}{\text{IPM} / \text{RPM}}$$

### METRIC

$$\text{RPM} = \frac{\text{Revolutions Per Minute}}{1000 \times \text{M/MIN} / (3.14 \times \text{D})}$$

$$\text{M/MIN} = \frac{\text{Meters Per Minute}}{(3.14 \times \text{D} \times \text{RPM}) / 1000}$$

$$\text{Fz OR CPT} = \frac{\text{Chip-Load Per Tooth}}{\text{Feedrate (mm) per MIN} / (\text{Z} \times \text{RPM})}$$

$$\text{VF OR FPM} = \frac{\text{Feedrate (mm) Per Minute}}{\text{Feedrate (mm) per Tooth} \times \text{Z} \times \text{RPM}}$$

D = Cutter Dia.  
Z = No. Of Teeth.

## EQUIVALENTS & CONVERSIONS:

### ABBREVIATIONS

RPM	Revolutions Per Minute
SFM	Surface Feet Per Minute
CPT	Chip Load Per Tooth
IPM	Inches Per Minute
V <sub>f</sub>	Millimeters Per Minute
ae	Radial Width of Cut
ap	Axial Depth of Cut
Vc	Surface Meters Per Minute
Fz	Metric Chip Load Per Tooth

$$N, n \text{ or } \text{Min}^{-1} = \text{RPM}$$

$$Vc \text{ or } \text{M/MIN} = \text{SFM}$$

$$Fz \text{ or } \text{mm/TOOTH} = \text{CPT}$$

$$V_f \text{ or } \text{mm/MIN} = \text{IPM}$$

$$\text{SFM} / 3.281 = \text{M/MIN}$$

$$\text{M/MIN} \times 3.281 = \text{SFM}$$

$$\text{mm/MIN} / 25.4 = \text{IPM}$$

$$\text{mm/TOOTH} / 25.4 = \text{CPT}$$



IMPERIAL                      METRIC

$$\text{Inch} \times 25.4 = \text{Millimeter}$$

$$\text{Millimeter} \times .03937 = \text{Inch}$$

ALL PRODUCTS MANUFACTURED IN OUR OWN USA PLANT



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