HARVEY TOOL™

SPRING 2022

Your Specials Are Our Standards™

NEW!

INTERACTIVE PDF

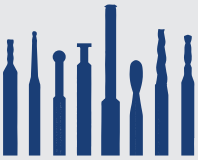
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Offering the Industry's Best Selection of
High Precision Miniature End Mills & Speciality Cutters

THINK HARVEY TOOL FIRST

FOR



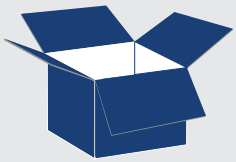
Unique Selection

We offer a comprehensive selection of over 26,000 miniature and specialty cutting tools that are all *fully stocked*. The breadth and depth of our products help solve the industry's toughest machining challenges.



Quality Products

We are committed to designing unique geometries that optimize cutting performance for a variety of materials and applications. We introduce hundreds of new tools into the market every 6 months, offering our customers the solutions they need most.



Same-Day Shipping

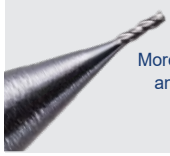
Our fully stocked inventory is ready to ship the same day. We offer second day delivery at ground pricing, and any overnight orders ship until 7:00 p.m. EST. For additional shipping information and stock availability, please visit www.harveytool.com.

Harvey Performance Company combines the leading Harvey Tool, Helical Solutions, Micro 100, Titan USA, and CoreHog brands to provide world class tooling, unmatched service, and innovative solutions that increase productivity for our customers.

HARVEY TOOL

Think Harvey Tool First

More than 26,000 miniature and specialty end mills. Ship today, in your machine tomorrow.

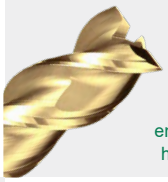


HARVEY PERFORMANCE COMPANY

Helical

Let Helical Impress You

Material-optimized high performance carbide end mills. Run faster, push harder, machine smarter.



MICRO 100

Make More with Micro 100

Exceptional quality turning tools designed for durability and performance in a range of difficult-to-machine materials.

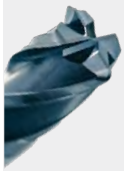


TITAN USA

MADE IN THE U.S.A.

Trust in Titan USA

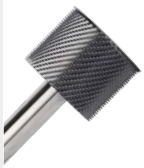
Broad assortment of premium quality, fully stocked cutting tools of exceptional value.



COREHOG

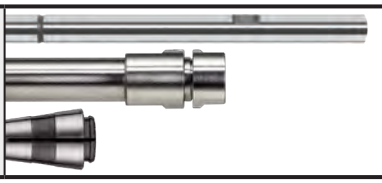
Innovative Tools for Innovative Materials

The industry's most innovative and advanced Composite and Honeycomb Core Cutting Tools.



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WHAT WE OFFER

Miniature End Mills (page 9)		Select from over **8,300** miniature end mills down to .001" cutter diameter, available in a variety of styles and profiles.
Material-Specific End Mills (page 89)		Achieve the best results in high temp alloys, medium alloys, free machining steels, aluminum alloys, graphite, plastics, composites, wood, and more with over **5,800** high performance end mills.
Undercutting End Mills (page 248)		Over **950** options, with **3** different wrap angles: 300°, 270°, and 220°.
Drill/End Mills (page 263)		Over **600** options, with cutter diameters from 1/64" to 1".
Chamfer Cutters (page 275)		Over **1,500** options, with diameters from 1/32" to 1" and **21** different angles per side.
Engraving Cutters (page 303)		Over **950** options, available with **16** included angles and a variety of styles.
Double Angle Shank Cutters (page 325)		Over **650** options in multiple styles and reach lengths and **14** included angles.
Keyseat Cutters (page 336)		Over **2,100** options, with cutter diameters from 1/16" to 1-1/2".
Slitting Saws (page 366)		Over **100** coated and uncoated options, with thicknesses from .0100" to .2500".
Corner Rounding End Mills (page 370)		Over **900** options, with over **100** radii from .003" to 5/8".
Dovetail Cutters (page 385)		**Over 550** options, with **17** included angles.
Holemaking & Threading (page 397)		Solve a variety of holemaking challenges from spotting to threading with over **4,000** options that include miniature drills, reamers, countersinks, counterbores, and single-form, multi-form, and tri-form threadmills.
Tool Holders (page 483)		Pair our exceptional tooling with different styles and reaches of tool holders. Choices range from Extended Reach Tool Holders, Solid ER Integrated Tool Holders, Saw Arbors, ER Collets, and ER Performance Collets.

All tool images appearing in this catalog are illustrations of exemplary tools. All prices in USD.

TABLE OF CONTENTS

MINIATURE END MILLS

Square *New Style and Sizes!* 10

Ball *New Sizes!* 40

Corner Radius *New Sizes!* 61

Corner Chamfer 82

Tapered *New Sizes!* 83

MATERIAL-SPECIFIC END MILLS

Ferrous Materials

Hardened Steels *New Sizes!* mm & in 90

High Temp Alloys *New Sizes!* mm & in 111

Medium Alloy Steels *New Sizes!* mm & in 148

Free Machining Steels mm & in 170

Non-Ferrous Materials

Aluminum Alloys *New Style and Sizes!* mm & in 178

Diamond Tooling *New Sizes!* 201

Plastics *New Style and Sizes!* mm & in 215

Composites *New Sizes!* 238

Wood 245

SPECIALTY PROFILES

Undercutting End Mills *New Sizes!* 248

Drill / End Mills *New Sizes!* 263

Chamfer Cutters *New Sizes!* mm & in 275

Picatinny Form Cutters *New Size!* 296

Runner Cutters *New Sizes!* 298

Hexalobe Cutters 301

Engraving Cutters *New Sizes!* mm & in 303

Double Angle Shank Cutters *New Sizes!* 325

Back Deburring Mills 335

Keyseat Cutters *New Sizes!* 336

Slitting Saws 366

SPECIALTY PROFILES (CONT.)

Concave Radius End Mills . . . 369

Corner Rounding End Mills *New Sizes!* . . . 370

Boring Bars . . . 382

Backdraft Cutters . . . 383

Dovetail Cutters *New Sizes!* . . . 385

HOLEMAKING & THREADING

High Performance Miniature Drills . . . 398

Hardened Steels *New Sizes!* . . . 398

Prehardened Steels . . . 408

Aluminum Alloys . . . 421

PCD Diamond – Double Angle . . . 433

Composites – Double Angle . . . 434

Composites – Brad Point . . . 437

Flat Bottom . . . 439

Deep Hole Drills – Coolant Through . . . 442

Miniature Drills . . . 444

Spotting Drills . . . 448

Miniature Reamers . . . 452

Flat Bottom Counterbores *New Sizes!* . . . 461

Combined Drill & Countersinks . . . 464

Combination Drill / Thread Mill . . . 465

Thread Milling Cutters *New Sizes!* mm & in . . . 466

TOOL HOLDERS

Tool Holders . . . 484

Collets . . . 487

INFORMATION & TECHNICAL RESOURCES

Coatings & Substrates Guide . . . 490

Index by Series ID . . . 492

Alphabetical Index . . . 506

FEATURED SOLUTIONS

Mold Tool & Die Solutions

Building complex cavities requires **high performance tooling** that can mill **precise contours** while leaving **superior part finish**. Harvey Tool offers a selection of **tapered end mills** with unique geometries that are perfect for tackling the tough machining requirements of the **die and mold making** industries.



Square – Tapered Reach (Clearance Cutters) 34

Ball – Tapered Reach (Clearance Cutters) 57

Tapered – Square. 83

Tapered – Ball 87

Medium Alloy Steels – Tapered Reach (Mold Cutters) 156

Aluminum Alloys – Tapered Reach (Mold Cutters) 188

Runner Cutters 298

Corner Conditioning Solutions

Whether prepping a corner for functional or aesthetic reasons, Harvey Tool has a variety of unique and **hard-to-find profiles** for machining **corner requirements** and features. With multiple **angle options, reaches, and styles**, we are confident that our tools can solve any corner conditioning challenge.



Undercutting End Mills 248

Chamfer Cutters 275

Double Angle Shank Cutters. 325

Back Deburring Mills. 335

Corner Rounding End Mills 370

FEATURED SOLUTIONS

Finishing Solutions

Achieving **optimal surface finish** is a critical goal for any machinist, but not all tools are designed with finish requirements in mind. Harvey Tool has a wide selection of finishing tools with **material-specific geometries** designed to ensure **tight part tolerances** and **reduce witness marks**.



Finishers for Hardened Steels 102

Finishers for High Temp Alloys 136

Finishers for Medium Alloy Steels 165

Finishers for Free Machining Steels 176

Finishers for Aluminum Alloys. 196

Finishers for Plastics 231

Finishers for Composites 244

Deburring Solutions

Deburring parts can be tiresome, expensive, and time-consuming, especially if done by hand. Harvey Tool's engineers have created a variety of **CNC-toleranced** deburring tools that allow you to deburr **in your CNC machine**, providing better finish, **reduced part and labor costs**, and increased capacity.



Deburring End Mills 21, 47

270° Deburring Undercutting End Mills. 261

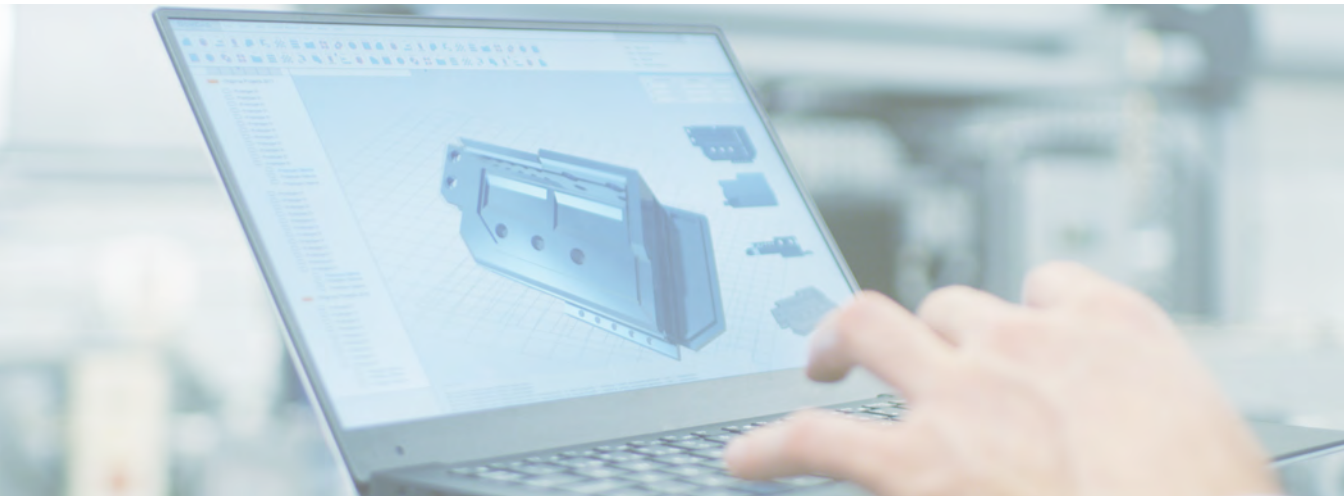
Deburring Chamfer Cutters 292

Double Angle Shank Cutters. 325

Back Deburring Mills. 335

CAM Tool Libraries

Harvey Performance Company works closely with industry-leading CAM software companies to optimize Harvey Tool and Helical Solutions product libraries for their platforms.



CAM Partners

Valuable Time Savings

Import tool libraries directly into CAM software and allow more time to be spent at the machine.

Confident Machining

Program confidently with accurate tool dimensions and CAM-specific tool data.

Growing Libraries & Partnerships

Count on up-to-date product libraries across a roster of leading CAM partners.



Download Tool Libraries Now

AUTODESK® FUSION 360™ · AUTODESK® HSM · CAMWorks · ESPRIT CAM System · GibbsCAM® · Mastercam · SolidCAM iMachining – The Revolution in CAM!

www.harveyperformance.com/tool-libraries

MINIATURE END MILLS

SQUARE

Square – Stub & Standard *New Sizes!* 10
Square – Long Flute *New Sizes!* 15
Square – Deburring End Mill 21
Square – Long Reach, Standard Flute *New Coating!* 22
Square – Long Reach, Stub Flute *New Sizes!* 25
Square – Tapered Reach (Clearance Cutters) 34
Square – Long Reach, Long Flute *New Sizes!* 35
Square – Extra Long Length 37
Square – Router Shank *New!* 38
Square – Reduced Shank *New Coating!* 39

BALL

Ball – Stub & Standard *New Sizes!* 40
Ball – Long Flute *New Sizes!* 44
Ball – Deburring End Mill *New Sizes!* 47
Ball – Long Reach, Standard Flute *New Coating!* 48
Ball – Long Reach, Stub Flute *New Sizes!* 50
Ball – Tapered Reach (Clearance Cutters) 57
Ball – Long Reach, Long Flute 58
Ball – Extra Long Length 59
Ball – Reduced Shank 60

CORNER RADIUS

Corner Radius – Stub & Standard *New Sizes!* 61
Corner Radius – Long Flute *New Coating and Sizes!* 69
Corner Radius – Long Reach, Standard Flute *New Sizes!* 72
Corner Radius – Long Reach, Stub Flute *New Sizes!* 74
Corner Radius – Extra Long Length 80
Corner Radius – Reduced Shank *New Sizes!* 81

CORNER CHAMFER

Corner Chamfer – Standard 82

TAPERED

Tapered – Square 83
Tapered – Ball 87

NEW SIZES!

MINIATURE END MILLS

Square – Stub & Standard



- **Cutter diameter down to .001"**
- Center cutting
- Solid carbide
- CNC ground in the USA





SQUARE

CUTTER DIA.	LOC	SHANK DIA.	OAL	UNCOATED				AlTiN COATED				AMORPHOUS DIAMOND				
D_1 +.0005" −.0005"	L_2 +.010" −.000"	D_2	L_1	2 FL	3 FL	4 FL	PRICE	2 FL	3 FL	4 FL	PRICE	2 FL	3 FL	4 FL	PRICE	
.001	**.001** (1.5x)	1/8	1-1/2	13901			53.90									
.001	**.003** (3x)	1/8	1-1/2	72001			53.90									
.002	**.003** (1.5x)	1/8	1-1/2	13902			46.90									
.002	**.006** (3x)	1/8	1-1/2	72002			46.90									
.003	**.004** (1.5x)	1/8	1-1/2	13903			40.50									
.003	**.009** (3x)	1/8	1-1/2	72003			40.50									
.004 (.1 mm)	**.006** (1.5x)	1/8	1-1/2	13904			34.80									
.004 (.1 mm)	**.012** (3x)	1/8	1-1/2	72004			34.80									
.005	**.007** (1.5x)	1/8	1-1/2	13905	823005	14005*	31.50	13905-C3	823005-C3	14005-C3*	36.40					
.005	**.015** (3x)	1/8	1-1/2	72005	836305	73005*	31.50	72005-C3	836305-C3	73005-C3*	36.40			73005-C4*	43.90	
.006	**.009** (1.5x)	1/8	1-1/2	13906		14006*	32.20	13906-C3		14006-C3*	37.10					
.006	**.018** (3x)	1/8	1-1/2	72006	836306	73006*	32.20	72006-C3	836306-C3	73006-C3*	37.10					
.007	**.010** (1.5x)	1/8	1-1/2	13907		14007*	32.20	13907-C3		14007-C3*	37.10					
.007	**.021** (3x)	1/8	1-1/2	72007	836307	73007*	32.20	72007-C3	836307-C3	73007-C3*	37.10	72007-C4			44.60	NEW
.008 (.2 mm)	**.012** (1.5x)	1/8	1-1/2	13908		14008*	32.20	13908-C3		14008-C3*	37.10					
.008 (.2 mm)	**.024** (3x)	1/8	1-1/2	72008	836308	73008*	32.20	72008-C3	836308-C3	73008-C3*	37.10	72008-C4			44.60	NEW
.009	**.013** (1.5x)	1/8	1-1/2	13909		14009*	32.20	13909-C3		14009-C3*	37.10			14009-C4*	44.60	
.009	**.027** (3x)	1/8	1-1/2	72009	836309	73009*	32.20	72009-C3	836309-C3	73009-C3*	37.10					
.010	**.015** (1.5x)	1/8	1-1/2	13910	823010	14010	25.40	13910-C3	823010-C3	14010-C3	30.30	13910-C4		14010-C4	37.80	
.010	**.030** (3x)	1/8	1-1/2	72010	836310	73010	25.40	72010-C3	836310-C3	73010-C3	30.30	72010-C4		73010-C4	37.80	
.011	**.016** (1.5x)	1/8	1-1/2	13911		14011	25.90	13911-C3		14011-C3	30.80					
.011	**.033** (3x)	1/8	1-1/2	72011	836311	73011	25.90	72011-C3	836311-C3	73011-C3	30.80			73011-C4	38.30	
.012 (.3 mm)	**.018** (1.5x)	1/8	1-1/2	13912		14012	25.90	13912-C3		14012-C3	30.80			14012-C4	38.30	
.012 (.3 mm)	**.036** (3x)	1/8	1-1/2	72012	836312	73012	25.90	72012-C3	836312-C3	73012-C3	30.80	72012-C4		73012-C4	38.30	
.013	**.019** (1.5x)	1/8	1-1/2	13913		14013	25.90	13913-C3		14013-C3	30.80					
.013	**.039** (3x)	1/8	1-1/2	72013	836313	73013	25.90	72013-C3	836313-C3	73013-C3	30.80			73013-C4	38.30	
.014	**.021** (1.5x)	1/8	1-1/2	13914		14014	25.90	13914-C3		14014-C3	30.80					
.014	**.042** (3x)	1/8	1-1/2	72014	836314	73014	25.90	72014-C3	836314-C3	73014-C3	30.80			73014-C4	38.30	
.015 (1/64)	**.022** (1.5x)	1/8	1-1/2	13915	823015	14015	21.70	13915-C3	823015-C3	14015-C3	26.60	13915-C4		14015-C4	34.10	
.015 (1/64)	**.045** (3x)	1/8	1-1/2	72015	836315	73015	21.70	72015-C3	836315-C3	73015-C3	26.60	72015-C4		73015-C4	34.10	
.016 (.4 mm)	**.024** (1.5x)	1/8	1-1/2	13916		14016	23.30	13916-C3		14016-C3	28.20	13916-C4			35.70	
.016 (.4 mm)	**.048** (3x)	1/8	1-1/2	72016	836316	73016	23.30	72016-C3	836316-C3	73016-C3	28.20			73016-C4	35.70	
.017	**.026** (1.5x)	1/8	1-1/2	13917		14017	23.30	13917-C3		14017-C3	28.20					
.017	**.051** (3x)	1/8	1-1/2	72017	836317	73017	23.30	72017-C3	836317-C3	73017-C3	28.20			73017-C4	35.70	
.018	**.027** (1.5x)	1/8	1-1/2	13918		14018	23.30	13918-C3		14018-C3	28.20					
.018	**.054** (3x)	1/8	1-1/2	72018	836318	73018	23.30	72018-C3	836318-C3	73018-C3	28.20	72018-C4		73018-C4	35.70	NEW
.019	**.029** (1.5x)	1/8	1-1/2	13919		14019	23.30	13919-C3		14019-C3	28.20					
.019	**.057** (3x)	1/8	1-1/2	72019	836319	73019	23.30	72019-C3	836319-C3	73019-C3	28.20			73019-C4	35.70	
.020 (.5 mm)	**.030** (1.5x)	1/8	1-1/2	13920	823020	14020	20.80	13920-C3	823020-C3	14020-C3	25.70	13920-C4		14020-C4	33.20	

Coated sizes down to .005"!

*End cutting (not center cutting)

continued on next page

NEW SIZES!

MINIATURE END MILLS

Square – Stub & Standard (cont.)

continued from previous page

	CUTTER DIA.	LOC	SHANK DIA.	OAL	UNCOATED				AlTiN COATED				AMORPHOUS DIAMOND			
	D_1 +.0005″ −.0005″	L_2 +.010″ −.000″	D_2	L_1	2 FL	3 FL	4 FL	PRICE	2 FL	3 FL	4 FL	PRICE	2 FL	3 FL	4 FL	PRICE
	.020 (.5 mm)	**.060** (3x)	1/8	1-1/2	72020	836320	73020	20.80	72020-C3	836320-C3	73020-C3	25.70	72020-C4		73020-C4	33.20
	.021	**.031** (1.5x)	1/8	1-1/2	13921		14021	22.20	13921-C3		14021-C3	27.10				
	.021	**.063** (3x)	1/8	1-1/2	72021	836321	73021	22.20	72021-C3	836321-C3	73021-C3	27.10			73021-C4	34.60
	.022	**.033** (1.5x)	1/8	1-1/2	13922		14022	22.20	13922-C3		14022-C3	27.10				
	.022	**.066** (3x)	1/8	1-1/2	72022	836322	73022	22.20	72022-C3	836322-C3	73022-C3	27.10			73022-C4	34.60
	.023	**.035** (1.5x)	1/8	1-1/2	13923		14023	22.20	13923-C3		14023-C3	27.10				
	.023	**.069** (3x)	1/8	1-1/2	72023	836323	73023	22.20	72023-C3	836323-C3	73023-C3	27.10			73023-C4	34.60
	.024 (.6 mm)	**.036** (1.5x)	1/8	1-1/2	13924		14024	22.20	13924-C3		14024-C3	27.10				
NEW	.024 (.6 mm)	**.072** (3x)	1/8	1-1/2	72024	836324	73024	22.20	72024-C3	836324-C3	73024-C3	27.10	72024-C4		73024-C4	34.60
	.025	**.037** (1.5x)	1/8	1-1/2	13925	823025	14025	19.20	13925-C3	823025-C3	14025-C3	24.10	13925-C4		14025-C4	31.60
	.025	**.075** (3x)	1/8	1-1/2	72025	836325	73025	19.20	72025-C3	836325-C3	73025-C3	24.10	72025-C4		73025-C4	31.60
	.026	**.039** (1.5x)	1/8	1-1/2	13926		14026	20.60	13926-C3		14026-C3	25.50				
	.026	**.078** (3x)	1/8	1-1/2	72026	836326	73026	20.60	72026-C3	836326-C3	73026-C3	25.50			73026-C4	33.00
	.027	**.041** (1.5x)	1/8	1-1/2	13927		14027	20.60	13927-C3		14027-C3	25.50				
	.027	**.081** (3x)	1/8	1-1/2	72027	836327	73027	20.60	72027-C3	836327-C3	73027-C3	25.50			73027-C4	33.00
	.028 (.7 mm)	**.042** (1.5x)	1/8	1-1/2	13928		14028	20.60	13928-C3		14028-C3	25.50				
	.028 (.7 mm)	**.084** (3x)	1/8	1-1/2	72028	836328	73028	20.60	72028-C3	836328-C3	73028-C3	25.50			73028-C4	33.00
	.029	**.043** (1.5x)	1/8	1-1/2	13929		14029	20.60	13929-C3		14029-C3	25.50				
	.029	**.087** (3x)	1/8	1-1/2	72029	836329	73029	20.60	72029-C3	836329-C3	73029-C3	25.50			73029-C4	33.00
	.030	**.045** (1.5x)	1/8	1-1/2	13930	823030	14030	19.20	13930-C3	823030-C3	14030-C3	24.10			14030-C4	31.60
	.030	**.090** (3x)	1/8	1-1/2	72030	836330	73030	19.20	72030-C3	836330-C3	73030-C3	24.10	72030-C4		73030-C4	31.60
NEW	.031 (1/32)	**.025** (0.8x)	1/8	1-1/2			771331	20.50			771331-C3	25.40				
	.031 (1/32)	**.046** (1.5x)	1/8	1-1/2	13931	823031	14031	19.20	13931-C3	823031-C3	14031-C3	24.10	13931-C4		14031-C4	31.60
NEW	.031 (1/32)	**.093** (3x)	1/8	1-1/2	72031	836331	73031	19.20	72031-C3	836331-C3	73031-C3	24.10	72031-C4	836331-C4	73031-C4	31.60
	.032	**.048** (1.5x)	1/8	1-1/2	13932		14032	20.60	13932-C3		14032-C3	25.50				
	.032	**.096** (3x)	1/8	1-1/2	72032		73032	20.60	72032-C3		73032-C3	25.50				
	.033	**.049** (1.5x)	1/8	1-1/2	13933		14033	20.60	13933-C3		14033-C3	25.50				
	.033	**.099** (3x)	1/8	1-1/2	72033		73033	20.60	72033-C3		73033-C3	25.50				
	.034	**.051** (1.5x)	1/8	1-1/2	13934		14034	20.60	13934-C3		14034-C3	25.50				
	.034	**.102** (3x)	1/8	1-1/2	72034		73034	20.60	72034-C3		73034-C3	25.50				
	.035 (.9 mm)	**.052** (1.5x)	1/8	1-1/2	13935	823035	14035	16.70	13935-C3	823035-C3	14035-C3	21.60			14035-C4	29.10
	.035 (.9 mm)	**.105** (3x)	1/8	1-1/2	72035	836335	73035	16.70	72035-C3	836335-C3	73035-C3	21.60	72035-C4		73035-C4	29.10
	.036	**.054** (1.5x)	1/8	1-1/2	13936		14036	17.70	13936-C3		14036-C3	22.60				
	.036	**.108** (3x)	1/8	1-1/2	72036		73036	17.70	72036-C3		73036-C3	22.60				
	.037	**.055** (1.5x)	1/8	1-1/2	13937		14037	17.70	13937-C3		14037-C3	22.60				
	.037	**.111** (3x)	1/8	1-1/2	72037		73037	17.70	72037-C3		73037-C3	22.60				
	.038	**.057** (1.5x)	1/8	1-1/2	13938		14038	17.70	13938-C3		14038-C3	22.60				
NEW	.038	**.114** (3x)	1/8	1-1/2	72038	836338	73038	17.70	72038-C3	836338-C3	73038-C3	22.60			73038-C4	30.10
	.039 (1 mm)	**.058** (1.5x)	1/8	1-1/2	13939	823039	14039	17.50	13939-C3	823039-C3	14039-C3	22.40				
	.039 (1 mm)	**.117** (3x)	1/8	1-1/2	72039	836339	73039	17.50	72039-C3	836339-C3	73039-C3	22.40	72039-C4		73039-C4	29.90
	.040	**.060** (1.5x)	1/8	1-1/2	13940	823040	14040	16.70	13940-C3	823040-C3	14040-C3	21.60	13940-C4		14040-C4	29.10
	.040	**.120** (3x)	1/8	1-1/2	72040	836340	73040	16.70	72040-C3	836340-C3	73040-C3	21.60	72040-C4		73040-C4	29.10
	.041	**.062** (1.5x)	1/8	1-1/2	13941		14041	17.70	13941-C3		14041-C3	22.60				
	.041	**.123** (3x)	1/8	1-1/2	72041		73041	17.70	72041-C3		73041-C3	22.60				
	.042	**.063** (1.5x)	1/8	1-1/2	13942		14042	17.70	13942-C3		14042-C3	22.60				
	.042	**.126** (3x)	1/8	1-1/2	72042		73042	17.70	72042-C3		73042-C3	22.60				

*End cutting (not center cutting)

continued on next page

NEW SIZES!

MINIATURE END MILLS

Square – Stub & Standard (cont.)

continued from previous page

SQUARE

CUTTER DIA.	LOC		SHANK DIA.	OAL	UNCOATED				AlTiN COATED				AMORPHOUS DIAMOND				
D_1 +.0005" −.0005"	L_2 +.010" −.000"		D_2	L_1	2 FL	3 FL	4 FL	PRICE	2 FL	3 FL	4 FL	PRICE	2 FL	3 FL	4 FL	PRICE	
.043 (1.1 mm)	**.065**	(1.5x)	1/8	1-1/2	13943		14043	17.70	13943-C3		14043-C3	22.60					
.043 (1.1 mm)	**.129**	(3x)	1/8	1-1/2	72043	836343	73043	17.70	72043-C3	836343-C3	73043-C3	22.60					NEW
.044	**.066**	(1.5x)	1/8	1-1/2	13944		14044	17.70	13944-C3		14044-C3	22.60					
.044	**.132**	(3x)	1/8	1-1/2	72044	836344	73044	17.70	72044-C3	836344-C3	73044-C3	22.60			73044-C4	30.10	NEW
.045	**.067**	(1.5x)	1/8	1-1/2	13945	823045	14045	16.70	13945-C3	823045-C3	14045-C3	21.60			14045-C4	29.10	
.045	**.135**	(3x)	1/8	1-1/2	72045	836345	73045	16.70	72045-C3	836345-C3	73045-C3	21.60	72045-C4		73045-C4	29.10	
.046	**.069**	(1.5x)	1/8	1-1/2			14046	17.70			14046-C3	22.60					
.046	**.138**	(3x)	1/8	1-1/2	72046	836346	73046	17.70	72046-C3	836346-C3	73046-C3	22.60					
.047 (3/64)	**.070**	(1.5x)	1/8	1-1/2	13947	823047	14047	16.70	13947-C3	823047-C3	14047-C3	21.60	13947-C4		14047-C4	29.10	
.047 (3/64)	**.141**	(3x)	1/8	1-1/2	72047	836347	73047	16.70	72047-C3	836347-C3	73047-C3	21.60	72047-C4		73047-C4	29.10	
.048	**.144**	(3x)	1/8	1-1/2	72048		73048	17.70	72048-C3		73048-C3	22.60					
.049	**.147**	(3x)	1/8	1-1/2	72049		73049	17.70	72049-C3		73049-C3	22.60					
.050	**.075**	(1.5x)	1/8	1-1/2	13950	823050	14050	16.70	13950-C3	823050-C3	14050-C3	21.60			14050-C4	29.10	
.050	**.150**	(3x)	1/8	1-1/2	72050	836350	73050	16.70	72050-C3	836350-C3	73050-C3	21.60	72050-C4		73050-C4	29.10	
.051 (1.3 mm)	**.153**	(3x)	1/8	1-1/2	72051		73051	17.70	72051-C3		73051-C3	22.60					
.052	**.078**	(1.5x)	1/8	1-1/2	13952		14052	17.70	13952-C3		14052-C3	22.60					
.052	**.156**	(3x)	1/8	1-1/2	72052	836352	73052	17.70	72052-C3	836352-C3	73052-C3	22.60					
.053	**.080**	(1.5x)	1/8	1-1/2			14053	17.70			14053-C3	22.60					
.053	**.159**	(3x)	1/8	1-1/2	72053	836353	73053	17.70	72053-C3	836353-C3	73053-C3	22.60					NEW
.054	**.162**	(3x)	1/8	1-1/2	72054		73054	17.70	72054-C3		73054-C3	22.60					
.055 (1.4 mm)	**.082**	(1.5x)	1/8	1-1/2	13955	823055	14055	16.70	13955-C3	823055-C3	14055-C3	21.60	13955-C4		14055-C4	29.10	
.055 (1.4 mm)	**.165**	(3x)	1/8	1-1/2	72055	836355	73055	16.70	72055-C3	836355-C3	73055-C3	21.60	72055-C4		73055-C4	29.10	
.056	**.168**	(3x)	1/8	1-1/2	72056		73056	17.70	72056-C3		73056-C3	22.60					
.057	**.086**	(1.5x)	1/8	1-1/2			14057	17.70			14057-C3	22.60					
.057	**.171**	(3x)	1/8	1-1/2	72057	836357	73057	17.70	72057-C3	836357-C3	73057-C3	22.60					NEW
.058	**.087**	(1.5x)	1/8	1-1/2			14058	17.70			14058-C3	22.60					
.058	**.174**	(3x)	1/8	1-1/2	72058		73058	17.70	72058-C3		73058-C3	22.60					
.059 (1.5 mm)	**.089**	(1.5x)	1/8	1-1/2	13959	823059	14059	17.70	13959-C3	823059-C3	14059-C3	22.60					
.059 (1.5 mm)	**.177**	(3x)	1/8	1-1/2	72059	836359	73059	17.70	72059-C3	836359-C3	73059-C3	22.60			73059-C4	30.10	
.060	**.090**	(1.5x)	1/8	1-1/2	13960	823060	14060	16.70	13960-C3	823060-C3	14060-C3	21.60			14060-C4	29.10	
.060	**.180**	(3x)	1/8	1-1/2	72060	836360	73060	16.70	72060-C3	836360-C3	73060-C3	21.60	72060-C4		73060-C4	29.10	
.061	**.183**	(3x)	1/8	1-1/2			73061	17.80			73061-C3	22.70					
.062 (1/16)	**.050**	(0.8x)	1/8	1-1/2			771362	18.80			771362-C3	23.70					NEW
.062 (1/16)	**.093**	(1.5x)	1/8	1-1/2	13962	823062	14062	15.10	13962-C3	823062-C3	14062-C3	20.00	13962-C4		14062-C4	27.50	
.062 (1/16)	**.186**	(3x)	1/8	1-1/2	72062	836362	73062	15.10	72062-C3	836362-C3	73062-C3	20.00	72062-C4	836362-C4	73062-C4	27.50	NEW
.063 (1.6 mm)	**.189**	(3x)	1/8	1-1/2			73063	17.80			73063-C3	22.70					
.064	**.192**	(3x)	1/8	1-1/2	72064		73064	17.80	72064-C3		73064-C3	22.70					
.065	**.097**	(1.5x)	1/8	1-1/2	13965	823065	14065	15.10	13965-C3	823065-C3	14065-C3	20.00			14065-C4	27.50	
.065	**.195**	(3x)	1/8	1-1/2	72065	836365	73065	15.10	72065-C3	836365-C3	73065-C3	20.00	72065-C4		73065-C4	27.50	
.066	**.198**	(3x)	1/8	1-1/2			73066	17.80			73066-C3	22.70					
.067 (1.7 mm)	**.201**	(3x)	1/8	1-1/2			73067	17.80			73067-C3	22.70					
.068	**.204**	(3x)	1/8	1-1/2			73068	17.80			73068-C3	22.70					
.069	**.207**	(3x)	1/8	1-1/2			73069	17.80			73069-C3	22.70					
.070	**.105**	(1.5x)	1/8	1-1/2	13970	823070	14070	15.10	13970-C3	823070-C3	14070-C3	20.00			14070-C4	27.50	
.070	**.210**	(3x)	1/8	1-1/2	72070	836370	73070	15.10	72070-C3	836370-C3	73070-C3	20.00	72070-C4		73070-C4	27.50	
.071 (1.8 mm)	**.213**	(3x)	1/8	1-1/2	72071		73071	17.80	72071-C3		73071-C3	22.70					NEW
.072	**.216**	(3x)	1/8	1-1/2			73072	17.80			73072-C3	22.70					
.073	**.219**	(3x)	1/8	1-1/2			73073	17.80			73073-C3	22.70					
.074	**.222**	(3x)	1/8	1-1/2			73074	17.80			73074-C3	22.70					

*End cutting (not center cutting)

continued on next page

NEW SIZES!

MINIATURE END MILLS

Square – Stub & Standard (cont.)

continued from previous page

	CUTTER DIA.	LOC	SHANK DIA.	OAL	UNCOATED				AlTiN COATED				AMORPHOUS DIAMOND			
	D_1 +.0005″ −.0005″	L_2 +.010″ −.000″	D_2	L_1	2 FL	3 FL	4 FL	PRICE	2 FL	3 FL	4 FL	PRICE	2 FL	3 FL	4 FL	PRICE
	.075 (1.9 mm)	**.112** (1.5x)	1/8	1-1/2	13975	823075	14075	15.10	13975-C3	823075-C3	14075-C3	20.00				
	.075 (1.9 mm)	**.225** (3x)	1/8	1-1/2	72075	836375	73075	15.10	72075-C3	836375-C3	73075-C3	20.00			73075-C4	27.50
	.076	**.228** (3x)	1/8	1-1/2			73076	17.80			73076-C3	22.70				
	.077	**.231** (3x)	1/8	1-1/2			73077	17.80			73077-C3	22.70				
	.078 (5/64)	**.117** (1.5x)	1/8	1-1/2	13978	823078	14078	15.10	13978-C3	823078-C3	14078-C3	20.00	13978-C4		14078-C4	27.50
NEW	.078 (5/64)	**.234** (3x)	1/8	1-1/2	72078	836378	73078	15.10	72078-C3	836378-C3	73078-C3	20.00	72078-C4	836378-C4	73078-C4	27.50
	.079	**.237** (3x)	1/8	1-1/2			73079	17.80			73079-C3	22.70				
	.080	**.120** (1.5x)	1/8	1-1/2	13980	823080	14080	15.10	13980-C3	823080-C3	14080-C3	20.00				
	.080	**.240** (3x)	1/8	1-1/2	72080	836380	73080	15.10	72080-C3	836380-C3	73080-C3	20.00	72080-C4		73080-C4	27.50
	.081	**.243** (3x)	1/8	1-1/2			73081	17.80			73081-C3	22.70				
	.082	**.246** (3x)	1/8	1-1/2			73082	17.80			73082-C3	22.70				
	.083 (2.1 mm)	**.249** (3x)	1/8	1-1/2			73083	17.80			73083-C3	22.70				
	.084	**.252** (3x)	1/8	1-1/2			73084	17.80			73084-C3	22.70				
	.085	**.127** (1.5x)	1/8	1-1/2	13985	823085	14085	15.10	13985-C3	823085-C3	14085-C3	20.00				
	.085	**.255** (3x)	1/8	1-1/2	72085	836385	73085	15.10	72085-C3	836385-C3	73085-C3	20.00			73085-C4	27.50
	.086	**.258** (3x)	1/8	1-1/2			73086	17.80			73086-C3	22.70				
	.087 (2.2 mm)	**.261** (3x)	1/8	1-1/2			73087	17.80			73087-C3	22.70				
	.088	**.264** (3x)	1/8	1-1/2			73088	17.80			73088-C3	22.70				
	.089	**.267** (3x)	1/8	1-1/2			73089	17.80			73089-C3	22.70				
	.090	**.135** (1.5x)	1/8	1-1/2	13990	823090	14090	15.10	13990-C3	823090-C3	14090-C3	20.00			14090-C4	27.50
	.090	**.270** (3x)	1/8	1-1/2	72090	836390	73090	15.10	72090-C3	836390-C3	73090-C3	20.00	72090-C4		73090-C4	27.50
	.091 (2.3 mm)	**.273** (3x)	1/8	1-1/2			73091	17.80			73091-C3	22.70				
	.092	**.276** (3x)	1/8	1-1/2			73092	17.80			73092-C3	22.70				
NEW	.093 (3/32)	**.074** (0.8x)	1/8	1-1/2			771393	16.40			771393-C3	21.30				
	.093 (3/32)	**.139** (1.5x)	1/8	1-1/2	13993	823093	14093	15.10	13993-C3	823093-C3	14093-C3	20.00	13993-C4		14093-C4	27.50
NEW	.093 (3/32)	**.279** (3x)	1/8	1-1/2	72093	836393	73093	15.10	72093-C3	836393-C3	73093-C3	20.00	72093-C4	836393-C4	73093-C4	27.50
	.094 (2.4 mm)	**.141** (1.5x)	1/8	1-1/2			14094	17.80			14094-C3	22.70				
NEW	.094 (2.4 mm)	**.282** (3x)	1/8	1-1/2	72094		73094	17.80	72094-C3		73094-C3	22.70				
	.095	**.142** (1.5x)	1/8	1-1/2	13995	823095	14095	15.10	13995-C3	823095-C3	14095-C3	20.00				
	.095	**.285** (3x)	1/8	1-1/2	72095	836395	73095	15.10	72095-C3	836395-C3	73095-C3	20.00			73095-C4	27.50
	.096	**.288** (3x)	1/8	1-1/2			73096	17.80			73096-C3	22.70				
	.097	**.291** (3x)	1/8	1-1/2			73097	17.80			73097-C3	22.70				
	.098 (2.5 mm)	**.147** (1.5x)	1/8	1-1/2			14098	17.80			14098-C3	22.70				
NEW	.098 (2.5 mm)	**.294** (3x)	1/8	1-1/2	72098		73098	17.80	72098-C3		73098-C3	22.70				
	.099	**.297** (3x)	1/8	1-1/2			73099	17.80			73099-C3	22.70				
	.100	**.150** (1.5x)	1/8	1-1/2	13999	823100	14099	15.10	13999-C3	823100-C3	14099-C3	20.00			14099-C4	27.50
	.100	**.300** (3x)	1/8	1-1/2	72100	836400	73100	15.10	72100-C3	836400-C3	73100-C3	20.00	72100-C4		73100-C4	27.50
	.101	**.303** (3x)	1/8	1-1/2			73101	17.80			73101-C3	22.70				
	.102 (2.6 mm)	**.306** (3x)	1/8	1-1/2			73102	17.80			73102-C3	22.70				
	.103	**.309** (3x)	1/8	1-1/2			73103	17.80			73103-C3	22.70				
	.104	**.312** (3x)	1/8	1-1/2			73104	17.80			73104-C3	22.70				
	.105	**.158** (1.5x)	1/8	1-1/2	50200		50300	15.10	50200-C3		50300-C3	20.00				
	.105	**.315** (3x)	1/8	1-1/2	72105		73105	15.10	72105-C3		73105-C3	20.00			73105-C4	27.50
	.106 (2.7 mm)	**.318** (3x)	1/8	1-1/2			73106	17.80			73106-C3	22.70				
	.107	**.321** (3x)	1/8	1-1/2			73107	17.80			73107-C3	22.70				
	.108	**.324** (3x)	1/8	1-1/2			73108	17.80			73108-C3	22.70				
	.109 (7/64)	**.164** (1.5x)	1/8	1-1/2	50201	823102	50301	15.10	50201-C3	823102-C3	50301-C3	20.00				
	.109 (7/64)	**.327** (3x)	1/8	1-1/2	72109	836402	73109	15.10	72109-C3	836402-C3	73109-C3	20.00			73109-C4	27.50
	.110	**.165** (1.5x)	1/8	1-1/2	50202		50302	15.10	50202-C3		50302-C3	20.00				

*End cutting (not center cutting)

continued on next page

NEW SIZES!

MINIATURE END MILLS

Square – Stub & Standard (cont.)

continued from previous page

SQUARE

CUTTER DIA.	LOC	SHANK DIA.	OAL	UNCOATED				AlTiN COATED				AMORPHOUS DIAMOND				
D_1 +.0005″ −.0005″	L_2 +.010″ −.000″	D_2	L_1	2 FL	3 FL	4 FL	PRICE	2 FL	3 FL	4 FL	PRICE	2 FL	3 FL	4 FL	PRICE	
.110	**.330** (3x)	1/8	1-1/2	72110		73110	15.10	72110-C3		73110-C3	20.00			73110-C4	27.50	
.111 (2.8 mm)	**.333** (3x)	1/8	1-1/2			73111	17.80			73111-C3	22.70					
.112	**.336** (3x)	1/8	1-1/2			73112	17.80			73112-C3	22.70					
.113	**.339** (3x)	1/8	1-1/2			73113	17.80			73113-C3	22.70					
.114 (2.9 mm)	**.341** (3x)	1/8	1-1/2			73114	17.80			73114-C3	22.70					
.115	**.173** (1.5x)	1/8	1-1/2	50203		50303	15.10	50203-C3		50303-C3	20.00					
.115	**.345** (3x)	1/8	1-1/2	72115		73115	15.10	72115-C3		73115-C3	20.00			73115-C4	27.50	
.116	**.348** (3x)	1/8	1-1/2			73116	17.80			73116-C3	22.70					
.117	**.351** (3x)	1/8	1-1/2			73117	17.80			73117-C3	22.70					
.118 (3 mm)	**.177** (1.5x)	1/8	1-1/2	50204	823105	50304	15.40	50204-C3	823105-C3	50304-C3	20.30					
.118 (3 mm)	**.354** (3x)	1/8	1-1/2	72118	836405	73118	15.40	72118-C3	836405-C3	73118-C3	20.30	72118-C4		73118-C4	27.80	NEW
.119	**.357** (3x)	1/8	1-1/2			73119	17.80			73119-C3	22.70					
.120	**.180** (1.5x)	1/8	1-1/2	50205		50305	15.10	50205-C3		50305-C3	20.00					
.120	**.360** (3x)	1/8	1-1/2	72120	836406	73120	15.10	72120-C3	836406-C3	73120-C3	20.00			73120-C4	27.50	
.121	**.363** (3x)	1/8	1-1/2			73121	17.80			73121-C3	22.70					
.122	**.366** (3x)	1/8	1-1/2			73189	17.80			73189-C3	22.70					
.123	**.369** (3x)	1/8	1-1/2			73123	17.80			73123-C3	22.70					
.124	**.372** (3x)	1/8	1-1/2			73124	17.80			73124-C3	22.70					

D_1 +.000″ −.002″	L_2 +.030″ −.000″	D_2	L_1	2 FL	3 FL	4 FL	PRICE	2 FL	3 FL	4 FL	PRICE	2 FL	3 FL	4 FL	PRICE	
.125 (1/8)	**.100** (0.8x)	1/8	1-1/2			771408	16.00			771408-C3	20.90					NEW
.125 (1/8)	**.187** (1.5x)	1/8	1-1/2	50208	823108	50308	14.60	50208-C3	823108-C3	50308-C3	19.50	50208-C4		50308-C4	27.00	
.125 (1/8)	**.375** (3x)	1/8	1-1/2	72125	836408	73125	14.60	72125-C3	836408-C3	73125-C3	19.50	72125-C4	836408-C4	73125-C4	27.00	
.140 (9/64)	**.220** (1.5x)	3/16	2	50209	823109	50309	15.90	50209-C3	823109-C3	50309-C3	21.20					
.140 (9/64)	**.562** (4x)	3/16	2	72140	836409	73140	15.90	72140-C3	836409-C3	73140-C3	21.20			73140-C4	33.00	
.156 (5/32)	**.281** (1.5x)	3/16	2	50210	823110	50310	15.90	50210-C3	823110-C3	50310-C3	21.20			50310-C4	33.00	
.156 (5/32)	**.562** (3x)	3/16	2	72156	836410	73156	15.90	72156-C3	836410-C3	73156-C3	21.20	72156-C4		73156-C4	33.00	
.172 (11/64)	**.312** (1.5x)	3/16	2			50311	15.90			50311-C3	21.20					
.172 (11/64)	**.625** (3x)	3/16	2	72172	836411	73172	15.90	72172-C3	836411-C3	73172-C3	21.20					NEW
.187 (3/16)	**.312** (1.5x)	3/16	2	50212	823112	50312	15.90	50212-C3	823112-C3	50312-C3	21.20	50212-C4		50312-C4	33.00	
.187 (3/16)	**.625** (3x)	3/16	2	72187	836412	73187	15.90	72187-C3	836412-C3	73187-C3	21.20	72187-C4		73187-C4	33.00	
.203 (13/64)	**.312** (1.5x)	1/4	2-1/2			50313	17.30			50313-C3	24.50					NEW
.203 (13/64)	**.625** (3x)	1/4	2-1/2	72190		73190	17.30	72190-C3		73190-C3	24.50					
.218 (7/32)	**.330** (1.5x)	1/4	2-1/2	50214	823114	50314	17.30	50214-C3	823114-C3	50314-C3	24.50					
.218 (7/32)	**.625** (3x)	1/4	2-1/2	72193	836414	73193	17.30	72193-C3	836414-C3	73193-C3	24.50					
.234 (15/64)	**.750** (3x)	1/4	2-1/2	72195		73195	17.30	72195-C3		73195-C3	24.50					
.250 (1/4)	**.375** (1.5x)	1/4	2-1/2	50216	823116	50316	17.30	50216-C3	823116-C3	50316-C3	24.50	50216-C4		50316-C4	36.70	
.250 (1/4)	**.750** (3x)	1/4	2-1/2	72199	836416	73199	17.30	72199-C3	836416-C3	73199-C3	24.50	72199-C4		73199-C4	36.70	
.281 (9/32)	**.750** (3x)	5/16	2-1/2			73122	23.70			73122-C3	32.10					
.312 (5/16)	**.470** (1.5x)	5/16	2-1/2	50220		50320	23.70	50220-C3		50320-C3	32.10					
.312 (5/16)	**.812** (3x)	5/16	2-1/2	15120		15220	23.70	15120-C3		15220-C3	32.10			15220-C4	47.10	
.343 (11/32)	**1.000** (3x)	3/8	2-1/2			15222	33.90			15222-C3	43.40					
.375 (3/8)	**.570** (1.5x)	3/8	2-1/2	50224		50324	31.60	50224-C3		50324-C3	41.10	50224-C4			55.00	NEW
.375 (3/8)	**1.000** (3x)	3/8	2-1/2	15124	836424	15224	31.60	15124-C3	836424-C3	15224-C3	41.10			15224-C4	55.00	
.437 (7/16)	**1.312** (3x)	7/16	3			15228	50.30			15228-C3	61.50					
.500 (1/2)	**1.000** (2x)	1/2	3	15132	836432	15232	54.40	15132-C3	836432-C3	15232-C3	68.60	15132-C4		15232-C4	82.60	NEW

*End cutting (not center cutting)

NEW SIZES!

MINIATURE END MILLS

Square – Long Flute



Stocked in 9 Lengths of Cut!

Long flute and long shank design for deep cavities

Mills deep pockets · Center cutting · Solid carbide · CNC ground in the USA

	CUTTER DIAMETER	LENGTH OF CUT	FLUTES	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN COATED		AMORPHOUS DIAMOND	
	D_1 $^{+.0005''}_{-.0005''}$	L_2 $^{+.010''}_{-.000''}$		D_2	L_1	TOOL #	PRICE	TOOL #	PRICE	TOOL #	PRICE
	.004	**.020** (5x)	3	1/8	2-1/2	31804	45.70				
	.005	**.025** (5x)	3	1/8	2-1/2	31805	45.70				
	.005	**.040** (8x)	3	1/8	2-1/2	33605	48.60				
	.008	**.040** (5x)	3	1/8	2-1/2	31808	45.70				
	.008	**.064** (8x)	3	1/8	2-1/2	33608	48.60				
	.010	**.040** (4x)	3	1/8	2-1/2	888410	38.70	888410-C3	43.60		
	.010	**.050** (5x)	3	1/8	2-1/2	12710	38.90	12710-C3	43.80	12710-C4	51.30
	.010	**.050** (5x)	4	1/8	2-1/2	834110	40.60	834110-C3	45.50		
	.010	**.060** (6x)	3	1/8	2-1/2	894210	46.70	894210-C3	51.60		
	.010	**.070** (7x)	3	1/8	2-1/2	897910	54.40	897910-C3	59.30		
	.010	**.080** (8x)	3	1/8	2-1/2	33610	67.70	33610-C3	72.60		
	.010	**.100** (10x)	3	1/8	2-1/2	951310	73.20	951310-C3	78.10		
NEW	.012	**.060** (5x)	3	1/8	2-1/2	31812	38.90	31812-C3	43.80		
NEW	.012	**.096** (8x)	3	1/8	2-1/2	33612	67.70	33612-C3	72.60		
	.015 (1/64)	**.062** (4x)	3	1/8	2-1/2	888415	35.70	888415-C3	40.60		
	.015 (1/64)	**.078** (5x)	3	1/8	2-1/2	31815	35.70	31815-C3	40.60	31815-C4	48.10
	.015 (1/64)	**.078** (5x)	4	1/8	2-1/2	834115	37.30	834115-C3	42.20		
	.015 (1/64)	**.093** (6x)	3	1/8	2-1/2	894215	42.60	894215-C3	47.50		
	.015 (1/64)	**.109** (7x)	3	1/8	2-1/2	897915	49.70	897915-C3	54.60		
	.015 (1/64)	**.125** (8x)	3	1/8	2-1/2	33615	62.50	33615-C3	67.40	33615-C4	74.90
	.015 (1/64)	**.125** (8x)	4	1/8	2-1/2	826815	63.90	826815-C3	68.80		
	.015 (1/64)	**.156** (10x)	3	1/8	2-1/2	951315	69.90	951315-C3	74.80		
	.015 (1/64)	**.187** (12x)	3	1/8	2-1/2	34915	77.00	34915-C3	81.90		
NEW	.017	**.085** (5x)	3	1/8	2-1/2	31817	38.90	31817-C3	43.80		
NEW	.017	**.136** (8x)	3	1/8	2-1/2	33617	67.70	33617-C3	72.60		
	.020 (.5 mm)	**.080** (4x)	3	1/8	2-1/2	888420	30.50	888420-C3	35.40		
	.020 (.5 mm)	**.100** (5x)	3	1/8	2-1/2	12720	30.50	12720-C3	35.40	12720-C4	42.90
	.020 (.5 mm)	**.100** (5x)	4	1/8	2-1/2	834120	32.50	834120-C3	37.40		
	.020 (.5 mm)	**.120** (6x)	3	1/8	2-1/2	894220	36.70	894220-C3	41.60		
	.020 (.5 mm)	**.140** (7x)	3	1/8	2-1/2	897920	42.60	897920-C3	47.50		
	.020 (.5 mm)	**.160** (8x)	3	1/8	2-1/2	33620	59.80	33620-C3	64.70	33620-C4	72.20
	.020 (.5 mm)	**.200** (10x)	3	1/8	2-1/2	951320	67.00	951320-C3	71.90		
	.020 (.5 mm)	**.250** (12x)	3	1/8	2-1/2	34920	74.10	34920-C3	79.00		
NEW	.020 (.5 mm)	**.300** (15x)	3	1/8	2-1/2	35820	88.80	35820-C3	93.70		
	.024	**.120** (5x)	3	1/8	2-1/2	31824	29.10	31824-C3	34.00		
	.024	**.192** (8x)	3	1/8	2-1/2	33624	58.20	33624-C3	63.10		
	.025	**.100** (4x)	3	1/8	2-1/2	888425	29.10	888425-C3	34.00		
	.025	**.125** (5x)	3	1/8	2-1/2	12725	29.10	12725-C3	34.00	12725-C4	41.50
	.025	**.125** (5x)	4	1/8	2-1/2	834125	30.80	834125-C3	35.70		
	.025	**.150** (6x)	3	1/8	2-1/2	894225	35.00	894225-C3	39.90		
	.025	**.175** (7x)	3	1/8	2-1/2	897925	40.80	897925-C3	45.70		

continued on next page

NEW SIZES!

MINIATURE END MILLS

Square – Long Flute (cont.)

continued from previous page

CUTTER DIAMETER	LENGTH OF CUT	FLUTES	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN COATED		AMORPHOUS DIAMOND		
D_1 $^{+.0005''}_{-.0005''}$	L_2 $^{+.010''}_{-.000''}$		D_2	L_1	TOOL #	PRICE	TOOL #	PRICE	TOOL #	PRICE	
.025	**.203** (8x)	3	1/8	2-1/2	33625	58.20	33625-C3	63.10	33625-C4	70.60	
.025	**.203** (8x)	4	1/8	2-1/2	826825	59.90	826825-C3	64.80			
.025	**.250** (10x)	3	1/8	2-1/2	951325	61.90	951325-C3	66.80			
.025	**.312** (12x)	3	1/8	2-1/2	34925	65.70	34925-C3	70.60			
.030	**.125** (4x)	3	1/8	2-1/2	888430	28.10	888430-C3	33.00			
.030	**.150** (5x)	3	1/8	2-1/2	12730	28.10	12730-C3	33.00	12730-C4	40.50	
.030	**.156** (5x)	4	1/8	2-1/2	834130	29.80	834130-C3	34.70			
.030	**.187** (6x)	3	1/8	2-1/2	894230	33.60	894230-C3	38.50			
.030	**.218** (7x)	3	1/8	2-1/2	897930	39.20	897930-C3	44.10			
.030	**.250** (8x)	3	1/8	2-1/2	33630	55.20	33630-C3	60.10	33630-C4	67.60	
.030	**.312** (10x)	3	1/8	2-1/2	951330	59.20	951330-C3	64.10			
.030	**.375** (12x)	3	1/8	2-1/2	34930	62.20	34930-C3	67.10			
.031 (1/32)	**.125** (4x)	3	1/8	2-1/2	888431	28.10	888431-C3	33.00	888431-C4	40.50	
.031 (1/32)	**.125** (4x)	4	1/8	2-1/2	836931	29.80	836931-C3	34.70			
.031 (1/32)	**.156** (5x)	3	1/8	2-1/2	31831	28.10	31831-C3	33.00	31831-C4	40.50	
.031 (1/32)	**.156** (5x)	4	1/8	2-1/2	834131	29.50	834131-C3	34.40			
.031 (1/32)	**.187** (6x)	3	1/8	2-1/2	894231	33.60	894231-C3	38.50	894231-C4	46.00	NEW
.031 (1/32)	**.187** (6x)	4	1/8	2-1/2	12531	35.20	12531-C3	40.10			
.031 (1/32)	**.218** (7x)	3	1/8	2-1/2	897931	39.20	897931-C3	44.10			
.031 (1/32)	**.250** (8x)	3	1/8	2-1/2	33631	55.20	33631-C3	60.10	33631-C4	67.60	
.031 (1/32)	**.250** (8x)	4	1/8	2-1/2	826831	56.90	826831-C3	61.80			
.031 (1/32)	**.281** (9x)	3	1/8	2-1/2	837831	57.90	837831-C3	62.80			
.031 (1/32)	**.312** (10x)	3	1/8	2-1/2	951331	58.60	951331-C3	63.50			
.031 (1/32)	**.375** (12x)	3	1/8	2-1/2	34931	62.20	34931-C3	67.10	34931-C4	74.60	
.031 (1/32)	**.470** (15x)	3	1/8	2-1/2	35831	82.90	35831-C3	87.80			
.035 (.9 mm)	**.140** (4x)	3	1/8	2-1/2	888435	28.10	888435-C3	33.00			
.035 (.9 mm)	**.175** (5x)	3	1/8	2-1/2	12735	28.10	12735-C3	33.00	12735-C4	40.50	
.035 (.9 mm)	**.187** (5x)	4	1/8	2-1/2	834135	30.10	834135-C3	35.00			
.035 (.9 mm)	**.218** (6x)	3	1/8	2-1/2	894235	33.60	894235-C3	38.50			
.035 (.9 mm)	**.250** (7x)	3	1/8	2-1/2	897935	39.20	897935-C3	44.10			
.035 (.9 mm)	**.280** (8x)	3	1/8	2-1/2	33635	55.20	33635-C3	60.10	33635-C4	67.60	
.035 (.9 mm)	**.350** (10x)	3	1/8	2-1/2	951335	58.60	951335-C3	63.50			
.035 (.9 mm)	**.425** (12x)	3	1/8	2-1/2	34935	63.10	34935-C3	68.00			
.039 (1 mm)	**.156** (4x)	3	1/8	2-1/2	888439	28.50	888439-C3	33.40			
.039 (1 mm)	**.203** (5x)	3	1/8	2-1/2	31839	28.50	31839-C3	33.40	31839-C4	40.90	
.039 (1 mm)	**.203** (5x)	4	1/8	2-1/2	834139	30.50	834139-C3	35.40			
.039 (1 mm)	**.240** (6x)	3	1/8	2-1/2	894239	44.90	894239-C3	49.80			
.039 (1 mm)	**.281** (7x)	3	1/8	2-1/2	897939	50.60	897939-C3	55.50			
.039 (1 mm)	**.325** (8x)	3	1/8	2-1/2	33639	55.70	33639-C3	60.60			
.039 (1 mm)	**.400** (10x)	3	1/8	2-1/2	951339	59.20	951339-C3	64.10			
.039 (1 mm)	**.480** (12x)	3	1/8	2-1/2	34939	63.40	34939-C3	68.30			
.040	**.160** (4x)	3	1/8	2-1/2	888440	28.10	888440-C3	33.00			
.040	**.200** (5x)	3	1/8	2-1/2	12740	28.10	12740-C3	33.00	12740-C4	40.50	
.040	**.203** (5x)	4	1/8	2-1/2	834140	29.80	834140-C3	34.70			
.040	**.240** (6x)	3	1/8	2-1/2	894240	33.60	894240-C3	38.50			
.040	**.281** (7x)	3	1/8	2-1/2	897940	39.20	897940-C3	44.10			

continued on next page

NEW SIZES!

MINIATURE END MILLS

Square – Long Flute (cont.)

continued from previous page

CUTTER DIAMETER	LENGTH OF CUT	FLUTES	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN COATED		AMORPHOUS DIAMOND	
D_1 $^{+.0005''}_{-.0005''}$	L_2 $^{+.010''}_{-.000''}$		D_2	L_1	TOOL #	PRICE	TOOL #	PRICE	TOOL #	PRICE
.040	**.325** (8x)	3	1/8	2-1/2	33640	55.20	33640-C3	60.10	33640-C4	67.60
.040	**.325** (8x)	4	1/8	2-1/2	826840	56.90	826840-C3	61.80		
.040	**.400** (10x)	3	1/8	2-1/2	951340	58.60	951340-C3	63.50		
.040	**.480** (12x)	3	1/8	2-1/2	34940	63.10	34940-C3	68.00		
.045	**.187** (4x)	3	1/8	2-1/2	888445	28.10	888445-C3	33.00		
.045	**.225** (5x)	3	1/8	2-1/2	12745	28.10	12745-C3	33.00	12745-C4	40.50
.045	**.225** (5x)	4	1/8	2-1/2	834145	29.80	834145-C3	34.70		
.045	**.281** (6x)	3	1/8	2-1/2	894245	33.60	894245-C3	38.50		
.045	**.325** (7x)	3	1/8	2-1/2	897945	39.20	897945-C3	44.10		
.045	**.375** (8x)	3	1/8	2-1/2	33645	55.20	33645-C3	60.10		
.045	**.450** (10x)	3	1/8	2-1/2	951345	58.60	951345-C3	63.50		
.045	**.550** (12x)	3	1/8	2-1/2	34945	63.10	34945-C3	68.00		
.047 (3/64)	**.187** (4x)	3	1/8	2-1/2	888447	28.10	888447-C3	33.00	888447-C4	40.50
.047 (3/64)	**.187** (4x)	4	1/8	2-1/2	836947	29.80	836947-C3	34.70		
.047 (3/64)	**.250** (5x)	3	1/8	2-1/2	31847	28.10	31847-C3	33.00	31847-C4	40.50
NEW .047 (3/64)	**.250** (5x)	4	1/8	2-1/2	834147	29.50	834147-C3	34.40	834147-C4	41.90
.047 (3/64)	**.281** (6x)	3	1/8	2-1/2	894247	33.60	894247-C3	38.50		
.047 (3/64)	**.328** (7x)	3	1/8	2-1/2	897947	39.20	897947-C3	44.10		
.047 (3/64)	**.375** (8x)	3	1/8	2-1/2	33647	54.20	33647-C3	59.10	33647-C4	66.60
.047 (3/64)	**.375** (8x)	4	1/8	2-1/2	826847	55.70	826847-C3	60.60		
.047 (3/64)	**.480** (10x)	3	1/8	2-1/2	951347	58.60	951347-C3	63.50		
.047 (3/64)	**.570** (12x)	3	1/8	2-1/2	34947	62.20	34947-C3	67.10	34947-C4	74.60
.047 (3/64)	**.710** (15x)	3	1/8	2-1/2	35847	78.00	35847-C3	82.90		
.050	**.203** (4x)	3	1/8	2-1/2	888450	28.10	888450-C3	33.00		
.050	**.250** (5x)	3	1/8	2-1/2	31850	28.10	31850-C3	33.00		
.050	**.250** (5x)	4	1/8	2-1/2	834150	29.80	834150-C3	34.70		
.050	**.300** (6x)	3	1/8	2-1/2	12750	28.10	12750-C3	33.00	12750-C4	40.50
.050	**.300** (6x)	4	1/8	2-1/2	12550	29.80	12550-C3	34.70		
.050	**.350** (7x)	3	1/8	2-1/2	897950	39.20	897950-C3	44.10		
.050	**.400** (8x)	3	1/8	2-1/2	33650	55.20	33650-C3	60.10	33650-C4	67.60
.050	**.500** (10x)	3	1/8	2-1/2	951350	59.20	951350-C3	64.10		
.050	**.600** (12x)	3	1/8	2-1/2	34950	62.20	34950-C3	67.10		
.055 (1.4 mm)	**.220** (4x)	3	1/8	2-1/2	888455	25.00	888455-C3	29.90		
.055 (1.4 mm)	**.275** (5x)	3	1/8	2-1/2	31855	25.00	31855-C3	29.90	31855-C4	37.40
.055 (1.4 mm)	**.275** (5x)	4	1/8	2-1/2	834155	27.00	834155-C3	31.90		
.055 (1.4 mm)	**.330** (6x)	3	1/8	2-1/2	894255	27.30	894255-C3	32.20		
.055 (1.4 mm)	**.385** (7x)	3	1/8	2-1/2	12755	28.10	12755-C3	33.00	12755-C4	40.50
.055 (1.4 mm)	**.385** (7x)	4	1/8	2-1/2	810355	29.80	810355-C3	34.70		
.055 (1.4 mm)	**.560** (10x)	3	1/8	2-1/2	951355	43.70	951355-C3	48.60		
.055 (1.4 mm)	**.660** (12x)	3	1/8	2-1/2	34955	63.10	34955-C3	68.00		
.059 (1.5 mm)	**.295** (5x)	3	1/8	2-1/2	31859	26.20	31859-C3	31.10		
.059 (1.5 mm)	**.472** (8x)	3	1/8	2-1/2	12759	26.20	12759-C3	31.10		
.060	**.250** (4x)	3	1/8	2-1/2	888460	25.00	888460-C3	29.90		
.060	**.312** (5x)	3	1/8	2-1/2	31860	25.00	31860-C3	29.90		
.060	**.312** (5x)	4	1/8	2-1/2	834160	26.50	834160-C3	31.40		
.060	**.375** (6x)	3	1/8	2-1/2	894260	26.10	894260-C3	31.00		
.060	**.437** (7x)	3	1/8	2-1/2	897960	27.30	897960-C3	32.20		

continued on next page

NEW SIZES!

MINIATURE END MILLS

Square – Long Flute (cont.)

continued from previous page

CUTTER DIAMETER	LENGTH OF CUT	FLUTES	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN COATED		AMORPHOUS DIAMOND		
D_1 $^{+.0005''}_{-.0005''}$	L_2 $^{+.010''}_{-.000''}$		D_2	L_1	TOOL #	PRICE	TOOL #	PRICE	TOOL #	PRICE	
.060	**.500** (8x)	3	1/8	2-1/2	12760	28.50	12760-C3	33.40	12760-C4	40.90	
.060	**.500** (8x)	4	1/8	2-1/2	826860	30.50	826860-C3	35.40			
.060	**.625** (10x)	3	1/8	2-1/2	951360	49.50	951360-C3	54.40			
.060	**.720** (12x)	3	1/8	2-1/2	34960	63.10	34960-C3	68.00			
.062 (1/16)	**.250** (4x)	3	1/8	2-1/2	888462	25.00	888462-C3	29.90	888462-C4	37.40	
.062 (1/16)	**.250** (4x)	4	1/8	2-1/2	836962	27.00	836962-C3	31.90	836962-C4	39.40	NEW
.062 (1/16)	**.312** (5x)	3	1/8	2-1/2	31862	25.00	31862-C3	29.90	31862-C4	37.40	
.062 (1/16)	**.312** (5x)	4	1/8	2-1/2	834162	27.00	834162-C3	31.90	834162-C4	39.40	
.062 (1/16)	**.375** (6x)	3	1/8	2-1/2	894262	26.10	894262-C3	31.00	894262-C4	38.50	
.062 (1/16)	**.375** (6x)	4	1/8	2-1/2	12562	26.80	12562-C3	31.70			
.062 (1/16)	**.437** (7x)	3	1/8	2-1/2	897962	27.30	897962-C3	32.20	897962-C4	39.70	NEW
.062 (1/16)	**.437** (7x)	4	1/8	2-1/2	810362	28.20	810362-C3	33.10			
.062 (1/16)	**.500** (8x)	3	1/8	2-1/2	33662	28.50	33662-C3	33.40	33662-C4	40.90	
.062 (1/16)	**.500** (8x)	4	1/8	2-1/2	826862	30.00	826862-C3	34.90	826862-C4	42.40	
.062 (1/16)	**.562** (9x)	3	1/8	2-1/2	837862	33.00	837862-C3	37.90			
.062 (1/16)	**.562** (9x)	4	1/8	2-1/2	770862	34.50	770862-C3	39.40			NEW
.062 (1/16)	**.625** (10x)	3	1/8	2-1/2	951362	35.90	951362-C3	40.80	951362-C4	48.30	
.062 (1/16)	**.625** (10x)	4	1/8	2-1/2	802662	38.60	802662-C3	43.50			
.062 (1/16)	**.750** (12x)	3	1/8	2-1/2	34962	48.70	34962-C3	53.60	34962-C4	61.10	
.062 (1/16)	**.750** (12x)	4	1/8	2-1/2	818062	50.70	818062-C3	55.60			
.062 (1/16)	**.950** (15x)	3	1/8	2-1/2	35862	68.80	35862-C3	73.70	35862-C4	81.20	
.065	**.325** (5x)	3	1/8	2-1/2	31865	25.00	31865-C3	29.90			
.065	**.500** (8x)	3	1/8	2-1/2	12765	28.10	12765-C3	33.00	12765-C4	40.50	
.065	**.650** (10x)	3	1/8	2-1/2	951365	43.70	951365-C3	48.60			
.070	**.281** (4x)	3	1/8	2-1/2	888470	27.00	888470-C3	31.90			
.070	**.375** (5x)	3	1/8	2-1/2	31870	25.00	31870-C3	29.90			
.070	**.500** (7x)	3	1/8	2-1/2	12770	28.10	12770-C3	33.00	12770-C4	40.50	
.070	**.700** (10x)	3	1/8	2-1/2	951370	43.70	951370-C3	48.60			
.070	**.850** (12x)	3	1/8	2-1/2	34970	49.30	34970-C3	54.20			
.075	**.375** (5x)	3	1/8	2-1/2	31875	25.00	31875-C3	29.90			
.075	**.500** (7x)	3	1/8	2-1/2	12775	28.10	12775-C3	33.00	12775-C4	40.50	
.075	**.750** (10x)	3	1/8	2-1/2	951375	43.70	951375-C3	48.60			
.075	**.900** (12x)	3	1/8	2-1/2	34975	49.30	34975-C3	54.20			
.078 (5/64)	**.312** (4x)	3	1/8	2-1/2	888478	25.00	888478-C3	29.90	888478-C4	37.40	
.078 (5/64)	**.312** (4x)	4	1/8	2-1/2	836978	27.00	836978-C3	31.90			
.078 (5/64)	**.406** (5x)	3	1/8	2-1/2	31878	25.00	31878-C3	29.90	31878-C4	37.40	
.078 (5/64)	**.406** (5x)	4	1/8	2-1/2	834178	27.00	834178-C3	31.90	834178-C4	39.40	NEW
.078 (5/64)	**.475** (6x)	3	1/8	2-1/2	894278	26.10	894278-C3	31.00			
.078 (5/64)	**.550** (7x)	3	1/8	2-1/2	897978	27.30	897978-C3	32.20			
.078 (5/64)	**.550** (7x)	4	1/8	2-1/2	810378	28.90	810378-C3	33.80			
.078 (5/64)	**.625** (8x)	3	1/8	2-1/2	33678	28.50	33678-C3	33.40	33678-C4	40.90	
.078 (5/64)	**.625** (8x)	4	1/8	2-1/2	826878	31.10	826878-C3	36.00			
.078 (5/64)	**.800** (10x)	3	1/8	2-1/2	951378	35.20	951378-C3	40.10			
.078 (5/64)	**.940** (12x)	3	1/8	2-1/2	34978	48.70	34978-C3	53.60	34978-C4	61.10	
.078 (5/64)	**1.187** (15x)	3	1/8	2-1/2	35878	68.80	35878-C3	73.70	35878-C4	81.20	

continued on next page

MINIATURE END MILLS

Square – Long Flute (cont.)

continued from previous page

	CUTTER DIAMETER	LENGTH OF CUT	FLUTES	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN COATED		AMORPHOUS DIAMOND	
	D_1 $^{+.0005''}_{-.0005''}$	L_2 $^{+.010''}_{-.000''}$		D_2	L_1	TOOL #	PRICE	TOOL #	PRICE	TOOL #	PRICE
NEW	.080	**.320** (4x)	3	1/8	2-1/2	888480	25.00	888480-C3	29.90		
	.080	**.406** (5x)	3	1/8	2-1/2	31880	25.00	31880-C3	29.90		
	.080	**.750** (9x)	3	1/8	2-1/2	12780	28.60	12780-C3	33.50	12780-C4	41.00
	.080	**.960** (12x)	3	1/8	2-1/2	34980	49.30	34980-C3	54.20		
	.085	**.425** (5x)	3	1/8	2-1/2	31885	25.00	31885-C3	29.90		
	.085	**.750** (9x)	3	1/8	2-1/2	12785	28.60	12785-C3	33.50	12785-C4	41.00
	.090	**.450** (5x)	3	1/8	2-1/2	31890	25.00	31890-C3	29.90		
	.090	**.750** (8x)	3	1/8	2-1/2	12790	28.50	12790-C3	33.40	12790-C4	40.90
	.090	**.900** (10x)	3	1/8	2-1/2	951390	43.70	951390-C3	48.60		
	.090	**1.080** (12x)	3	1/8	2-1/2	34990	49.30	34990-C3	54.20		
	.093 (3/32)	**.375** (4x)	3	1/8	2-1/2	888493	25.00	888493-C3	29.90	888493-C4	37.40
	.093 (3/32)	**.375** (4x)	4	1/8	2-1/2	836993	27.00	836993-C3	31.90		
	.093 (3/32)	**.500** (5x)	3	1/8	2-1/2	31893	25.00	31893-C3	29.90	31893-C4	37.40
	.093 (3/32)	**.500** (5x)	4	1/8	2-1/2	834193	27.00	834193-C3	31.90	834193-C4	39.40
	.093 (3/32)	**.585** (6x)	3	1/8	2-1/2	894293	26.10	894293-C3	31.00		
	.093 (3/32)	**.585** (6x)	4	1/8	2-1/2	12593	26.60	12593-C3	31.50		
NEW	.093 (3/32)	**.670** (7x)	3	1/8	2-1/2	897993	27.30	897993-C3	32.20	897993-C4	39.70
	.093 (3/32)	**.670** (7x)	4	1/8	2-1/2	810393	28.70	810393-C3	33.60		
	.093 (3/32)	**.750** (8x)	3	1/8	2-1/2	33693	28.50	33693-C3	33.40	33693-C4	40.90
	.093 (3/32)	**.750** (8x)	4	1/8	2-1/2	826893	31.10	826893-C3	36.00		
	.093 (3/32)	**.850** (9x)	3	1/8	2-1/2	837893	33.30	837893-C3	38.20		
	.093 (3/32)	**.950** (10x)	3	1/8	2-1/2	951393	35.20	951393-C3	40.10		
	.093 (3/32)	**1.125** (12x)	3	1/8	2-1/2	34993	48.70	34993-C3	53.60	34993-C4	61.10
	.093 (3/32)	**1.400** (15x)	3	1/8	3	35893	71.50	35893-C3	76.40	35893-C4	83.90
	.095	**.500** (5x)	3	1/8	2-1/2	31895	25.00	31895-C3	29.90		
	.095	**.750** (8x)	3	1/8	2-1/2	12795	28.10	12795-C3	33.00	12795-C4	40.50
	.095	**.950** (10x)	3	1/8	2-1/2	951395	43.70	951395-C3	48.60		
	.100	**.400** (4x)	3	1/8	2-1/2	888500	25.00	888500-C3	29.90		
	.100	**.500** (5x)	3	1/8	2-1/2	31899	25.00	31899-C3	29.90		
	.100	**.500** (5x)	4	1/8	2-1/2	834200	27.00	834200-C3	31.90		
	.100	**.600** (6x)	3	1/8	2-1/2	894300	26.10	894300-C3	31.00		
	.100	**.750** (7.5x)	3	1/8	2-1/2	12799	28.10	12799-C3	33.00	12799-C4	40.50
	.100	**1.000** (10x)	3	1/8	2-1/2	951600	43.70	951600-C3	48.60		
	.100	**1.200** (12x)	3	1/8	2-1/2	34999	49.30	34999-C3	54.20		
	.105	**.530** (5x)	3	1/8	2-1/2	31901	25.90	31901-C3	30.80		
	.109 (7/64)	**.437** (4x)	3	1/8	2-1/2	888502	25.00	888502-C3	29.90		
	.109 (7/64)	**.570** (5x)	3	1/8	2-1/2	31902	25.00	31902-C3	29.90	31902-C4	37.40
	.109 (7/64)	**.570** (5x)	4	1/8	2-1/2	834202	27.00	834202-C3	31.90		
	.109 (7/64)	**.900** (8x)	3	1/8	2-1/2	33702	28.40	33702-C3	33.30		
	.109 (7/64)	**1.125** (10x)	3	1/8	2-1/2	951602	49.50	951602-C3	54.40		
	.110	**.570** (5x)	3	1/8	2-1/2	31903	25.90	31903-C3	30.80		
	.115	**.600** (5x)	3	1/8	2-1/2	31904	25.90	31904-C3	30.80		
	.118 (3 mm)	**.625** (5x)	3	1/8	2-1/2	31905	25.40	31905-C3	30.30	31905-C4	37.80
	.118 (3 mm)	**.625** (5x)	4	1/8	2-1/2	834205	26.90	834205-C3	31.80		
	.118 (3 mm)	**.950** (8x)	3	1/8	2-1/2	33705	28.70	33705-C3	33.60		
	.118 (3 mm)	**1.187** (10x)	3	1/8	2-1/2	951605	49.80	951605-C3	54.70		
	.120	**.625** (5x)	3	1/8	2-1/2	31906	26.20	31906-C3	31.10		

continued on next page

NEW SIZES!

MINIATURE END MILLS

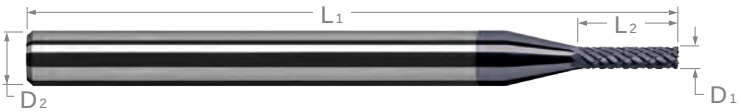
Square – Long Flute (cont.)

continued from previous page

CUTTER DIAMETER	LENGTH OF CUT	FLUTES	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN COATED		AMORPHOUS DIAMOND		
D_1 $^{+.000''}_{-.002''}$	L_2 $^{+.030''}_{-.000''}$		D_2	L_1	TOOL #	PRICE	TOOL #	PRICE	TOOL #	PRICE	
.125 (1/8)	**.500** (4x)	3	1/8	2-1/2	888508	24.60	888508-C3	29.50	888508-C4	37.00	
.125 (1/8)	**.500** (4x)	4	1/8	2-1/2	837008	27.10	837008-C3	32.00			
.125 (1/8)	**.625** (5x)	3	1/8	2-1/2	31908	24.60	31908-C3	29.50	31908-C4	37.00	
.125 (1/8)	**.625** (5x)	4	1/8	2-1/2	834208	27.10	834208-C3	32.00	834208-C4	39.50	NEW
.125 (1/8)	**.750** (6x)	3	1/8	2-1/2	894308	25.50	894308-C3	30.40	894308-C4	37.90	
.125 (1/8)	**.750** (6x)	4	1/8	2-1/2	12508	27.10	12508-C3	32.00			
.125 (1/8)	**.875** (7x)	3	1/8	2-1/2	898008	26.00	898008-C3	30.90			
.125 (1/8)	**1.000** (8x)	3	1/8	2-1/2	33708	26.50	33708-C3	31.40	33708-C4	38.90	
.125 (1/8)	**1.000** (8x)	4	1/8	2-1/2	826908	29.20	826908-C3	34.10			
.125 (1/8)	**1.125** (9x)	3	1/8	2-1/2	837908	37.30	837908-C3	42.20			
.125 (1/8)	**1.250** (10x)	3	1/8	2-1/2	951608	45.20	951608-C3	50.10			
.125 (1/8)	**1.250** (10x)	4	1/8	2-1/2	802708	47.20	802708-C3	52.10			NEW
.125 (1/8)	**1.500** (12x)	3	1/8	3	35008	51.80	35008-C3	56.70	35008-C4	64.20	
.125 (1/8)	**1.500** (12x)	4	1/8	3	818108	53.80	818108-C3	58.70			
.125 (1/8)	**1.875** (15x)	3	1/8	3	35908	71.50	35908-C3	76.40	35908-C4	83.90	
.140 (9/64)	**.750** (5x)	4	3/16	3	31909	27.10	31909-C3	32.40			
.140 (9/64)	**1.125** (8x)	4	3/16	3	33709	47.90	33709-C3	53.20			
.140 (9/64)	**1.450** (10x)	4	3/16	3	951609	56.70	951609-C3	62.00			
.156 (5/32)	**.625** (4x)	4	3/16	3	888510	25.20	888510-C3	30.50			
.156 (5/32)	**.750** (5x)	4	3/16	3	834210	25.20	834210-C3	30.50			
.156 (5/32)	**.937** (6x)	3	3/16	3	894310	25.40	894310-C3	30.70			
.156 (5/32)	**1.000** (6x)	4	3/16	3	12510	27.40	12510-C3	32.70	12510-C4	44.50	
.156 (5/32)	**1.093** (7x)	4	3/16	3	898010	32.40	898010-C3	37.70			
.156 (5/32)	**1.250** (8x)	4	3/16	3	33710	47.90	33710-C3	53.20			
.156 (5/32)	**1.570** (10x)	4	3/16	3	951610	56.70	951610-C3	62.00			
.156 (5/32)	**1.875** (12x)	4	3/16	4	35010	66.00	35010-C3	73.20	35010-C4	84.20	
.172 (11/64)	**.875** (5x)	4	3/16	3	834211	27.10	834211-C3	32.40			
.187 (3/16)	**.750** (4x)	4	3/16	3	888512	25.20	888512-C3	30.50	888512-C4	42.30	
.187 (3/16)	**1.000** (5x)	4	3/16	3	834212	25.20	834212-C3	30.50			
.187 (3/16)	**1.156** (6x)	3	3/16	3	894312	25.40	894312-C3	30.70			
.187 (3/16)	**1.125** (6x)	4	3/16	3	12512	27.40	12512-C3	32.70	77012	44.50	
.187 (3/16)	**1.312** (7x)	4	3/16	3	898012	32.40	898012-C3	37.70			
.187 (3/16)	**1.500** (8x)	4	3/16	3	33712	47.90	33712-C3	53.20	33712-C4	65.00	
.187 (3/16)	**1.875** (10x)	4	3/16	4	951612	56.90	951612-C3	64.10			
.187 (3/16)	**2.250** (12x)	4	3/16	4	35012	66.00	35012-C3	73.20			
.218 (7/32)	**1.125** (5x)	4	1/4	4	834214	28.80	834214-C3	37.20			
.218 (7/32)	**1.750** (8x)	4	1/4	4	33714	36.20	33714-C3	44.60			
.250 (1/4)	**1.000** (4x)	4	1/4	4	888516	28.80	888516-C3	37.20			
.250 (1/4)	**1.250** (5x)	4	1/4	4	834216	28.80	834216-C3	37.20			
.250 (1/4)	**1.500** (6x)	3	1/4	4	894316	29.00	894316-C3	37.40			
.250 (1/4)	**1.500** (6x)	4	1/4	4	12516	31.00	12516-C3	39.40	77016	50.40	
.250 (1/4)	**1.750** (7x)	4	1/4	4	898016	36.20	898016-C3	44.60			
.250 (1/4)	**2.000** (8x)	4	1/4	4	33716	51.30	33716-C3	59.70	33716-C4	70.70	
.250 (1/4)	**2.500** (10x)	4	1/4	4	951616	61.60	951616-C3	70.00			
.250 (1/4)	**3.000** (12x)	4	1/4	6	35016	72.40	35016-C3	81.90			
.312 (5/16)	**1.625** (5x)	4	5/16	4	12520	44.60	12520-C3	54.70			
.375 (3/8)	**1.750** (5x)	4	3/8	4	12524	47.40	12524-C3	60.40			
.500 (1/2)	**2.000** (4x)	4	1/2	4	12532	66.70	12532-C3	80.90			

MINIATURE END MILLS

Square – Deburring End Mill



End Mill Tolerances with Bur-Style Geometry!

- Deburr in your CNC machine with these high-precision burs held to end mill tolerances
- Stop scrapping expensive parts due to handheld operator errors
- High flute count allows for increased feeds which reduces cycle times
- Achieve better finish than with milling type cutters
- Bur geometry is optimized for removing burrs and/or adding a small controlled edge break with superior finish
- Double cut style flute pattern
- Bur-style end allows for shallow ramping, not suited for plunge cutting
- Solid carbide
- CNC ground in the USA

CUTTER DIAMETER	LENGTH OF CUT	RIGHT HAND TEETH	LEFT HAND TEETH	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN COATED	
D_1 $^{+.0005''}_{-.0005''}$	L_2 $^{+.020''}_{-.000''}$			D_2	L_1	TOOL #	PRICE	TOOL #	PRICE
.015 (1/64)	**.045** (3x)	6	3	1/8	2-1/2	60715	34.20	60715-C3	39.10
.031 (1/32)	**.093** (3x)	6	3	1/8	2-1/2	60731	26.20	60731-C3	31.10
.047 (3/64)	**.141** (3x)	8	4	1/8	2-1/2	60747	25.30	60747-C3	30.20
.062 (1/16)	**.186** (3x)	8	4	1/8	2-1/2	60762	25.30	60762-C3	30.20
.078 (5/64)	**.234** (3x)	10	5	1/8	2-1/2	60778	25.30	60778-C3	30.20
.093 (3/32)	**.279** (3x)	12	6	1/8	2-1/2	60793	25.30	60793-C3	30.20
D_1 $^{+.000''}_{-.002''}$	L_2 $^{+.030''}_{-.000''}$			D_2	L_1	TOOL #	PRICE	TOOL #	PRICE
.125 (1/8)	**.375** (3x)	14	7	1/8	2-1/2	60808	23.90	60808-C3	28.80
.187 (3/16)	**.562** (3x)	16	8	3/16	2-1/2	60812	42.70	60812-C3	48.00
.250 (1/4)	**.750** (3x)	18	9	1/4	2-1/2	60816	50.70	60816-C3	57.90



Tips for Maintaining Tight Tolerances

Tolerances are very important for machining operations, but do you know what they mean? Do you know how to maintain tight tolerances even in difficult operations, such as machining thin walls? Our "In the Loupe" blog post **Tips for Maintaining Tight Tolerances** is a must-read before beginning any job.

Read more on harveyperformance.com/in-the-loupe/

NEW SIZES!

MINIATURE END MILLS

Square – Long Reach, Standard Flute





Reduced Neck Diameter to Avoid Heeling

SQUARE

- Length of cut = 3x diameter
- Center cutting
- Solid carbide
- CNC ground in the USA

CUTTER DIAMETER	LENGTH OF CUT	OVERALL REACH	SHANK DIA.	OAL	UNCOATED			AlTiN COATED			AMORPHOUS DIAMOND		
D_1 +.0005″ −.0005″	L_2 +.010″ −.000″	L_3 +.010″ −.000″	D_2	L_1	2 FL	4FL	PRICE	2FL	4FL	PRICE	4 FL	PRICE	
.010	.030	**.050** (5x)	1/8	1-1/2	944510	956810	47.90	944510-C3	956810-C3	52.80			
.010	.030	**.080** (8x)	1/8	1-1/2	76210	76410	47.90	76210-C3	76410-C3	52.80			
.010	.030	**.125** (12x)	1/8	1-1/2	952010	992510	50.70	952010-C3	992510-C3	55.60			
.015 (1/64)	.045	**.078** (5x)	1/8	1-1/2	944515	956815	38.70	944515-C3	956815-C3	43.60			
.015 (1/64)	.045	**.128** (8x)	1/8	1-1/2	76215	76415	38.70	76215-C3	76415-C3	43.60			
.015 (1/64)	.045	**.156** (10x)	1/8	1-1/2	849615	846115	40.30		846115-C3	45.20			
.015 (1/64)	.045	**.187** (12x)	1/8	1-1/2	952015	992515	40.30	952015-C3	992515-C3	45.20			
.020 (.5 mm)	.060	**.100** (5x)	1/8	1-1/2	944520	956820	37.00	944520-C3	956820-C3	41.90	956820-C4	49.40	NEW
.020 (.5 mm)	.060	**.120** (6x)	1/8	1-1/2		802420	37.00		802420-C3	41.90			
.020 (.5 mm)	.060	**.140** (7x)	1/8	1-1/2		896820	37.00		896820-C3	41.90			
.020 (.5 mm)	.060	**.170** (8x)	1/8	1-1/2	76220	76420	37.00	76220-C3	76420-C3	41.90	76420-C4	49.40	NEW
.020 (.5 mm)	.060	**.200** (10x)	1/8	1-1/2	849620	846120	38.90		846120-C3	43.80			
.020 (.5 mm)	.060	**.250** (12x)	1/8	1-1/2	952020	992520	38.90	952020-C3	992520-C3	43.80			
.025	.075	**.125** (5x)	1/8	1-1/2	944525	956825	35.70	944525-C3	956825-C3	40.60			
.025	.075	**.213** (8x)	1/8	1-1/2	76225	76425	35.70	76225-C3	76425-C3	40.60			
.025	.075	**.312** (12x)	1/8	1-1/2	952025	992525	36.90	952025-C3	992525-C3	41.80			
.030	.090	**.156** (5x)	1/8	1-1/2	944530	956830	35.70	944530-C3	956830-C3	40.60			
.030	.090	**.270** (9x)	1/8	1-1/2	76230	76430	35.70	76230-C3	76430-C3	40.60			
.030	.090	**.375** (12x)	1/8	1-1/2	952030	992530	36.90	952030-C3	992530-C3	41.80			
.031 (1/32)	.093	**.156** (5x)	1/8	1-1/2	944531	956831	35.70	944531-C3	956831-C3	40.60	956831-C4	48.10	NEW
.031 (1/32)	.093	**.187** (6x)	1/8	1-1/2		802431	35.70		802431-C3	40.60			
.031 (1/32)	.093	**.218** (7x)	1/8	1-1/2		896831	35.70		896831-C3	40.60			
.031 (1/32)	.093	**.250** (8x)	1/8	1-1/2		972231	35.70		972231-C3	40.60			
.031 (1/32)	.093	**.279** (9x)	1/8	1-1/2	76231	76431	35.70	76231-C3	76431-C3	40.60	76431-C4	48.10	NEW
.031 (1/32)	.093	**.375** (12x)	1/8	1-1/2	952031	992531	36.90	952031-C3	992531-C3	41.80			
.031 (1/32)	.093	**.470** (15x)	1/8	1-1/2	829131	838631	39.00	829131-C3	838631-C3	43.90			
.035 (.9 mm)	.105	**.187** (5x)	1/8	1-1/2	944535	956835	35.70	944535-C3	956835-C3	40.60			
.035 (.9 mm)	.105	**.315** (9x)	1/8	1-1/2	76235	76435	35.70	76235-C3	76435-C3	40.60			
.035 (.9 mm)	.105	**.425** (12x)	1/8	1-1/2	952035	992535	36.90	952035-C3	992535-C3	41.80			
.039 (1 mm)	.117	**.203** (5x)	1/8	1-1/2	944539	956839	35.70	944539-C3	956839-C3	40.60			
.039 (1 mm)	.117	**.325** (8x)	1/8	1-1/2	960839	972239	35.70	960839-C3	972239-C3	40.60			
.039 (1 mm)	.117	**.480** (12x)	1/8	1-1/2	952039	992539	36.90		992539-C3	41.80			
.040	.120	**.203** (5x)	1/8	1-1/2	944540	956840	35.70	944540-C3	956840-C3	40.60			
.040	.120	**.360** (9x)	1/8	1-1/2	76240	76440	35.70	76240-C3	76440-C3	40.60			
.040	.120	**.480** (12x)	1/8	1-1/2	952040	992540	36.90	952040-C3	992540-C3	41.80			
.045	.135	**.225** (5x)	1/8	1-1/2	944545	956845	35.00	944545-C3	956845-C3	39.90			
.045	.135	**.405** (9x)	1/8	1-1/2	76245	76445	35.00	76245-C3	76445-C3	39.90			
.047 (3/64)	.141	**.250** (5x)	1/8	1-1/2	944547	956847	35.00	944547-C3	956847-C3	39.90			
.047 (3/64)	.141	**.328** (7x)	1/8	1-1/2	898747	896847	35.00		896847-C3	39.90			
.047 (3/64)	.141	**.423** (9x)	1/8	1-1/2	76247	76447	35.00	76247-C3	76447-C3	39.90			
.047 (3/64)	.141	**.570** (12x)	1/8	1-1/2	952047	992547	36.10	952047-C3	992547-C3	41.00			

continued on next page

NEW SIZES!

MINIATURE END MILLS

Square – Long Reach, Standard Flute (cont.)

continued from previous page

	CUTTER DIAMETER	LENGTH OF CUT	OVERALL REACH	SHANK DIA.	OAL	UNCOATED			AlTiN COATED			AMORPHOUS DIAMOND	
	D_1 +.0005″ −.0005″	L_2 +.010″ −.000″	L_3 +.010″ −.000″	D_2	L_1	2 FL	4FL	PRICE	2FL	4FL	PRICE	4 FL	PRICE
	.050	.150	**.250** (5x)	1/8	1-1/2	944550	956850	35.00	944550-C3	956850-C3	39.90		
	.050	.150	**.400** (8x)	1/8	1-1/2	960850	972250	35.00	960850-C3	972250-C3	39.90		
	.050	.150	**.500** (10x)	1/8	1-1/2	76250	76450	36.10	76250-C3	76450-C3	41.00		
	.050	.150	**.600** (12x)	1/8	2	952050	992550	38.40	952050-C3	992550-C3	43.30		
	.055 (1.4 mm)	.165	**.275** (5x)	1/8	1-1/2	944555	956855	35.90	944555-C3	956855-C3	40.80		
	.055 (1.4 mm)	.165	**.500** (9x)	1/8	1-1/2	76255	76455	35.90	76255-C3	76455-C3	40.80		
	.055 (1.4 mm)	.165	**.660** (12x)	1/8	2	952055	992555	38.20		992555-C3	43.10		
	.060	.180	.312 (5x)	1/8	1-1/2	944560	956860	35.00	944560-C3	956860-C3	39.90		
	.060	.180	**.500** (8x)	1/8	1-1/2	76260	76460	35.00	76260-C3	76460-C3	39.90		
	.060	.180	**.720** (12x)	1/8	2	952060	992560	36.10	952060-C3	992560-C3	41.00		
NEW	.062 (1/16)	.186	**.312** (5x)	1/8	1-1/2	944562	956862	35.00	944562-C3	956862-C3	39.90	956862-C4	47.40
	.062 (1/16)	.186	**.375** (6x)	1/8	1-1/2		802462	35.00		802462-C3	39.90		
	.062 (1/16)	.186	**.437** (7x)	1/8	1-1/2		896862	35.00		896862-C3	39.90		
NEW	.062 (1/16)	.186	**.500** (8x)	1/8	1-1/2	76262	76462	35.00	76262-C3	76462-C3	39.90	76462-C4	47.40
	.062 (1/16)	.186	**.625** (10x)	1/8	2	849662	846162	36.10	849662-C3	846162-C3	41.00		
	.062 (1/16)	.186	**.750** (12x)	1/8	2	952062	992562	36.10	952062-C3	992562-C3	41.00		
	.062 (1/16)	.186	**.950** (15x)	1/8	2	829162	838662	38.40	829162-C3	838662-C3	43.30		
	.065	.195	**.500** (8x)	1/8	1-1/2	76265	76465	35.00	76265-C3	76465-C3	39.90		
	.070	.210	**.500** (7x)	1/8	1-1/2	76270	76470	35.00	76270-C3	76470-C3	39.90		
	.070	.210	**.850** (12x)	1/8	2	952070	992570	36.10	952070-C3	992570-C3	41.00		
	.075	.225	**.500** (7x)	1/8	1-1/2	76275	76475	35.00	76275-C3	76475-C3	39.90		
NEW	.078 (5/64)	.234	**.406** (5x)	1/8	1-1/2		956878	35.00		956878-C3	39.90		
	.078 (5/64)	.234	**.500** (6x)	1/8	1-1/2	76278	76478	35.00	76278-C3	76478-C3	39.90		
NEW	.078 (5/64)	.234	**.550** (7x)	1/8	1-1/2		896878	35.00		896878-C3	39.90		
	.078 (5/64)	.234	**.625** (8x)	1/8	2	960878	972278	35.10		972278-C3	40.00		
	.078 (5/64)	.234	**.800** (10x)	1/8	2	849678	846178	36.10		846178-C3	41.00		
	.078 (5/64)	.234	**.940** (12x)	1/8	2	952078	992578	36.10	952078-C3	992578-C3	41.00		
	.080	.240	**.500** (6x)	1/8	1-1/2	76280	76480	35.00	76280-C3	76480-C3	39.90		
	.080	.240	**.960** (12x)	1/8	2	952080	992580	36.10	952080-C3	992580-C3	41.00		
	.085	.255	**.500** (6x)	1/8	1-1/2	76285	76485	35.00	76285-C3	76485-C3	39.90		
	.090	.270	**.625** (7x)	1/8	1-1/2	76290	76490	35.00	76290-C3	76490-C3	39.90		
	.090	.270	**1.080** (12x)	1/8	2	952090	992590	36.10	952090-C3	992590-C3	41.00		
NEW	.093 (3/32)	.279	**.500** (5x)	1/8	1-1/2	944593	956893	35.00	944593-C3	956893-C3	39.90	956893-C4	47.40
	.093 (3/32)	.279	**.585** (6x)	1/8	1-1/2		802493	35.00		802493-C3	39.90		
NEW	.093 (3/32)	.279	**.625** (7x)	1/8	1-1/2	76293	76493	35.00	76293-C3	76493-C3	39.90	76493-C4	47.40
	.093 (3/32)	.279	**.750** (8x)	1/8	2		960893	36.10		960893-C3	41.00		
	.093 (3/32)	.279	**.950** (10x)	1/8	2	849693	846193	36.10	849693-C3	846193-C3	41.00		
	.093 (3/32)	.279	**1.125** (12x)	1/8	2	952093	992593	36.10	952093-C3	992593-C3	41.00		
	.093 (3/32)	.279	**1.400** (15x)	1/8	2-1/2	829193	838693	38.40	829193-C3	838693-C3	43.30		
	.095	.285	**.625** (6x)	1/8	1-1/2	76295	76495	35.00	76295-C3	76495-C3	39.90		
	.100	.300	**.625** (6x)	1/8	1-1/2	76300	76500	35.00	76300-C3	76500-C3	39.90		
	.100	.300	**.800** (8x)	1/8	2		972300	36.10		972300-C3	41.00		
	.100	.300	**1.200** (12x)	1/8	2-1/2	952100	992600	36.10	952100-C3	992600-C3	41.00		
	.109 (7/64)	.327	**.570** (5x)	1/8	1-1/2	944602	956902	35.00		956902-C3	39.90		
	.109 (7/64)	.327	**.900** (8x)	1/8	2	960902	972302	35.00		972302-C3	39.90		
	.118 (3 mm)	.354	**.625** (5x)	1/8	1-1/2	944605	956905	35.00	944605-C3	956905-C3	39.90		
	.118 (3 mm)	.354	**.950** (8x)	1/8	2	960905	972305	35.00	960905-C3	972305-C3	39.90		

continued on next page

NEW SIZES!

MINIATURE END MILLS

Square – Long Reach, Standard Flute (cont.)

continued from previous page

SQUARE

CUTTER DIAMETER	LENGTH OF CUT	OVERALL REACH	SHANK DIA.	OAL	UNCOATED			AlTiN COATED			AMORPHOUS DIAMOND		
D_1 +.000″ −.002″	L_2 +.030″ −.000″	L_3 +.030″ −.000″	D_2	L_1	2 FL	4FL	PRICE	2FL	4FL	PRICE	4 FL	PRICE	
.125 (1/8)	.375	**.625** (5x)	1/8	1-1/2	944608	956908	35.00	944608-C3	956908-C3	39.90	956908-C4	47.40	NEW
.125 (1/8)	.375	**.750** (6x)	1/8	2		802508	35.00		802508-C3	39.90			
.125 (1/8)	.375	**.875** (7x)	1/8	2-1/2		802308	38.00		802308-C3	42.90			
.125 (1/8)	.375	**1.000** (8x)	1/8	2	960908	972308	35.00	960908-C3	972308-C3	39.90	972308-C4	53.20	NEW
.125 (1/8)	.375	**1.250** (10x)	1/8	2-1/2	849708	846208	38.00	849708-C3	846208-C3	42.90			
.125 (1/8)	.375	**1.500** (12x)	1/8	2-1/2	952108	992608	38.00	952108-C3	992608-C3	42.90			
.125 (1/8)	.375	**1.875** (15x)	1/8	3	829208	838708	40.50	829208-C3	838708-C3	45.40			
.140 (9/64)	.422	**.750** (5x)	3/16	2	944609	956909	41.40		956909-C3	46.70			
.140 (9/64)	.422	**1.125** (8x)	3/16	2-1/2	960909	972309	41.40		972309-C3	46.70			
.156 (5/32)	.469	**.750** (5x)	3/16	2	944610	956910	41.40		956910-C3	46.70			
.156 (5/32)	.469	**1.250** (8x)	3/16	2-1/2	960910	972310	41.40		972310-C3	46.70			
.187 (3/16)	.562	**1.000** (5x)	3/16	2	944612	956912	41.40	944612-C3	956912-C3	46.70			
.187 (3/16)	.562	**1.500** (8x)	3/16	2-1/2	960912	972312	41.40	960912-C3	972312-C3	46.70			
.187 (3/16)	.562	**1.875** (10x)	3/16	3	849712	846212	43.30	849712-C3	846212-C3	48.60			
.250 (1/4)	.750	**1.250** (5x)	1/4	2-1/2	944616	956916	46.30	944616-C3	956916-C3	53.50			
.250 (1/4)	.750	**2.000** (8x)	1/4	4	960916	972316	46.30	960916-C3	972316-C3	54.70			
.250 (1/4)	.750	**3.000** (12x)	1/4	6	952116	992616	52.60		992616-C3	62.10			
.375 (3/8)	1.125	**3.000** (8x)	3/8	4		972324	48.50		972324-C3	61.50			NEW

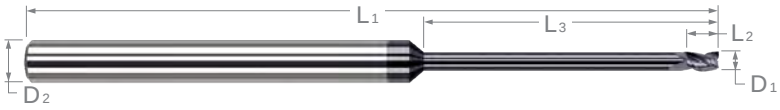
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MINIATURE END MILLS

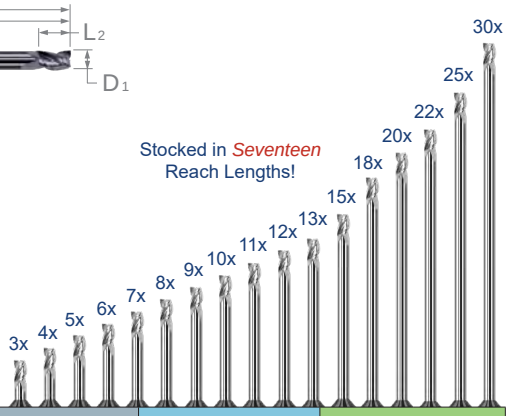
Square – Long Reach, Stub Flute



- **Long length design for deep cavities**
- Stub flutes for maximum rigidity
- Length of cut = 1½ x diameter
- Center cutting
- Solid carbide
- CNC ground in the USA



Reduced Neck Diameter to Avoid Heeling



	CUTTER DIAMETER	LENGTH OF CUT	OVERALL REACH	FLUTES	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN COATED		AMORPHOUS DIAMOND	
	D_1 +.0005″ −.0005″	L_2 +.010″ −.000″	L_3 +.010″ −.000″		D_2	L_1	TOOL #	PRICE	TOOL #	PRICE	TOOL #	PRICE
	.005	.007	**.025** (5x)	3	1/8	2-1/2	33205	48.80				
	.005	.007	**.040** (8x)	3	1/8	2-1/2	34605	48.80				
	.008	.012	**.040** (5x)	3	1/8	2-1/2	33208	48.80				
	.008	.012	**.065** (8x)	3	1/8	2-1/2	34608	48.80				
	.010	.015	**.030** (3x)	3	1/8	2-1/2	47810	46.90	47810-C3	51.80		
	.010	.015	**.050** (5x)	3	1/8	2-1/2	33210	46.90	33210-C3	51.80	33210-C4	59.30
	.010	.015	**.080** (8x)	3	1/8	2-1/2	34610	48.80	34610-C3	53.70	34610-C4	61.20
	.010	.015	**.100** (10x)	3	1/8	2-1/2	982110	51.30	982110-C3	56.20		
	.010	.015	**.125** (12x)	3	1/8	2-1/2	35410	51.30	35410-C3	56.20	35410-C4	63.70
	.010	.015	**.150** (15x)	3	1/8	2-1/2	48910	59.60	48910-C3	64.50		
	.010	.015	**.180** (18x)	3	1/8	2-1/2	977310	66.30	977310-C3	71.20		
	.011	.016	**.055** (5x)	3	1/8	2-1/2	33211	46.90	33211-C3	51.80		
	.011	.016	**.088** (8x)	3	1/8	2-1/2	34611	48.80	34611-C3	53.70		
	.012 (.3 mm)	.018	**.060** (5x)	3	1/8	2-1/2	33212	46.90	33212-C3	51.80		
	.012 (.3 mm)	.018	**.096** (8x)	3	1/8	2-1/2	34612	48.80	34612-C3	53.70		
	.013	.019	**.065** (5x)	3	1/8	2-1/2	33213	46.90	33213-C3	51.80		
	.013	.019	**.104** (8x)	3	1/8	2-1/2	34613	48.80	34613-C3	53.70		
	.014	.021	**.070** (5x)	3	1/8	2-1/2	33214	46.90	33214-C3	51.80		
	.014	.021	**.112** (8x)	3	1/8	2-1/2	34614	48.80	34614-C3	53.70		
	.015 (1/64)	.022	**.045** (3x)	3	1/8	2-1/2	47815	38.70	47815-C3	43.60	47815-C4	51.10
	.015 (1/64)	.022	**.062** (4x)	3	1/8	2-1/2	945515	38.70	945515-C3	43.60		
	.015 (1/64)	.022	**.078** (5x)	3	1/8	2-1/2	33215	38.70	33215-C3	43.60	33215-C4	51.10
NEW	.015 (1/64)	.022	**.078** (5x)	4	1/8	2-1/2	861615	38.70	861615-C3	43.60		
	.015 (1/64)	.022	**.093** (6x)	3	1/8	2-1/2	937015	38.90	937015-C3	43.80		
	.015 (1/64)	.022	**.109** (7x)	3	1/8	2-1/2	934815	38.90	934815-C3	43.80		
	.015 (1/64)	.022	**.125** (8x)	3	1/8	2-1/2	34615	38.90	34615-C3	43.80	34615-C4	51.30
NEW	.015 (1/64)	.022	**.125** (8x)	4	1/8	2-1/2	874115	38.90	874115-C3	43.80		
	.015 (1/64)	.022	**.156** (10x)	3	1/8	2-1/2	982115	40.30	982115-C3	45.20	982115-C4	52.70
	.015 (1/64)	.022	**.187** (12x)	3	1/8	2-1/2	35415	40.30	35415-C3	45.20	35415-C4	52.70
	.015 (1/64)	.022	**.225** (15x)	3	1/8	2-1/2	48915	45.60	48915-C3	50.50	48915-C4	58.00
	.015 (1/64)	.022	**.270** (18x)	3	1/8	2-1/2	977315	53.60	977315-C3	58.50		
	.015 (1/64)	.022	**.300** (20x)	3	1/8	2-1/2	58315	56.90	58315-C3	61.80		
NEW	.015 (1/64)	.022	**.375** (25x)	3	1/8	2-1/2	38015	72.70	38015-C3	77.60	38015-C4	85.10
	.016 (.4 mm)	.024	**.080** (5x)	3	1/8	2-1/2	33216	39.90	33216-C3	44.80		
	.016 (.4 mm)	.024	**.128** (8x)	3	1/8	2-1/2	34616	40.10	34616-C3	45.00		

continued on next page

NEW SIZES!

MINIATURE END MILLS

Square – Long Reach, Stub Flute (cont.)

continued from previous page

CUTTER DIAMETER	LENGTH OF CUT	OVERALL REACH	FLUTES	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN COATED		AMORPHOUS DIAMOND		
D_1 $^{+.0005''}_{-.0005''}$	L_2 $^{+.010''}_{-.000''}$	L_3 $^{+.010''}_{-.000''}$		D_2	L_1	TOOL #	PRICE	TOOL #	PRICE	TOOL #	PRICE	
.017	.026	**.085** (5x)	3	1/8	2-1/2	33217	39.90	33217-C3	44.80			
.017	.026	**.136** (8x)	3	1/8	2-1/2	34617	40.10	34617-C3	45.00			
.018	.027	**.090** (5x)	3	1/8	2-1/2	33218	39.90	33218-C3	44.80			
.018	.027	**.144** (8x)	3	1/8	2-1/2	34618	40.10	34618-C3	45.00			
.019	.029	**.095** (5x)	3	1/8	2-1/2	33219	39.90	33219-C3	44.80			
.019	.029	**.152** (8x)	3	1/8	2-1/2	34619	40.10	34619-C3	45.00			
.020 (.5 mm)	.030	**.060** (3x)	3	1/8	2-1/2	47820	37.00	47820-C3	41.90			
.020 (.5 mm)	.030	**.080** (4x)	3	1/8	2-1/2	945520	37.00	945520-C3	41.90			
.020 (.5 mm)	.030	**.100** (5x)	3	1/8	2-1/2	33220	37.00	33220-C3	41.90	33220-C4	49.40	
.020 (.5 mm)	.030	**.100** (5x)	4	1/8	2-1/2	861620	39.00	861620-C3	43.90			
.020 (.5 mm)	.030	**.120** (6x)	3	1/8	2-1/2	937020	37.00	937020-C3	41.90			
.020 (.5 mm)	.030	**.140** (7x)	3	1/8	2-1/2	934820	37.20	934820-C3	42.10			
.020 (.5 mm)	.030	**.160** (8x)	3	1/8	2-1/2	34620	37.20	34620-C3	42.10	34620-C4	49.60	
.020 (.5 mm)	.030	**.180** (9x)	3	1/8	2-1/2	846820	38.90	846820-C3	43.80			
.020 (.5 mm)	.030	**.200** (10x)	3	1/8	2-1/2	982120	38.90	982120-C3	43.80	982120-C4	51.30	
.020 (.5 mm)	.030	**.250** (12x)	3	1/8	2-1/2	35420	38.90	35420-C3	43.80	35420-C4	51.30	
.020 (.5 mm)	.030	**.300** (15x)	3	1/8	2-1/2	48920	43.90	48920-C3	48.80	48920-C4	56.30	
.020 (.5 mm)	.030	**.360** (18x)	3	1/8	2-1/2	977320	50.00	977320-C3	54.90			
.020 (.5 mm)	.030	**.400** (20x)	3	1/8	2-1/2	58320	54.30	58320-C3	59.20	58320-C4	66.70	NEW
.020 (.5 mm)	.030	**.440** (22x)	3	1/8	2-1/2	969620	60.10	969620-C3	65.00			NEW
.020 (.5 mm)	.030	**.500** (25x)	3	1/8	2-1/2	38020	70.10	38020-C3	75.00	***25x Diameter!***		
.020 (.5 mm)	.030	**.600** (30x)	3	1/8	2-1/2	972020	73.80	972020-C3	78.70	***30x Diameter!***		
.021	.031	**.105** (5x)	3	1/8	2-1/2	33221	38.70	33221-C3	43.60			
.021	.031	**.168** (8x)	3	1/8	2-1/2	34621	38.90	34621-C3	43.80			
.022	.033	**.110** (5x)	3	1/8	2-1/2	33222	38.70	33222-C3	43.60			
.022	.033	**.176** (8x)	3	1/8	2-1/2	34622	38.90	34622-C3	43.80			
.023	.035	**.115** (5x)	3	1/8	2-1/2	33223	38.70	33223-C3	43.60			
.023	.035	**.187** (8x)	3	1/8	2-1/2	34623	38.90	34623-C3	43.80			
.024 (.6 mm)	.036	**.120** (5x)	3	1/8	2-1/2	33224	38.70	33224-C3	43.60			
.024 (.6 mm)	.036	**.192** (8x)	3	1/8	2-1/2	34624	38.90	34624-C3	43.80			
.025	.037	**.075** (3x)	3	1/8	2-1/2	47825	35.70	47825-C3	40.60			
.025	.037	**.100** (4x)	3	1/8	2-1/2	945525	35.70	945525-C3	40.60			
.025	.037	**.125** (5x)	3	1/8	2-1/2	33225	35.70	33225-C3	40.60	33225-C4	48.10	
.025	.037	**.125** (5x)	4	1/8	2-1/2	861625	35.70	861625-C3	40.60			
.025	.037	**.150** (6x)	3	1/8	2-1/2	937025	35.70	937025-C3	40.60			
.025	.037	**.175** (7x)	3	1/8	2-1/2	934825	35.70	934825-C3	40.60			
.025	.037	**.203** (8x)	3	1/8	2-1/2	34625	35.90	34625-C3	40.80	34625-C4	48.30	
.025	.037	**.250** (10x)	3	1/8	2-1/2	982125	36.90	982125-C3	41.80			
.025	.037	**.312** (12x)	3	1/8	2-1/2	35425	36.90	35425-C3	41.80	35425-C4	49.30	
.025	.037	**.375** (15x)	3	1/8	2-1/2	48925	43.10	48925-C3	48.00	48925-C4	55.50	
.025	.037	**.450** (18x)	3	1/8	2-1/2	977325	49.40	977325-C3	54.30			
.025	.037	**.500** (20x)	3	1/8	2-1/2	58325	53.60	58325-C3	58.50			
.025	.037	**.625** (25x)	3	1/8	2-1/2	38025	69.50	38025-C3	74.40	***25x Diameter!***		
.026	.039	**.130** (5x)	3	1/8	2-1/2	33226	36.50	33226-C3	41.40			
.026	.039	**.208** (8x)	3	1/8	2-1/2	34626	36.70	34626-C3	41.60			
.027	.041	**.135** (5x)	3	1/8	2-1/2	33227	36.50	33227-C3	41.40			
.027	.041	**.216** (8x)	3	1/8	2-1/2	34627	36.70	34627-C3	41.60			
.028 (.7 mm)	.042	**.140** (5x)	3	1/8	2-1/2	33228	36.50	33228-C3	41.40			
.028 (.7 mm)	.042	**.224** (8x)	3	1/8	2-1/2	34628	36.70	34628-C3	41.60			

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NEW SIZES!

MINIATURE END MILLS

Square – Long Reach, Stub Flute (cont.)

continued from previous page

	CUTTER DIAMETER D_1 +.0005″ −.0005″	LENGTH OF CUT L_2 +.010″ −.000″	OVERALL REACH L_3 +.010″ −.000″	FLUTES	SHANK DIAMETER D_2	OVERALL LENGTH L_1	UNCOATED TOOL #	UNCOATED PRICE	AlTiN COATED TOOL #	AlTiN COATED PRICE	AMORPHOUS DIAMOND TOOL #	AMORPHOUS DIAMOND PRICE
	.029	.043	**.145** (5x)	3	1/8	2-1/2	33229	36.50	33229-C3	41.40		
	.029	.043	**.232** (8x)	3	1/8	2-1/2	34629	36.70	34629-C3	41.60		
	.030	.045	**.090** (3x)	3	1/8	2-1/2	47830	35.70	47830-C3	40.60		
	.030	.045	**.125** (4x)	3	1/8	2-1/2	945530	35.70	945530-C3	40.60		
	.030	.045	**.156** (5x)	3	1/8	2-1/2	33230	35.70	33230-C3	40.60	33230-C4	48.10
	.030	.045	**.156** (5x)	4	1/8	2-1/2	861630	37.80	861630-C3	42.70		
	.030	.045	**.187** (6x)	3	1/8	2-1/2	937030	35.90	937030-C3	40.80		
	.030	.045	**.218** (7x)	3	1/8	2-1/2	934830	35.90	934830-C3	40.80		
	.030	.045	**.250** (8x)	3	1/8	2-1/2	34630	35.90	34630-C3	40.80	34630-C4	48.30
	.030	.045	**.270** (9x)	3	1/8	2-1/2	846830	36.90	846830-C3	41.80		
	.030	.045	**.312** (10x)	3	1/8	2-1/2	982130	36.90	982130-C3	41.80		
	.030	.045	**.375** (12x)	3	1/8	2-1/2	35430	36.90	35430-C3	41.80	35430-C4	49.30
	.030	.045	**.450** (15x)	3	1/8	2-1/2	48930	43.10	48930-C3	48.00		
	.030	.045	**.540** (18x)	3	1/8	2-1/2	977330	49.40	977330-C3	54.30		
	.030	.045	**.600** (20x)	3	1/8	2-1/2	58330	53.60	58330-C3	58.50		
	.031 (1/32)	.046	**.093** (3x)	3	1/8	2-1/2	47831	35.70	47831-C3	40.60	47831-C4	48.10
NEW	.031 (1/32)	.046	**.125** (4x)	3	1/8	2-1/2	945531	35.70	945531-C3	40.60	945531-C4	48.10
	.031 (1/32)	.046	**.156** (5x)	3	1/8	2-1/2	33231	35.70	33231-C3	40.60	33231-C4	48.10
	.031 (1/32)	.046	**.156** (5x)	4	1/8	2-1/2	861631	37.80	861631-C3	42.70		
NEW	.031 (1/32)	.046	**.187** (6x)	3	1/8	2-1/2	937031	35.70	937031-C3	40.60	937031-C4	48.10
	.031 (1/32)	.046	**.218** (7x)	3	1/8	2-1/2	934831	35.90	934831-C3	40.80		
	.031 (1/32)	.046	**.250** (8x)	3	1/8	2-1/2	34631	35.90	34631-C3	40.80	34631-C4	48.30
	.031 (1/32)	.046	**.250** (8x)	4	1/8	2-1/2	874131	37.90	874131-C3	42.80		
	.031 (1/32)	.046	**.281** (9x)	3	1/8	2-1/2	846831	36.90	846831-C3	41.80		
	.031 (1/32)	.046	**.312** (10x)	3	1/8	2-1/2	982131	36.90	982131-C3	41.80	982131-C4	49.30
	.031 (1/32)	.046	**.375** (12x)	3	1/8	2-1/2	35431	36.90	35431-C3	41.80	35431-C4	49.30
NEW	.031 (1/32)	.046	**.375** (12x)	4	1/8	2-1/2	801731	36.90	801731-C3	41.80		
	.031 (1/32)	.046	**.470** (15x)	3	1/8	2-1/2	48931	43.10	48931-C3	48.00	48931-C4	55.50
NEW	.031 (1/32)	.046	**.565** (18x)	3	1/8	2-1/2	977331	53.60	977331-C3	58.50	977331-C4	66.00
	.031 (1/32)	.046	**.625** (20x)	3	1/8	2-1/2	58331	53.60	58331-C3	58.50		
	.031 (1/32)	.046	**.687** (22x)	3	1/8	2-1/2	969631	59.20	969631-C3	64.10		
	.031 (1/32)	.046	**.775** (25x)	3	1/8	2-1/2	38031	69.50	38031-C3	74.40	***25x Diameter!***	
	.031 (1/32)	.046	**.937** (30x)	3	1/8	2-1/2	972031	81.50	972031-C3	86.40	***30x Diameter!***	
	.035 (.9 mm)	.052	**.105** (3x)	3	1/8	2-1/2	47835	35.70	47835-C3	40.60		
	.035 (.9 mm)	.052	**.187** (5x)	3	1/8	2-1/2	33235	35.70	33235-C3	40.60	33235-C4	48.10
	.035 (.9 mm)	.052	**.281** (8x)	3	1/8	2-1/2	34635	35.90	34635-C3	40.80	34635-C4	48.30
	.035 (.9 mm)	.052	**.350** (10x)	3	1/8	2-1/2	982135	36.90	982135-C3	41.80		
	.035 (.9 mm)	.052	**.425** (12x)	3	1/8	2-1/2	35435	36.90	35435-C3	41.80	35435-C4	49.30
	.035 (.9 mm)	.052	**.525** (15x)	3	1/8	2-1/2	48935	43.10	48935-C3	48.00		
	.035 (.9 mm)	.052	**.700** (20x)	3	1/8	2-1/2	58335	53.60	58335-C3	58.50		
	.039 (1 mm)	.059	**.117** (3x)	3	1/8	2-1/2	47839	35.70	47839-C3	40.60		
	.039 (1 mm)	.059	**.203** (5x)	3	1/8	2-1/2	33239	35.70	33239-C3	40.60	33239-C4	48.10
NEW	.039 (1 mm)	.059	**.240** (6x)	3	1/8	2-1/2	937039	35.90	937039-C3	40.80		
NEW	.039 (1 mm)	.059	**.281** (7x)	3	1/8	2-1/2	934839	35.90	934839-C3	40.80		
	.039 (1 mm)	.059	**.325** (8x)	3	1/8	2-1/2	34639	35.90	34639-C3	40.80	34639-C4	48.30
	.039 (1 mm)	.059	**.400** (10x)	3	1/8	2-1/2	982139	36.90	982139-C3	41.80		
	.039 (1 mm)	.059	**.480** (12x)	3	1/8	2-1/2	35439	36.90	35439-C3	41.80		
	.039 (1 mm)	.059	**.600** (15x)	3	1/8	2-1/2	48939	43.10	48939-C3	48.00		
	.039 (1 mm)	.059	**.700** (18x)	3	1/8	2-1/2	977339	46.20	977339-C3	50.50		

continued on next page

NEW SIZES!

MINIATURE END MILLS

Square – Long Reach, Stub Flute (cont.)

continued from previous page

CUTTER DIAMETER	LENGTH OF CUT	OVERALL REACH	FLUTES	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN COATED		AMORPHOUS DIAMOND		
D_1 $^{+.0005''}_{-.0005''}$	L_2 $^{+.010''}_{-.000''}$	L_3 $^{+.010''}_{-.000''}$		D_2	L_1	TOOL #	PRICE	TOOL #	PRICE	TOOL #	PRICE	
.040	.060	**.120** (3x)	3	1/8	2-1/2	47840	35.70	47840-C3	40.60			
.040	.060	**.160** (4x)	3	1/8	2-1/2	945540	35.70	945540-C3	40.60			
.040	.060	**.203** (5x)	3	1/8	2-1/2	33240	35.70	33240-C3	40.60	33240-C4	48.10	
.040	.060	**.203** (5x)	4	1/8	2-1/2	861640	37.80	861640-C3	42.70			
.040	.060	**.240** (6x)	3	1/8	2-1/2	937040	35.90	937040-C3	40.80			
.040	.060	**.281** (7x)	3	1/8	2-1/2	934840	35.90	934840-C3	40.80			
.040	.060	**.325** (8x)	3	1/8	2-1/2	34640	35.90	34640-C3	40.80	34640-C4	48.30	
.040	.060	**.325** (8x)	4	1/8	2-1/2	874140	35.90	874140-C3	40.80			NEW
.040	.060	**.400** (10x)	3	1/8	2-1/2	982140	36.90	982140-C3	41.80	982140-C4	49.30	
.040	.060	**.480** (12x)	3	1/8	2-1/2	35440	36.90	35440-C3	41.80	35440-C4	49.30	
.040	.060	**.600** (15x)	3	1/8	2-1/2	48940	43.10	48940-C3	48.00	48940-C4	55.50	NEW
.040	.060	**.720** (18x)	3	1/8	2-1/2	977340	53.60	977340-C3	58.50			
.040	.060	**.800** (20x)	3	1/8	2-1/2	58340	53.60	58340-C3	58.50			
.040	.060	**1.000** (25x)	3	1/8	2-1/2	38040	69.50	38040-C3	74.40	***25x Diameter!***		
.045	.067	**.135** (3x)	3	1/8	2-1/2	47845	35.00	47845-C3	39.90			
.045	.067	**.225** (5x)	3	1/8	2-1/2	33245	35.00	33245-C3	39.90	33245-C4	47.40	
.045	.067	**.375** (8x)	3	1/8	2-1/2	34645	35.10	34645-C3	40.00	34645-C4	47.50	
.045	.067	**.450** (10x)	3	1/8	2-1/2	982145	36.40	982145-C3	41.30			
.045	.067	**.550** (12x)	3	1/8	2-1/2	35445	36.40	35445-C3	41.30	35445-C4	48.80	
.045	.067	**.680** (15x)	3	1/8	2-1/2	48945	41.00	48945-C3	45.90			
.045	.067	**.900** (20x)	3	1/8	2-1/2	58345	50.50	58345-C3	55.40			
.047 (3/64)	.070	**.141** (3x)	3	1/8	2-1/2	47847	35.00	47847-C3	39.90			
.047 (3/64)	.070	**.187** (4x)	3	1/8	2-1/2	945547	35.00	945547-C3	39.90			
.047 (3/64)	.070	**.250** (5x)	3	1/8	2-1/2	33247	35.00	33247-C3	39.90	33247-C4	47.40	
.047 (3/64)	.070	**.250** (5x)	4	1/8	2-1/2	861647	37.20	861647-C3	42.10			
.047 (3/64)	.070	**.281** (6x)	3	1/8	2-1/2	937047	35.00	937047-C3	39.90			
.047 (3/64)	.070	**.328** (7x)	3	1/8	2-1/2	934847	35.10	934847-C3	40.00			
.047 (3/64)	.070	**.375** (8x)	3	1/8	2-1/2	34647	35.10	34647-C3	40.00	34647-C4	47.50	
.047 (3/64)	.070	**.375** (8x)	4	1/8	2-1/2	874147	37.30	874147-C3	42.20			
.047 (3/64)	.070	**.425** (9x)	3	1/8	2-1/2	846847	36.40	846847-C3	41.30			
.047 (3/64)	.070	**.480** (10x)	3	1/8	2-1/2	982147	36.40	982147-C3	41.30	982147-C4	48.80	NEW
.047 (3/64)	.070	**.570** (12x)	3	1/8	2-1/2	35447	36.40	35447-C3	41.30	35447-C4	48.80	
.047 (3/64)	.070	**.710** (15x)	3	1/8	2-1/2	48947	41.00	48947-C3	45.90	48947-C4	53.40	NEW
.047 (3/64)	.070	**.850** (18x)	3	1/8	2-1/2	977347	50.50	977347-C3	55.40			
.047 (3/64)	.070	**.950** (20x)	3	1/8	2-1/2	58347	50.50	58347-C3	55.40			
.047 (3/64)	.070	**1.187** (25x)	3	1/8	2-1/2	38047	61.30	38047-C3	66.20	***25x Diameter!***		
.047 (3/64)	.070	**1.406** (30x)	3	1/8	2-1/2	972047	79.90	972047-C3	84.80	***30x Diameter!***		
.050	.075	**.150** (3x)	3	1/8	2-1/2	47850	35.00	47850-C3	39.90			
.050	.075	**.203** (4x)	3	1/8	2-1/2	945550	35.00	945550-C3	39.90			
.050	.075	**.250** (5x)	3	1/8	2-1/2	33250	35.00	33250-C3	39.90	33250-C4	47.40	
.050	.075	**.250** (5x)	4	1/8	2-1/2	861650	37.30	861650-C3	42.20			
.050	.075	**.300** (6x)	3	1/8	2-1/2	937050	35.10	937050-C3	40.00			
.050	.075	**.350** (7x)	3	1/8	2-1/2	934850	35.10	934850-C3	40.00			
.050	.075	**.400** (8x)	3	1/8	2-1/2	34650	35.10	34650-C3	40.00	34650-C4	47.50	
.050	.075	**.450** (9x)	3	1/8	2-1/2	846850	36.40	846850-C3	41.30			
.050	.075	**.500** (10x)	3	1/8	2-1/2	982150	36.40	982150-C3	41.30			
.050	.075	**.600** (12x)	3	1/8	2-1/2	35450	36.40	35450-C3	41.30	35450-C4	48.80	
.050	.075	**.750** (15x)	3	1/8	2-1/2	48950	41.00	48950-C3	45.90			
.050	.075	**.900** (18x)	3	1/8	2-1/2	977350	50.50	977350-C3	55.40			

continued on next page

NEW SIZES!

MINIATURE END MILLS

Square – Long Reach, Stub Flute (cont.)

continued from previous page

	CUTTER DIAMETER	LENGTH OF CUT	OVERALL REACH	FLUTES	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN COATED		AMORPHOUS DIAMOND	
	D_1 $^{+.0005''}_{-.0005''}$	L_2 $^{+.010''}_{-.000''}$	L_3 $^{+.010''}_{-.000''}$		D_2	L_1	TOOL #	PRICE	TOOL #	PRICE	TOOL #	PRICE
	.055 (1.4 mm)	.082	**.165** (3x)	3	1/8	2-1/2	47855	35.00	47855-C3	39.90		
	.055 (1.4 mm)	.082	**.275** (5x)	3	1/8	2-1/2	33255	35.00	33255-C3	39.90	33255-C4	47.40
	.055 (1.4 mm)	.082	**.330** (6x)	3	1/8	2-1/2	937055	35.10	937055-C3	40.00		
	.055 (1.4 mm)	.082	**.385** (7x)	3	1/8	2-1/2	934855	35.10	934855-C3	40.00		
	.055 (1.4 mm)	.082	**.450** (8x)	3	1/8	2-1/2	34655	35.10	34655-C3	40.00	34655-C4	47.50
	.055 (1.4 mm)	.082	**.560** (10x)	3	1/8	2-1/2	982155	36.40	982155-C3	41.30		
	.055 (1.4 mm)	.082	**.660** (12x)	3	1/8	2-1/2	35455	36.40	35455-C3	41.30	35455-C4	48.80
	.055 (1.4 mm)	.082	**.825** (15x)	3	1/8	2-1/2	48955	41.00	48955-C3	45.90		
	.055 (1.4 mm)	.082	**1.000** (18x)	3	1/8	2-1/2	977355	50.50	977355-C3	55.40		
	.060	.090	**.180** (3x)	3	1/8	2-1/2	47860	35.00	47860-C3	39.90		
	.060	.090	**.250** (4x)	3	1/8	2-1/2	945560	35.00	945560-C3	39.90		
	.060	.090	**.312** (5x)	3	1/8	2-1/2	33260	35.00	33260-C3	39.90	33260-C4	47.40
	.060	.090	**.312** (5x)	4	1/8	2-1/2	861660	37.10	861660-C3	42.00		
	.060	.090	**.375** (6x)	3	1/8	2-1/2	937060	35.10	937060-C3	40.00		
	.060	.090	**.437** (7x)	3	1/8	2-1/2	934860	35.10	934860-C3	40.00		
	.060	.090	**.500** (8x)	3	1/8	2-1/2	34660	35.10	34660-C3	40.00	34660-C4	47.50
	.060	.090	**.562** (9x)	3	1/8	2-1/2	846860	36.40	846860-C3	41.30		
	.060	.090	**.625** (10x)	3	1/8	2-1/2	982160	36.40	982160-C3	41.30		
	.060	.090	**.720** (12x)	3	1/8	2-1/2	35460	36.40	35460-C3	41.30	35460-C4	48.80
	.060	.090	**.900** (15x)	3	1/8	2-1/2	48960	41.00	48960-C3	45.90		
	.060	.090	**1.062** (18x)	3	1/8	2-1/2	977360	50.50	977360-C3	55.40		
	.060	.090	**1.200** (20x)	3	1/8	2-1/2	58360	50.50	58360-C3	55.40		
	.062 (1/16)	.093	**.186** (3x)	3	1/8	2-1/2	47862	35.00	47862-C3	39.90	47862-C4	47.40
	.062 (1/16)	.093	**.250** (4x)	3	1/8	2-1/2	945562	35.00	945562-C3	39.90	945562-C4	47.40
	.062 (1/16)	.093	**.312** (5x)	3	1/8	2-1/2	33262	35.00	33262-C3	39.90	33262-C4	47.40
	.062 (1/16)	.093	**.312** (5x)	4	1/8	2-1/2	861662	37.20	861662-C3	42.10		
	.062 (1/16)	.093	**.375** (6x)	3	1/8	2-1/2	937062	35.00	937062-C3	39.90	937062-C4	47.40
	.062 (1/16)	.093	**.437** (7x)	3	1/8	2-1/2	934862	35.10	934862-C3	40.00	934862-C4	47.50
	.062 (1/16)	.093	**.500** (8x)	3	1/8	2-1/2	34662	35.10	34662-C3	40.00	34662-C4	47.50
	.062 (1/16)	.093	**.500** (8x)	4	1/8	2-1/2	874162	37.30	874162-C3	42.20	874162-C4	49.70
	.062 (1/16)	.093	**.562** (9x)	3	1/8	2-1/2	846862	36.40	846862-C3	41.30		
	.062 (1/16)	.093	**.625** (10x)	3	1/8	2-1/2	982162	36.40	982162-C3	41.30	982162-C4	48.80
	.062 (1/16)	.093	**.687** (11x)	3	1/8	2-1/2	850262	36.40	850262-C3	41.30		
	.062 (1/16)	.093	**.750** (12x)	3	1/8	2-1/2	35462	36.40	35462-C3	41.30	35462-C4	48.80
	.062 (1/16)	.093	**.750** (12x)	4	1/8	2-1/2	801762	38.50	801762-C3	43.40		
	.062 (1/16)	.093	**.800** (13x)	3	1/8	2-1/2	839362	38.70	839362-C3	43.60		
	.062 (1/16)	.093	**.950** (15x)	3	1/8	2-1/2	48962	41.00	48962-C3	45.90	48962-C4	53.40
NEW	.062 (1/16)	.093	**1.125** (18x)	3	1/8	2-1/2	977362	50.50	977362-C3	55.40	977362-C4	62.90
NEW	.062 (1/16)	.093	**1.250** (20x)	3	1/8	2-1/2	58362	50.50	58362-C3	55.40	58362-C4	62.90
	.062 (1/16)	.093	**1.375** (22x)	3	1/8	3	969662	56.90	969662-C3	61.80		
	.062 (1/16)	.093	**1.550** (25x)	3	1/8	3	38062	61.30	38062-C3	66.20	***25x Diameter!***	
	.062 (1/16)	.093	**1.875** (30x)	3	1/8	3	972062	79.90	972062-C3	84.80	***30x Diameter!***	
	.065	.097	**.195** (3x)	3	1/8	2-1/2	47865	35.00	47865-C3	39.90		
	.065	.097	**.325** (5x)	3	1/8	2-1/2	33265	35.00	33265-C3	39.90		
	.065	.097	**.530** (8x)	3	1/8	2-1/2	34665	35.10	34665-C3	40.00	34665-C4	47.50
	.065	.097	**.650** (10x)	3	1/8	2-1/2	982165	36.40	982165-C3	41.30		
	.065	.097	**.800** (12x)	3	1/8	2-1/2	35465	36.40	35465-C3	41.30		
	.070	.105	**.210** (3x)	3	1/8	2-1/2	47870	35.00	47870-C3	39.90		
NEW	.070	.105	**.375** (5x)	3	1/8	2-1/2	33270	35.00	33270-C3	39.90	33270-C4	47.40

continued on next page

NEW SIZES!

MINIATURE END MILLS

Square – Long Reach, Stub Flute (cont.)

continued from previous page

SQUARE

CUTTER DIAMETER	LENGTH OF CUT	OVERALL REACH	FLUTES	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN COATED		AMORPHOUS DIAMOND	
D_1 +.0005″ −.0005″	L_2 +.010″ −.000″	L_3 +.010″ −.000″		D_2	L_1	TOOL #	PRICE	TOOL #	PRICE	TOOL #	PRICE
.070	.105	**.375** (5x)	4	1/8	2-1/2	861670	37.10	861670-C3	42.00		
.070	.105	**.570** (8x)	3	1/8	2-1/2	34670	35.10	34670-C3	40.00	34670-C4	47.50
.070	.105	**.700** (10x)	3	1/8	2-1/2	982170	36.40	982170-C3	41.30		
.070	.105	**.850** (12x)	3	1/8	2-1/2	35470	36.40	35470-C3	41.30		
.070	.105	**1.062** (15x)	3	1/8	2-1/2	48970	41.00	48970-C3	45.90		
.075	.112	**.225** (3x)	3	1/8	2-1/2	47875	35.00	47875-C3	39.90		
.075	.112	**.375** (5x)	3	1/8	2-1/2	33275	35.00	33275-C3	39.90		
.075	.112	**.625** (8x)	3	1/8	2-1/2	34675	35.10	34675-C3	40.00	34675-C4	47.50
.075	.112	**.750** (10x)	3	1/8	2-1/2	982175	36.40	982175-C3	41.30		
.075	.112	**.900** (12x)	3	1/8	2-1/2	35475	36.40	35475-C3	41.30		
.078 (5/64)	.117	**.234** (3x)	3	1/8	2-1/2	47878	35.00	47878-C3	39.90		
.078 (5/64)	.117	**.312** (4x)	3	1/8	2-1/2	945578	35.00	945578-C3	39.90		
.078 (5/64)	.117	**.406** (5x)	3	1/8	2-1/2	33278	35.00	33278-C3	39.90	33278-C4	47.40
.078 (5/64)	.117	**.406** (5x)	4	1/8	2-1/2	861678	37.20	861678-C3	42.10		
.078 (5/64)	.117	**.475** (6x)	3	1/8	2-1/2	937078	35.00	937078-C3	39.90		
.078 (5/64)	.117	**.550** (7x)	3	1/8	2-1/2	934878	35.10	934878-C3	40.00		
.078 (5/64)	.117	**.625** (8x)	3	1/8	2-1/2	34678	35.10	34678-C3	40.00	34678-C4	47.50
.078 (5/64)	.117	**.625** (8x)	4	1/8	2-1/2	874178	37.30	874178-C3	42.20		
.078 (5/64)	.117	**.700** (9x)	3	1/8	2-1/2	846878	36.40	846878-C3	41.30		
.078 (5/64)	.117	**.800** (10x)	3	1/8	2-1/2	982178	36.40	982178-C3	41.30		
.078 (5/64)	.117	**.940** (12x)	3	1/8	2-1/2	35478	36.40	35478-C3	41.30	35478-C4	48.80
.078 (5/64)	.117	**1.187** (15x)	3	1/8	2-1/2	48978	41.00	48978-C3	45.90		
.078 (5/64)	.117	**1.400** (18x)	3	1/8	3	977378	50.50	977378-C3	55.40		
.078 (5/64)	.117	**1.562** (20x)	3	1/8	3	58378	50.50	58378-C3	55.40		
.078 (5/64)	.117	**1.950** (25x)	3	1/8	3	38078	61.30	38078-C3	66.20	***25x Diameter!***	
.078 (5/64)	.117	**2.343** (30x)	3	1/8	4	972078	79.90	972078-C3	85.20	***30x Diameter!***	
.080	.120	**.240** (3x)	3	1/8	2-1/2	47880	35.00	47880-C3	39.90		
.080	.120	**.406** (5x)	3	1/8	2-1/2	33280	35.00	33280-C3	39.90		
.080	.120	**.650** (8x)	3	1/8	2-1/2	34680	35.10	34680-C3	40.00	34680-C4	47.50
.080	.120	**.960** (12x)	3	1/8	2-1/2	35480	36.40	35480-C3	41.30		
.085	.127	**.425** (5x)	3	1/8	2-1/2	33285	35.00	33285-C3	39.90		
.085	.127	**.700** (8x)	3	1/8	2-1/2	34685	35.10	34685-C3	40.00	34685-C4	47.50
.085	.127	**1.020** (12x)	3	1/8	2-1/2	35485	36.40	35485-C3	41.30		
.090	.135	**.270** (3x)	3	1/8	2-1/2	47890	35.00	47890-C3	39.90		
.090	.135	**.450** (5x)	3	1/8	2-1/2	33290	35.00	33290-C3	39.90		
.090	.135	**.750** (8x)	3	1/8	2-1/2	34690	35.10	34690-C3	40.00	34690-C4	47.50
.090	.135	**1.080** (12x)	3	1/8	2-1/2	35490	36.40	35490-C3	41.30		
.093 (3/32)	.139	**.279** (3x)	3	1/8	2-1/2	47893	35.00	47893-C3	39.90	47893-C4	47.40
.093 (3/32)	.139	**.375** (4x)	3	1/8	2-1/2	945593	35.00	945593-C3	39.90	945593-C4	47.40
.093 (3/32)	.139	**.500** (5x)	3	1/8	2-1/2	33293	35.00	33293-C3	39.90	33293-C4	47.40
.093 (3/32)	.139	**.500** (5x)	4	1/8	2-1/2	861693	37.20	861693-C3	42.10		
.093 (3/32)	.139	**.585** (6x)	3	1/8	2-1/2	937093	35.00	937093-C3	39.90	937093-C4	47.40
.093 (3/32)	.139	**.670** (7x)	3	1/8	2-1/2	934893	35.10	934893-C3	40.00	934893-C4	47.50
.093 (3/32)	.139	**.750** (8x)	3	1/8	2-1/2	34693	35.10	34693-C3	40.00	34693-C4	47.50
.093 (3/32)	.139	**.750** (8x)	4	1/8	2-1/2	874193	37.30	874193-C3	42.20		
.093 (3/32)	.139	**.850** (9x)	3	1/8	2-1/2	846893	36.40	846893-C3	41.30		
.093 (3/32)	.139	**.950** (10x)	3	1/8	2-1/2	982193	36.40	982193-C3	41.30		

continued on next page

MINIATURE END MILLS

Square – Long Reach, Stub Flute (cont.)

continued from previous page

	CUTTER DIAMETER	LENGTH OF CUT	OVERALL REACH	FLUTES	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN COATED		AMORPHOUS DIAMOND	
	D_1 $^{+.0005''}_{-.0005''}$	L_2 $^{+.010''}_{-.000''}$	L_3 $^{+.010''}_{-.000''}$		D_2	L_1	TOOL #	PRICE	TOOL #	PRICE	TOOL #	PRICE
	.093 (3/32)	.139	**1.030** (11x)	3	1/8	2-1/2	850293	36.40	850293-C3	41.30		
	.093 (3/32)	.139	**1.125** (12x)	3	1/8	2-1/2	35493	36.40	35493-C3	41.30	35493-C4	48.80
NEW	.093 (3/32)	.139	**1.125** (12x)	4	1/8	2-1/2	801793	36.40	801793-C3	41.30		
	.093 (3/32)	.139	**1.250** (13x)	3	1/8	2-1/2	839393	39.10	839393-C3	44.00		
	.093 (3/32)	.139	**1.400** (15x)	3	1/8	3	48993	42.60	48993-C3	47.00	48993-C4	55.00
	.093 (3/32)	.139	**1.675** (18x)	3	1/8	3	977393	51.10	977393-C3	55.40		
	.093 (3/32)	.139	**1.875** (20x)	3	1/8	4	58393	55.70	58393-C3	61.00		
	.093 (3/32)	.139	**2.062** (22x)	3	1/8	4	969693	58.50	969693-C3	63.80		
	.093 (3/32)	.139	**2.312** (25x)	3	1/8	4	38093	63.80	38093-C3	69.10	***25x Diameter!***	
	.093 (3/32)	.139	**2.812** (30x)	3	1/8	4	972093	88.50	972093-C3	93.80	***30x Diameter!***	
	.095	.142	**.500** (5x)	3	1/8	2-1/2	33295	35.00	33295-C3	39.90		
	.095	.142	**.750** (8x)	3	1/8	2-1/2	34695	35.10	34695-C3	40.00	34695-C4	47.50
	.095	.142	**1.150** (12x)	3	1/8	2-1/2	35495	36.40	35495-C3	41.30		
	.100	.150	**.300** (3x)	3	1/8	2-1/2	978400	35.00	978400-C3	39.90		
	.100	.150	**.400** (4x)	3	1/8	2-1/2	945600	35.00	945600-C3	39.90		
	.100	.150	**.500** (5x)	3	1/8	2-1/2	33300	35.00	33300-C3	39.90		
	.100	.150	**.600** (6x)	3	1/8	2-1/2	937100	35.00	937100-C3	39.90		
	.100	.150	**.700** (7x)	3	1/8	2-1/2	934900	35.00	934900-C3	39.90		
	.100	.150	**.800** (8x)	3	1/8	2-1/2	34700	35.10	34700-C3	40.00	34700-C4	47.50
	.100	.150	**1.000** (10x)	3	1/8	2-1/2	982200	36.40	982200-C3	41.30		
	.100	.150	**1.200** (12x)	3	1/8	2-1/2	35499	36.40	35499-C3	41.30		
	.100	.150	**1.500** (15x)	3	1/8	3	49000	43.40	49000-C3	48.30		
	.100	.150	**1.812** (18x)	3	1/8	4	977400	53.60	977400-C3	58.90		
	.105	.158	**.530** (5x)	3	1/8	2-1/2	33301	35.00	33301-C3	39.90		
	.105	.158	**.850** (8x)	3	1/8	2-1/2	34701	35.10	34701-C3	40.00		
	.109 (7/64)	.163	**.570** (5x)	3	1/8	2-1/2	33302	35.00	33302-C3	39.90		
NEW	.109 (7/64)	.163	**.680** (6x)	3	1/8	2-1/2	937102	35.10	937102-C3	40.00		
NEW	.109 (7/64)	.163	**.790** (7x)	3	1/8	2-1/2	934902	35.10	934902-C3	40.00		
	.109 (7/64)	.163	**.900** (8x)	3	1/8	2-1/2	34702	35.10	34702-C3	40.00		
	.109 (7/64)	.163	**1.125** (10x)	3	1/8	2-1/2	982202	36.40	982202-C3	41.30		
	.109 (7/64)	.163	**1.312** (12x)	3	1/8	3	35502	36.90	35502-C3	41.80		
	.110	.165	**.570** (5x)	3	1/8	2-1/2	33303	35.00	33303-C3	39.90		
	.110	.165	**.900** (8x)	3	1/8	2-1/2	34703	35.10	34703-C3	40.00		
	.115	.173	**.600** (5x)	3	1/8	2-1/2	33304	35.00	33304-C3	39.90		
	.115	.173	**.950** (8x)	3	1/8	2-1/2	34704	35.10	34704-C3	40.00		
	.118 (3 mm)	.177	**.625** (5x)	3	1/8	2-1/2	33305	35.00	33305-C3	39.90		
	.118 (3 mm)	.177	**.625** (5x)	4	1/8	2-1/2	861705	35.00	861705-C3	39.90		
NEW	.118 (3 mm)	.177	**.735** (6x)	3	1/8	2-1/2	937105	35.10	937105-C3	40.00		
NEW	.118 (3 mm)	.177	**.840** (7x)	3	1/8	2-1/2	934905	35.10	934905-C3	40.00		
	.118 (3 mm)	.177	**.950** (8x)	3	1/8	2-1/2	34705	35.10	34705-C3	40.00		
	.118 (3 mm)	.177	**1.187** (10x)	3	1/8	2-1/2	982205	36.40	982205-C3	41.30		
	.118 (3 mm)	.177	**1.420** (12x)	3	1/8	3	35505	36.90	35505-C3	41.80		
	.118 (3 mm)	.177	**1.770** (15x)	3	1/8	3	49005	44.30	49005-C3	49.20		
	.118 (3 mm)	.177	**2.125** (18x)	3	1/8	4	977405	54.20	977405-C3	59.50		
	.120	.180	**.625** (5x)	3	1/8	2-1/2	33306	35.00	33306-C3	39.90		
	.120	.180	**1.000** (8x)	3	1/8	2-1/2	34706	35.10	34706-C3	40.00		

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NEW SIZES!

MINIATURE END MILLS

Square – Long Reach, Stub Flute (cont.)

continued from previous page

SQUARE

CUTTER DIAMETER	LENGTH OF CUT	OVERALL REACH	FLUTES	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN COATED		AMORPHOUS DIAMOND		
D_1 $^{+.000''}_{-.002''}$	L_2 $^{+.030''}_{-.000''}$	L_3 $^{+.030''}_{-.000''}$		D_2	L_1	TOOL #	PRICE	TOOL #	PRICE	TOOL #	PRICE	
.125 (1/8)	.187	**.375** (3x)	3	1/8	2-1/2	978408	35.00	978408-C3	39.90			
.125 (1/8)	.187	**.500** (4x)	3	1/8	2-1/2	945608	35.00	945608-C3	39.90	945608-C4	47.40	
.125 (1/8)	.187	**.625** (5x)	3	1/8	2-1/2	33308	35.00	33308-C3	39.90	33308-C4	47.40	
.125 (1/8)	.187	**.625** (5x)	4	1/8	2-1/2	861708	37.20	861708-C3	42.10			
.125 (1/8)	.187	**.750** (6x)	3	1/8	2-1/2	937108	35.00	937108-C3	39.90	937108-C4	47.40	
.125 (1/8)	.187	**.875** (7x)	3	1/8	2-1/2	934908	35.00	934908-C3	39.90	934908-C4	47.40	
.125 (1/8)	.187	**1.000** (8x)	3	1/8	2-1/2	34708	35.00	34708-C3	39.90	34708-C4	47.40	
.125 (1/8)	.187	**1.000** (8x)	4	1/8	2-1/2	874208	37.20	874208-C3	42.10			
.125 (1/8)	.187	**1.125** (9x)	3	1/8	2-1/2	846908	37.90	846908-C3	42.80			
.125 (1/8)	.187	**1.250** (10x)	3	1/8	2-1/2	982208	37.90	982208-C3	42.80	982208-C4	50.30	
.125 (1/8)	.187	**1.250** (10x)	4	1/8	2-1/2	789208	37.90	789208-C3	42.80			
.125 (1/8)	.187	**1.375** (11x)	3	1/8	2-1/2	850308	38.00	850308-C3	42.90			
.125 (1/8)	.187	**1.500** (12x)	3	1/8	3	35508	38.00	35508-C3	42.90	35508-C4	50.40	
.125 (1/8)	.187	**1.625** (13x)	3	1/8	3	839408	40.70	839408-C3	45.60			
.125 (1/8)	.187	**1.875** (15x)	3	1/8	3	49008	43.40	49008-C3	48.30	49008-C4	55.80	NEW
.125 (1/8)	.187	**2.250** (18x)	3	1/8	4	977408	52.10	977408-C3	57.40			
.125 (1/8)	.187	**2.500** (20x)	3	1/8	4	58408	53.10	58408-C3	58.40			
.125 (1/8)	.187	**2.750** (22x)	3	1/8	4	969708	56.90	969708-C3	62.20			
.125 (1/8)	.187	**3.125** (25x)	3	1/8	4	38108	62.50	38108-C3	67.80	***25x Diameter!***		
.125 (1/8)	.187	**3.750** (30x)	3	1/8	6	973608	74.60	973608-C3	81.10	***30x Diameter!***		
.140 (9/64)	.220	**.425** (3x)	3	3/16	3	978409	41.40	978409-C3	46.70			
.140 (9/64)	.220	**.750** (5x)	3	3/16	3	33309	41.40	33309-C3	46.70			
.140 (9/64)	.220	**.750** (5x)	4	3/16	3	861709	41.40	861709-C3	46.70			NEW
.140 (9/64)	.220	**1.125** (8x)	3	3/16	3	34709	41.40	34709-C3	46.70			
.140 (9/64)	.220	**1.450** (10x)	3	3/16	3	982209	44.40	982209-C3	49.70			
.140 (9/64)	.220	**1.680** (12x)	3	3/16	4	35509	47.60	35509-C3	54.80			
.156 (5/32)	.234	**.470** (3x)	3	3/16	3	978410	41.40	978410-C3	46.70			
.156 (5/32)	.234	**.625** (4x)	3	3/16	3	945610	41.40	945610-C3	46.70			
.156 (5/32)	.234	**.750** (5x)	3	3/16	3	33310	41.40	33310-C3	46.70	33310-C4	58.50	
.156 (5/32)	.234	**.750** (5x)	4	3/16	3	861710	41.40	861710-C3	46.70			
.156 (5/32)	.234	**.937** (6x)	3	3/16	3	937110	41.40	937110-C3	46.70			
.156 (5/32)	.234	**1.093** (7x)	3	3/16	3	934910	41.40	934910-C3	46.70			
.156 (5/32)	.234	**1.250** (8x)	3	3/16	3	34710	41.40	34710-C3	46.70	34710-C4	58.50	
.156 (5/32)	.234	**1.375** (9x)	3	3/16	3	846910	44.40	846910-C3	49.70			
.156 (5/32)	.234	**1.570** (10x)	3	3/16	3	982210	44.40	982210-C3	49.70			
.156 (5/32)	.234	**1.875** (12x)	3	3/16	4	35510	44.60	35510-C3	51.80			
.156 (5/32)	.234	**2.375** (15x)	3	3/16	4	49010	47.60	49010-C3	54.80			
.156 (5/32)	.234	**2.812** (18x)	3	3/16	6	977410	65.70	977410-C3	75.20			
.172 (11/64)	.258	**.875** (5x)	3	3/16	3	33311	41.40	33311-C3	46.70			
.172 (11/64)	.258	**1.375** (8x)	3	3/16	3	34711	41.40	34711-C3	46.70			

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MINIATURE END MILLS

Square – Long Reach, Stub Flute (cont.)

continued from previous page

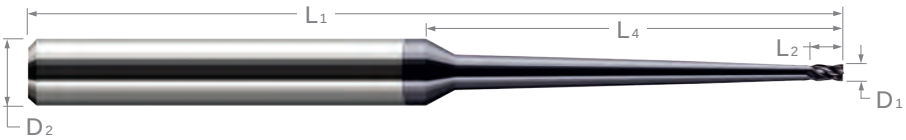
CUTTER DIAMETER	LENGTH OF CUT	OVERALL REACH	FLUTES	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN COATED		AMORPHOUS DIAMOND	
D_1 $^{+.000''}_{-.002''}$	L_2 $^{+.030''}_{-.000''}$	L_3 $^{+.030''}_{-.000''}$		D_2	L_1	TOOL #	PRICE	TOOL #	PRICE	TOOL #	PRICE
.187 (3/16)	.281	**.570** (3x)	3	3/16	3	978412	41.40	978412-C3	46.70		
.187 (3/16)	.281	**.750** (4x)	3	3/16	3	945612	41.40	945612-C3	46.70		
.187 (3/16)	.281	**1.000** (5x)	3	3/16	3	33312	41.40	33312-C3	46.70	33312-C4	58.50
.187 (3/16)	.281	**1.000** (5x)	4	3/16	3	861712	41.40	861712-C3	46.70		
.187 (3/16)	.281	**1.156** (6x)	3	3/16	3	937112	41.40	937112-C3	46.70		
.187 (3/16)	.281	**1.312** (7x)	3	3/16	3	934912	41.40	934912-C3	46.70		
.187 (3/16)	.281	**1.500** (8x)	3	3/16	3	34712	41.40	34712-C3	46.70	34712-C4	58.50
.187 (3/16)	.281	**1.500** (8x)	4	3/16	3	874212	43.30	874212-C3	48.60		
.187 (3/16)	.281	**1.680** (9x)	3	3/16	3	846912	44.40	846912-C3	49.70		
.187 (3/16)	.281	**1.875** (10x)	3	3/16	4	982212	44.40	982212-C3	51.60		
.187 (3/16)	.281	**2.250** (12x)	3	3/16	4	35512	44.60	35512-C3	51.80	35512-C4	62.80
.187 (3/16)	.281	**2.812** (15x)	3	3/16	4	49012	47.60	49012-C3	54.80		
.187 (3/16)	.281	**3.375** (18x)	3	3/16	6	977412	66.80	977412-C3	76.30		
.187 (3/16)	.281	**3.750** (20x)	3	3/16	6	58412	66.80	58412-C3	76.30		
.187 (3/16)	.281	**4.125** (22x)	3	3/16	6	969712	67.00	969712-C3	76.50		
.203 (13/64)	.312	**1.015** (5x)	3	1/4	4	33313	52.10	33313-C3	60.50		
.203 (13/64)	.312	**1.625** (8x)	3	1/4	4	34713	52.10	34713-C3	60.50		
.218 (7/32)	.330	**1.125** (5x)	3	1/4	4	33314	51.80	33314-C3	60.20		
.218 (7/32)	.330	**1.750** (8x)	3	1/4	4	34714	51.80	34714-C3	60.20		
.218 (7/32)	.330	**2.187** (10x)	3	1/4	4	982214	53.30	982214-C3	61.70		
.250 (1/4)	.375	**.750** (3x)	3	1/4	4	978416	46.30	978416-C3	54.70		
.250 (1/4)	.375	**1.000** (4x)	3	1/4	4	945616	46.30	945616-C3	54.70		
.250 (1/4)	.375	**1.250** (5x)	3	1/4	4	33316	46.30	33316-C3	54.70	33316-C4	65.70
.250 (1/4)	.375	**1.250** (5x)	4	1/4	4	861716	46.30	861716-C3	54.70		
.250 (1/4)	.375	**1.500** (6x)	3	1/4	4	937116	46.30	937116-C3	54.70		
.250 (1/4)	.375	**1.750** (7x)	3	1/4	4	934916	46.30	934916-C3	54.70		
.250 (1/4)	.375	**2.000** (8x)	3	1/4	4	34716	46.30	34716-C3	54.70	34716-C4	65.70
.250 (1/4)	.375	**2.000** (8x)	4	1/4	4	874216	48.30	874216-C3	56.70		
.250 (1/4)	.375	**2.250** (9x)	3	1/4	4	846916	52.30	846916-C3	60.70		
.250 (1/4)	.375	**2.500** (10x)	3	1/4	4	982216	52.30	982216-C3	60.70		
.250 (1/4)	.375	**3.000** (12x)	3	1/4	6	35516	56.20	35516-C3	65.70	35516-C4	84.30
.250 (1/4)	.375	**3.750** (15x)	3	1/4	6	49016	58.30	49016-C3	67.80		
.250 (1/4)	.375	**5.000** (20x)	3	1/4	8	58416	118.50	58416-C3	132.70		
.312 (5/16)	.470	**1.625** (5x)	3	5/16	4	33320	77.00	33320-C3	87.10		
.312 (5/16)	.470	**2.500** (8x)	3	5/16	4	34720	77.00	34720-C3	87.10		
.375 (3/8)	.570	**2.000** (5x)	3	3/8	4	33324	77.00	33324-C3	90.00		
.375 (3/8)	.570	**3.000** (8x)	3	3/8	6	34724	105.90	34724-C3	120.60		

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MINIATURE END MILLS

Square – Tapered Reach (Clearance Cutters)



- Designed for deep cavity profiling
- 2° tapered neck design minimizes deflection and maximizes wall clearance
- Length of cut = 1½ x diameter
- Neck behind length of cut is reduced for 1x diameter
- h6 shank tolerance for high precision tool holders
- Solid carbide
- CNC ground in the USA

Maximum Reach & Maximum Rigidity!

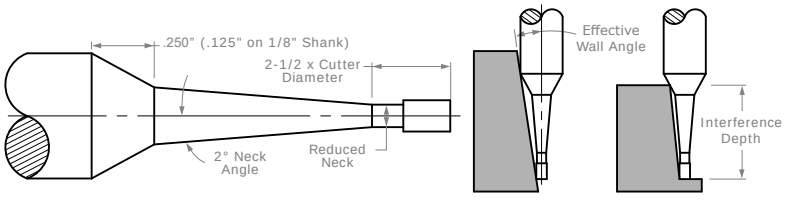
CUTTER DIA.	LOC	OVERALL REACH	EFF. WALL ANGLE	SHANK DIA.	OAL	INTERFERENCE DEPTH AT WALL ANGLE*						UNCOATED			AlTiN NANO COATED		
D_1 +.000″ −.001″	L_2 +.020″ −.000″	L_4 +.020″ −.000″		D_2 (h6)	L_1	0°	.5°	1°	2°	3°	4°	2 FL	4 FL	PRICE	2 FL	4 FL	PRICE
.015	.023	**1/2**	6.4°	1/8	2-1/2	.060	.080	.125	.375	.395	.420		990215	73.30		990215-C6	80.50
.031	.047	**1/2**	5.4°	1/8	2-1/2	.115	.155	.235	.385	.410	.440		990231	56.50		990231-C6	63.70
.031	.047	**1**	6.3°	1/4	4	.115	.155	.235	.755	.800	.850	26631	30831	68.00	26631-C6	30831-C6	78.60
.031	.047	**1-1/2**	4.2°	1/4	4	.115	.155	.235	1.260	1.355	1.470	28331	31231	73.50	28331-C6	31231-C6	84.10
.031	.047	**2**	3.1°	1/4	4	.115	.155	.235	1.765	1.965	-	17431	913131	78.80	17431-C6	913131-C6	89.40
.047	.071	**1/2**	4.5°	1/8	2-1/2	.180	.245	.370	.395	.430	.470		990247	56.50		990247-C6	63.70
.047	.071	**1**	5.9°	1/4	4	.180	.245	.370	.765	.815	.870	26647	30847	68.00	26647-C6	30847-C6	78.60
.047	.071	**1-1/2**	3.9°	1/4	4	.180	.245	.370	1.275	1.380	-	28347	31247	73.50	28347-C6	31247-C6	84.10
.062	.093	**1/2**	3.7°	1/8	2-1/2	.220	.295	.375	.410	.460	-		990262	54.90		990262-C6	62.10
.062	.093	**1**	5.4°	1/4	4	.220	.295	.445	.775	.825	.890	26662	30862	66.10	26662-C6	30862-C6	76.70
.062	.093	**1-1/2**	3.7°	1/4	4	.220	.295	.445	1.285	1.410	-	28362	31262	71.50	28362-C6	31262-C6	82.10
.062	.093	**2**	2.6°	1/4	4	.220	.295	.445	1.805	-	-	17462	913162	76.90	17462-C6	913162-C6	87.50
.078	.118	**1**	5.0°	1/4	4	.305	.405	.610	.785	.845	.915	26678	30878	66.10	26678-C6	30878-C6	76.70
.078	.118	**1-1/2**	3.4°	1/4	4	.305	.405	.610	1.305	1.445	-	28378	31278	71.50	28378-C6	31278-C6	82.10
.093	.140	**1**	4.6°	1/4	4	.340	.455	.685	.795	.865	.945	26693	30893	66.90	26693-C6	30893-C6	77.50
.093	.140	**1-1/2**	3.1°	1/4	4	.340	.455	.685	1.320	-	-	28393	31293	70.90	28393-C6	31293-C6	81.50
.093	.140	**2**	2.2°	1/4	4	.340	.455	.685	1.890	-	-	17493	913193	74.90	17493-C6	913193-C6	85.50
.125	.188	**1**	3.7°	1/4	4	.450	.600	.760	.835	.930	-	26708	30908	66.90	26708-C6	30908-C6	77.50
.125	.188	**1-1/2**	2.5°	1/4	4	.450	.600	.905	1.395	-	-	28408	31308	70.90	28408-C6	31308-C6	81.50
.125	.188	**2**	1.7°	1/4	4	.450	.600	.905	-	-	-	17508	913208	74.90	17508-C6	913208-C6	85.50
.156	.234	**1**	2.8°	1/4	4	.525	.705	.780	.895	-	-	26710	30910	66.90	26710-C6	30910-C6	77.50
.156	.234	**1-1/2**	1.9°	1/4	4	.525	.705	1.060	-	-	-	28410	31310	70.90	28410-C6	31310-C6	81.50
.187	.281	**1-1/2**	1.3°	1/4	4	.605	.805	1.215	-	-	-	28412	31312	70.90	28412-C6	31312-C6	81.50
.250	.375	**1-1/2**	2.5°	3/8	4	.760	1.015	1.275	1.425	-	-	28416	31316	91.50	28416-C6	31316-C6	103.40

*Values are approximate and may vary due to tolerancing.

For detailed interference charts with more angles, search for keyword InterferenceChart on www.harveytool.com.

Effective Wall Angle:
Minimum wall angle (measured from centerline of tool) that can be machined at overall reach.

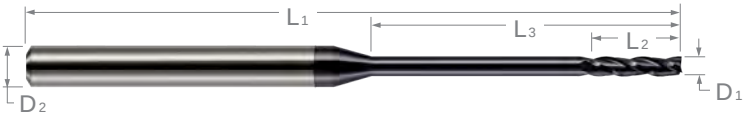
Interference Depth:
At a given angle, the depth at which the cutter interferes with the workpiece.



NEW SIZES!

MINIATURE END MILLS

Square – Long Reach, Long Flute



- **Long length design for deep cavities**
- Long flutes for deep pocket milling
- Length of cut is ≥ 5x diameter
- 3 flutes
- Center cutting
- Solid carbide
- CNC ground in the USA



Reduced Neck Diameter to Avoid Heeling

SQUARE

CUTTER DIAMETER	LENGTH OF CUT	OVERALL REACH	FLUTES	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN COATED		AMORPHOUS DIAMOND	
D_1 +.0005″ −.0005″	L_2 +.010″ −.000″	L_3 +.010″ −.000″		D_2	L_1	TOOL #	PRICE	TOOL #	PRICE	TOOL #	PRICE
.010	.050	**.100** (10x)	3	1/8	2-1/2	13610	50.20	13610-C3	55.10	10010	62.60
.010	.050	**.150** (15x)	3	1/8	2-1/2	948210	63.40	948210-C3	68.30		
.015 (1/64)	.075	**.150** (10x)	3	1/8	2-1/2	13615	40.50	13615-C3	45.40	10015	52.90
.015 (1/64)	.075	**.225** (15x)	3	1/8	2-1/2	948215	54.40	948215-C3	59.30		
.020 (.5 mm)	.100	**.200** (10x)	3	1/8	2-1/2	13620	38.90	13620-C3	43.80	10020	51.30
.020 (.5 mm)	.100	**.300** (15x)	3	1/8	2-1/2	948220	52.60	948220-C3	57.50		
.025	.125	**.250** (10x)	3	1/8	2-1/2	13625	37.40	13625-C3	42.30	10025	49.80
.030	.150	**.300** (10x)	3	1/8	2-1/2	13630	37.40	13630-C3	42.30	10030	49.80
.030	.150	**.450** (15x)	3	1/8	2-1/2	948230	50.90	948230-C3	55.80		
.031 (1/32)	.155	**.250** (8x)	3	1/8	2-1/2	876631	36.30	876631-C3	41.20		
.031 (1/32)	.155	**.310** (10x)	3	1/8	2-1/2	13631	37.40	13631-C3	42.30	10031	49.80
.031 (1/32)	.155	**.312** (10x)	4	1/8	2-1/2	776031	37.40	776031-C3	42.30		
.031 (1/32)	.155	**.375** (12x)	3	1/8	2-1/2	867031	47.80	867031-C3	52.70		
.031 (1/32)	.155	**.470** (15x)	3	1/8	2-1/2	948231	50.90	948231-C3	55.80		
.035 (.9 mm)	.175	**.350** (10x)	3	1/8	2-1/2	13635	37.40	13635-C3	42.30	10035	49.80
.040	.200	**.400** (10x)	3	1/8	2-1/2	13640	37.40	13640-C3	42.30	10040	49.80
.040	.200	**.600** (15x)	3	1/8	2-1/2	948240	50.90	948240-C3	55.80		
.045	.225	**.450** (10x)	3	1/8	2-1/2	13645	36.70	13645-C3	41.60	10045	49.10
NEW .047 (3/64)	.250	**.375** (8x)	3	1/8	2-1/2	876647	35.50	876647-C3	40.40		
.047 (3/64)	.250	**.500** (10x)	3	1/8	2-1/2	13647	36.70	13647-C3	41.60	10047	49.10
.047 (3/64)	.250	**.500** (10x)	4	1/8	2-1/2	776047	36.70	776047-C3	41.60		
.047 (3/64)	.250	**.570** (12x)	3	1/8	2-1/2	867047	45.20	867047-C3	50.10		
.047 (3/64)	.250	**.710** (15x)	3	1/8	2-1/2	948247	48.30	948247-C3	53.20		
.050	.300	**.500** (10x)	3	1/8	2-1/2	956350	36.70	956350-C3	41.60		
.050	.300	**.600** (12x)	3	1/8	2-1/2	13650	36.70	13650-C3	41.60	10050	49.10
.050	.300	**.750** (15x)	3	1/8	2-1/2	948250	48.30	948250-C3	53.20		
.055 (1.4 mm)	.385	**.770** (14x)	3	1/8	2-1/2	13655	38.10	13655-C3	43.00	10055	50.50
.060	.312	**.625** (10x)	3	1/8	2-1/2	956360	36.70	956360-C3	41.60		
.060	.500	**1.000** (16x)	3	1/8	2-1/2	13660	38.30	13660-C3	43.20	10060	50.70
.062 (1/16)	.312	**.500** (8x)	3	1/8	2-1/2	876662	35.40	876662-C3	40.30		
.062 (1/16)	.312	**.625** (10x)	3	1/8	2-1/2	956362	36.70	956362-C3	41.60		
.062 (1/16)	.312	**.750** (12x)	3	1/8	2-1/2	867062	35.50	867062-C3	40.40		
.062 (1/16)	.500	**1.000** (16x)	3	1/8	2-1/2	13662	38.30	13662-C3	43.20	10062	50.70
.062 (1/16)	.312	**1.000** (16x)	4	1/8	2-1/2	776062	38.30	776062-C3	43.20		
.065	.500	**1.000** (15x)	3	1/8	2-1/2	13665	38.10	13665-C3	43.00	10065	50.50

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NEW SIZES!

MINIATURE END MILLS

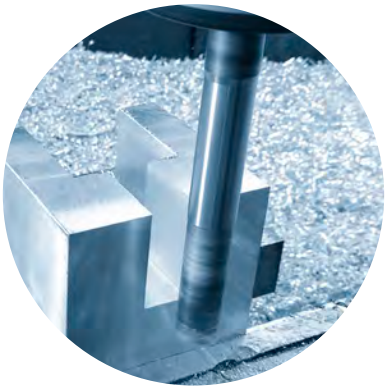
Square – Long Reach, Long Flute (cont.)

continued from previous page

SQUARE

CUTTER DIAMETER	LENGTH OF CUT	OVERALL REACH	FLUTES	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN COATED		AMORPHOUS DIAMOND	
D_1 +.0005″ −.0005″	L_2 +.010″ −.000″	L_3 +.010″ −.000″		D_2	L_1	TOOL #	PRICE	TOOL #	PRICE	TOOL #	PRICE
.070	.500	**1.000** (14x)	3	1/8	2-1/2	13670	38.10	13670-C3	43.00	10070	50.50
.075	.500	**1.000** (13x)	3	1/8	2-1/2	13675	36.70	13675-C3	41.60	10075	49.10
.078 (5/64)	.406	**.800** (10x)	3	1/8	2-1/2	956378	36.70	956378-C3	41.60		
.078 (5/64)	.500	**1.000** (12x)	3	1/8	2-1/2	13678	36.70	13678-C3	41.60	10078	49.10
.078 (5/64)	.406	**1.000** (12x)	4	1/8	2-1/2	776078	36.70	776078-C3	41.60		
.078 (5/64)	.406	**1.187** (15x)	3	1/8	2-1/2	948278	48.30	948278-C3	53.20		
.080	.750	**1.250** (15x)	3	1/8	2-1/2	13680	38.30	13680-C3	43.20	10080	50.70
.085	.750	**1.250** (14x)	3	1/8	2-1/2	13685	38.30	13685-C3	43.20	10085	50.70
.090	.750	**1.250** (13x)	3	1/8	2-1/2	13690	36.90	13690-C3	41.80	10090	49.30
.093 (3/32)	.500	**.750** (8x)	3	1/8	2-1/2	876693	35.40	876693-C3	40.30		
.093 (3/32)	.500	**.950** (10x)	3	1/8	2-1/2	956393	36.70	956393-C3	41.60		
.093 (3/32)	.750	**1.250** (13x)	3	1/8	2-1/2	13693	36.90	13693-C3	41.80	10093	49.30
.093 (3/32)	.500	**1.250** (13x)	4	1/8	2-1/2	776093	36.90	776093-C3	41.80		
.093 (3/32)	.500	**1.400** (15x)	3	1/8	3	948293	48.30	948293-C3	53.20		
.095	.750	**1.250** (13x)	3	1/8	2-1/2	13695	36.70	13695-C3	41.60	10095	49.10
.100	.750	**1.250** (12x)	3	1/8	2-1/2	13700	36.70	13700-C3	41.60	10100	49.10

D_1 +.000″ −.002″	L_2 +.020″ −.000″	L_3 +.020″ −.000″		D_2	L_1	TOOL #	PRICE	TOOL #	PRICE	TOOL #	PRICE	
.125 (1/8)	.625	**1.000** (8x)	3	1/8	2-1/2	876708	35.40	876708-C3	40.30			
.125 (1/8)	.625	**1.250** (10x)	3	1/8	2-1/2	956408	37.10	956408-C3	42.00			
.125 (1/8)	1.000	**1.500** (12x)	3	1/8	2-1/2	13708	37.30	13708-C3	42.20	10108	49.70	
.125 (1/8)	.625	**1.500** (12x)	4	1/8	2-1/2	776108	37.30	776108-C3	42.20			
.125 (1/8)	.625	**1.875** (15x)	3	1/8	3	948308	51.30	948308-C3	56.20			
.187 (3/16)	1.125	**1.625** (8x)	3	3/16	3	13712	43.40	13712-C3	48.70	10112	60.50	
.187 (3/16)	1.000	**1.875** (10x)	3	3/16	4	956412	45.10	956412-C3	52.30			NEW
.250 (1/4)	1.500	**2.000** (8x)	3	1/4	4	13716	48.40	13716-C3	53.70	10116	67.80	
.250 (1/4)	1.250	**2.500** (10x)	3	1/4	4	956416	51.40	956416-C3	59.80			NEW
.375 (3/8)	2.000	**3.000** (8x)	3	3/8	6	876724	123.30	876724-C3	138.00			NEW



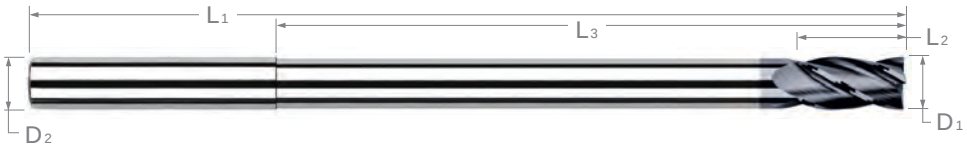
Applying HEM to Micromachining

You've heard a great deal about High Efficiency Milling (HEM), but you probably thought it was just for larger diameter tooling. In fact, this popular machining method can be used for tools smaller than .125" in diameter! Our "In the Loupe" blog post **Applying HEM to Micromachining** explains how.

Read more on harveyperformance.com/in-the-loupe/

MINIATURE END MILLS

Square – Extra Long Length



- **Up to 10" overall length**
- Longest overall length carbide end mill available in stock
- Extended reach
- 4 flutes
- Center cutting
- Solid carbide
- CNC ground in the USA

CUTTER DIAMETER	LENGTH OF CUT	OVERALL REACH	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN COATED	
D_1 +.000″ −.002″	L_2 +.030″ −.000″	L_3 +.030″ −.000″	D_2	L_1	4 FL	PRICE	4 FL	PRICE
.250 (1/4)	.375	4.375 (17.5x)	1/4	6	991916	87.10	991916-C3	96.60
.250 (1/4)	.375	4.375 (17.5x)	1/4	8	960516	118.50	960516-C3	132.70
.312 (5/16)	.470	4.343 (14x)	5/16	6	991920	103.90	991920-C3	118.10
.375 (3/8)	.562	4.312 (11.5x)	3/8	6	991924	117.20	991924-C3	131.90
.375 (3/8)	.562	4.312 (11.5x)	3/8	8	960524	142.00	960524-C3	161.90
.437 (7/16)	.656	5.875 (13.5x)	7/16	8	991928	204.10	991928-C3	233.40
.500 (1/2)	.750	5.750 (11.5x)	1/2	8	991932	209.30	991932-C3	238.60
.500 (1/2)	.750	5.750 (11.5x)	1/2	10	960532	307.10	960532-C3	336.40
.625 (5/8)	.937	5.687 (9x)	5/8	8	991940	355.50	991940-C3	381.30
.750 (3/4)	1.125	5.625 (7.5x)	3/4	8	991948	437.40	991948-C3	467.40

NEW!

MINIATURE END MILLS

Square – Router Style



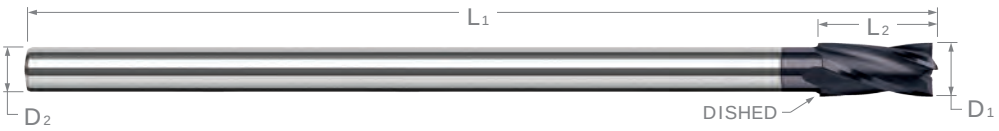
- Router style shank and tight overall length for quick and consistent tool changes
- Center cutting
- Solid carbide
- CNC ground in the USA

CUTTER DIAMETER	LENGTH OF CUT	SHANK DIAMETER	OVERALL LENGTH	UNCOATED			AlTiN COATED			
D_1 +.0005″ −.0005″	L_2 +.010″ −.000″	D_2	L_1 +.010″ −.000″	2 FL	4 FL	PRICE	2 FL	4 FL	PRICE	
.015 (1/64)	.045 (3x)	1/4	2	760615	761715	32.90	760615-C3	761715-C3	40.10	NEW
.031 (1/32)	.093 (3x)	1/4	2	760631	761731	32.90	760631-C3	761731-C3	40.10	NEW
.047 (3/64)	.141 (3x)	1/4	2	760647	761747	32.90	760647-C3	761747-C3	40.10	NEW
.062 (1/16)	.186 (3x)	1/4	2	760662	761762	32.90	760662-C3	761762-C3	40.10	NEW
.078 (5/64)	.234 (3x)	1/4	2	760678	761778	32.90	760678-C3	761778-C3	40.10	NEW
.093 (3/32)	.279 (3x)	1/4	2	760693	761793	32.90	760693-C3	761793-C3	40.10	NEW

D_1 +.0005″ −.0005″	L_2 +.030″ −.000″	D_2	L_1 +.010″ −.000″	2 FL	4 FL	PRICE	2 FL	4 FL	PRICE	NEW
.125 (1/8)	.375 (3x)	1/4	2	760708	761808	32.90	760708-C3	761808-C3	40.10	NEW
.187 (3/16)	.625 (3x)	1/4	2	760712	761812	32.90	760712-C3	761812-C3	40.10	NEW

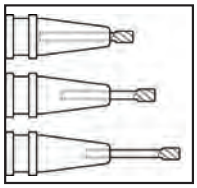
END MILLS

Square – Reduced Shank



- Reduced straight shank allows any chucking depth
- Solid carbide construction for maximum rigidity
- Long length design for deep cavity machining
- Center cutting
- Solid carbide
- CNC ground in the USA

Chuck at Any Depth!



	CUTTER DIAMETER	LENGTH OF CUT		FLUTES	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN COATED		AMORPHOUS DIAMOND	
	D_1 +.000″ −.002″	L_2 +.030″ −.000″			D_2 (h6)	L_1	TOOL #	PRICE	TOOL #	PRICE	TOOL #	PRICE
NEW	1/8	3/16	(1.5x)	2	3 mm	2-1/2	907808	86.40	907808-C3	91.30	907808-C4	98.80
NEW	1/8	3/16	(1.5x)	4	3 mm	2-1/2	943208	88.90	943208-C3	93.80	943208-C4	101.30
	1/8	3/8	(3x)	4	3 mm	2-1/2	789308	91.10	789308-C3	96.00		
	5/32	15/64	(1.5x)	2	1/8	2-1/2	907810	86.40	907810-C3	91.70		
	5/32	15/64	(1.5x)	4	1/8	2-1/2	943210	88.90	943210-C3	94.20		
	5/32	15/64	(1.5x)	4	1/8	4	920610	95.90	920610-C3	103.10		
	3/16	9/32	(1.5x)	2	1/8	2-1/2	907812	86.40	907812-C3	91.70		
	3/16	9/32	(1.5x)	4	1/8	2-1/2	943212	88.90	943212-C3	94.20		
NEW	3/16	9/32	(1.5x)	4	5/32	4	920613	95.90	920613-C3	103.10	920613-C4	114.10
	3/16	9/16	(3x)	4	5/32	2-1/2	789312	91.10	789312-C3	96.40		
	1/4	3/8	(1.5x)	2	3/16	3	907816	93.70	907816-C3	100.90		
NEW	1/4	3/8	(1.5x)	4	3/16	3	943216	96.30	943216-C3	103.50	943216-C4	115.70
	1/4	3/8	(1.5x)	4	3/16	4	920616	128.80	920616-C3	137.20		
	1/4	3/4	(3x)	4	3/16	3	789316	98.80	789316-C3	106.00		
	5/16	15/32	(1.5x)	4	1/4	4	943220	118.20	943220-C3	128.30		
	5/16	15/32	(1.5x)	4	1/4	6	920620	154.00	920620-C3	168.20		
NEW	3/8	9/16	(1.5x)	4	5/16	4	943224	139.60	943224-C3	152.60	943224-C4	163.00
	3/8	9/16	(1.5x)	4	5/16	6	920624	167.80	920624-C3	182.50		
	7/16	21/32	(1.5x)	4	3/8	6	943228	188.70	943228-C3	204.60		
	1/2	3/4	(1.5x)	4	7/16	6	943232	214.60	943232-C3	228.80		
	5/8	15/16	(1.5x)	4	1/2	6	943240	278.70	943240-C3	299.90		
	3/4	1-1/8	(1.5x)	4	5/8	6	943248	344.00	943248-C3	366.30		

For Ball Reduced Shank, please see page 60.

For Corner Radius Reduced Shank, please see page 81.

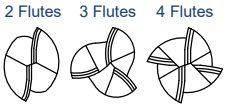
NEW SIZES!

MINIATURE END MILLS

Ball – Stub & Standard



- **Cutter diameter down to .002"**
- Center cutting
- Solid carbide
- CNC ground in the USA



Stub Flute & Standard Length



BALL

CUTTER DIA.	LOC	SHANK DIA.	OAL	UNCOATED				AlTiN COATED				AMORPHOUS DIAMOND			
D1 +.0005" −.0005"	L2 +.010" −.000"	D2	L1	2 FL	3 FL	4 FL	PRICE	2 FL	3 FL	4 FL	PRICE	2 FL	4 FL	PRICE	
.002	**.003** (1.5x)	1/8	1-1/2	24502			66.10								
.002	**.006** (3x)	1/8	1-1/2	74002			66.10								
.003	**.004** (1.5x)	1/8	1-1/2	24503			58.50								
.003	**.009** (3x)	1/8	1-1/2	74003			58.50								
.004 (.1 mm)	**.006** (1.5x)	1/8	1-1/2	24504			52.60								
.004 (.1 mm)	**.012** (3x)	1/8	1-1/2	74004			52.60								
.005	**.007** (1.5x)	1/8	1-1/2	24505		24605	47.50	24505-C3		24605-C3	52.40		24605-C4	59.90	
.005	**.015** (3x)	1/8	1-1/2	74005		74305	47.50	74005-C3		74305-C3	52.40	74005-C4	74305-C4	59.90	NEW
.006	**.009** (1.5x)	1/8	1-1/2	24506		24606	48.80			24606-C3	53.70				
.006	**.018** (3x)	1/8	1-1/2	74006		74306	48.80	74006-C3		74306-C3	53.70				
.007	**.010** (1.5x)	1/8	1-1/2	24507		24607	48.80			24607-C3	53.70				
.007	**.021** (3x)	1/8	1-1/2	74007		74307	48.80	74007-C3		74307-C3	53.70				
.008 (.2 mm)	**.012** (1.5x)	1/8	1-1/2	24508		24608	48.80	24508-C3		24608-C3	53.70				
.008 (.2 mm)	**.024** (3x)	1/8	1-1/2	74008	835908	74308	48.80	74008-C3	835908-C3	74308-C3	53.70	74008-C4		61.20	
.009	**.013** (1.5x)	1/8	1-1/2	24509		24609	48.80			24609-C3	53.70				
.009	**.027** (3x)	1/8	1-1/2	74009		74309	48.80			74309-C3	53.70				
.010	**.015** (1.5x)	1/8	1-1/2	24510	823410	24610	38.40	24510-C3	823410-C3	24610-C3	43.30		24610-C4	50.80	
.010	**.030** (3x)	1/8	1-1/2	74010	835910	74310	38.40	74010-C3	835910-C3	74310-C3	43.30	74010-C4	74310-C4	50.80	
.011	**.016** (1.5x)	1/8	1-1/2	24511		24611	39.60			24611-C3	44.50				
.011	**.033** (3x)	1/8	1-1/2	74011		74311	39.60			74311-C3	44.50				
.012 (.3 mm)	**.018** (1.5x)	1/8	1-1/2	24512		24612	39.60	24512-C3		24612-C3	44.50				
.012 (.3 mm)	**.036** (3x)	1/8	1-1/2	74012		74312	39.60	74012-C3		74312-C3	44.50	74012-C4		52.00	
.013	**.019** (1.5x)	1/8	1-1/2	24513		24613	39.60			24613-C3	44.50				
.013	**.039** (3x)	1/8	1-1/2	74013		74313	39.60			74313-C3	44.50				
.014	**.021** (1.5x)	1/8	1-1/2	24514		24614	39.60			24614-C3	44.50				
.014	**.042** (3x)	1/8	1-1/2	74014		74314	39.60			74314-C3	44.50				
.015 (1/64)	**.022** (1.5x)	1/8	1-1/2	24515	823415	24615	29.80	24515-C3	823415-C3	24615-C3	34.70		24615-C4	42.20	
.015 (1/64)	**.045** (3x)	1/8	1-1/2	74015	835915	74315	29.80	74015-C3	835915-C3	74315-C3	34.70	74015-C4	74315-C4	42.20	
.016 (.4 mm)	**.024** (1.5x)	1/8	1-1/2	24516		24616	31.20			24616-C3	36.10				
.016 (.4 mm)	**.048** (3x)	1/8	1-1/2	74016		74316	31.20			74316-C3	36.10				
.017	**.026** (1.5x)	1/8	1-1/2	24517		24617	31.20			24617-C3	36.10				
.017	**.051** (3x)	1/8	1-1/2	74017		74317	31.20			74317-C3	36.10				
.018	**.027** (1.5x)	1/8	1-1/2	24518		24618	31.20			24618-C3	36.10				
.018	**.054** (3x)	1/8	1-1/2	74018		74318	31.20	74018-C3		74318-C3	36.10				
.019	**.029** (1.5x)	1/8	1-1/2	24519		24619	31.20			24619-C3	36.10				
.019	**.057** (3x)	1/8	1-1/2	74019		74319	31.20			74319-C3	36.10	74019-C4		43.60	
.020 (.5 mm)	**.030** (1.5x)	1/8	1-1/2	24520	823420	24620	28.70	24520-C3	823420-C3	24620-C3	33.60	24520-C4	24620-C4	41.10	
.020 (.5 mm)	**.060** (3x)	1/8	1-1/2	74020	835920	74320	28.70	74020-C3	835920-C3	74320-C3	33.60	74020-C4	74320-C4	41.10	

Down to .002"!

continued on next page

NEW SIZES!

MINIATURE END MILLS

Ball – Stub & Standard

continued from previous page

CUTTER DIA.	LOC	SHANK DIA.	OAL	UNCOATED				AlTiN COATED				AMORPHOUS DIAMOND		
D_1 +.0005″ −.0005″	L_2 +.010″ −.000″	D_2	L_1	2 FL	3 FL	4 FL	PRICE	2 FL	3 FL	4 FL	PRICE	2 FL	4 FL	PRICE
.021	**.031** (1.5x)	1/8	1-1/2	24521		24621	30.00			24621-C3	34.90			
.021	**.063** (3x)	1/8	1-1/2	74021		74321	30.00	74021-C3		74321-C3	34.90			
.022	**.033** (1.5x)	1/8	1-1/2	24522		24622	30.00			24622-C3	34.90			
.022	**.066** (3x)	1/8	1-1/2	74022		74322	30.00			74322-C3	34.90			
.023	**.035** (1.5x)	1/8	1-1/2	24523		24623	30.00			24623-C3	34.90			
.023	**.069** (3x)	1/8	1-1/2	74023		74323	30.00	74023-C3		74323-C3	34.90			
.024 (.6 mm)	**.036** (1.5x)	1/8	1-1/2	24524		24624	30.00			24624-C3	34.90			
.024 (.6 mm)	**.072** (3x)	1/8	1-1/2	74024		74324	30.00			74324-C3	34.90			
.025	**.037** (1.5x)	1/8	1-1/2	24525	823425	24625	25.90	24525-C3	823425-C3	24625-C3	30.80		24625-C4	38.30
.025	**.075** (3x)	1/8	1-1/2	74025	835925	74325	25.90	74025-C3	835925-C3	74325-C3	30.80	74025-C4	74325-C4	38.30
.026	**.039** (1.5x)	1/8	1-1/2	24526		24626	27.00			24626-C3	31.90			
.026	**.078** (3x)	1/8	1-1/2	74026		74326	27.00			74326-C3	31.90			
.027	**.041** (1.5x)	1/8	1-1/2	24527		24627	27.00			24627-C3	31.90			
.027	**.081** (3x)	1/8	1-1/2	74027		74327	27.00			74327-C3	31.90			
.028 (.7 mm)	**.042** (1.5x)	1/8	1-1/2	24528		24628	27.00			24628-C3	31.90			
.028 (.7 mm)	**.084** (3x)	1/8	1-1/2	74028		74328	27.00			74328-C3	31.90			
.029	**.043** (1.5x)	1/8	1-1/2	24529		24629	27.00			24629-C3	31.90			
.029	**.087** (3x)	1/8	1-1/2	74029		74329	27.00			74329-C3	31.90			
.030	**.045** (1.5x)	1/8	1-1/2	24530	823430	24630	23.60	24530-C3	823430-C3	24630-C3	28.50		24630-C4	36.00
.030	**.090** (3x)	1/8	1-1/2	74030	835930	74330	23.60	74030-C3	835930-C3	74330-C3	28.50	74030-C4	74330-C4	36.00
.031 (1/32)	**.046** (1.5x)	1/8	1-1/2	24531	823431	24631	23.60	24531-C3	823431-C3	24631-C3	28.50	24531-C4	24631-C4	36.00
.031 (1/32)	**.093** (3x)	1/8	1-1/2	74031	835931	74331	23.60	74031-C3	835931-C3	74331-C3	28.50	74031-C4	74331-C4	36.00
.032	**.048** (1.5x)	1/8	1-1/2	24532		24632	24.80			24632-C3	29.70			
.032	**.096** (3x)	1/8	1-1/2	74032		74332	24.80	74032-C3		74332-C3	29.70			
.033	**.049** (1.5x)	1/8	1-1/2	24533		24633	24.80			24633-C3	29.70			
.033	**.099** (3x)	1/8	1-1/2	74033		74333	24.80	74033-C3		74333-C3	29.70			
.034	**.051** (1.5x)	1/8	1-1/2	24534		24634	24.80			24634-C3	29.70			
.034	**.102** (3x)	1/8	1-1/2	74034		74334	24.80			74334-C3	29.70			
.035 (.9 mm)	**.052** (1.5x)	1/8	1-1/2	24535	823435	24635	22.40	24535-C3	823435-C3	24635-C3	27.30		24635-C4	34.80
.035 (.9 mm)	**.105** (3x)	1/8	1-1/2	74035	835935	74335	22.40	74035-C3	835935-C3	74335-C3	27.30	74035-C4	74335-C4	34.80
.036	**.054** (1.5x)	1/8	1-1/2	24536		24636	23.40			24636-C3	28.30			
.036	**.108** (3x)	1/8	1-1/2	74036		74336	23.40			74336-C3	28.30			
.037	**.055** (1.5x)	1/8	1-1/2	24537		24637	23.40			24637-C3	28.30			
.037	**.111** (3x)	1/8	1-1/2	74037		74337	23.40			74337-C3	28.30			
.038	**.057** (1.5x)	1/8	1-1/2	24538		24638	23.40			24638-C3	28.30			
.038	**.114** (3x)	1/8	1-1/2	74038		74338	23.40			74338-C3	28.30			
.039 (1 mm)	**.058** (1.5x)	1/8	1-1/2	24539	823439	24639	22.90	24539-C3	823439-C3	24639-C3	27.80			
NEW .039 (1 mm)	**.117** (3x)	1/8	1-1/2	74039	835939	74339	22.90	74039-C3	835939-C3	74339-C3	27.80	74039-C4	74339-C4	35.30
.040	**.060** (1.5x)	1/8	1-1/2	24540	823440	24640	22.40	24540-C3	823440-C3	24640-C3	27.30	24540-C4	24640-C4	34.80
.040	**.120** (3x)	1/8	1-1/2	74040	835940	74340	22.40	74040-C3	835940-C3	74340-C3	27.30	74040-C4	74340-C4	34.80
.041	**.123** (3x)	1/8	1-1/2	74041		74341	23.40			74341-C3	28.30			
.042	**.126** (3x)	1/8	1-1/2	74042		74342	23.40			74342-C3	28.30			
.043 (1.1 mm)	**.129** (3x)	1/8	1-1/2	74043		74343	23.40			74343-C3	28.30			
.044	**.132** (3x)	1/8	1-1/2	74044		74344	23.40			74344-C3	28.30			
.045	**.067** (1.5x)	1/8	1-1/2	24545	823445	24645	22.40		823445-C3	24645-C3	27.30		24645-C4	34.80
.045	**.135** (3x)	1/8	1-1/2	74045	835945	74345	22.40	74045-C3	835945-C3	74345-C3	27.30	74045-C4	74345-C4	34.80

continued on next page

NEW SIZES!

MINIATURE END MILLS

Ball – Stub & Standard (cont.)

continued from previous page

CUTTER DIA.	LOC	SHANK DIA.	OAL	UNCOATED				AlTiN COATED				AMORPHOUS DIAMOND		
D_1 +.0005″ −.0005″	L_2 +.010″ −.000″	D_2	L_1	2 FL	3 FL	4 FL	PRICE	2 FL	3 FL	4 FL	PRICE	2 FL	4 FL	PRICE
.046	**.138** (3x)	1/8	1-1/2	74046		74346	23.40			74346-C3	28.30			
.047 (3/64)	**.070** (1.5x)	1/8	1-1/2	24547	823447	24647	22.40	24547-C3	823447-C3	24647-C3	27.30	24547-C4	24647-C4	34.80
.047 (3/64)	**.141** (3x)	1/8	1-1/2	74047	835947	74347	22.40	74047-C3	835947-C3	74347-C3	27.30	74047-C4	74347-C4	34.80
.048	**.144** (3x)	1/8	1-1/2	74048		74348	23.40			74348-C3	28.30			
.049	**.147** (3x)	1/8	1-1/2	74049		74349	23.40			74349-C3	28.30			
.050	**.075** (1.5x)	1/8	1-1/2	24550	823450	24650	22.40	24550-C3	823450-C3	24650-C3	27.30		24650-C4	34.80
.050	**.150** (3x)	1/8	1-1/2	74050	835950	74350	22.40	74050-C3	835950-C3	74350-C3	27.30	74050-C4	74350-C4	34.80
.051 (1.3 mm)	**.153** (3x)	1/8	1-1/2	74051		74351	23.40			74351-C3	28.30			
.052	**.156** (3x)	1/8	1-1/2	74052		74352	23.40			74352-C3	28.30			
.053	**.159** (3x)	1/8	1-1/2	74053		74353	23.40			74353-C3	28.30			
.054	**.162** (3x)	1/8	1-1/2	74054		74354	23.40			74354-C3	28.30			
.055 (1.4 mm)	**.082** (1.5x)	1/8	1-1/2	24555	823455	24655	22.40	24555-C3	823455-C3	24655-C3	27.30		24655-C4	34.80
.055 (1.4 mm)	**.165** (3x)	1/8	1-1/2	74055	835955	74355	22.40	74055-C3	835955-C3	74355-C3	27.30	74055-C4	74355-C4	34.80
.056	**.168** (3x)	1/8	1-1/2	74056		74356	23.40			74356-C3	28.30			
.057	**.171** (3x)	1/8	1-1/2	74057		74357	23.40			74357-C3	28.30			
.058	**.174** (3x)	1/8	1-1/2	74058		74358	23.40			74358-C3	28.30			
.059 (1.5 mm)	**.089** (1.5x)	1/8	1-1/2	24559		24659	23.40			24659-C3	28.30			
.059 (1.5 mm)	**.177** (3x)	1/8	1-1/2	74059		74359	23.40			74359-C3	28.30			
.060	**.090** (1.5x)	1/8	1-1/2	24560	823460	24660	22.40	24560-C3	823460-C3	24660-C3	27.30		24660-C4	34.80
.060	**.180** (3x)	1/8	1-1/2	74060	835960	74360	22.40	74060-C3	835960-C3	74360-C3	27.30	74060-C4	74360-C4	34.80
.061	**.183** (3x)	1/8	1-1/2			74361	22.40			74361-C3	27.30			
.062 (1/16)	**.093** (1.5x)	1/8	1-1/2	24562	823462	24662	22.00	24562-C3	823462-C3	24662-C3	26.90	24562-C4	24662-C4	34.40
.062 (1/16)	**.186** (3x)	1/8	1-1/2	74062	835962	74362	22.00	74062-C3	835962-C3	74362-C3	26.90	74062-C4	74362-C4	34.40
.063	**.189** (3x)	1/8	1-1/2			74363	22.40			74363-C3	27.30			
.064	**.192** (3x)	1/8	1-1/2			74364	22.40			74364-C3	27.30			
.065	**.097** (1.5x)	1/8	1-1/2	24565		24665	22.00			24665-C3	26.90			
.065	**.195** (3x)	1/8	1-1/2	74065		74365	22.00	74065-C3		74365-C3	26.90	74065-C4	74365-C4	34.40
.066	**.198** (3x)	1/8	1-1/2			74366	22.40			74366-C3	27.30			
.067	**.201** (3x)	1/8	1-1/2			74367	22.40			74367-C3	27.30			
.068	**.204** (3x)	1/8	1-1/2			74368	22.40			74368-C3	27.30			
.069	**.207** (3x)	1/8	1-1/2			74369	22.40			74369-C3	27.30			
.070	**.105** (1.5x)	1/8	1-1/2	24570	823470	24670	22.00	24570-C3	823470-C3	24670-C3	26.90			
.070	**.210** (3x)	1/8	1-1/2	74070	835970	74370	22.00	74070-C3	835970-C3	74370-C3	26.90	74070-C4	74370-C4	34.40
.075	**.112** (1.5x)	1/8	1-1/2	24575		24675	22.00			24675-C3	26.90			
.075	**.225** (3x)	1/8	1-1/2	74075	835975	74375	22.00	74075-C3	835975-C3	74375-C3	26.90	74075-C4		34.40
.078 (5/64)	**.117** (1.5x)	1/8	1-1/2	24578	823478	24678	22.00	24578-C3	823478-C3	24678-C3	26.90		24678-C4	34.40
.078 (5/64)	**.234** (3x)	1/8	1-1/2	74078	835978	74378	22.00	74078-C3	835978-C3	74378-C3	26.90	74078-C4	74378-C4	34.40
.080	**.120** (1.5x)	1/8	1-1/2	24580	823480	24680	22.00		823480-C3	24680-C3	26.90			
.080	**.240** (3x)	1/8	1-1/2	74080	835980	74380	22.00	74080-C3	835980-C3	74380-C3	26.90	74080-C4	74380-C4	34.40
.085	**.127** (1.5x)	1/8	1-1/2	24585		24685	22.00			24685-C3	26.90			
.085	**.255** (3x)	1/8	1-1/2	74085		74385	22.00			74385-C3	26.90			
.090	**.135** (1.5x)	1/8	1-1/2	24590	823490	24690	22.00		823490-C3	24690-C3	26.90			
.090	**.270** (3x)	1/8	1-1/2	74090	835990	74390	22.00	74090-C3	835990-C3	74390-C3	26.90	74090-C4	74390-C4	34.40
.093 (3/32)	**.139** (1.5x)	1/8	1-1/2	24593	823493	24693	22.00	24593-C3	823493-C3	24693-C3	26.90	24593-C4	24693-C4	34.40
.093 (3/32)	**.279** (3x)	1/8	1-1/2	74093	835993	74393	22.00	74093-C3	835993-C3	74393-C3	26.90	74093-C4	74393-C4	34.40

continued on next page

NEW SIZES!

MINIATURE END MILLS

Ball – Stub & Standard (cont.)

continued from previous page

CUTTER DIA.	LOC		SHANK DIA.	OAL	UNCOATED				AlTiN COATED				AMORPHOUS DIAMOND		
D_1 +.0005″ −.0005″	L_2 +.010″ −.000″		D_2	L_1	2 FL	3 FL	4 FL	PRICE	2 FL	3 FL	4 FL	PRICE	2 FL	4 FL	PRICE
.095	**.142**	(1.5x)	1/8	1-1/2	24595		24695	22.00			24695-C3	26.90			
.095	**.285**	(3x)	1/8	1-1/2	74095		74395	22.00			74395-C3	26.90			
.100	**.150**	(1.5x)	1/8	1-1/2	24599	823500	24699	22.00		823500-C3	24699-C3	26.90			
.100	**.300**	(3x)	1/8	1-1/2	74100	836000	74400	22.00	74100-C3	836000-C3	74400-C3	26.90	74100-C4	74400-C4	34.40
.105	**.158**	(1.5x)	1/8	1-1/2	50900		51000	22.00			51000-C3	26.90			
.105	**.315**	(3x)	1/8	1-1/2	74105		74405	22.00			74405-C3	26.90			
.109 (7/64)	**.164**	(1.5x)	1/8	1-1/2	50901	823502	51001	22.00	50901-C3	823502-C3	51001-C3	26.90			
.109 (7/64)	**.375**	(3x)	1/8	1-1/2	74109	836002	74409	22.00	74109-C3	836002-C3	74409-C3	26.90			
.110	**.165**	(1.5x)	1/8	1-1/2	50902		51002	22.00			51002-C3	26.90			
.110	**.330**	(3x)	1/8	1-1/2	74110		74410	22.00			74410-C3	26.90			
.115	**.173**	(1.5x)	1/8	1-1/2	50903		51003	22.00			51003-C3	26.90			
.115	**.345**	(3x)	1/8	1-1/2	74115		74415	22.00			74415-C3	26.90			
.118 (3 mm)	**.177**	(1.5x)	1/8	1-1/2	50904	823505	51004	22.50		823505-C3	51004-C3	27.40			
.118 (3 mm)	**.354**	(3x)	1/8	1-1/2	74118	836005	74418	22.50	74118-C3	836005-C3	74418-C3	27.40			
.120	**.180**	(1.5x)	1/8	1-1/2	50905		51005	22.00			51005-C3	26.90			
.120	**.360**	(3x)	1/8	1-1/2	74120		74420	22.00			74420-C3	26.90			

D_1 +.000″ −.002″	L_2 +.030″ −.000″		D_2	L_1	2 FL	3 FL	4 FL	PRICE	2 FL	3 FL	4 FL	PRICE	2 FL	4 FL	PRICE
.125 (1/8)	**.187**	(1.5x)	1/8	1-1/2	50908	823508	51008	20.80	50908-C3	823508-C3	51008-C3	25.70	50908-C4	51008-C4	33.20
.125 (1/8)	**.375**	(3x)	1/8	1-1/2	74125	836008	74425	20.80	74125-C3	836008-C3	74425-C3	25.70	74125-C4	74425-C4	33.20
.140 (9/64)	**.220**	(1.5x)	3/16	2	50909		51009	21.30			51009-C3	26.60			
.140 (9/64)	**.562**	(3x)	3/16	2	74140		74440	21.30	74140-C3		74440-C3	26.60			
.156 (5/32)	**.281**	(1.5x)	3/16	2	50910	823510	51010	22.10		823510-C3	51010-C3	27.40		51010-C4	39.20
.156 (5/32)	**.562**	(3x)	3/16	2	74156	836010	74456	22.10	74156-C3	836010-C3	74456-C3	27.40		74456-C4	39.20
.172 (11/64)	**.312**	(1.5x)	3/16	2			51011	24.70			51011-C3	30.00			
.172 (11/64)	**.625**	(3x)	3/16	2			74472	24.70			74472-C3	30.00			
.187 (3/16)	**.312**	(1.5x)	3/16	2	50912	823512	51012	22.10	50912-C3	823512-C3	51012-C3	27.40		51012-C4	39.20
.187 (3/16)	**.625**	(3x)	3/16	2	74187	836012	74487	22.10	74187-C3	836012-C3	74487-C3	27.40	74187-C4	74487-C4	39.20
.203 (13/64)	**.312**	(1.5x)	1/4	2-1/2			51013	27.10			51013-C3	34.30			
.203 (13/64)	**.625**	(3x)	1/4	2-1/2			74490	27.10			74490-C3	34.30			
.218 (7/32)	**.330**	(1.5x)	1/4	2-1/2	50914	823514	51014	24.40		823514-C3	51014-C3	31.60			
.218 (7/32)	**.625**	(3x)	1/4	2-1/2	74193	836014	74493	24.40	74193-C3	836014-C3	74493-C3	31.60			
.234 (15/64)	**.750**	(3x)	1/4	2-1/2			74495	27.10			74495-C3	34.30			
.250 (1/4)	**.375**	(1.5x)	1/4	2-1/2	50916	823516	51016	24.40	50916-C3	823516-C3	51016-C3	31.60		51016-C4	43.80
.250 (1/4)	**.750**	(3x)	1/4	2-1/2	74199	836016	74499	24.40	74199-C3	836016-C3	74499-C3	31.60	74199-C4	74499-C4	43.80
.312 (5/16)	**.470**	(1.5x)	5/16	2-1/2			51020	31.60			51020-C3	40.00			
.312 (5/16)	**.812**	(3x)	5/16	2-1/2			74620	31.60			74620-C3	40.00			
.375 (3/8)	**.570**	(1.5x)	3/8	2-1/2			51024	39.40			51024-C3	48.90			
NEW .375 (3/8)	**1.000**	(3x)	3/8	2-1/2			74624	39.40			74624-C3	48.90		74624-C4	62.80
.500 (1/2)	**1.000**	(2x)	1/2	3			74632	60.60			74632-C3	74.80			

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NEW SIZES!

MINIATURE END MILLS

Ball – Long Flute



Stocked in 8 Lengths of Cut!

Long flute and long shank design for deep cavities

Mills deep pockets · Center cutting · Solid carbide · CNC ground in the USA

BALL

CUTTER DIAMETER	LENGTH OF CUT	FLUTES	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN COATED		AMORPHOUS DIAMOND		
D_1 $^{+.0005''}_{-.0005''}$	L_2 $^{+.010''}_{-.000''}$		D_2	L_1	TOOL #	PRICE	TOOL #	PRICE	TOOL #	PRICE	
.005	**.025** (5x)	3	1/8	2-1/2	32205	48.70					
.008	**.040** (5x)	3	1/8	2-1/2	32208	47.50					
.010	**.050** (5x)	3	1/8	2-1/2	12810	44.90	12810-C3	49.80	12810-C4	57.30	
.010	**.080** (8x)	3	1/8	2-1/2	34010	75.40	34010-C3	80.30			
.015 (1/64)	**.062** (4x)	3	1/8	2-1/2	895715	41.40	895715-C3	46.30			NEW
.015 (1/64)	**.078** (5x)	3	1/8	2-1/2	32215	41.40	32215-C3	46.30	32215-C4	53.80	
.015 (1/64)	**.078** (5x)	4	1/8	2-1/2	841015	43.20	841015-C3	48.10			
.015 (1/64)	**.093** (6x)	3	1/8	2-1/2	877115	47.90	877115-C3	52.80			
.015 (1/64)	**.109** (7x)	3	1/8	2-1/2	861415	55.20	861415-C3	60.10			
.015 (1/64)	**.125** (8x)	3	1/8	2-1/2	34015	72.30	34015-C3	77.20	34015-C4	84.70	
.015 (1/64)	**.187** (12x)	3	1/8	2-1/2	35115	91.50	35115-C3	96.40			
.020 (.5 mm)	**.080** (4x)	3	1/8	2-1/2	895720	35.70	895720-C3	40.60			
.020 (.5 mm)	**.100** (5x)	3	1/8	2-1/2	12820	35.70	12820-C3	40.60	12820-C4	48.10	
.020 (.5 mm)	**.100** (5x)	4	1/8	2-1/2	841020	39.60	841020-C3	44.50			
.020 (.5 mm)	**.120** (6x)	3	1/8	2-1/2	877120	41.50	877120-C3	46.40			
.020 (.5 mm)	**.160** (8x)	3	1/8	2-1/2	34020	67.20	34020-C3	72.10	34020-C4	79.60	
.020 (.5 mm)	**.200** (10x)	3	1/8	2-1/2	957220	80.60	957220-C3	85.50			
.020 (.5 mm)	**.250** (12x)	3	1/8	2-1/2	35120	86.20	35120-C3	91.10			
.025	**.125** (5x)	3	1/8	2-1/2	12825	33.70	12825-C3	38.60	12825-C4	46.10	
.025	**.203** (8x)	3	1/8	2-1/2	34025	65.70	34025-C3	70.60			
.030	**.125** (4x)	3	1/8	2-1/2	895730	32.80	895730-C3	37.70			NEW
.030	**.150** (5x)	3	1/8	2-1/2	12830	32.80	12830-C3	37.70	12830-C4	45.20	
.030	**.156** (5x)	4	1/8	2-1/2	841030	36.30	841030-C3	41.20			
.030	**.250** (8x)	3	1/8	2-1/2	34030	63.80	34030-C3	68.70			
.031 (1/32)	**.125** (4x)	3	1/8	2-1/2	895731	32.80	895731-C3	37.70			
.031 (1/32)	**.125** (4x)	4	1/8	2-1/2	801531	36.30	801531-C3	41.20			NEW
.031 (1/32)	**.156** (5x)	3	1/8	2-1/2	32231	32.80	32231-C3	37.70	32231-C4	45.20	
.031 (1/32)	**.156** (5x)	4	1/8	2-1/2	841031	36.10	841031-C3	41.00			
.031 (1/32)	**.187** (6x)	3	1/8	2-1/2	877131	36.90	877131-C3	41.80	877131-C4	49.30	NEW
.031 (1/32)	**.218** (7x)	3	1/8	2-1/2	861431	41.40	861431-C3	46.30			
.031 (1/32)	**.250** (8x)	3	1/8	2-1/2	34031	63.80	34031-C3	68.70	34031-C4	76.20	
.031 (1/32)	**.250** (8x)	4	1/8	2-1/2	845531	65.50	845531-C3	70.40			
.031 (1/32)	**.312** (10x)	3	1/8	2-1/2	957231	68.20	957231-C3	73.10			
.031 (1/32)	**.375** (12x)	3	1/8	2-1/2	35131	73.50	35131-C3	78.40	35131-C4	85.90	
.031 (1/32)	**.470** (15x)	3	1/8	2-1/2	36031	91.80	36031-C3	96.70			
.035 (.9 mm)	**.175** (5x)	3	1/8	2-1/2	12835	32.80	12835-C3	37.70	12835-C4	45.20	
.035 (.9 mm)	**.281** (8x)	3	1/8	2-1/2	34035	63.80	34035-C3	68.70			
.039 (1 mm)	**.203** (5x)	3	1/8	2-1/2	32239	32.80	32239-C3	37.70			
.039 (1 mm)	**.325** (8x)	3	1/8	2-1/2	34039	63.80	34039-C3	68.70			
.039 (1 mm)	**.480** (12x)	3	1/8	2-1/2	35139	73.50	35139-C3	78.40			NEW

continued on next page

NEW SIZES!

MINIATURE END MILLS

Ball – Long Flute (cont.)

continued from previous page

	CUTTER DIAMETER	LENGTH OF CUT	FLUTES	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN COATED		AMORPHOUS DIAMOND	
	D_1 $^{+.0005''}_{-.0005''}$	L_2 $^{+.010''}_{-.000''}$		D_2	L_1	TOOL #	PRICE	TOOL #	PRICE	TOOL #	PRICE
NEW	.040	**.160** (4x)	3	1/8	2-1/2	895740	32.80	895740-C3	37.70		
	.040	**.200** (5x)	3	1/8	2-1/2	12840	32.80	12840-C3	37.70	12840-C4	45.20
	.040	**.200** (5x)	4	1/8	2-1/2	841040	36.30	841040-C3	41.20		
	.040	**.240** (6x)	3	1/8	2-1/2	877140	36.90	877140-C3	41.80		
	.040	**.281** (7x)	3	1/8	2-1/2	861440	41.40	861440-C3	46.30		
	.040	**.325** (8x)	3	1/8	2-1/2	34040	63.80	34040-C3	68.70	34040-C4	76.20
	.040	**.480** (12x)	3	1/8	2-1/2	35140	73.50	35140-C3	78.40		
	.045	**.225** (5x)	3	1/8	2-1/2	12845	32.80	12845-C3	37.70	12845-C4	45.20
	.047 (3/64)	**.187** (4x)	3	1/8	2-1/2	895747	32.80	895747-C3	37.70		
	.047 (3/64)	**.250** (5x)	3	1/8	2-1/2	32247	32.80	32247-C3	37.70	32247-C4	45.20
	.047 (3/64)	**.250** (5x)	4	1/8	2-1/2	841047	36.10	841047-C3	41.00		
	.047 (3/64)	**.375** (8x)	3	1/8	2-1/2	34047	60.20	34047-C3	65.10	34047-C4	72.60
	.047 (3/64)	**.375** (8x)	4	1/8	2-1/2	845547	63.20	845547-C3	68.10		
	.047 (3/64)	**.570** (12x)	3	1/8	2-1/2	35147	73.50	35147-C3	78.40	35147-C4	85.90
NEW	.050	**.200** (4x)	3	1/8	2-1/2	895750	32.80	895750-C3	37.70		
	.050	**.300** (6x)	3	1/8	2-1/2	12850	32.80	12850-C3	37.70	12850-C4	45.20
	.050	**.400** (8x)	3	1/8	2-1/2	34050	63.80	34050-C3	68.70		
	.055 (1.4 mm)	**.275** (5x)	3	1/8	2-1/2	32255	29.10	32255-C3	34.00		
	.055 (1.4 mm)	**.385** (7x)	3	1/8	2-1/2	12855	32.80	12855-C3	37.70	12855-C4	45.20
NEW	.060	**.250** (4x)	3	1/8	2-1/2	895760	29.10	895760-C3	34.00		
NEW	.060	**.312** (5x)	3	1/8	2-1/2	32260	29.10	32260-C3	34.00	32260-C4	41.50
	.060	**.500** (8x)	3	1/8	2-1/2	12860	33.30	12860-C3	38.20	12860-C4	45.70
NEW	.060	**.720** (12x)	3	1/8	2-1/2	35160	57.20	35160-C3	62.10		
	.062 (1/16)	**.250** (4x)	3	1/8	2-1/2	895762	29.10	895762-C3	34.00	895762-C4	41.50
	.062 (1/16)	**.250** (4x)	4	1/8	2-1/2	801562	31.10	801562-C3	36.00		
	.062 (1/16)	**.312** (5x)	3	1/8	2-1/2	32262	29.10	32262-C3	34.00	32262-C4	41.50
	.062 (1/16)	**.312** (5x)	4	1/8	2-1/2	841062	32.10	841062-C3	37.00	841062-C4	44.50
NEW	.062 (1/16)	**.375** (6x)	3	1/8	2-1/2	877162	30.30	877162-C3	35.20	877162-C4	42.70
	.062 (1/16)	**.437** (7x)	3	1/8	2-1/2	861462	31.60	861462-C3	36.50		
	.062 (1/16)	**.500** (8x)	3	1/8	2-1/2	34062	32.80	34062-C3	37.70	34062-C4	45.20
NEW	.062 (1/16)	**.500** (8x)	4	1/8	2-1/2	845562	35.70	845562-C3	40.60	845562-C4	48.10
	.062 (1/16)	**.625** (10x)	3	1/8	2-1/2	957262	44.80	957262-C3	49.70	957262-C4	57.20
	.062 (1/16)	**.750** (12x)	3	1/8	2-1/2	35162	57.70	35162-C3	62.60	35162-C4	70.10
	.062 (1/16)	**.950** (15x)	3	1/8	2-1/2	36062	78.60	36062-C3	83.50	36062-C4	91.00
	.065	**.500** (8x)	3	1/8	2-1/2	12865	32.70	12865-C3	37.60	12865-C4	45.10
	.070	**.500** (7x)	3	1/8	2-1/2	12870	32.70	12870-C3	37.60	12870-C4	45.10
	.075	**.500** (7x)	3	1/8	2-1/2	12875	32.70	12875-C3	37.60	12875-C4	45.10
	.078 (5/64)	**.312** (4x)	3	1/8	2-1/2	895778	29.10	895778-C3	34.00		
	.078 (5/64)	**.406** (5x)	3	1/8	2-1/2	32278	29.10	32278-C3	34.00	32278-C4	41.50
	.078 (5/64)	**.406** (5x)	4	1/8	2-1/2	841078	32.10	841078-C3	37.00		
	.078 (5/64)	**.475** (6x)	3	1/8	2-1/2	877178	30.30	877178-C3	35.20		
	.078 (5/64)	**.550** (7x)	3	1/8	2-1/2	861478	31.60	861478-C3	36.50		
	.078 (5/64)	**.625** (8x)	3	1/8	2-1/2	34078	32.80	34078-C3	37.70	34078-C4	45.20
	.078 (5/64)	**.625** (8x)	4	1/8	2-1/2	845578	35.70	845578-C3	40.60		
	.078 (5/64)	**.940** (12x)	3	1/8	2-1/2	35178	57.70	35178-C3	62.60	35178-C4	70.10
	.078 (5/64)	**1.187** (15x)	3	1/8	2-1/2	36078	78.60	36078-C3	83.50	36078-C4	91.00
	.080	**.750** (9x)	3	1/8	2-1/2	12880	33.00	12880-C3	37.90	12880-C4	45.40
	.085	**.750** (9x)	3	1/8	2-1/2	12885	33.00	12885-C3	37.90	12885-C4	45.40
	.090	**.750** (8x)	3	1/8	2-1/2	12890	33.00	12890-C3	37.90	12890-C4	45.40

continued on next page

NEW SIZES!

MINIATURE END MILLS

Ball – Long Flute (cont.)

continued from previous page

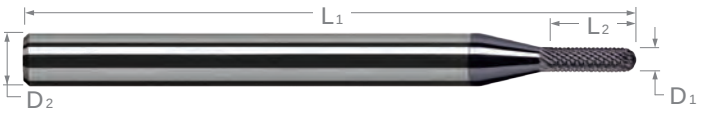
CUTTER DIAMETER	LENGTH OF CUT	FLUTES	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN COATED		AMORPHOUS DIAMOND		
D_1 $^{+.0005''}_{-.0005''}$	L_2 $^{+.010''}_{-.000''}$		D_2	L_1	TOOL #	PRICE	TOOL #	PRICE	TOOL #	PRICE	
.093 (3/32)	**.375** (4x)	3	1/8	2-1/2	895793	29.10	895793-C3	34.00	895793-C4	41.50	NEW
.093 (3/32)	**.375** (4x)	4	1/8	2-1/2	801593	29.10	801593-C3	34.00			NEW
.093 (3/32)	**.500** (5x)	3	1/8	2-1/2	32293	29.10	32293-C3	34.00	32293-C4	41.50	
.093 (3/32)	**.500** (5x)	4	1/8	2-1/2	841093	32.10	841093-C3	37.00			
.093 (3/32)	**.585** (6x)	3	1/8	2-1/2	877193	30.30	877193-C3	35.20			
.093 (3/32)	**.670** (7x)	3	1/8	2-1/2	861493	31.60	861493-C3	36.50			
.093 (3/32)	**.750** (8x)	3	1/8	2-1/2	34093	32.80	34093-C3	37.70	34093-C4	45.20	
.093 (3/32)	**.750** (8x)	4	1/8	2-1/2	845593	35.70	845593-C3	40.60			
.093 (3/32)	**.950** (10x)	3	1/8	2-1/2	957293	44.80	957293-C3	49.70			
.093 (3/32)	**1.125** (12x)	3	1/8	2-1/2	35193	57.70	35193-C3	62.60	35193-C4	70.10	
.093 (3/32)	**1.400** (15x)	3	1/8	3	36093	80.60	36093-C3	85.50	36093-C4	93.00	
.095	**.750** (8x)	3	1/8	2-1/2	12895	32.70	12895-C3	37.60	12895-C4	45.10	
.100	**.500** (5x)	3	1/8	2-1/2	32299	29.20	32299-C3	34.10			
.100	**.750** (7.5x)	3	1/8	2-1/2	12899	33.00	12899-C3	37.90	12899-C4	45.40	
.109 (7/64)	**.570** (5x)	3	1/8	2-1/2	32302	29.10	32302-C3	34.00			
.109 (7/64)	**.900** (8x)	3	1/8	2-1/2	34102	32.80	34102-C3	37.70			
.118 (3 mm)	**.625** (5x)	3	1/8	2-1/2	32305	29.10	32305-C3	34.00	32305-C4	41.50	NEW
.118 (3 mm)	**.950** (8x)	3	1/8	2-1/2	34105	32.80	34105-C3	37.70	34105-C4	45.20	NEW
.118 (3 mm)	**1.420** (12x)	3	1/8	3	35205	80.60	35205-C3	85.50			NEW

D_1 $^{+.000''}_{-.002''}$	L_2 $^{+.030''}_{-.000''}$		D_2	L_1	TOOL #	PRICE	TOOL #	PRICE	TOOL #	PRICE	
.125 (1/8)	**.500** (4x)	3	1/8	2-1/2	895808	26.90	895808-C3	31.80	895808-C4	39.30	NEW
.125 (1/8)	**.625** (5x)	3	1/8	2-1/2	32308	26.90	32308-C3	31.80	32308-C4	39.30	
.125 (1/8)	**.625** (5x)	4	1/8	2-1/2	12608	29.70	12608-C3	34.60			
.125 (1/8)	**.750** (6x)	3	1/8	2-1/2	877208	28.50	877208-C3	33.40	877208-C4	40.90	NEW
.125 (1/8)	**.875** (7x)	3	1/8	2-1/2	861508	29.80	861508-C3	34.70			
.125 (1/8)	**1.000** (8x)	3	1/8	2-1/2	34108	29.80	34108-C3	34.70	34108-C4	42.20	
.125 (1/8)	**1.000** (8x)	4	1/8	2-1/2	845608	32.80	845608-C3	37.70			
.125 (1/8)	**1.250** (10x)	3	1/8	2-1/2	957308	44.30	957308-C3	49.20			
.125 (1/8)	**1.500** (12x)	3	1/8	3	35208	60.00	35208-C3	64.90	35208-C4	72.40	
.125 (1/8)	**1.875** (15x)	3	1/8	3	36108	80.60	36108-C3	85.50	36108-C4	93.00	
.140 (9/64)	**.750** (5x)	4	3/16	3	12609	31.80	12609-C3	37.10			
.140 (9/64)	**1.125** (8x)	4	3/16	3	34109	35.40	34109-C3	40.70			
.156 (5/32)	**.750** (5x)	4	3/16	3	841110	29.00	841110-C3	34.30			
.156 (5/32)	**1.000** (6x)	4	3/16	3	12610	31.80	12610-C3	37.10	12610-C4	48.90	
.156 (5/32)	**1.093** (7x)	4	3/16	3	856310	36.80	856310-C3	42.10			
.156 (5/32)	**1.250** (8x)	4	3/16	3	34110	35.40	34110-C3	40.70			
.187 (3/16)	**.750** (4x)	4	3/16	3	837012	29.00	837012-C3	34.30			
.187 (3/16)	**1.000** (5x)	4	3/16	3	841112	29.00	841112-C3	34.30			
.187 (3/16)	**1.125** (6x)	4	3/16	3	12612	31.80	12612-C3	37.10	77112	48.90	
.187 (3/16)	**1.312** (7x)	4	3/16	3	856312	33.60	856312-C3	38.90			
.187 (3/16)	**1.500** (8x)	4	3/16	3	34112	35.40	34112-C3	40.70			
.187 (3/16)	**1.875** (10x)	4	3/16	3	957312	49.80	957312-C3	55.10			
.250 (1/4)	**1.000** (4x)	4	1/4	4	837016	33.80	837016-C3	42.20			
.250 (1/4)	**1.250** (5x)	4	1/4	4	841116	33.80	841116-C3	42.20			
.250 (1/4)	**1.500** (6x)	4	1/4	4	12616	35.70	12616-C3	44.10	77116	55.10	
.250 (1/4)	**1.750** (7x)	4	1/4	4	856316	37.50	856316-C3	45.90			
.250 (1/4)	**2.000** (8x)	4	1/4	4	34116	39.50	34116-C3	47.90	34116-C4	58.90	NEW
.312 (5/16)	**1.625** (5x)	4	5/16	4	12620	48.80	12620-C3	58.90			
.375 (3/8)	**1.750** (5x)	4	3/8	4	12624	61.30	12624-C3	74.30			
.500 (1/2)	**2.000** (4x)	4	1/2	4	12632	74.60	12632-C3	88.80			

NEW SIZES!

MINIATURE END MILLS

Ball – Deburring End Mill



End Mill Tolerances with Bur-Style Geometry!

- Deburr in your CNC machine with these high-precision burs held to end mill tolerances
- Stop scrapping expensive parts due to handheld operator errors
- High flute count allows for increased feeds which reduces cycle times
- Achieve better finish than with milling type cutters
- Bur geometry is optimized for removing burrs and/or adding a small controlled edge break with superior finish
- Double cut style flute pattern
- Center cutting (2 flutes to center)
- Solid carbide
- CNC ground in the USA

	CUTTER DIAMETER	LENGTH OF CUT	RIGHT HAND TEETH	LEFT HAND TEETH	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN COATED	
	D_1 $^{+.0005''}_{-.0005''}$	L_2 $^{+.020''}_{-.000''}$			D_2	L_1	TOOL #	PRICE	TOOL #	PRICE
NEW	.015 (1/64)	**.045** (3x)	12	10	1/8	2-1/2	892115	29.40	892115-C3	34.30
NEW	.020	**.060** (3x)	12	10	1/8	2-1/2	892120	29.40	892120-C3	34.30
	.031 (1/32)	**.093** (3x)	12	10	1/8	2-1/2	892131	29.40	892131-C3	34.30
NEW	.047 (3/64)	**.141** (3x)	12	10	1/8	2-1/2	892147	29.40	892147-C3	34.30
	.062 (1/16)	**.186** (3x)	14	12	1/8	2-1/2	892162	28.30	892162-C3	33.20
NEW	.078 (5/64)	**.234** (3x)	14	12	1/8	2-1/2	892178	29.40	892178-C3	34.30
	.093 (3/32)	**.279** (3x)	14	12	1/8	2-1/2	892193	28.30	892193-C3	33.20
	D_1 $^{+.000''}_{-.002''}$	L_2 $^{+.030''}_{-.000''}$			D_2	L_1	TOOL #	PRICE	TOOL #	PRICE
	.125 (1/8)	**.375** (3x)	16	13	1/8	2-1/2	892208	26.80	892208-C3	31.70
	.187 (3/16)	**.561** (3x)	16	13	3/16	2-1/2	892212	37.30	892212-C3	42.60
	.250 (1/4)	**.750** (3x)	16	13	1/4	2-1/2	892216	47.80	892216-C3	55.00

View a comprehensive library of **Speeds & Feeds** charts for every Harvey Tool End Mill on the new Harveytool.com.

Access **Simulation Files** in DXF format for every Harvey Tool product, downloadable now from the new Harveytool.com.

NEW COATING!

MINIATURE END MILLS

Ball – Long Reach, Standard Flute





Reduced Neck Diameter to Avoid Heeling

- Length of cut = 3x diameter
- Center cutting
- Solid carbide
- CNC ground in the USA

BALL

CUTTER DIAMETER	LENGTH OF CUT	OVERALL REACH	SHANK DIA.	OAL	UNCOATED			AlTiN COATED		AMORPHOUS DIAMOND		
D_1 +.0005″ −.0005″	L_2 +.010″ −.000″	L_3 +.010″ −.000″	D_2	L_1	2 FL	4 FL	PRICE	4 FL	PRICE	4 FL	PRICE	
.010	.030	**.050** (5x)	1/8	1-1/2	948610	982810	65.40	982810-C3	70.30			
.010	.030	**.080** (8x)	1/8	1-1/2	76610	76810	65.70	76810-C3	70.60			
.010	.030	**.125** (12x)	1/8	1-1/2	950210	991110	66.70	991110-C3	71.60			
.015 (1/64)	.045	**.078** (5x)	1/8	1-1/2	948615	982815	50.80	982815-C3	55.70			
.015 (1/64)	.045	**.128** (8x)	1/8	1-1/2	76615	76815	51.90	76815-C3	56.80			
.015 (1/64)	.045	**.156** (10x)	1/8	1-1/2		851015	53.70	851015-C3	58.60			
.015 (1/64)	.045	**.187** (12x)	1/8	1-1/2	950215	991115	53.70	991115-C3	58.60			
.015 (1/64)	.045	**.225** (15x)	1/8	1-1/2		861215	56.50	861215-C3	61.40			
.020 (.5 mm)	.060	**.100** (5x)	1/8	1-1/2	948620	982820	49.70	982820-C3	54.60	982820-C4	62.10	NEW
.020 (.5 mm)	.060	**.170** (8x)	1/8	1-1/2	76620	76820	49.90	76820-C3	54.80	76820-C4	62.30	NEW
.020 (.5 mm)	.060	**.200** (10x)	1/8	1-1/2		851020	51.50	851020-C3	56.40			
.020 (.5 mm)	.060	**.250** (12x)	1/8	1-1/2	950220	991120	51.50	991120-C3	56.40			
.020 (.5 mm)	.060	**.300** (15x)	1/8	1-1/2		861220	54.30	861220-C3	59.20			
.025	.075	**.125** (5x)	1/8	1-1/2	948625	982825	45.40	982825-C3	50.30			
.025	.075	**.213** (8x)	1/8	1-1/2	76625	76825	45.60	76825-C3	50.50			
.025	.075	**.312** (12x)	1/8	1-1/2	950225	991125	47.30	991125-C3	52.20			
.030	.090	**.156** (5x)	1/8	1-1/2	948630	982830	45.40	982830-C3	50.30			
.030	.090	**.270** (9x)	1/8	1-1/2	76630	76830	45.60	76830-C3	50.50			
.030	.090	**.375** (12x)	1/8	1-1/2	950230	991130	47.30	991130-C3	52.20			
.031 (1/32)	.093	**.156** (5x)	1/8	1-1/2	948631	982831	44.60	982831-C3	49.50	982831-C4	57.00	NEW
.031 (1/32)	.093	**.250** (8x)	1/8	1-1/2		904431	45.60	904431-C3	50.50			
.031 (1/32)	.093	**.279** (9x)	1/8	1-1/2	76631	76831	45.60	76831-C3	50.50	76831-C4	58.00	NEW
.031 (1/32)	.093	**.312** (10x)	1/8	1-1/2		851031	47.30	851031-C3	52.20			
.031 (1/32)	.093	**.375** (12x)	1/8	1-1/2	950231	991131	47.30	991131-C3	52.20			
.031 (1/32)	.093	**.470** (15x)	1/8	1-1/2		861231	50.00	861231-C3	54.90			
.035 (.9 mm)	.105	**.187** (5x)	1/8	1-1/2	948635	982835	44.60	982835-C3	49.50			
.035 (.9 mm)	.105	**.315** (9x)	1/8	1-1/2	76635	76835	45.60	76835-C3	50.50			
.039 (1 mm)	.117	**.203** (5x)	1/8	1-1/2	948639	982839	44.60	982839-C3	49.50			
.039 (1 mm)	.117	**.325** (8x)	1/8	1-1/2	903839	904439	45.60	904439-C3	50.50			
.040	.120	**.203** (5x)	1/8	1-1/2	948640	982840	44.60	982840-C3	49.50			
.040	.120	**.325** (8x)	1/8	1-1/2		904440	45.60	904440-C3	50.50			
.040	.120	**.360** (9x)	1/8	1-1/2	76640	76840	45.60	76840-C3	50.50			
.040	.120	**.480** (12x)	1/8	1-1/2	950240	991140	47.30	991140-C3	52.20			
.045	.135	**.405** (9x)	1/8	1-1/2	76645	76845	44.30	76845-C3	49.20			
.047 (3/64)	.141	**.250** (5x)	1/8	1-1/2	948647	982847	43.20	982847-C3	48.10			
.047 (3/64)	.141	**.375** (8x)	1/8	1-1/2		904447	44.30	904447-C3	49.20			
.047 (3/64)	.141	**.423** (9x)	1/8	1-1/2	76647	76847	44.30	76847-C3	49.20			
.047 (3/64)	.141	**.480** (10x)	1/8	1-1/2		851047	45.60	851047-C3	50.50			
.047 (3/64)	.141	**.570** (12x)	1/8	1-1/2	950247	991147	45.60	991147-C3	50.50			
.047 (3/64)	.141	**.710** (15x)	1/8	2		861247	48.50	861247-C3	53.40			

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NEW COATING!

MINIATURE END MILLS

Ball – Long Reach, Standard Flute (cont.)

continued from previous page

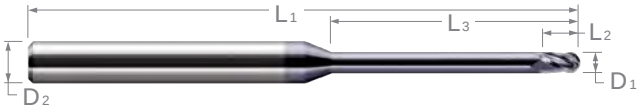
	CUTTER DIAMETER	LENGTH OF CUT	OVERALL REACH	SHANK DIA.	OAL	UNCOATED			AlTiN COATED		AMORPHOUS DIAMOND	
	D_1 $^{+.0005''}_{-.0005''}$	L_2 $^{+.010''}_{-.000''}$	L_3 $^{+.010''}_{-.000''}$	D_2	L_1	2 FL	4 FL	PRICE	4 FL	PRICE	4 FL	PRICE
	.050	.150	**.250** (5x)	1/8	1-1/2	948650	982850	43.20	982850-C3	48.10		
	.050	.150	**.500** (10x)	1/8	1-1/2	76650	76850	44.30	76850-C3	49.20		
	.055 (1.4 mm)	.165	**.500** (9x)	1/8	1-1/2	76655	76855	44.30	76855-C3	49.20		
	.060	.180	**.312** (5x)	1/8	1-1/2		982860	43.20	982860-C3	48.10		
	.060	.180	**.500** (8x)	1/8	1-1/2	76660	76860	44.30	76860-C3	49.20		
	.060	.180	**.720** (12x)	1/8	2	950260	991160	45.60	991160-C3	50.50		
NEW	.062 (1/16)	.186	**.312** (5x)	1/8	1-1/2	948662	982862	43.20	982862-C3	48.10	982862-C4	55.60
	.062 (1/16)	.186	**.375** (6x)	1/8	1-1/2		805762	44.30	805762-C3	49.20		
	.062 (1/16)	.186	**.437** (7x)	1/8	1-1/2		805562	44.30	805562-C3	49.20		
NEW	.062 (1/16)	.186	**.500** (8x)	1/8	1-1/2	76662	76862	44.30	76862-C3	49.20	76862-C4	56.70
	.062 (1/16)	.186	**.625** (10x)	1/8	2	811062	851062	45.60	851062-C3	50.50		
	.062 (1/16)	.186	**.750** (12x)	1/8	2	950262	991162	45.60	991162-C3	50.50		
	.062 (1/16)	.186	**.950** (15x)	1/8	2		861262	48.50	861262-C3	53.40		
	.065	.195	**.500** (8x)	1/8	1-1/2	76665	76865	44.30	76865-C3	49.20		
	.070	.210	**.500** (7x)	1/8	1-1/2	76670	76870	44.30	76870-C3	49.20		
	.075	.225	**.500** (7x)	1/8	1-1/2	76675	76875	44.30	76875-C3	49.20		
	.078 (5/64)	.234	**.500** (6x)	1/8	1-1/2	76678	76878	44.30	76878-C3	49.20		
	.078 (5/64)	.234	**.625** (8x)	1/8	2		904478	44.30	904478-C3	49.20		
	.078 (5/64)	.234	**.800** (10x)	1/8	2		851078	45.60	851078-C3	50.50		
	.078 (5/64)	.234	**.940** (12x)	1/8	2	950278	991178	45.60	991178-C3	50.50		
	.078 (5/64)	.234	**1.187** (15x)	1/8	2-1/2		861278	48.50	861278-C3	53.40		
	.080	.240	**.500** (6x)	1/8	1-1/2	76680	76880	44.30	76880-C3	49.20		
	.085	.255	**.500** (6x)	1/8	1-1/2	76685	76885	43.40	76885-C3	48.30		
	.090	.270	**.625** (7x)	1/8	1-1/2	76690	76890	44.30	76890-C3	49.20		
NEW	.093 (3/32)	.279	**.500** (5x)	1/8	1-1/2	948693	982893	44.10	982893-C3	49.00	982893-C4	56.50
NEW	.093 (3/32)	.279	**.625** (7x)	1/8	1-1/2	76693	76893	44.30	76893-C3	49.20	76893-C4	56.70
	.093 (3/32)	.279	**.950** (10x)	1/8	2		851093	45.60	851093-C3	50.50		
	.093 (3/32)	.279	**1.125** (12x)	1/8	2	950293	991193	45.60	991193-C3	50.50		
	.093 (3/32)	.279	**1.400** (15x)	1/8	2-1/2		861293	48.50	861293-C3	53.40		
	.095	.285	**.625** (6x)	1/8	1-1/2	76695	76895	44.30	76895-C3	49.20		
	.100	.300	**.625** (6x)	1/8	1-1/2	76700	76900	44.30	76900-C3	49.20		
	.109 (7/64)	.327	**.570** (5x)	1/8	1-1/2	948602	982902	44.10	982902-C3	49.00		
	.109 (7/64)	.327	**.900** (8x)	1/8	2	903802	904402	45.60	904402-C3	50.50		
	.118 (3 mm)	.354	**.625** (5x)	1/8	1-1/2	948705	982905	44.10	982905-C3	49.00		
	.118 (3 mm)	.354	**.950** (8x)	1/8	2	903805	904405	45.60	904405-C3	50.50		

	D_1 $^{+.000''}_{-.002''}$	L_2 $^{+.030''}_{-.000''}$	L_3 $^{+.030''}_{-.000''}$	D_2	L_1	2 FL	4 FL	PRICE	4 FL	PRICE	4FL	PRICE
NEW	.125 (1/8)	.375	**.625** (5x)	1/8	1-1/2	948708	982908	44.10	982908-C3	49.00	982908-C4	56.50
	.125 (1/8)	.375	**.750** (6x)	1/8	2		805808	44.30	805808-C3	49.20		
	.125 (1/8)	.375	**.875** (7x)	1/8	2		805608	44.30	805608-C3	49.20		
NEW	.125 (1/8)	.375	**1.000** (8x)	1/8	2	76708	76908	44.30	76908-C3	49.20	76908-C4	62.50
	.125 (1/8)	.375	**1.250** (10x)	1/8	2-1/2		851108	47.10	851108-C3	52.00		
	.125 (1/8)	.375	**1.500** (12x)	1/8	2-1/2	950308	991208	47.10	991208-C3	52.00		
	.125 (1/8)	.375	**1.875** (15x)	1/8	3		861308	51.10	861308-C3	56.00		
	.156 (5/32)	.470	**.750** (5x)	3/16	2		982910	50.80	982910-C3	56.10		
	.156 (5/32)	.470	**1.250** (8x)	3/16	2-1/2		76910	51.00	76910-C3	56.30		
	.187 (3/16)	.570	**1.000** (5x)	3/16	2	948712	982912	50.80	982912-C3	56.10		
	.187 (3/16)	.570	**1.500** (8x)	3/16	2-1/2	76712	76912	51.00	76912-C3	56.30		
	.250 (1/4)	.750	**1.250** (5x)	1/4	2-1/2	948716	982916	55.50	982916-C3	62.70		
	.250 (1/4)	.750	**2.000** (8x)	1/4	4	76716	76916	55.80	76916-C3	64.20		

NEW SIZES!

MINIATURE END MILLS

Ball – Long Reach, Stub Flute





Reduced Neck Diameter to Avoid Heeling

- **Long length design for deep cavities**
- Stub flutes for maximum rigidity
- Length of cut = 1½ x diameter
- Center cutting
- Solid carbide
- CNC ground in the USA

BALL

CUTTER DIAMETER	LENGTH OF CUT	OVERALL REACH	FLUTES	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN COATED		AMORPHOUS DIAMOND		
D_1 +.0005″ −.0005″	L_2 +.010″ −.000″	L_3 +.010″ −.000″		D_2	L_1	TOOL #	PRICE	TOOL #	PRICE	TOOL #	PRICE	
.010	.015	**.030** (3x)	3	1/8	2-1/2	47910	60.10	47910-C3	65.00			
.010	.015	**.050** (5x)	3	1/8	2-1/2	33410	60.10	33410-C3	65.00	33410-C4	72.50	
.010	.015	**.050** (5x)	4	1/8	2-1/2	803110	60.10	803110-C3	65.00			NEW
.010	.015	**.080** (8x)	3	1/8	2-1/2	34210	60.70	34210-C3	65.60	34210-C4	73.10	
.010	.015	**.080** (8x)	4	1/8	2-1/2	801310	60.70	801310-C3	65.60			NEW
.010	.015	**.100** (10x)	3	1/8	2-1/2	966010	63.40	966010-C3	68.30	966010-C4	75.80	
.010	.015	**.125** (12x)	3	1/8	2-1/2	35610	63.40	35610-C3	68.30	35610-C4	75.80	
.010	.015	**.150** (15x)	3	1/8	2-1/2	49210	71.40	49210-C3	76.30	49210-C4	83.80	
.010	.015	**.180** (18x)	3	1/8	2-1/2	970710	80.90	970710-C3	85.80			
.011	.016	**.055** (5x)	3	1/8	2-1/2	33411	60.10	33411-C3	65.00			
.011	.016	**.088** (8x)	3	1/8	2-1/2	34211	60.70	34211-C3	65.60			
.012 (.3 mm)	.018	**.060** (5x)	3	1/8	2-1/2	33412	60.10	33412-C3	65.00			
.012 (.3 mm)	.018	**.096** (8x)	3	1/8	2-1/2	34212	60.70	34212-C3	65.60			
.013	.019	**.065** (5x)	3	1/8	2-1/2	33413	60.10	33413-C3	65.00			
.013	.019	**.104** (8x)	3	1/8	2-1/2	34213	60.70	34213-C3	65.60			
.014	.021	**.070** (5x)	3	1/8	2-1/2	33414	60.10	33414-C3	65.00			
.014	.021	**.112** (8x)	3	1/8	2-1/2	34214	60.70	34214-C3	65.60			
.015 (1/64)	.022	**.045** (3x)	3	1/8	2-1/2	47915	50.10	47915-C3	55.00			
.015 (1/64)	.022	**.062** (4x)	3	1/8	2-1/2	844415	50.10	844415-C3	55.00			
.015 (1/64)	.022	**.078** (5x)	3	1/8	2-1/2	33415	50.10	33415-C3	55.00	33415-C4	62.50	
.015 (1/64)	.022	**.078** (5x)	4	1/8	2-1/2	803115	50.10	803115-C3	55.00			NEW
.015 (1/64)	.022	**.093** (6x)	3	1/8	2-1/2	860615	50.10	860615-C3	55.00			
.015 (1/64)	.022	**.109** (7x)	3	1/8	2-1/2	868215	50.10	868215-C3	55.00			
.015 (1/64)	.022	**.125** (8x)	3	1/8	2-1/2	34215	51.30	34215-C3	56.20	34215-C4	63.70	
.015 (1/64)	.022	**.125** (8x)	4	1/8	2-1/2	801315	51.30	801315-C3	56.20			NEW
.015 (1/64)	.022	**.156** (10x)	3	1/8	2-1/2	966015	52.70	966015-C3	57.60	966015-C4	65.10	
.015 (1/64)	.022	**.187** (12x)	3	1/8	2-1/2	35615	52.70	35615-C3	57.60	35615-C4	65.10	
.015 (1/64)	.022	**.225** (15x)	3	1/8	2-1/2	49215	58.30	49215-C3	63.20	49215-C4	70.70	
.015 (1/64)	.022	**.270** (18x)	3	1/8	2-1/2	970715	67.70	970715-C3	72.60			
.015 (1/64)	.022	**.300** (20x)	3	1/8	2-1/2	59415	67.70	59415-C3	72.60	59415-C4	80.10	
.015 (1/64)	.022	**.375** (25x)	3	1/8	2-1/2	40115	85.70	40115-C3	90.60			
.016 (.4 mm)	.024	**.080** (5x)	3	1/8	2-1/2	33416	52.70	33416-C3	57.60			
.016 (.4 mm)	.024	**.128** (8x)	3	1/8	2-1/2	34216	53.70	34216-C3	58.60			
.017	.026	**.085** (5x)	3	1/8	2-1/2	33417	52.70	33417-C3	57.60			
.017	.026	**.136** (8x)	3	1/8	2-1/2	34217	53.70	34217-C3	58.60			
.018	.027	**.090** (5x)	3	1/8	2-1/2	33418	52.70	33418-C3	57.60			
.018	.027	**.144** (8x)	3	1/8	2-1/2	34218	53.70	34218-C3	58.60			
.019	.029	**.095** (5x)	3	1/8	2-1/2	33419	52.70	33419-C3	57.60			
.019	.029	**.152** (8x)	3	1/8	2-1/2	34219	53.70	34219-C3	58.60			

continued on next page

NEW SIZES!

MINIATURE END MILLS

Ball – Long Reach, Stub Flute (cont.)

continued from previous page

	CUTTER DIAMETER	LENGTH OF CUT	OVERALL REACH	FLUTES	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN COATED		AMORPHOUS DIAMOND	
	D_1 +.0005″ −.0005″	L_2 +.010″ −.000″	L_3 +.010″ −.000″		D_2	L_1	TOOL #	PRICE	TOOL #	PRICE	TOOL #	PRICE
NEW	.020 (.5 mm)	.030	**.060** (3x)	3	1/8	2-1/2	47920	48.50	47920-C3	53.40	47920-C4	60.90
	.020 (.5 mm)	.030	**.080** (4x)	3	1/8	2-1/2	844420	48.50	844420-C3	53.40		
	.020 (.5 mm)	.030	**.100** (5x)	3	1/8	2-1/2	33420	48.50	33420-C3	53.40	33420-C4	60.90
	.020 (.5 mm)	.030	**.100** (5x)	4	1/8	2-1/2	803120	48.50	803120-C3	53.40		
	.020 (.5 mm)	.030	**.120** (6x)	3	1/8	2-1/2	860620	48.50	860620-C3	53.40		
	.020 (.5 mm)	.030	**.140** (7x)	3	1/8	2-1/2	868220	48.50	868220-C3	53.40		
	.020 (.5 mm)	.030	**.160** (8x)	3	1/8	2-1/2	34220	49.80	34220-C3	54.70	34220-C4	62.20
	.020 (.5 mm)	.030	**.160** (8x)	4	1/8	2-1/2	801320	49.80	801320-C3	54.70		
	.020 (.5 mm)	.030	**.200** (10x)	3	1/8	2-1/2	966020	51.10	966020-C3	56.00	966020-C4	63.50
	.020 (.5 mm)	.030	**.250** (12x)	3	1/8	2-1/2	35620	51.10	35620-C3	56.00	35620-C4	63.50
	.020 (.5 mm)	.030	**.300** (15x)	3	1/8	2-1/2	49220	56.50	49220-C3	61.40	49220-C4	68.90
	.020 (.5 mm)	.030	**.360** (18x)	3	1/8	2-1/2	970720	67.20	970720-C3	72.10		
	.020 (.5 mm)	.030	**.400** (20x)	3	1/8	2-1/2	59420	67.20	59420-C3	72.10	59420-C4	79.60
NEW	.020 (.5 mm)	.030	**.500** (25x)	3	1/8	2-1/2	40120	83.70	40120-C3	88.60	40120-C4	96.10
	.020 (.5 mm)	.030	**.600** (30x)	3	1/8	2-1/2	922720	93.00	922720-C3	97.90	***30x Diameter!***	
	.021	.031	**.105** (5x)	3	1/8	2-1/2	33421	52.70	33421-C3	57.60		
	.021	.031	**.168** (8x)	3	1/8	2-1/2	34221	53.70	34221-C3	58.60		
	.022	.033	**.110** (5x)	3	1/8	2-1/2	33422	52.70	33422-C3	57.60		
	.022	.033	**.176** (8x)	3	1/8	2-1/2	34222	53.70	34222-C3	58.60		
	.023	.035	**.115** (5x)	3	1/8	2-1/2	33423	52.70	33423-C3	57.60		
	.023	.035	**.187** (8x)	3	1/8	2-1/2	34223	53.70	34223-C3	58.60		
	.024 (.6 mm)	.036	**.120** (5x)	3	1/8	2-1/2	33424	52.70	33424-C3	57.60		
	.024 (.6 mm)	.036	**.192** (8x)	3	1/8	2-1/2	34224	53.70	34224-C3	58.60		
	.025	.037	**.075** (3x)	3	1/8	2-1/2	47925	42.10	47925-C3	47.00		
	.025	.037	**.125** (5x)	3	1/8	2-1/2	33425	42.10	33425-C3	47.00	33425-C4	54.50
	.025	.037	**.150** (6x)	3	1/8	2-1/2	860625	42.80	860625-C3	47.70		
	.025	.037	**.175** (7x)	3	1/8	2-1/2	868225	42.80	868225-C3	47.70		
	.025	.037	**.203** (8x)	3	1/8	2-1/2	34225	42.80	34225-C3	47.70	34225-C4	55.20
	.025	.037	**.250** (10x)	3	1/8	2-1/2	966025	44.30	966025-C3	49.20		
	.025	.037	**.312** (12x)	3	1/8	2-1/2	35625	44.30	35625-C3	49.20	35625-C4	56.70
	.025	.037	**.375** (15x)	3	1/8	2-1/2	49225	50.70	49225-C3	55.60	49225-C4	63.10
	.026	.039	**.130** (5x)	3	1/8	2-1/2	33426	52.70	33426-C3	57.60		
	.026	.039	**.208** (8x)	3	1/8	2-1/2	34226	53.70	34226-C3	58.60		
	.027	.041	**.135** (5x)	3	1/8	2-1/2	33427	52.70	33427-C3	57.60		
	.027	.041	**.216** (8x)	3	1/8	2-1/2	34227	53.70	34227-C3	58.60		
	.028 (.7 mm)	.042	**.140** (5x)	3	1/8	2-1/2	33428	52.70	33428-C3	57.60		
	.028 (.7 mm)	.042	**.224** (8x)	3	1/8	2-1/2	34228	53.70	34228-C3	58.60		
	.029	.043	**.145** (5x)	3	1/8	2-1/2	33429	52.70	33429-C3	57.60		
	.029	.043	**.232** (8x)	3	1/8	2-1/2	34229	53.70	34229-C3	58.60		
	.030	.045	**.090** (3x)	3	1/8	2-1/2	47930	42.10	47930-C3	47.00		
	.030	.045	**.156** (5x)	3	1/8	2-1/2	33430	42.10	33430-C3	47.00	33430-C4	54.50
	.030	.045	**.250** (8x)	3	1/8	2-1/2	34230	42.80	34230-C3	47.70	34230-C4	55.20
NEW	.030	.045	**.312** (10x)	3	1/8	2-1/2	966030	44.30	966030-C3	49.20	966030-C4	56.70
	.030	.045	**.375** (12x)	3	1/8	2-1/2	35630	44.30	35630-C3	49.20	35630-C4	56.70
	.030	.045	**.450** (15x)	3	1/8	2-1/2	49230	50.70	49230-C3	55.60	49230-C4	63.10
	.030	.045	**.540** (18x)	3	1/8	2-1/2	970730	61.00	970730-C3	65.90		

continued on next page

NEW SIZES!

MINIATURE END MILLS

Ball – Long Reach, Stub Flute (cont.)

continued from previous page

CUTTER DIAMETER	LENGTH OF CUT	OVERALL REACH	FLUTES	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN COATED		AMORPHOUS DIAMOND		
D_1 $^{+.0005''}_{-.0005''}$	L_2 $^{+.010''}_{-.000''}$	L_3 $^{+.010''}_{-.000''}$		D_2	L_1	TOOL #	PRICE	TOOL #	PRICE	TOOL #	PRICE	
.031 (1/32)	.046	**.093** (3x)	3	1/8	2-1/2	47931	42.10	47931-C3	47.00	47931-C4	54.50	
.031 (1/32)	.046	**.125** (4x)	3	1/8	2-1/2	844431	42.10	844431-C3	47.00	844431-C4	54.50	NEW
.031 (1/32)	.046	**.156** (5x)	3	1/8	2-1/2	33431	42.10	33431-C3	47.00	33431-C4	54.50	
.031 (1/32)	.046	**.156** (5x)	4	1/8	2-1/2	803131	42.10	803131-C3	47.00			
.031 (1/32)	.046	**.187** (6x)	3	1/8	2-1/2	860631	42.10	860631-C3	47.00	860631-C4	54.50	
.031 (1/32)	.046	**.218** (7x)	3	1/8	2-1/2	868231	42.10	868231-C3	47.00			
.031 (1/32)	.046	**.250** (8x)	3	1/8	2-1/2	34231	42.80	34231-C3	47.70	34231-C4	55.20	
.031 (1/32)	.046	**.250** (8x)	4	1/8	2-1/2	801331	42.80	801331-C3	47.70			
.031 (1/32)	.046	**.312** (10x)	3	1/8	2-1/2	966031	44.30	966031-C3	49.20	966031-C4	56.70	
.031 (1/32)	.046	**.312** (10x)	4	1/8	2-1/2	769231	44.30	769231-C3	49.20			NEW
.031 (1/32)	.046	**.375** (12x)	3	1/8	2-1/2	35631	44.30	35631-C3	49.20	35631-C4	56.70	
.031 (1/32)	.046	**.375** (12x)	4	1/8	2-1/2	768031	44.30	768031-C3	49.20			NEW
.031 (1/32)	.046	**.470** (15x)	3	1/8	2-1/2	49231	50.70	49231-C3	55.60	49231-C4	63.10	
.031 (1/32)	.046	**.565** (18x)	3	1/8	2-1/2	970731	61.00	970731-C3	65.90	970731-C4	73.40	
.031 (1/32)	.046	**.625** (20x)	3	1/8	2-1/2	59431	61.00	59431-C3	65.90	59431-C4	73.40	
.031 (1/32)	.046	**.775** (25x)	3	1/8	2-1/2	40131	72.90	40131-C3	77.80	40131-C4	85.30	
.031 (1/32)	.046	**.937** (30x)	3	1/8	2-1/2	922731	86.10	922731-C3	91.00	***30x Diameter!***		
.035 (.9 mm)	.052	**.187** (5x)	3	1/8	2-1/2	33435	42.10	33435-C3	47.00	33435-C4	54.50	
.035 (.9 mm)	.052	**.281** (8x)	3	1/8	2-1/2	34235	42.80	34235-C3	47.70	34235-C4	55.20	
.035 (.9 mm)	.052	**.425** (12x)	3	1/8	2-1/2	35635	44.80	35635-C3	49.70	35635-C4	57.20	
.035 (.9 mm)	.052	**.525** (15x)	3	1/8	2-1/2	49235	50.70	49235-C3	55.60			
.039 (1 mm)	.059	**.203** (5x)	3	1/8	2-1/2	33439	42.30	33439-C3	47.20			
.039 (1 mm)	.059	**.325** (8x)	3	1/8	2-1/2	34239	42.80	34239-C3	47.70			
.039 (1 mm)	.059	**.400** (10x)	3	1/8	2-1/2	966039	44.80	966039-C3	49.70			
.040	.060	**.120** (3x)	3	1/8	2-1/2	47940	42.10	47940-C3	47.00	47940-C4	54.50	NEW
.040	.060	**.203** (5x)	3	1/8	2-1/2	33440	42.10	33440-C3	47.00	33440-C4	54.50	
.040	.060	**.203** (5x)	4	1/8	2-1/2	803140	42.10	803140-C3	47.00			NEW
.040	.060	**.240** (6x)	3	1/8	2-1/2	860640	42.10	860640-C3	47.00			
.040	.060	**.281** (7x)	3	1/8	2-1/2	868240	42.10	868240-C3	47.00			
.040	.060	**.325** (8x)	3	1/8	2-1/2	34240	42.80	34240-C3	47.70	34240-C4	55.20	
.040	.060	**.325** (8x)	4	1/8	2-1/2	801340	42.80	801340-C3	47.70			NEW
.040	.060	**.400** (10x)	3	1/8	2-1/2	966040	44.80	966040-C3	49.70	966040-C4	57.20	
.040	.060	**.480** (12x)	3	1/8	2-1/2	35640	44.80	35640-C3	49.70	35640-C4	57.20	
.040	.060	**.600** (15x)	3	1/8	2-1/2	49240	50.70	49240-C3	55.60	49240-C4	63.10	
.040	.060	**.720** (18x)	3	1/8	2-1/2	970740	61.00	970740-C3	65.90			
.040	.060	**.800** (20x)	3	1/8	2-1/2	59440	61.00	59440-C3	65.90	59440-C4	73.40	
.040	.060	**1.000** (25x)	3	1/8	2-1/2	40140	72.90	40140-C3	77.80	***25x Diameter!***		
.045	.067	**.225** (5x)	3	1/8	2-1/2	33445	41.00	33445-C3	45.90	33445-C4	53.40	
.045	.067	**.375** (8x)	3	1/8	2-1/2	34245	42.00	34245-C3	46.90	34245-C4	54.40	
.045	.067	**.550** (12x)	3	1/8	2-1/2	35645	43.10	35645-C3	48.00	35645-C4	55.50	
.045	.067	**.680** (15x)	3	1/8	2-1/2	49245	47.90	49245-C3	52.80			

continued on next page

NEW SIZES!

MINIATURE END MILLS

Ball – Long Reach, Stub Flute (cont.)

continued from previous page

	CUTTER DIAMETER	LENGTH OF CUT	OVERALL REACH	FLUTES	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN COATED		AMORPHOUS DIAMOND	
	D_1 +.0005″ −.0005″	L_2 +.010″ −.000″	L_3 +.010″ −.000″		D_2	L_1	TOOL #	PRICE	TOOL #	PRICE	TOOL #	PRICE
	.047 (3/64)	.070	**.141** (3x)	3	1/8	2-1/2	47947	41.00	47947-C3	45.90		
	.047 (3/64)	.070	**.187** (4x)	3	1/8	2-1/2	844447	41.00	844447-C3	45.90		
	.047 (3/64)	.070	**.250** (5x)	3	1/8	2-1/2	33447	41.00	33447-C3	45.90	33447-C4	53.40
NEW	.047 (3/64)	.070	**.250** (5x)	4	1/8	2-1/2	803147	41.00	803147-C3	45.90		
	.047 (3/64)	.070	**.281** (6x)	3	1/8	2-1/2	860647	41.00	860647-C3	45.90		
	.047 (3/64)	.070	**.328** (7x)	3	1/8	2-1/2	868247	41.00	868247-C3	45.90		
	.047 (3/64)	.070	**.375** (8x)	3	1/8	2-1/2	34247	42.00	34247-C3	46.90	34247-C4	54.40
NEW	.047 (3/64)	.070	**.375** (8x)	4	1/8	2-1/2	801347	42.00	801347-C3	46.90		
	.047 (3/64)	.070	**.480** (10x)	3	1/8	2-1/2	966047	43.10	966047-C3	48.00	966047-C4	55.50
	.047 (3/64)	.070	**.570** (12x)	3	1/8	2-1/2	35647	43.10	35647-C3	48.00	35647-C4	55.50
	.047 (3/64)	.070	**.710** (15x)	3	1/8	2-1/2	49247	47.90	49247-C3	52.80	49247-C4	60.30
	.047 (3/64)	.070	**.850** (18x)	3	1/8	2-1/2	970747	57.40	970747-C3	62.30		
	.047 (3/64)	.070	**.950** (20x)	3	1/8	2-1/2	59447	57.40	59447-C3	62.30	59447-C4	69.80
	.047 (3/64)	.070	**1.187** (25x)	3	1/8	2-1/2	40147	70.30	40147-C3	75.20	***25x Diameter!***	
	.050	.075	**.150** (3x)	3	1/8	2-1/2	47950	41.00	47950-C3	45.90		
	.050	.075	**.250** (5x)	3	1/8	2-1/2	33450	41.00	33450-C3	45.90	33450-C4	53.40
	.050	.075	**.400** (8x)	3	1/8	2-1/2	34250	42.00	34250-C3	46.90	34250-C4	54.40
	.050	.075	**.500** (10x)	3	1/8	2-1/2	966050	43.10	966050-C3	48.00		
	.050	.075	**.600** (12x)	3	1/8	2-1/2	35650	43.10	35650-C3	48.00	35650-C4	55.50
	.050	.075	**.750** (15x)	3	1/8	2-1/2	49250	47.90	49250-C3	52.80		
	.055 (1.4 mm)	.082	**.165** (3x)	3	1/8	2-1/2	47955	41.00	47955-C3	45.90		
	.055 (1.4 mm)	.082	**.275** (5x)	3	1/8	2-1/2	33455	41.00	33455-C3	45.90	33455-C4	53.40
	.055 (1.4 mm)	.082	**.450** (8x)	3	1/8	2-1/2	34255	42.00	34255-C3	46.90	34255-C4	54.40
	.055 (1.4 mm)	.082	**.560** (10x)	3	1/8	2-1/2	966055	43.10	966055-C3	48.00		
	.055 (1.4 mm)	.082	**.660** (12x)	3	1/8	2-1/2	35655	43.10	35655-C3	48.00	35655-C4	55.50
	.060	.090	**.180** (3x)	3	1/8	2-1/2	47960	41.00	47960-C3	45.90		
	.060	.090	**.312** (5x)	3	1/8	2-1/2	33460	41.00	33460-C3	45.90	33460-C4	53.40
	.060	.090	**.375** (6x)	3	1/8	2-1/2	860660	42.00	860660-C3	46.90		
	.060	.090	**.437** (7x)	3	1/8	2-1/2	868260	42.00	868260-C3	46.90		
	.060	.090	**.500** (8x)	3	1/8	2-1/2	34260	42.00	34260-C3	46.90	34260-C4	54.40
	.060	.090	**.625** (10x)	3	1/8	2-1/2	966060	43.10	966060-C3	48.00		
	.060	.090	**.720** (12x)	3	1/8	2-1/2	35660	43.10	35660-C3	48.00	35660-C4	55.50
	.060	.090	**.900** (15x)	3	1/8	2-1/2	49260	47.90	49260-C3	52.80		
	.060	.090	**1.062** (18x)	3	1/8	2-1/2	970760	57.40	970760-C3	62.30		
	.060	.090	**1.200** (20x)	3	1/8	2-1/2	59460	57.40	59460-C3	62.30		
	.062 (1/16)	.093	**.186** (3x)	3	1/8	2-1/2	47962	41.00	47962-C3	45.90	47962-C4	53.40
NEW	.062 (1/16)	.093	**.250** (4x)	3	1/8	2-1/2	844462	41.00	844462-C3	45.90	844462-C4	53.40
	.062 (1/16)	.093	**.312** (5x)	3	1/8	2-1/2	33462	41.00	33462-C3	45.90	33462-C4	53.40
	.062 (1/16)	.093	**.312** (5x)	4	1/8	2-1/2	803162	41.00	803162-C3	45.90		
	.062 (1/16)	.093	**.375** (6x)	3	1/8	2-1/2	860662	41.00	860662-C3	45.90	860662-C4	53.40
	.062 (1/16)	.093	**.437** (7x)	3	1/8	2-1/2	868262	41.00	868262-C3	45.90	868262-C4	53.40
	.062 (1/16)	.093	**.500** (8x)	3	1/8	2-1/2	34262	42.00	34262-C3	46.90	34262-C4	54.40
	.062 (1/16)	.093	**.500** (8x)	4	1/8	2-1/2	801362	42.00	801362-C3	46.90		
	.062 (1/16)	.093	**.558** (9x)	3	1/8	2-1/2	805362	43.10	805362-C3	48.00		
	.062 (1/16)	.093	**.625** (10x)	3	1/8	2-1/2	966062	43.10	966062-C3	48.00	966062-C4	55.50
NEW	.062 (1/16)	.093	**.625** (10x)	4	1/8	2-1/2	769262	43.10	769262-C3	48.00		

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NEW SIZES!

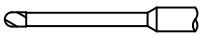
MINIATURE END MILLS

Ball – Long Reach, Stub Flute (cont.)

continued from previous page

CUTTER DIAMETER	LENGTH OF CUT	OVERALL REACH	FLUTES	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN COATED		AMORPHOUS DIAMOND		
D_1 +.0005″ −.0005″	L_2 +.010″ −.000″	L_3 +.010″ −.000″		D_2	L_1	TOOL #	PRICE	TOOL #	PRICE	TOOL #	PRICE	
.062 (1/16)	.093	**.750** (12x)	3	1/8	2-1/2	35662	43.10	35662-C3	48.00	35662-C4	55.50	
.062 (1/16)	.093	**.750** (12x)	4	1/8	2-1/2	768062	43.10	768062-C3	48.00			NEW
.062 (1/16)	.093	**.950** (15x)	3	1/8	2-1/2	49262	47.90	49262-C3	52.80	49262-C4	60.30	
.062 (1/16)	.093	**1.125** (18x)	3	1/8	2-1/2	970762	57.40	970762-C3	62.30	970762-C4	69.80	
.062 (1/16)	.093	**1.250** (20x)	3	1/8	2-1/2	59462	57.40	59462-C3	62.30	59462-C4	69.80	
.062 (1/16)	.093	**1.550** (25x)	3	1/8	3	40162	70.30	40162-C3	75.20	40162-C4	82.70	
.062 (1/16)	.093	**1.875** (30x)	3	1/8	3	922762	90.30	922762-C3	95.20	***30x Diameter!***		
.065	.097	**.325** (5x)	3	1/8	2-1/2	33465	41.00	33465-C3	45.90			
.065	.097	**.530** (8x)	3	1/8	2-1/2	34265	42.00	34265-C3	46.90	34265-C4	54.40	
.070	.105	**.375** (5x)	3	1/8	2-1/2	33470	41.00	33470-C3	45.90			
.070	.105	**.570** (8x)	3	1/8	2-1/2	34270	42.00	34270-C3	46.90	34270-C4	54.40	
.075	.112	**.375** (5x)	3	1/8	2-1/2	33475	41.00	33475-C3	45.90			
.075	.112	**.625** (8x)	3	1/8	2-1/2	34275	42.00	34275-C3	46.90	34275-C4	54.40	
.078 (5/64)	.117	**.234** (3x)	3	1/8	2-1/2	47978	41.00	47978-C3	45.90			
.078 (5/64)	.117	**.312** (4x)	3	1/8	2-1/2	844478	41.00	844478-C3	45.90			
.078 (5/64)	.117	**.406** (5x)	3	1/8	2-1/2	33478	41.00	33478-C3	45.90	33478-C4	53.40	
.078 (5/64)	.117	**.406** (5x)	4	1/8	2-1/2	803178	41.00	803178-C3	45.90			NEW
.078 (5/64)	.117	**.475** (6x)	3	1/8	2-1/2	860678	41.00	860678-C3	45.90			
.078 (5/64)	.117	**.550** (7x)	3	1/8	2-1/2	868278	41.00	868278-C3	45.90			
.078 (5/64)	.117	**.625** (8x)	3	1/8	2-1/2	34278	42.00	34278-C3	46.90	34278-C4	54.40	
.078 (5/64)	.117	**.800** (10x)	3	1/8	2-1/2	966078	43.10	966078-C3	48.00			
.078 (5/64)	.117	**.940** (12x)	3	1/8	2-1/2	35678	43.10	35678-C3	48.00	35678-C4	55.50	
.078 (5/64)	.117	**1.187** (15x)	3	1/8	2-1/2	49278	47.90	49278-C3	52.80	49278-C4	60.30	
.078 (5/64)	.117	**1.400** (18x)	3	1/8	3	970778	57.40	970778-C3	62.30			
.078 (5/64)	.117	**1.562** (20x)	3	1/8	3	59478	57.40	59478-C3	62.30			
.078 (5/64)	.117	**1.950** (25x)	3	1/8	3	40178	70.30	40178-C3	75.20	***25x Diameter!***		
.080	.120	**.406** (5x)	3	1/8	2-1/2	33480	41.00	33480-C3	45.90			
.080	.120	**.650** (8x)	3	1/8	2-1/2	34280	42.00	34280-C3	46.90	34280-C4	54.40	
.085	.127	**.425** (5x)	3	1/8	2-1/2	33485	41.00	33485-C3	45.90			
.085	.127	**.700** (8x)	3	1/8	2-1/2	34285	42.00	34285-C3	46.90	34285-C4	54.40	
.090	.135	**.450** (5x)	3	1/8	2-1/2	33490	41.00	33490-C3	45.90			
.090	.135	**.750** (8x)	3	1/8	2-1/2	34290	42.00	34290-C3	46.90	34290-C4	54.40	
.093 (3/32)	.139	**.279** (3x)	3	1/8	2-1/2	47993	41.00	47993-C3	45.90			
.093 (3/32)	.139	**.375** (4x)	3	1/8	2-1/2	844493	41.00	844493-C3	45.90			
.093 (3/32)	.139	**.500** (5x)	3	1/8	2-1/2	33493	41.00	33493-C3	45.90	33493-C4	53.40	
.093 (3/32)	.139	**.500** (5x)	4	1/8	2-1/2	803193	41.00	803193-C3	45.90			
.093 (3/32)	.139	**.585** (6x)	3	1/8	2-1/2	860693	41.00	860693-C3	45.90			
.093 (3/32)	.139	**.670** (7x)	3	1/8	2-1/2	868293	41.00	868293-C3	45.90			
.093 (3/32)	.139	**.750** (8x)	3	1/8	2-1/2	34293	42.00	34293-C3	46.90	34293-C4	54.40	
.093 (3/32)	.139	**.750** (8x)	4	1/8	2-1/2	801393	42.00	801393-C3	46.90			
.093 (3/32)	.139	**.950** (10x)	3	1/8	2-1/2	966093	43.10	966093-C3	48.00	966093-C4	55.50	
.093 (3/32)	.139	**1.125** (12x)	3	1/8	2-1/2	35693	43.10	35693-C3	48.00	35693-C4	55.50	
.093 (3/32)	.139	**1.400** (15x)	3	1/8	3	49293	50.40	49293-C3	55.30	49293-C4	62.80	
.093 (3/32)	.139	**1.675** (18x)	3	1/8	3	970793	60.90	970793-C3	65.80			
.093 (3/32)	.139	**1.875** (20x)	3	1/8	4	59493	63.50	59493-C3	68.80			
.093 (3/32)	.139	**2.312** (25x)	3	1/8	4	40193	72.70	40193-C3	78.00	***25x Diameter!***		
.093 (3/32)	.139	**2.812** (30x)	3	1/8	4	922793	98.40	922793-C3	103.70	***30x Diameter!***		

continued on next page



MINIATURE END MILLS

Ball – Long Reach, Stub Flute (cont.)

continued from previous page

CUTTER DIAMETER	LENGTH OF CUT	OVERALL REACH	FLUTES	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN COATED		AMORPHOUS DIAMOND	
D_1 +.0005″ −.0005″	L_2 +.010″ −.000″	L_3 +.010″ −.000″		D_2	L_1	TOOL #	PRICE	TOOL #	PRICE	TOOL #	PRICE
.095	.142	**.500** (5x)	3	1/8	2-1/2	33495	41.00	33495-C3	45.90		
.095	.142	**.750** (8x)	3	1/8	2-1/2	34295	42.00	34295-C3	46.90	34295-C4	54.40
.100	.150	**.300** (3x)	3	1/8	2-1/2	978500	41.00	978500-C3	45.90		
.100	.150	**.500** (5x)	3	1/8	2-1/2	33500	41.00	33500-C3	45.90		
.100	.150	**.800** (8x)	3	1/8	2-1/2	34300	42.00	34300-C3	46.90	34300-C4	54.40
.100	.150	**1.000** (10x)	3	1/8	2-1/2	966100	43.10	966100-C3	48.00		
.100	.150	**1.200** (12x)	3	1/8	2-1/2	35700	43.10	35700-C3	48.00		
.109 (7/64)	.163	**.570** (5x)	3	1/8	2-1/2	33502	41.00	33502-C3	45.90		
.109 (7/64)	.163	**.900** (8x)	3	1/8	2-1/2	34302	42.00	34302-C3	46.90		
.118 (3 mm)	.177	**.625** (5x)	3	1/8	2-1/2	33505	41.00	33505-C3	45.90		
.118 (3 mm)	.177	**.950** (8x)	3	1/8	2-1/2	34305	42.00	34305-C3	46.90		
.118 (3 mm)	.177	**1.187** (10x)	3	1/8	2-1/2	966105	43.10	966105-C3	48.00		

	D_1 +.000″ −.002″	L_2 +.030″ −.000″	L_3 +.030″ −.000″		D_2	L_1	TOOL #	PRICE	TOOL #	PRICE	TOOL #	PRICE
	.125 (1/8)	.187	**.375** (3x)	3	1/8	2-1/2	978508	41.00	978508-C3	45.90	978508-C4	53.40
	.125 (1/8)	.187	**.500** (4x)	3	1/8	2-1/2	844508	41.00	844508-C3	45.90		
	.125 (1/8)	.187	**.625** (5x)	3	1/8	2-1/2	33508	41.00	33508-C3	45.90	33508-C4	53.40
	.125 (1/8)	.187	**.625** (5x)	4	1/8	2-1/2	803208	41.00	803208-C3	45.90		
	.125 (1/8)	.187	**.750** (6x)	3	1/8	2-1/2	860708	41.00	860708-C3	45.90	860708-C4	53.40
	.125 (1/8)	.187	**.875** (7x)	3	1/8	2-1/2	868308	41.00	868308-C3	45.90		
	.125 (1/8)	.187	**1.000** (8x)	3	1/8	2-1/2	34308	42.00	34308-C3	46.90	34308-C4	54.40
	.125 (1/8)	.187	**1.000** (8x)	4	1/8	2-1/2	801408	42.00	801408-C3	46.90		
	.125 (1/8)	.187	**1.125** (9x)	3	1/8	2-1/2	805408	45.00	805408-C3	49.90		
	.125 (1/8)	.187	**1.250** (10x)	3	1/8	2-1/2	966108	45.00	966108-C3	49.90	966108-C4	57.40
NEW	.125 (1/8)	.187	**1.250** (10x)	4	1/8	2-1/2	769308	45.00	769308-C3	49.90		
	.125 (1/8)	.187	**1.500** (12x)	3	1/8	3	35708	45.00	35708-C3	49.90	35708-C4	57.40
NEW	.125 (1/8)	.187	**1.500** (12x)	4	1/8	3	768108	45.00	768108-C3	49.90		
	.125 (1/8)	.187	**1.875** (15x)	3	1/8	3	49308	50.40	49308-C3	55.30	49308-C4	62.80
	.125 (1/8)	.187	**2.250** (18x)	3	1/8	4	970808	60.90	970808-C3	66.20	970808-C4	73.30
	.125 (1/8)	.187	**2.500** (20x)	3	1/8	4	59508	60.90	59508-C3	66.20	59508-C4	79.00
	.125 (1/8)	.187	**3.125** (25x)	3	1/8	4	959108	76.60	959108-C3	81.90	***25x Diameter!***	
	.125 (1/8)	.187	**3.750** (30x)	3	1/8	6	922808	91.70	922808-C3	98.20	***30x Diameter!***	
	.140 (9/64)	.220	**.750** (5x)	3	3/16	3	33509	45.20	33509-C3	50.50		
	.140 (9/64)	.220	**1.125** (8x)	3	3/16	3	34309	46.20	34309-C3	51.50		
	.140 (9/64)	.220	**1.450** (10x)	3	3/16	3	966109	49.30	966109-C3	54.60		
	.156 (5/32)	.234	**.470** (3x)	3	3/16	3	978510	45.20	978510-C3	49.70		
	.156 (5/32)	.234	**.750** (5x)	3	3/16	3	33510	45.20	33510-C3	50.50		
	.156 (5/32)	.234	**1.250** (8x)	3	3/16	3	34310	46.20	34310-C3	51.50	34310-C4	63.30
	.156 (5/32)	.234	**1.570** (10x)	3	3/16	3	966110	49.30	966110-C3	54.60		
	.156 (5/32)	.234	**1.875** (12x)	3	3/16	4	35710	49.30	35710-C3	56.50		
	.156 (5/32)	.234	**2.375** (15x)	3	3/16	4	49310	52.10	49310-C3	59.30		

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NEW SIZES!

MINIATURE END MILLS

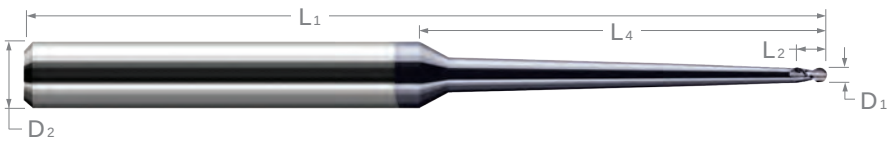
Ball – Long Reach, Stub Flute (cont.)

continued from previous page

CUTTER DIAMETER	LENGTH OF CUT	OVERALL REACH	FLUTES	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN COATED		AMORPHOUS DIAMOND		
D_1 $^{+.000''}_{-.002''}$	L_2 $^{+.030''}_{-.000''}$	L_3 $^{+.030''}_{-.000''}$		D_2	L_1	TOOL #	PRICE	TOOL #	PRICE	TOOL #	PRICE	
.187 (3/16)	.281	**.570** (3x)	3	3/16	3	978512	45.20	978512-C3	50.50			
.187 (3/16)	.281	**1.000** (5x)	3	3/16	3	33512	45.20	33512-C3	50.50	33512-C4	62.30	
.187 (3/16)	.281	**1.000** (5x)	4	3/16	3	803212	45.20	803212-C3	50.50			NEW
.187 (3/16)	.281	**1.156** (6x)	3	3/16	3	860712	46.20	860712-C3	51.50			
.187 (3/16)	.281	**1.312** (7x)	3	3/16	3	868312	46.20	868312-C3	51.50			
.187 (3/16)	.281	**1.500** (8x)	3	3/16	3	34312	46.20	34312-C3	51.50	34312-C4	63.30	
.187 (3/16)	.281	**1.500** (8x)	4	3/16	3	801412	46.20	801412-C3	51.50			NEW
.187 (3/16)	.281	**1.875** (10x)	3	3/16	4	966112	49.30	966112-C3	56.50	966112-C4	67.50	
.187 (3/16)	.281	**2.250** (12x)	3	3/16	4	35712	49.30	35712-C3	56.50	35712-C4	67.50	
.187 (3/16)	.281	**2.812** (15x)	3	3/16	4	49312	52.10	49312-C3	59.30	49312-C4	70.30	
.187 (3/16)	.281	**3.375** (18x)	3	3/16	6	970812	71.10	970812-C3	80.60			
.218 (7/32)	.330	**1.125** (5x)	3	1/4	4	33514	52.50	33514-C3	60.90			
.218 (7/32)	.330	**1.750** (8x)	3	1/4	4	34314	53.10	34314-C3	61.50			
.250 (1/4)	.375	**.750** (3x)	3	1/4	4	978516	49.90	978516-C3	58.30			
.250 (1/4)	.375	**1.250** (5x)	3	1/4	4	33516	49.90	33516-C3	58.30	33516-C4	69.30	
.250 (1/4)	.375	**1.250** (5x)	4	1/4	4	803216	49.90	803216-C3	57.10			NEW
.250 (1/4)	.375	**2.000** (8x)	3	1/4	4	34316	51.10	34316-C3	59.50	34316-C4	70.50	
.250 (1/4)	.375	**2.000** (8x)	4	1/4	4	801416	51.10	801416-C3	59.50			NEW
.250 (1/4)	.375	**2.500** (10x)	3	1/4	4	966116	57.10	966116-C3	65.50	966116-C4	76.50	NEW
.250 (1/4)	.375	**3.000** (12x)	3	1/4	6	35716	60.10	35716-C3	69.60	35716-C4	88.20	
.250 (1/4)	.375	**3.750** (15x)	3	1/4	6	49316	62.80	49316-C3	72.30			
.250 (1/4)	.375	**5.000** (20x)	3	1/4	8	59516	125.10	59516-C3	139.30			
.375 (3/8)	.570	**2.000** (5x)	3	3/8	4	33524	87.10	33524-C3	100.10			
.375 (3/8)	.570	**3.000** (8x)	3	3/8	6	34324	117.30	34324-C3	132.00			

MINIATURE END MILLS

Ball – Tapered Reach (Clearance Cutters)



- Designed for deep cavity profiling
- 2° tapered neck design minimizes deflection and maximizes wall clearance
- Length of cut = 1½ x diameter
- Neck behind length of cut is reduced for 1x diameter
- h6 shank tolerance for high precision tool holders
- Center cutting
- Solid carbide
- CNC ground in the USA

Maximum Reach & Maximum Rigidity!

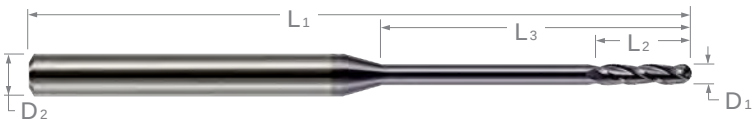
CUTTER DIA.	LOC	EFFECTIVE OVERALL REACH	WALL ANGLE	SHANK DIA.	OAL	INTERFERENCE DEPTH AT WALL ANGLE*			UNCOATED			AlTiN NANO COATED			AMORPHOUS DIAMOND	
D_1 +.000″ −.001″	L_2 +.020″ −.000″	L_4 +.020″ −.000″		D_2 (h6)	L_1	0°	.5°	1°	2 FL	4 FL	PRICE	2 FL	4 FL	PRICE	2 FL	PRICE
.015	.023	**1/2**	6.4°	1/8	2-1/2	.060	.080	.120	29815	778115	70.60	29815-C6	778115-C6	77.80	29815-C4	83.00
.015	.023	**1**	6.7°	1/4	4	.060	.080	.120	17715		82.90	17715-C6		93.50		
.020	.030	**1/2**	6.1°	1/8	2-1/2	.070	.095	.140	29820		70.60	29820-C6		77.80		
.020	.030	**1**	6.6°	1/4	4	.070	.095	.140	17720		82.90	17720-C6		93.50		
.031	.047	**1/2**	5.5°	1/8	2-1/2	.115	.150	.220	29831	778131	55.20	29831-C6	778131-C6	62.40	29831-C4	67.60
.031	.047	**1**	6.3°	1/4	4	.115	.150	.220	17731	777231	68.20	17731-C6	777231-C6	78.80	17731-C4	87.60
.031	.047	**1-1/2**	4.2°	1/4	4	.115	.150	.220	24831	776231	73.50	24831-C6	776231-C6	84.10	24831-C4	92.90
.031	.047	**2**	3.2°	1/4	4	.115	.150	.220	18831		82.60	18831-C6		93.20	18831-C4	102.00
.039	.059	**1/2**	5.1°	1/8	2-1/2	.150	.195	.285	29839		55.20	29839-C6		62.40		
.039	.059	**1**	6.1°	1/4	4	.150	.195	.285	17739		68.20	17739-C6		78.80		
.047	.071	**1/2**	4.7°	1/8	2-1/2	.180	.235	.350	29847	778147	55.20	29847-C6	778147-C6	62.40	29847-C4	67.60
.047	.071	**1**	5.9°	1/4	4	.180	.235	.350	17747	777247	68.20	17747-C6	777247-C6	78.80	17747-C4	87.60
.047	.071	**1-1/2**	3.9°	1/4	4	.180	.235	.350	24847		73.50	24847-C6		84.10	24847-C4	92.90
.047	.071	**2**	2.9°	1/4	4	.180	.235	.350	18847		82.60	18847-C6		93.20	18847-C4	102.00
.062	.093	**1/2**	3.8°	1/8	2-1/2	.220	.285	.370	29862	778162	53.50	29862-C6	778162-C6	60.70	29862-C4	65.90
.062	.093	**1**	5.5°	1/4	4	.220	.285	.415	17762	777262	66.10	17762-C6	777262-C6	76.70	17762-C4	85.50
.062	.093	**1-1/2**	3.7°	1/4	4	.220	.285	.415	24862	776262	70.90	24862-C6	776262-C6	81.50	24862-C4	90.30
.062	.093	**2**	2.7°	1/4	4	.220	.285	.415	18862	775262	80.50	18862-C6	775262-C6	91.10	18862-C4	99.90
.062	.093	**2-1/2**	2.2°	1/4	4	.220	.285	.415	21362		82.50	21362-C6		93.10		
.078	.118	**1**	5.1°	1/4	4	.305	.395	.575	17778		66.10	17778-C6		76.70	17778-C4	85.50
.078	.118	**1-1/2**	3.4°	1/4	4	.305	.395	.575	24878		70.90	24878-C6		81.50	24878-C4	90.30
.078	.118	**2**	2.5°	1/4	4	.305	.395	.575	18878		80.50	18878-C6		91.10	18878-C4	99.90
.093	.140	**1**	4.7°	1/4	4	.340	.440	.640	17793	777293	66.90	17793-C6	777293-C6	77.50	17793-C4	86.30
.093	.140	**1-1/2**	3.1°	1/4	4	.340	.440	.640	24893	776293	70.90	24893-C6	776293-C6	81.50	24893-C4	90.30
.093	.140	**2**	2.3°	1/4	4	.340	.440	.640	18893		78.40	18893-C6		89.00	18893-C4	97.80
.125	.188	**1**	3.8°	1/4	4	.450	.580	.750	17808	777308	66.90	17808-C6	777308-C6	77.50	17808-C4	86.30
.125	.188	**1-1/2**	2.5°	1/4	4	.450	.580	.840	24908	776308	70.90	24908-C6	776308-C6	81.50	24908-C4	90.30
.125	.188	**2**	1.8°	1/4	4	.450	.580	.840	18908	775308	78.40	18908-C6	775308-C6	89.00	18908-C4	97.80
.125	.188	**2-1/2**	2.2°	5/16	4	.450	.580	.840	21408		82.30	21408-C6		94.20		
.156	.234	**1**	2.9°	1/4	4	.525	.680	.775	17810		66.90	17810-C6		77.50	17810-C4	86.30
.156	.234	**1-1/2**	1.9°	1/4	4	.525	.680	.980	24910		70.90	24910-C6		81.50	24910-C4	90.30
.156	.234	**2**	1.4°	1/4	4	.540	.710	1.085	18910†		78.40	18910-C6†		89.00	18910-C4†	97.80
.187	.281	**1-1/2**	1.3°	1/4	4	.605	.775	1.120	24912	776312	72.70	24912-C6	776312-C6	83.30	24912-C4	92.10
.187	.281	**2**	2.7°	3/8	4	.605	.775	1.120	18912	775312	105.30	18912-C6	775312-C6	117.20	18912-C4	128.70
.187	.281	**2-1/2**	2.2°	3/8	4	.605	.775	1.120	21412		108.70	21412-C6		120.60		
.250	.375	**1-1/2**	2.6°	3/8	4	.760	.975	1.260	24916	776316	93.30	24916-C6	776316-C6	105.20	24916-C4	116.70
.250	.375	**2**	1.8°	3/8	4	.760	.975	1.405	18916	775316	105.30	18916-C6	775316-C6	117.20	18916-C4	128.70
.250	.375	**2-1/2**	1.5°	3/8	4	.760	.975	1.405	21416		108.70	21416-C6		120.60		
.312	.468	**2**	2.7°	1/2	4	.915	1.170	1.685	18920		142.70	18920-C6		159.10	18920-C4	170.80
.375	.563	**2**	1.8°	1/2	4	1.075	1.370	1.770	18924		142.70	18924-C6		159.10	18924-C4	170.80

*Values are approximate and may vary due to tolerancing. †Tapered neck angle is 1.85°.

For detailed interference charts with more angles, search for keyword InterferenceChart on www.harveytool.com.

MINIATURE END MILLS

Ball – Long Reach, Long Flute



- **Long length design for deep cavities**
- Long flutes for deep pocket milling
- Length of cut ≥ 5x diameter
- 3 flutes
- Center cutting
- Solid carbide
- CNC ground in the USA



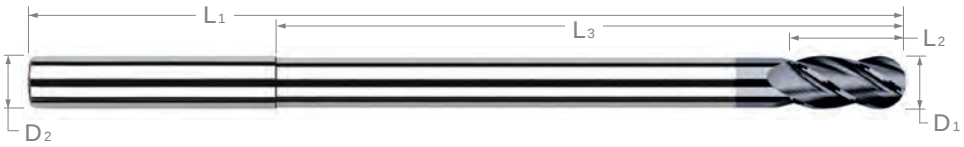
Reduced Neck Diameter to Avoid Heeling

BALL

CUTTER DIAMETER	LENGTH OF CUT	OVERALL REACH	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN COATED		AMORPHOUS DIAMOND	
D_1 +.0005″ −.0005″	L_2 +.010″ −.000″	L_3 +.010″ −.000″	D_2	L_1	3 FL	PRICE	3 FL	PRICE	3 FL	PRICE
.010	.050	.100 (10x)	1/8	2-1/2	13810	62.80	13810-C3	67.70	10210	75.20
.015 (1/64)	.075	.150 (10x)	1/8	2-1/2	13815	53.60	13815-C3	58.50	10215	66.00
.020 (.5 mm)	.100	.200 (10x)	1/8	2-1/2	13820	52.00	13820-C3	56.90	10220	64.40
.025	.125	.250 (10x)	1/8	2-1/2	13825	44.90	13825-C3	49.80	10225	57.30
.030	.150	.300 (10x)	1/8	2-1/2	13830	44.90	13830-C3	49.80	10230	57.30
.031 (1/32)	.155	.310 (10x)	1/8	2-1/2	13831	44.90	13831-C3	49.80	10231	57.30
.035 (.9 mm)	.175	.350 (10x)	1/8	2-1/2	13835	44.90	13835-C3	49.80	10235	57.30
.040	.200	.400 (10x)	1/8	2-1/2	13840	44.90	13840-C3	49.80	10240	57.30
.045	.225	.450 (10x)	1/8	2-1/2	13845	43.90	13845-C3	48.80	10245	56.30
.047 (3/64)	.250	.500 (10x)	1/8	2-1/2	13847	43.90	13847-C3	48.80	10247	56.30
.050	.300	.600 (12x)	1/8	2-1/2	13850	43.90	13850-C3	48.80	10250	56.30
.055 (1.4 mm)	.385	.770 (14x)	1/8	2-1/2	13855	43.90	13855-C3	48.80	10255	56.30
.060	.500	1.000 (16x)	1/8	2-1/2	13860	44.80	13860-C3	49.70	10260	57.20
.062 (1/16)	.500	.625 (10x)	1/8	2-1/2	803562	43.90	803562-C3	48.80	803362	56.30
.062 (1/16)	.500	1.000 (16x)	1/8	2-1/2	13862	44.80	13862-C3	49.70	10262	57.20
.065	.500	1.000 (15x)	1/8	2-1/2	13865	43.90	13865-C3	48.80	10265	56.30
.070	.500	1.000 (14x)	1/8	2-1/2	13870	43.90	13870-C3	48.80	10270	56.30
.075	.500	1.000 (13x)	1/8	2-1/2	13875	43.90	13875-C3	48.80	10275	56.30
.078 (5/64)	.500	1.000 (12x)	1/8	2-1/2	13878	43.90	13878-C3	48.80	10278	56.30
.080	.750	1.250 (15x)	1/8	2-1/2	13880	43.90	13880-C3	48.80	10280	56.30
.085	.750	1.250 (14x)	1/8	2-1/2	13885	43.90	13885-C3	48.80	10285	56.30
.090	.750	1.250 (13x)	1/8	2-1/2	13890	43.90	13890-C3	48.80	10290	56.30
.093 (3/32)	.750	1.250 (13x)	1/8	2-1/2	13893	43.90	13893-C3	48.80	10293	56.30
.095	.750	1.250 (13x)	1/8	2-1/2	13895	43.90	13895-C3	48.80	10295	56.30
.100	.750	1.250 (12x)	1/8	2-1/2	14800	43.90	14800-C3	48.80	10300	56.30
D_1 +.000″ −.002″	L_2 +.020″ −.000″	L_3 +.020″ −.000″	D_2	L_1	3 FL	PRICE	3 FL	PRICE	3 FL	PRICE
.125 (1/8)	1.000	1.500 (12x)	1/8	2-1/2	14808	43.90	14808-C3	48.80	10308	56.30
.187 (3/16)	1.125	1.625 (8x)	3/16	3	14812	47.50	14812-C3	52.80	10312	64.60
.250 (1/4)	1.500	2.000 (8x)	1/4	4	14816	53.20	14816-C3	58.50	10316	72.60

MINIATURE END MILLS

Ball – Extra Long Length



- **Up to 8" overall length**
- Longest overall length carbide end mill available in stock
- Extended reach
- 4 flutes
- Center cutting
- Solid carbide
- CNC ground in the USA

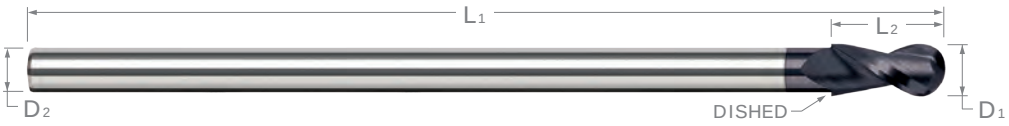
CUTTER DIAMETER	LENGTH OF CUT	OVERALL REACH	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN COATED	
D_1 $^{+.000''}_{-.002''}$	L_2 $^{+.030''}_{-.000''}$	L_3 $^{+.030''}_{-.000''}$	D_2	L_1	4 FL	PRICE	4 FL	PRICE
.250 (1/4)	.375	4.375 (17.5x)	1/4	6	14916	95.90	14916-C3	105.40
.312 (5/16)	.470	4.343 (14x)	5/16	6	14920	115.90	14920-C3	130.10
.375 (3/8)	.562	4.312 (11.5x)	3/8	6	14924	131.40	14924-C3	146.10
.500 (1/2)	.750	5.750 (11.5x)	1/2	8	14932	228.60	14932-C3	257.90
.625 (5/8)	.937	5.687 (9x)	5/8	8	14940	382.80		
.750 (3/4)	1.125	5.625 (7.5x)	3/4	8	14948	464.50		

View a comprehensive library of **Speeds & Feeds** charts for every Harvey Tool End Mill on the new Harveytool.com.

Access **Simulation Files** in DXF format for every Harvey Tool product, downloadable now from the new Harveytool.com.

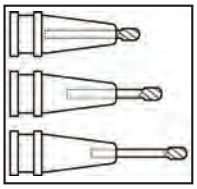
MINIATURE END MILLS

Ball – Reduced Shank



- Reduced straight shank allows any chucking depth
- Solid carbide construction for maximum rigidity
- Long length design for deep cavity machining
- Length of cut = 1½ x diameter
- Center cutting
- Solid carbide
- CNC ground in the USA

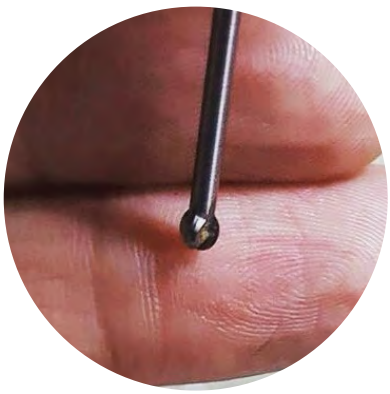
Chuck at Any Depth!



CUTTER DIAMETER	LENGTH OF CUT	FLUTES	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN COATED	
D_1 +.000″ −.002″	L_2 +.030″ −.000″		D_2 (h6)	L_1	TOOL #	PRICE	TOOL #	PRICE
1/8	3/16	2	**3 mm**	2-1/2	24708	95.90	24708-C3	100.80
1/8	3/16	4	**3 mm**	2-1/2	804208	99.30	804208-C3	104.20
5/32	15/64	2	**1/8**	2-1/2	24710	95.90	24710-C3	101.20
3/16	9/32	2	**1/8**	2-1/2	24712	95.90	24712-C3	101.20
3/16	9/32	2	**5/32**	2-1/2	24713	99.00	24713-C3	104.30
3/16	9/32	4	**5/32**	2-1/2	804212	102.40	804212-C3	107.70
1/4	3/8	2	**3/16**	3	24716	103.90	24716-C3	111.10
1/4	3/8	4	**3/16**	3	804216	107.60	804216-C3	114.80
5/16	15/32	2	**1/4**	4	24720	127.60	24720-C3	137.70
3/8	9/16	2	**5/16**	4	24724	150.70	24724-C3	163.70
7/16	21/32	2	**3/8**	6	24728	222.00	24728-C3	237.90
1/2	3/4	2	**7/16**	6	24732	232.00	24732-C3	246.20
5/8	15/16	2	**1/2**	6	24740	300.80	24740-C3	322.00
3/4	1-1/8	2	**5/8**	6	24748	371.70	24748-C3	394.00

For Square Reduced Shank, please see page 39.

For Corner Radius Reduced Shank, please see page 81.



★★★★★

"This little guy just hit it's 1,200th detent. I was worried about making it through one! Great job Harvey Tool."

— @visionmetaldesign

Follow us on Instagram @harveytool!

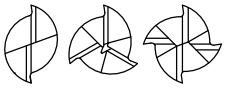
NEW SIZES!

MINIATURE END MILLS

Corner Radius – Stub & Standard



- Corner radius for improved strength
- Center cutting
- Solid carbide
- CNC ground in the USA



Stub Flute & Standard Length



	CUTTER DIA.	CORNER RADIUS	LOC	SHANK DIA.	OAL	UNCOATED				AlTiN COATED			AMORPHOUS DIAMOND		
	D_1 +.0005″ −.0005″	R +.001″ −.001″	L_2 +.010″ −.000″	D_2	L_1	2 FL	3 FL	4 FL	PRICE	3 FL	4 FL	PRICE	2 FL	4 FL	PRICE
	.008	.002	.012 (1.5x)	1/8	1-1/2			856008	50.40		856008-C3	55.30			
	.008	.002	.024 (3x)	1/8	1-1/2			854208	50.40		854208-C3	55.30			
	.010	.003	.015 (1.5x)	1/8	1-1/2			987510	45.40		987510-C3	50.30			
	.010	.003	.030 (3x)	1/8	1-1/2			47210	45.40		47210-C3	50.30			
	.015 (1/64)	.003	.023 (1.5x)	1/8	1-1/2			987515	45.40		987515-C3	50.30			
	.015 (1/64)	.003	.045 (3x)	1/8	1-1/2	45415		47215	45.40		47215-C3	50.30		47215-C4	57.80
	.015 (1/64)	.005	.023 (1.5x)	1/8	1-1/2			993815	45.40		993815-C3	50.30			
	.015 (1/64)	.005	.045 (3x)	1/8	1-1/2	44715		26315	45.40		26315-C3	50.30			
	.018	.005	.027 (1.5x)	1/8	1-1/2			993818	45.40		993818-C3	50.30			
	.018	.005	.054 (3x)	1/8	1-1/2			26318	45.40		26318-C3	50.30			
	.020 (.5 mm)	.003	.030 (1.5x)	1/8	1-1/2			987520	43.50		987520-C3	48.40			
	.020 (.5 mm)	.003	.060 (3x)	1/8	1-1/2			47220	43.50		47220-C3	48.40			
	.020 (.5 mm)	.005	.030 (1.5x)	1/8	1-1/2			993820	43.50		993820-C3	48.40			
	.020 (.5 mm)	.005	.060 (3x)	1/8	1-1/2	44720	848320	26320	43.50	848320-C3	26320-C3	48.40		26320-C4	55.90
	.022	.005	.066 (3x)	1/8	1-1/2			26322	39.60		26322-C3	44.50			
	.024 (.6 mm)	.005	.072 (3x)	1/8	1-1/2			26324	39.60		26324-C3	44.50			
NEW	.025	.003	.038 (1.5x)	1/8	1-1/2			987525	39.60		987525-C3	44.50			
	.025	.003	.075 (3x)	1/8	1-1/2			47225	39.60		47225-C3	44.50			
	.025	.005	.038 (1.5x)	1/8	1-1/2			993825	39.60		993825-C3	44.50			
	.025	.005	.075 (3x)	1/8	1-1/2	44725		26325	39.60		26325-C3	44.50		26325-C4	52.00
NEW	.025	.008	.038 (1.5x)	1/8	1-1/2			994525	39.60		994525-C3	44.50			
	.025	.008	.075 (3x)	1/8	1-1/2			953025	39.60		953025-C3	44.50			
	.028 (.7mm)	.005	.084 (3x)	1/8	1-1/2			26328	36.70		26328-C3	41.60			
	.030	.003	.090 (3x)	1/8	1-1/2			47230	36.70		47230-C3	41.60			
	.030	.005	.045 (1.5x)	1/8	1-1/2			993830	36.70		993830-C3	41.60			
	.030	.005	.090 (3x)	1/8	1-1/2	44730		26330	36.70		26330-C3	41.60		26330-C4	49.10
	.030	.008	.090 (3x)	1/8	1-1/2			953030	36.70		953030-C3	41.60			
	.030	.010	.045 (1.5x)	1/8	1-1/2			994530	36.70		994530-C3	41.60			
	.030	.010	.090 (3x)	1/8	1-1/2	45230		27230	36.70		27230-C3	41.60		27230-C4	49.10
	.031 (1/32)	.003	.047 (1.5x)	1/8	1-1/2			987531	36.70		987531-C3	41.60			
NEW	.031 (1/32)	.003	.093 (3x)	1/8	1-1/2			47231	36.70		47231-C3	41.60		47231-C4	49.10
	.031 (1/32)	.005	.047 (1.5x)	1/8	1-1/2			993831	36.70		993831-C3	41.60			
NEW	.031 (1/32)	.005	.093 (3x)	1/8	1-1/2	44731	848331	26331	36.70	848331-C3	26331-C3	41.60	44731-C4	26331-C4	49.10
	.031 (1/32)	.008	.047 (1.5x)	1/8	1-1/2			913731	36.70		913731-C3	41.60			
	.031 (1/32)	.008	.093 (3x)	1/8	1-1/2			953031	36.70		953031-C3	41.60			
	.031 (1/32)	.010	.047 (1.5x)	1/8	1-1/2			994531	36.70		994531-C3	41.60			
	.031 (1/32)	.010	.093 (3x)	1/8	1-1/2	45231	854131	27231	36.70	854131-C3	27231-C3	41.60		27231-C4	49.10
	.034	.005	.102 (3x)	1/8	1-1/2			26334	30.80		26334-C3	35.70			
	.035 (.9 mm)	.005	.053 (1.5x)	1/8	1-1/2			993835	30.80		993835-C3	35.70			
	.035 (.9 mm)	.005	.105 (3x)	1/8	1-1/2	44735		26335	30.80		26335-C3	35.70		26335-C4	43.20
	.035 (.9 mm)	.010	.053 (1.5x)	1/8	1-1/2			994535	30.80		994535-C3	35.70			
	.035 (.9 mm)	.010	.105 (3x)	1/8	1-1/2	45235		27235	30.80		27235-C3	35.70		27235-C4	43.20

continued on next page

NEW SIZES!

MINIATURE END MILLS

Corner Radius – Stub & Standard (cont.)

continued from previous page

CUTTER DIA.	CORNER RADIUS	LOC	SHANK DIA.	OAL	UNCOATED				AlTiN COATED			AMORPHOUS DIAMOND		
D_1 +.0005″ −.0005″	R +.001″ −.001″	L_2 +.010″ −.000″	D_2	L_1	2 FL	3 FL	4 FL	PRICE	3 FL	4 FL	PRICE	2 FL	4 FL	PRICE
.037	**.005**	.111 (3x)	1/8	1-1/2			26337	30.80		26337-C3	35.70			
.039 (1 mm)	**.003**	.117 (3x)	1/8	1-1/2			47239	23.90		47239-C3	28.80			
.039 (1 mm)	**.005**	.059 (1.5x)	1/8	1-1/2			993839	23.90		993839-C3	28.80			
.039 (1 mm)	**.005**	.117 (3x)	1/8	1-1/2			26339	23.90		26339-C3	28.80			
.039 (1 mm)	**.008**	.059 (1.5x)	1/8	1-1/2			913739	23.90		913739-C3	28.80			
.039 (1 mm)	**.008**	.117 (3x)	1/8	1-1/2			953039	23.90		953039-C3	28.80			
.039 (1 mm)	**.010**	.059 (1.5x)	1/8	1-1/2			994539	23.90		994539-C3	28.80			
.039 (1 mm)	**.010**	.117 (3x)	1/8	1-1/2			27239	23.90		27239-C3	28.80			
.040	**.003**	.120 (3x)	1/8	1-1/2			47240	23.50		47240-C3	28.40			
.040	**.005**	.060 (1.5x)	1/8	1-1/2		865140	993840	23.50	865140-C3	993840-C3	28.40			
.040	**.005**	.120 (3x)	1/8	1-1/2	44740	848340	26340	23.50	848340-C3	26340-C3	28.40		26340-C4	35.90
.040	**.008**	.120 (3x)	1/8	1-1/2			953040	23.50		953040-C3	28.40			
.040	**.010**	.060 (1.5x)	1/8	1-1/2			994540	23.50		994540-C3	28.40			
.040	**.010**	.120 (3x)	1/8	1-1/2	45240		27240	23.50		27240-C3	28.40		27240-C4	35.90
.045	**.005**	.068 (1.5x)	1/8	1-1/2			993845	23.50		993845-C3	28.40			
.045	**.005**	.135 (3x)	1/8	1-1/2	44745		26345	23.50		26345-C3	28.40		26345-C4	35.90
.045	**.010**	.068 (1.5x)	1/8	1-1/2			994545	23.50		994545-C3	28.40			
.045	**.010**	.135 (3x)	1/8	1-1/2	45245		27245	23.50		27245-C3	28.40		27245-C4	35.90
.045	**.015**	.068 (1.5x)	1/8	1-1/2			997945	23.50		997945-C3	28.40			
.045	**.015**	.135 (3x)	1/8	1-1/2	45545		28145	23.50		28145-C3	28.40		28145-C4	35.90
.046	**.005**	.138 (3x)	1/8	1-1/2			26346	23.50		26346-C3	28.40			
.047 (3/64)	**.003**	.071 (1.5x)	1/8	1-1/2			987547	23.50		987547-C3	28.40			
.047 (3/64)	**.003**	.141 (3x)	1/8	1-1/2			47247	23.50		47247-C3	28.40			
.047 (3/64)	**.005**	.071 (1.5x)	1/8	1-1/2			993847	23.50		993847-C3	28.40			
.047 (3/64)	**.005**	.141 (3x)	1/8	1-1/2	44747	848347	26347	23.50	848347-C3	26347-C3	28.40		26347-C4	35.90
.047 (3/64)	**.008**	.071 (1.5x)	1/8	1-1/2			913747	23.50		913747-C3	28.40			
.047 (3/64)	**.008**	.141 (3x)	1/8	1-1/2			953047	23.50		953047-C3	28.40			
.047 (3/64)	**.010**	.071 (1.5x)	1/8	1-1/2			994547	23.50		994547-C3	28.40			
.047 (3/64)	**.010**	.141 (3x)	1/8	1-1/2	45247		27247	23.50		27247-C3	28.40		27247-C4	35.90
.047 (3/64)	**.012**	.141 (3x)	1/8	1-1/2			966947	23.50		966947-C3	28.40			
.047 (3/64)	**.015**	.071 (1.5x)	1/8	1-1/2	830147	860847	997947	23.50	860847-C3	997947-C3	28.40			
.047 (3/64)	**.015**	.141 (3x)	1/8	1-1/2	45547	867247	28147	23.50	867247-C3	28147-C3	28.40		28147-C4	35.90
.050	**.003**	.150 (3x)	1/8	1-1/2			47250	23.50		47250-C3	28.40			
.050	**.005**	.075 (1.5x)	1/8	1-1/2			993850	23.50		993850-C3	28.40			
.050	**.005**	.150 (3x)	1/8	1-1/2	44750	848350	26350	23.50	848350-C3	26350-C3	28.40		26350-C4	35.90
.050	**.008**	.075 (1.5x)	1/8	1-1/2			913750	23.50		913750-C3	28.40			
.050	**.008**	.150 (3x)	1/8	1-1/2			953050	23.50		953050-C3	28.40			
.050	**.010**	.075 (1.5x)	1/8	1-1/2			994550	23.50		994550-C3	28.40			
.050	**.010**	.150 (3x)	1/8	1-1/2	45250		27250	23.50		27250-C3	28.40		27250-C4	35.90
.050	**.015**	.075 (1.5x)	1/8	1-1/2			997950	23.50		997950-C3	28.40			
.050	**.015**	.150 (3x)	1/8	1-1/2	45550		28150	23.50		28150-C3	28.40		28150-C4	35.90
.055 (1.4 mm)	**.003**	.165 (3x)	1/8	1-1/2			47255	23.50		47255-C3	28.40			
.055 (1.4 mm)	**.005**	.083 (1.5x)	1/8	1-1/2			993855	23.50		993855-C3	28.40			
.055 (1.4 mm)	**.005**	.165 (3x)	1/8	1-1/2	44755		26355	23.50		26355-C3	28.40		26355-C4	35.90
.055 (1.4 mm)	**.008**	.165 (3x)	1/8	1-1/2			953055	23.50		953055-C3	28.40			
.055 (1.4 mm)	**.010**	.083 (1.5x)	1/8	1-1/2			994555	23.50		994555-C3	28.40			
.055 (1.4 mm)	**.010**	.165 (3x)	1/8	1-1/2	45255		27255	23.50		27255-C3	28.40		27255-C4	35.90
.055 (1.4 mm)	**.015**	.083 (1.5x)	1/8	1-1/2			997955	23.50		997955-C3	28.40			
.055 (1.4 mm)	**.015**	.165 (3x)	1/8	1-1/2	45555		28155	23.50		28155-C3	28.40		28155-C4	35.90

continued on next page

NEW SIZES!

MINIATURE END MILLS

Corner Radius – Stub & Standard (cont.)

continued from previous page

	CUTTER DIA.	CORNER RADIUS	LOC	SHANK DIA.	OAL	UNCOATED				AlTiN COATED			AMORPHOUS DIAMOND		
	D_1 +.0005″ −.0005″	R +.001″ −.001″	L_2 +.010″ −.000″	D_2	L_1	2 FL	3 FL	4 FL	PRICE	3 FL	4 FL	PRICE	2 FL	4 FL	PRICE
	.059	.005	.177 (3x)	1/8	1-1/2			26359	23.50		26359-C3	28.40			
	.060	.003	.180 (3x)	1/8	1-1/2			47260	23.50		47260-C3	28.40			
	.060	.005	.090 (1.5x)	1/8	1-1/2			993860	23.50		993860-C3	28.40			
	.060	.005	.180 (3x)	1/8	1-1/2	44760	848360	26360	23.50	848360-C3	26360-C3	28.40		26360-C4	35.90
	.060	.008	.180 (3x)	1/8	1-1/2			953060	23.50		953060-C3	28.40			
	.060	.010	.090 (1.5x)	1/8	1-1/2			994560	23.50		994560-C3	28.40			
	.060	.010	.180 (3x)	1/8	1-1/2	45260		27260	23.50		27260-C3	28.40		27260-C4	35.90
	.060	.015	.090 (1.5x)	1/8	1-1/2			997960	23.50		997960-C3	28.40			
	.060	.015	.180 (3x)	1/8	1-1/2	45560		28160	23.50		28160-C3	28.40		28160-C4	35.90
	.060	.020	.090 (1.5x)	1/8	1-1/2			966460	23.50		966460-C3	28.40			
	.060	.020	.180 (3x)	1/8	1-1/2			51660	23.50		51660-C3	28.40			
	.062 (1/16)	.003	.093 (1.5x)	1/8	1-1/2			987562	23.50		987562-C3	28.40			
	.062 (1/16)	.003	.186 (3x)	1/8	1-1/2	45462		47262	23.50		47262-C3	28.40			
	.062 (1/16)	.005	.093 (1.5x)	1/8	1-1/2	804562	865162	993862	23.50	865162-C3	993862-C3	28.40			
NEW	.062 (1/16)	.005	.186 (3x)	1/8	1-1/2	44762	848362	26362	23.50	848362-C3	26362-C3	28.40	44762-C4	26362-C4	35.90
	.062 (1/16)	.008	.093 (1.5x)	1/8	1-1/2			913762	23.50		913762-C3	28.40			
	.062 (1/16)	.008	.186 (3x)	1/8	1-1/2	843962		953062	23.50		953062-C3	28.40			
	.062 (1/16)	.010	.093 (1.5x)	1/8	1-1/2	830362	864662	994562	23.50	864662-C3	994562-C3	28.40		994562-C4	35.90
NEW	.062 (1/16)	.010	.186 (3x)	1/8	1-1/2	45262	854162	27262	23.50	854162-C3	27262-C3	28.40	45262-C4	27262-C4	35.90
	.062 (1/16)	.012	.093 (1.5x)	1/8	1-1/2			904862	23.50		904862-C3	28.40			
	.062 (1/16)	.012	.186 (3x)	1/8	1-1/2			966962	23.50		966962-C3	28.40			
	.062 (1/16)	.015	.093 (1.5x)	1/8	1-1/2	830162	860862	997962	23.50	860862-C3	997962-C3	28.40			
	.062 (1/16)	.015	.186 (3x)	1/8	1-1/2	45562	867262	28162	23.50	867262-C3	28162-C3	28.40		28162-C4	35.90
	.062 (1/16)	.020	.093 (1.5x)	1/8	1-1/2	810662		966462	23.50		966462-C3	28.40			
NEW	.062 (1/16)	.020	.186 (3x)	1/8	1-1/2	51362	857762	51662	23.50	857762-C3	51662-C3	28.40	51362-C4	51662-C4	35.90
	.065	.005	.098 (1.5x)	1/8	1-1/2			993865	23.50		993865-C3	28.40			
	.065	.005	.195 (3x)	1/8	1-1/2	44765		26365	23.50		26365-C3	28.40		26365-C4	35.90
	.065	.010	.098 (1.5x)	1/8	1-1/2			994565	23.50		994565-C3	28.40			
	.065	.010	.195 (3x)	1/8	1-1/2	45265		27265	23.50		27265-C3	28.40		27265-C4	35.90
	.065	.015	.195 (3x)	1/8	1-1/2	45565		28165	23.50		28165-C3	28.40		28165-C4	35.90
	.065	.020	.195 (3x)	1/8	1-1/2			51665	23.50		51665-C3	28.40			
	.070	.003	.210 (3x)	1/8	1-1/2			47270	23.50		47270-C3	28.40			
	.070	.005	.105 (1.5x)	1/8	1-1/2			993870	23.50		993870-C3	28.40			
	.070	.005	.210 (3x)	1/8	1-1/2	44770		26370	23.50		26370-C3	28.40		26370-C4	35.90
	.070	.008	.210 (3x)	1/8	1-1/2			953070	23.50		953070-C3	28.40			
	.070	.010	.105 (1.5x)	1/8	1-1/2			994570	23.50		994570-C3	28.40			
	.070	.010	.210 (3x)	1/8	1-1/2	45270		27270	23.50		27270-C3	28.40		27270-C4	35.90
	.070	.015	.210 (3x)	1/8	1-1/2	45570		28170	23.50		28170-C3	28.40		28170-C4	35.90
NEW	.070	.020	.105 (1.5x)	1/8	1-1/2			966470	23.50		966470-C3	28.40			
	.070	.020	.210 (3x)	1/8	1-1/2			51670	23.50		51670-C3	28.40			
	.075	.005	.113 (1.5x)	1/8	1-1/2			993875	23.50		993875-C3	28.40			
	.075	.005	.225 (3x)	1/8	1-1/2	44775		26375	23.50		26375-C3	28.40		26375-C4	35.90
	.075	.010	.113 (1.5x)	1/8	1-1/2			994575	23.50		994575-C3	28.40			
	.075	.010	.225 (3x)	1/8	1-1/2	45275		27275	23.50		27275-C3	28.40		27275-C4	35.90
	.075	.015	.225 (3x)	1/8	1-1/2	45575		28175	23.50		28175-C3	28.40		28175-C4	35.90
	.078 (5/64)	.003	.234 (3x)	1/8	1-1/2			47278	23.50		47278-C3	28.40			
	.078 (5/64)	.005	.117 (1.5x)	1/8	1-1/2			993878	23.50		993878-C3	28.40			
	.078 (5/64)	.005	.234 (3x)	1/8	1-1/2	44778	848378	26378	23.50	848378-C3	26378-C3	28.40		26378-C4	35.90

continued on next page

NEW SIZES!

MINIATURE END MILLS

Corner Radius – Stub & Standard (cont.)

continued from previous page

CUTTER DIA.	CORNER RADIUS	LOC	SHANK DIA.	OAL	UNCOATED				ALTiN COATED			AMORPHOUS DIAMOND			
D_1 +.0005″ −.0005″	R +.001″ −.001″	L_2 +.010″ −.000″	D_2	L_1	2 FL	3 FL	4 FL	PRICE	3 FL	4 FL	PRICE	2 FL	4 FL	PRICE	
.078 (5/64)	.008	.117 (1.5x)	1/8	1-1/2			913778	23.50		913778-C3	28.40				
.078 (5/64)	.008	.234 (3x)	1/8	1-1/2			953078	23.50		953078-C3	28.40				
.078 (5/64)	.010	.117 (1.5x)	1/8	1-1/2	830378	864678	994578	23.50	864678-C3	994578-C3	28.40		994578-C4	35.90	NEW
.078 (5/64)	.010	.234 (3x)	1/8	1-1/2	45278	854178	27278	23.50	854178-C3	27278-C3	28.40		27278-C4	35.90	
.078 (5/64)	.012	.234 (3x)	1/8	1-1/2			966978	23.50		966978-C3	28.40				
.078 (5/64)	.015	.117 (1.5x)	1/8	1-1/2		860878	997978	23.50	860878-C3	997978-C3	28.40				
.078 (5/64)	.015	.234 (3x)	1/8	1-1/2	45578	867278	28178	23.50	867278-C3	28178-C3	28.40		28178-C4	35.90	
.078 (5/64)	.020	.117 (1.5x)	1/8	1-1/2	810678		966478	23.50		966478-C3	28.40				
.078 (5/64)	.020	.234 (3x)	1/8	1-1/2	51378	857778	51678	23.50	857778-C3	51678-C3	28.40		51678-C4	35.90	NEW
.078 (5/64)	.025	.117 (1.5x)	1/8	1-1/2			964078	23.50		964078-C3	28.40				
.078 (5/64)	.025	.234 (3x)	1/8	1-1/2		842678	957178	23.50	842678-C3	957178-C3	28.40				
.080	.003	.240 (3x)	1/8	1-1/2			47280	23.50		47280-C3	28.40				
.080	.005	.120 (1.5x)	1/8	1-1/2			993880	23.50		993880-C3	28.40				
.080	.005	.240 (3x)	1/8	1-1/2	44780		26380	23.50		26380-C3	28.40		26380-C4	35.90	
.080	.008	.240 (3x)	1/8	1-1/2			953080	23.50		953080-C3	28.40				
.080	.010	.120 (1.5x)	1/8	1-1/2			994580	23.50		994580-C3	28.40				
.080	.010	.240 (3x)	1/8	1-1/2	45280		27280	23.50		27280-C3	28.40		27280-C4	35.90	
.080	.015	.240 (3x)	1/8	1-1/2	45580		28180	23.50		28180-C3	28.40		28180-C4	35.90	
.080	.020	.240 (3x)	1/8	1-1/2			51680	23.50		51680-C3	28.40				
.085	.005	.128 (1.5x)	1/8	1-1/2			993885	23.50		993885-C3	28.40				
.085	.005	.255 (3x)	1/8	1-1/2	44785		26385	23.50		26385-C3	28.40		26385-C4	35.90	
.085	.010	.128 (1.5x)	1/8	1-1/2			994585	23.50		994585-C3	28.40				
.085	.010	.255 (3x)	1/8	1-1/2	45285		27285	23.50		27285-C3	28.40		27285-C4	35.90	
.085	.015	.255 (3x)	1/8	1-1/2	45585		28185	23.50		28185-C3	28.40		28185-C4	35.90	
.090	.003	.270 (3x)	1/8	1-1/2			47290	23.50		47290-C3	28.40				
.090	.005	.135 (1.5x)	1/8	1-1/2			993890	23.50		993890-C3	28.40				
.090	.005	.270 (3x)	1/8	1-1/2	44790		26390	23.50		26390-C3	28.40		26390-C4	35.90	
.090	.008	.270 (3x)	1/8	1-1/2			953090	23.50		953090-C3	28.40				
.090	.010	.135 (1.5x)	1/8	1-1/2			994590	23.50		994590-C3	28.40				
.090	.010	.270 (3x)	1/8	1-1/2	45290		27290	23.50		27290-C3	28.40		27290-C4	35.90	
.090	.015	.135 (1.5x)	1/8	1-1/2			997990	23.50		997990-C3	28.40				
.090	.015	.270 (3x)	1/8	1-1/2	45590		28190	23.50		28190-C3	28.40		28190-C4	35.90	
.090	.020	.135 (1.5x)	1/8	1-1/2			966490	23.50		966490-C3	28.40				
.090	.020	.270 (3x)	1/8	1-1/2			51690	23.50		51690-C3	28.40				
.090	.030	.135 (1.5x)	1/8	1-1/2			958890	23.50		958890-C3	28.40				
.090	.030	.270 (3x)	1/8	1-1/2			28690	23.50		28690-C3	28.40				
.093 (3/32)	.003	.140 (1.5x)	1/8	1-1/2			987593	23.50		987593-C3	28.40				
.093 (3/32)	.003	.279 (3x)	1/8	1-1/2	45493		47293	23.50		47293-C3	28.40				
.093 (3/32)	.005	.140 (1.5x)	1/8	1-1/2	804593	865193	993893	23.50	865193-C3	993893-C3	28.40				
.093 (3/32)	.005	.279 (3x)	1/8	1-1/2	44793	848393	26393	23.50	848393-C3	26393-C3	28.40		26393-C4	35.90	
.093 (3/32)	.008	.140 (1.5x)	1/8	1-1/2			913793	23.50		913793-C3	28.40				
.093 (3/32)	.008	.279 (3x)	1/8	1-1/2	843993		953093	23.50		953093-C3	28.40				
.093 (3/32)	.010	.140 (1.5x)	1/8	1-1/2	830393	864693	994593	23.50	864693-C3	994593-C3	28.40		994593-C4	35.90	
.093 (3/32)	.010	.279 (3x)	1/8	1-1/2	45293	854193	27293	23.50	854193-C3	27293-C3	28.40	45293-C4	27293-C4	35.90	NEW
.093 (3/32)	.012	.140 (1.5x)	1/8	1-1/2			904893	23.50		904893-C3	28.40				
.093 (3/32)	.012	.279 (3x)	1/8	1-1/2			966993	23.50		966993-C3	28.40				
.093 (3/32)	.015	.140 (1.5x)	1/8	1-1/2	830193	860893	997993	23.50	860893-C3	997993-C3	28.40				
.093 (3/32)	.015	.279 (3x)	1/8	1-1/2	45593	867293	28193	23.50	867293-C3	28193-C3	28.40		28193-C4	35.90	

continued on next page

MINIATURE END MILLS

Corner Radius – Stub & Standard (cont.)

continued from previous page

	CUTTER DIA.	CORNER RADIUS	LOC	SHANK DIA.	OAL	UNCOATED				AlTiN COATED			AMORPHOUS DIAMOND		
	D_1 $^{+.0005''}_{-.0005''}$	R $^{+.001''}_{-.001''}$	L_2 $^{+.010''}_{-.000''}$	D_2	L_1	2 FL	3 FL	4 FL	PRICE	3 FL	4 FL	PRICE	2 FL	4 FL	PRICE
	.093 (3/32)	**.020**	.140 (1.5x)	1/8	1-1/2	810693	858793	966493	23.50	858793-C3	966493-C3	28.40			
NEW	.093 (3/32)	**.020**	.279 (3x)	1/8	1-1/2	51393	857793	51693	23.50	857793-C3	51693-C3	28.40	51393-C4	51693-C4	35.90
	.093 (3/32)	**.025**	.140 (1.5x)	1/8	1-1/2			964093	23.50		964093-C3	28.40			
	.093 (3/32)	**.025**	.279 (3x)	1/8	1-1/2			957193	23.50		957193-C3	28.40			
	.093 (3/32)	**.030**	.140 (1.5x)	1/8	1-1/2			958893	23.50		958893-C3	28.40			
NEW	.093 (3/32)	**.030**	.279 (3x)	1/8	1-1/2	73993	853493	28693	23.50	853493-C3	28693-C3	28.40	73993-C4	28693-C4	35.90
	.095	**.005**	.143 (1.5x)	1/8	1-1/2			993895	23.50		993895-C3	28.40			
	.095	**.005**	.285 (3x)	1/8	1-1/2	44795		26395	23.50		26395-C3	28.40		26395-C4	35.90
	.095	**.010**	.143 (1.5x)	1/8	1-1/2			994595	23.50		994595-C3	28.40			
	.095	**.010**	.285 (3x)	1/8	1-1/2	45295		27295	23.50		27295-C3	28.40		27295-C4	35.90
	.095	**.015**	.285 (3x)	1/8	1-1/2	45595		28195	23.50		28195-C3	28.40		28195-C4	35.90
	.095	**.020**	.285 (3x)	1/8	1-1/2			51695	23.50		51695-C3	28.40			
	.095	**.030**	.285 (3x)	1/8	1-1/2			28695	23.50		28695-C3	28.40			
	.100	**.005**	.150 (1.5x)	1/8	1-1/2			993899	23.50		993899-C3	28.40			
	.100	**.005**	.300 (3x)	1/8	1-1/2	44799		26399	23.50		26399-C3	28.40		26399-C4	35.90
	.100	**.008**	.300 (3x)	1/8	1-1/2			953099	23.50		953099-C3	28.40			
	.100	**.010**	.150 (1.5x)	1/8	1-1/2			994599	23.50		994599-C3	28.40			
	.100	**.010**	.300 (3x)	1/8	1-1/2	45299		27299	23.50		27299-C3	28.40		27299-C4	35.90
	.100	**.015**	.150 (1.5x)	1/8	1-1/2			997999	23.50		997999-C3	28.40			
	.100	**.015**	.300 (3x)	1/8	1-1/2	45599		28199	23.50		28199-C3	28.40		28199-C4	35.90
	.100	**.020**	.150 (1.5x)	1/8	1-1/2			966499	23.50		966499-C3	28.40			
	.100	**.020**	.300 (3x)	1/8	1-1/2			51699	23.50		51699-C3	28.40			
	.100	**.030**	.150 (1.5x)	1/8	1-1/2			958899	23.50		958899-C3	28.40			
	.100	**.030**	.300 (3x)	1/8	1-1/2			28699	23.50		28699-C3	28.40			
	.109 (7/64)	**.003**	.327 (3x)	1/8	1-1/2			10802	23.50		10802-C3	28.40			
	.109 (7/64)	**.005**	.164 (1.5x)	1/8	1-1/2			941402	23.50		941402-C3	28.40			
	.109 (7/64)	**.005**	.327 (3x)	1/8	1-1/2			72902	23.50		72902-C3	28.40			
	.109 (7/64)	**.008**	.327 (3x)	1/8	1-1/2			75502	23.50		75502-C3	28.40			
	.109 (7/64)	**.010**	.164 (1.5x)	1/8	1-1/2			936902	23.50		936902-C3	28.40			
	.109 (7/64)	**.010**	.327 (3x)	1/8	1-1/2			75802	23.50		75802-C3	28.40			
	.109 (7/64)	**.015**	.164 (1.5x)	1/8	1-1/2			935002	23.50		935002-C3	28.40			
	.109 (7/64)	**.015**	.327 (3x)	1/8	1-1/2			74202	23.50		74202-C3	28.40			
	.109 (7/64)	**.020**	.164 (1.5x)	1/8	1-1/2			872002	23.50		872002-C3	28.40			
	.109 (7/64)	**.020**	.327 (3x)	1/8	1-1/2			986302	23.50		986302-C3	28.40			
	.109 (7/64)	**.025**	.327 (3x)	1/8	1-1/2			957109	23.50		957109-C3	28.40			
	.109 (7/64)	**.030**	.164 (1.5x)	1/8	1-1/2			892402	23.50		892402-C3	28.40			
NEW	.109 (7/64)	**.030**	.327 (3x)	1/8	1-1/2			937602	23.50		937602-C3	28.40		937602-C4	35.90
	.118 (3 mm)	**.005**	.177 (1.5x)	1/8	1-1/2			941405	23.90		941405-C3	28.80			
	.118 (3 mm)	**.005**	.354 (3x)	1/8	1-1/2			72905	23.90		72905-C3	28.80			
	.118 (3 mm)	**.008**	.177 (1.5x)	1/8	1-1/2			913805	23.90		913805-C3	28.80			
	.118 (3 mm)	**.008**	.354 (3x)	1/8	1-1/2			916705	23.90		916705-C3	28.80			
	.118 (3 mm)	**.010**	.177 (1.5x)	1/8	1-1/2			936905	23.90		936905-C3	28.80			
	.118 (3 mm)	**.010**	.354 (3x)	1/8	1-1/2			75805	23.90		75805-C3	28.80			
	.118 (3 mm)	**.015**	.177 (1.5x)	1/8	1-1/2			935005	23.90		935005-C3	28.80			
	.118 (3 mm)	**.015**	.354 (3x)	1/8	1-1/2			74205	23.90		74205-C3	28.80			
	.118 (3 mm)	**.020**	.177 (1.5x)	1/8	1-1/2			872005	23.90		872005-C3	28.80			
	.118 (3 mm)	**.020**	.354 (3x)	1/8	1-1/2			986305	23.90		986305-C3	28.80			
	.118 (3 mm)	**.030**	.177 (1.5x)	1/8	1-1/2			892405	23.90		892405-C3	28.80			
NEW	.118 (3 mm)	**.030**	.354 (3x)	1/8	1-1/2			937605	23.90		937605-C3	28.80		937605-C4	36.30
	.118 (3 mm)	**.040**	.354 (3x)	1/8	1-1/2			874005	23.90		874005-C3	28.80			

continued on next page

NEW SIZES!

MINIATURE END MILLS

Corner Radius – Stub & Standard (cont.)

continued from previous page

CUTTER DIA.	CORNER RADIUS	LOC	SHANK DIA.	OAL	UNCOATED				ALTiN COATED			AMORPHOUS DIAMOND			
D_1 +.000″ −.002″	R +.001″ −.001″	L_2 +.030″ −.000″	D_2	L_1	2 FL	3 FL	4 FL	PRICE	3 FL	4 FL	PRICE	2 FL	4 FL	PRICE	
.125 (1/8)	.003	.187 (1.5x)	1/8	1-1/2			980203	22.30		980203-C3	27.20				
.125 (1/8)	.003	.500 (4x)	1/8	1-1/2	46403		32403	22.30		32403-C3	27.20				
.125 (1/8)	.005	.187 (1.5x)	1/8	1-1/2	832905	833405	980205	23.50	833405-C3	980205-C3	28.40				
.125 (1/8)	.005	.500 (4x)	1/8	1-1/2	46405	870905	32405	23.50	870905-C3	32405-C3	28.40		32405-C4	35.90	
.125 (1/8)	.008	.187 (1.5x)	1/8	1-1/2			980208	23.50		980208-C3	28.40				
.125 (1/8)	.008	.500 (4x)	1/8	1-1/2	46408		32408	23.50		32408-C3	28.40				
.125 (1/8)	.010	.187 (1.5x)	1/8	1-1/2	832910	833410	980210	22.30	833410-C3	980210-C3	27.20		980210-C4	34.70	
.125 (1/8)	.010	.500 (4x)	1/8	1-1/2	46410	870910	32410	22.30	870910-C3	32410-C3	27.20	46410-C4	32410-C4	34.70	NEW
.125 (1/8)	.012	.187 (1.5x)	1/8	1-1/2			980212	23.50		980212-C3	28.40				
.125 (1/8)	.012	.500 (4x)	1/8	1-1/2			32412	23.50		32412-C3	28.40				
.125 (1/8)	.015	.187 (1.5x)	1/8	1-1/2	832915	833415	980215	22.30	833415-C3	980215-C3	27.20		980215-C4	34.70	NEW
.125 (1/8)	.015	.500 (4x)	1/8	1-1/2	46415	870915	32415	22.30	870915-C3	32415-C3	27.20		32415-C4	34.70	
.125 (1/8)	.020	.187 (1.5x)	1/8	1-1/2	832920	833420	980220	22.30	833420-C3	980220-C3	27.20		980220-C4	34.70	NEW
.125 (1/8)	.020	.500 (4x)	1/8	1-1/2	46420	870920	32420	22.30	870920-C3	32420-C3	27.20	46420-C4	32420-C4	34.70	NEW
.125 (1/8)	.025	.187 (1.5x)	1/8	1-1/2			980225	23.50		980225-C3	28.40				
.125 (1/8)	.025	.500 (4x)	1/8	1-1/2	46425		32425	23.50		32425-C3	28.40		32425-C4	35.90	NEW
.125 (1/8)	.030	.187 (1.5x)	1/8	1-1/2	832930	833430	980230	22.30	833430-C3	980230-C3	27.20		980230-C4	34.70	NEW
.125 (1/8)	.030	.500 (4x)	1/8	1-1/2	46430	870930	32430	22.30	870930-C3	32430-C3	27.20	46430-C4	32430-C4	34.70	NEW
.125 (1/8)	.040	.187 (1.5x)	1/8	1-1/2		833440	980240	23.50	833440-C3	980240-C3	28.40				
.125 (1/8)	.040	.500 (4x)	1/8	1-1/2	46440		32440	23.50		32440-C3	28.40				
.125 (1/8)	.045	.187 (1.5x)	1/8	1-1/2			980245	22.30		980245-C3	27.20				
.125 (1/8)	.045	.500 (4x)	1/8	1-1/2			32445	22.30		32445-C3	27.20				
.140 (9/64)	.005	.220 (1.5x)	3/16	2			857105	28.50		857105-C3	33.80				
.140 (9/64)	.005	.425 (3x)	3/16	2			966705	28.50		966705-C3	33.80				
.140 (9/64)	.010	.220 (1.5x)	3/16	2			857110	27.00		857110-C3	32.30				
.140 (9/64)	.010	.425 (3x)	3/16	2	810910		966710	27.00		966710-C3	32.30				
.140 (9/64)	.015	.220 (1.5x)	3/16	2		833315	857115	27.00	833315-C3	857115-C3	32.30				
.140 (9/64)	.015	.425 (3x)	3/16	2	810915	832115	966715	27.00	832115-C3	966715-C3	32.30				
.140 (9/64)	.020	.220 (1.5x)	3/16	2			857120	27.00		857120-C3	32.30				
.140 (9/64)	.020	.425 (3x)	3/16	2			966720	27.00		966720-C3	32.30				
.140 (9/64)	.030	.220 (1.5x)	3/16	2			857130	27.00		857130-C3	32.30				
.140 (9/64)	.030	.425 (3x)	3/16	2			966730	27.00		966730-C3	32.30				
.140 (9/64)	.040	.220 (1.5x)	3/16	2			857140	28.50		857140-C3	33.40				
.140 (9/64)	.040	.425 (3x)	3/16	2			966740	28.50		966740-C3	33.80				
.140 (9/64)	.045	.220 (1.5x)	3/16	2			857145	27.00		857145-C3	32.30				
.140 (9/64)	.045	.425 (3x)	3/16	2			966745	27.00		966745-C3	32.30				
.156 (5/32)	.005	.235 (1.5x)	3/16	2			954805	26.10		954805-C3	31.40				
.156 (5/32)	.005	.562 (3x)	3/16	2			75205	26.10		75205-C3	31.40				
.156 (5/32)	.010	.235 (1.5x)	3/16	2			954810	24.70		954810-C3	30.00				
.156 (5/32)	.010	.562 (3x)	3/16	2	71910		75210	24.70		75210-C3	30.00				
.156 (5/32)	.015	.235 (1.5x)	3/16	2			954815	24.70		954815-C3	30.00				
.156 (5/32)	.015	.562 (3x)	3/16	2	71915		75215	24.70		75215-C3	30.00				
.156 (5/32)	.020	.235 (1.5x)	3/16	2			954820	24.70		954820-C3	30.00				
.156 (5/32)	.020	.562 (3x)	3/16	2			75220	24.70		75220-C3	30.00		75220-C4	41.80	
.156 (5/32)	.025	.562 (3x)	3/16	2			75225	24.70		75225-C3	30.00				
.156 (5/32)	.030	.235 (1.5x)	3/16	2			954830	24.70		954830-C3	30.00				
.156 (5/32)	.030	.562 (3x)	3/16	2	71930	832030	75230	24.70	832030-C3	75230-C3	30.00		75230-C4	41.80	

continued on next page

NEW SIZES!

MINIATURE END MILLS

Corner Radius – Stub & Standard (cont.)

continued from previous page

	CUTTER DIA.	CORNER RADIUS	LOC	SHANK DIA.	OAL	UNCOATED				AlTiN COATED			AMORPHOUS DIAMOND		
	D_1 +.000″ −.002″	R +.001″ −.001″	L_2 +.030″ −.000″	D_2	L_1	2 FL	3 FL	4 FL	PRICE	3 FL	4 FL	PRICE	2 FL	4 FL	PRICE
	.156 (5/32)	**.040**	.235 (1.5x)	3/16	2			954840	26.10		954840-C3	31.40			
	.156 (5/32)	**.040**	.562 (3x)	3/16	2			75240	26.10		75240-C3	31.40			
	.156 (5/32)	**.045**	.235 (1.5x)	3/16	2			954845	24.70		954845-C3	30.00			
	.156 (5/32)	**.045**	.562 (3x)	3/16	2			75245	24.70		75245-C3	30.00			
	.172 (11/64)	**.010**	.515 (3x)	3/16	2			855310	24.70		855310-C3	30.00			
	.172 (11/64)	**.030**	.515 (3x)	3/16	2			855330	24.70		855330-C3	30.00			
NEW	.187 (3/16)	**.005**	.285 (1.5x)	3/16	2			937905	26.10		937905-C3	31.40		937905-C4	43.20
NEW	.187 (3/16)	**.005**	.625 (3x)	3/16	2	46705		34805	26.10		34805-C3	31.40		34805-C4	43.20
	.187 (3/16)	**.008**	.285 (1.5x)	3/16	2			937908	26.10		937908-C3	31.40			
	.187 (3/16)	**.008**	.625 (3x)	3/16	2		831908	34808	26.10	831908-C3	34808-C3	31.40			
NEW	.187 (3/16)	**.010**	.285 (1.5x)	3/16	2		833210	937910	24.70	833210-C3	937910-C3	30.00		937910-C4	41.80
NEW	.187 (3/16)	**.010**	.625 (3x)	3/16	2	46710	831910	34810	24.70	831910-C3	34810-C3	30.00	46710-C4	34810-C4	41.80
	.187 (3/16)	**.012**	.285 (1.5x)	3/16	2			937912	26.10		937912-C3	31.40			
	.187 (3/16)	**.012**	.625 (3x)	3/16	2			34812	26.10		34812-C3	31.40			
	.187 (3/16)	**.015**	.285 (1.5x)	3/16	2			937915	24.70		937915-C3	30.00			
NEW	.187 (3/16)	**.015**	.625 (3x)	3/16	2	46715		34815	24.70		34815-C3	30.00	46715-C4	34815-C4	41.80
	.187 (3/16)	**.020**	.285 (1.5x)	3/16	2	810520		937920	24.70		937920-C3	30.00			
	.187 (3/16)	**.020**	.625 (3x)	3/16	2	46720		34820	24.70		34820-C3	30.00			
	.187 (3/16)	**.025**	.285 (1.5x)	3/16	2			937925	26.10		937925-C3	31.40			
	.187 (3/16)	**.025**	.625 (3x)	3/16	2	46725		34825	26.10		34825-C3	31.40			
NEW	.187 (3/16)	**.030**	.285 (1.5x)	3/16	2	810530		937930	24.70		937930-C3	30.00		937930-C4	41.80
	.187 (3/16)	**.030**	.625 (3x)	3/16	2	46730		34830	24.70		34830-C3	30.00		34830-C4	41.80
	.187 (3/16)	**.040**	.285 (1.5x)	3/16	2			937940	26.10		937940-C3	31.40			
NEW	.187 (3/16)	**.040**	.625 (3x)	3/16	2	46740		34840	26.10		34840-C3	31.40		34840-C4	43.20
	.187 (3/16)	**.045**	.285 (1.5x)	3/16	2			937945	24.70		937945-C3	30.00			
	.187 (3/16)	**.045**	.625 (3x)	3/16	2	46745		34845	24.70		34845-C3	30.00		34845-C4	41.80
NEW	.187 (3/16)	**.050**	.625 (3x)	3/16	2			34850	26.10		34850-C3	31.40		34850-C4	43.20
	.187 (3/16)	**.060**	.285 (1.5x)	3/16	2	810560	833260	937960	24.70	833260-C3	937960-C3	30.00			
	.187 (3/16)	**.060**	.625 (3x)	3/16	2	46760	831960	34860	24.70	831960-C3	34860-C3	30.00		34860-C4	41.80
	.203 (13/64)	**.010**	.610 (3x)	1/4	2-1/2			865610	30.40		865610-C3	37.60			
	.203 (13/64)	**.030**	.610 (3x)	1/4	2-1/2			865630	30.40		865630-C3	37.60			
	.203 (13/64)	**.040**	.610 (3x)	1/4	2-1/2			865640	30.40		865640-C3	37.60			
	.218 (7/32)	**.010**	.660 (3x)	1/4	2-1/2			863910	30.40		863910-C3	37.60			
	.218 (7/32)	**.030**	.660 (3x)	1/4	2-1/2			863930	30.40		863930-C3	37.60			
	.218 (7/32)	**.040**	.660 (3x)	1/4	2-1/2			863940	30.40		863940-C3	37.60			
	.234 (15/64)	**.010**	.705 (3x)	1/4	2-1/2			863510	30.40		863510-C3	37.60			
	.234 (15/64)	**.030**	.705 (3x)	1/4	2-1/2			863530	30.40		863530-C3	37.60			
	.234 (15/64)	**.040**	.705 (3x)	1/4	2-1/2			863540	30.40		863540-C3	37.60			
	.250 (1/4)	**.005**	.375 (1.5x)	1/4	2-1/2	810805	833005	941105	32.10	833005-C3	941105-C3	39.30			
	.250 (1/4)	**.005**	.750 (3x)	1/4	2-1/2	47405	831805	36205	32.10	831805-C3	36205-C3	39.30		36205-C4	51.50
	.250 (1/4)	**.008**	.375 (1.5x)	1/4	2-1/2			941108	32.10		941108-C3	39.30			
	.250 (1/4)	**.008**	.750 (3x)	1/4	2-1/2			36208	32.10		36208-C3	39.30			
	.250 (1/4)	**.010**	.375 (1.5x)	1/4	2-1/2	810810	833010	941110	30.40	833010-C3	941110-C3	37.60			
NEW	.250 (1/4)	**.010**	.750 (3x)	1/4	2-1/2	47410	831810	36210	30.40	831810-C3	36210-C3	37.60	47410-C4	36210-C4	49.80
	.250 (1/4)	**.012**	.750 (3x)	1/4	2-1/2			36212	32.10		36212-C3	39.30			
	.250 (1/4)	**.015**	.375 (1.5x)	1/4	2-1/2		833015	941115	30.40	833015-C3	941115-C3	37.60			
	.250 (1/4)	**.015**	.750 (3x)	1/4	2-1/2	47415	831815	36215	30.40	831815-C3	36215-C3	37.60		36215-C4	49.80

continued on next page

NEW SIZES!

MINIATURE END MILLS

Corner Radius – Stub & Standard (cont.)

continued from previous page

CUTTER DIA.	CORNER RADIUS	LOC	SHANK DIA.	OAL	UNCOATED				ALTiN COATED			AMORPHOUS DIAMOND			
D_1 +.000″ −.002″	R +.001″ −.001″	L_2 +.030″ −.000″	D_2	L_1	2 FL	3 FL	4 FL	PRICE	3 FL	4 FL	PRICE	2 FL	4 FL	PRICE	
.250 (1/4)	**.020**	.375 (1.5x)	1/4	2-1/2			941120	30.40		941120-C3	37.60		941120-C4	49.80	NEW
.250 (1/4)	**.020**	.750 (3x)	1/4	2-1/2	47420		36220	30.40		36220-C3	37.60		36220-C4	49.80	
.250 (1/4)	**.025**	.375 (1.5x)	1/4	2-1/2		833025	941125	32.10	833025-C3	941125-C3	39.30				
.250 (1/4)	**.025**	.750 (3x)	1/4	2-1/2		831825	36225	32.10	831825-C3	36225-C3	39.30				
.250 (1/4)	**.030**	.375 (1.5x)	1/4	2-1/2			941130	30.40		941130-C3	37.60		941130-C4	49.80	NEW
.250 (1/4)	**.030**	.750 (3x)	1/4	2-1/2	47430		36230	30.40		36230-C3	37.60	47430-C4	36230-C4	49.80	NEW
.250 (1/4)	**.040**	.375 (1.5x)	1/4	2-1/2		833040	941140	32.10	833040-C3	941140-C3	39.30				
.250 (1/4)	**.040**	.750 (3x)	1/4	2-1/2	47440	831840	36240	32.10	831840-C3	36240-C3	39.30				
.250 (1/4)	**.045**	.375 (1.5x)	1/4	2-1/2			941145	30.40		941145-C3	37.60				
.250 (1/4)	**.045**	.750 (3x)	1/4	2-1/2	47445		36245	30.40		36245-C3	37.60		36245-C4	49.80	
.250 (1/4)	**.050**	.375 (1.5x)	1/4	2-1/2			941150	32.10		941150-C3	39.30				
.250 (1/4)	**.050**	.750 (3x)	1/4	2-1/2			36250	32.10		36250-C3	39.30		36250-C4	51.50	NEW
.250 (1/4)	**.060**	.375 (1.5x)	1/4	2-1/2			941160	30.40		941160-C3	37.60				
.250 (1/4)	**.060**	.750 (3x)	1/4	2-1/2	47460	831860	36260	30.40	831860-C3	36260-C3	37.60	47460-C4	36260-C4	49.80	NEW
.250 (1/4)	**.075**	.375 (1.5x)	1/4	2-1/2			941175	32.10		941175-C3	39.30				
.250 (1/4)	**.075**	.750 (3x)	1/4	2-1/2			36275	32.10		36275-C3	39.30				
.312 (5/16)	**.005**	1.000 (3x)	5/16	2-1/2			945105	35.90		945105-C3	44.30				
.312 (5/16)	**.010**	1.000 (3x)	5/16	2-1/2			945110	34.00		945110-C3	42.40				
.312 (5/16)	**.030**	1.000 (3x)	5/16	2-1/2			945130	34.00		945130-C3	42.40				
.312 (5/16)	**.040**	1.000 (3x)	5/16	2-1/2			945140	34.00		945140-C3	42.40				
.312 (5/16)	**.060**	1.000 (3x)	5/16	2-1/2			945160	34.00		945160-C3	42.40				
.375 (3/8)	**.005**	.570 (1.5x)	3/8	2-1/2			915205	48.80		915205-C3	58.30				
.375 (3/8)	**.005**	1.000 (3x)	3/8	2-1/2	804305		72805	48.80		72805-C3	58.30		72805-C4	72.20	
.375 (3/8)	**.010**	.570 (1.5x)	3/8	2-1/2			915210	46.20		915210-C3	55.70				
.375 (3/8)	**.010**	1.000 (3x)	3/8	2-1/2			72810	46.20		72810-C3	55.70				
.375 (3/8)	**.015**	1.000 (3x)	3/8	2-1/2			72815	46.20		72815-C3	55.70				
.375 (3/8)	**.020**	.570 (1.5x)	3/8	2-1/2			915220	46.20		915220-C3	55.70				NEW
.375 (3/8)	**.020**	1.000 (3x)	3/8	2-1/2			72820	46.20		72820-C3	55.70		72820-C4	69.60	NEW
.375 (3/8)	**.025**	1.000 (3x)	3/8	2-1/2			72825	46.20		72825-C3	55.70				
.375 (3/8)	**.030**	.570 (1.5x)	3/8	2-1/2			915230	46.20		915230-C3	55.70		915230-C4	69.60	NEW
.375 (3/8)	**.030**	1.000 (3x)	3/8	2-1/2			72830	46.20		72830-C3	55.70		72830-C4	69.60	
.375 (3/8)	**.040**	.570 (1.5x)	3/8	2-1/2			915240	48.80		915240-C3	58.30				
.375 (3/8)	**.040**	1.000 (3x)	3/8	2-1/2	804340	831740	72840	48.80	831740-C3	72840-C3	58.30		72840-C4	72.20	
.375 (3/8)	**.045**	1.000 (3x)	3/8	2-1/2			72845	46.20		72845-C3	55.70				
.375 (3/8)	**.050**	.570 (1.5x)	3/8	2-1/2			915250	46.20		915250-C3	55.70				
.375 (3/8)	**.050**	1.000 (3x)	3/8	2-1/2			72850	46.20		72850-C3	55.70				
.375 (3/8)	**.060**	1.000 (3x)	3/8	2-1/2			72860	46.20		72860-C3	55.70				
.375 (3/8)	**.075**	1.000 (3x)	3/8	2-1/2			72875	46.20		72875-C3	55.70				
.500 (1/2)	**.010**	1.000 (2x)	1/2	3			74510	71.40		74510-C3	85.60				
.500 (1/2)	**.015**	1.000 (2x)	1/2	3			74515	71.40		74515-C3	85.60				
.500 (1/2)	**.020**	1.000 (2x)	1/2	3			74520	71.40		74520-C3	85.60				
.500 (1/2)	**.030**	1.000 (2x)	1/2	3			74530	71.40		74530-C3	85.60		74530-C4	99.60	
.500 (1/2)	**.040**	1.000 (2x)	1/2	3			74540	71.40		74540-C3	85.60				
.500 (1/2)	**.045**	1.000 (2x)	1/2	3			74545	71.40		74545-C3	85.60				
.500 (1/2)	**.050**	1.000 (2x)	1/2	3			74550	71.40		74550-C3	85.60				
.500 (1/2)	**.060**	1.000 (2x)	1/2	3			74560	71.40		74560-C3	85.60				

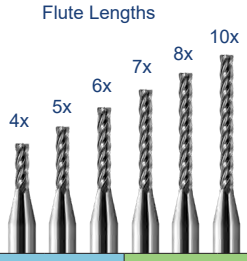
NEW SIZES!

MINIATURE END MILLS

Corner Radius – Long Flute



- **Long flute and long shank design for deep cavities**
- Mills deep pockets
- 4 flutes
- Center cutting
- Solid carbide
- CNC ground in the USA



CUTTER DIAMETER	CORNER RADIUS	LENGTH OF CUT	FLUTES	SHANK DIA.	OAL	UNCOATED		AlTiN COATED		AMORPHOUS DIAMOND	
D_1 $^{+.0005''}_{-.0005''}$	R $^{+.001''}_{-.001''}$	L_2 $^{+.010''}_{-.000''}$		D_2	L_1	4 FL	PRICE	4 FL	PRICE	4 FL	PRICE
.015 (1/64)	**.003**	**.078** (5x)	4	1/8	2-1/2	981415	68.70	981415-C3	73.60		
.015 (1/64)	**.003**	**.125** (8x)	4	1/8	2-1/2	933615	78.80	933615-C3	83.70		
.020 (.5 mm)	**.005**	**.100** (5x)	4	1/8	2-1/2	959620	61.60	959620-C3	66.50		
.020 (.5 mm)	**.005**	**.160** (8x)	4	1/8	2-1/2	949820	71.60	949820-C3	76.50		
.025	**.005**	**.125** (5x)	4	1/8	2-1/2	959625	58.60	959625-C3	63.50		
.025	**.005**	**.203** (8x)	4	1/8	2-1/2	949825	68.60	949825-C3	73.50		
.031 (1/32)	**.005**	**.125** (4x)	4	1/8	2-1/2	787531	55.70	787531-C3	60.60		
.031 (1/32)	**.005**	**.156** (5x)	4	1/8	2-1/2	959631	56.90	959631-C3	61.80		
.031 (1/32)	**.005**	**.187** (6x)	4	1/8	2-1/2	801131	60.00	801131-C3	64.90		
.031 (1/32)	**.005**	**.218** (7x)	4	1/8	2-1/2	800931	62.40	800931-C3	67.30		
.031 (1/32)	**.005**	**.250** (8x)	4	1/8	2-1/2	949831	66.70	949831-C3	71.60		
.031 (1/32)	**.008**	**.156** (5x)	4	1/8	2-1/2	884231	57.10	884231-C3	62.00		
.031 (1/32)	**.008**	**.250** (8x)	4	1/8	2-1/2	887431	66.70	887431-C3	71.60		
.031 (1/32)	**.010**	**.156** (5x)	4	1/8	2-1/2	964331	56.90	964331-C3	61.80		
.031 (1/32)	**.010**	**.250** (8x)	4	1/8	2-1/2	938031	66.70	938031-C3	71.60		
.039 (1 mm)	**.005**	**.203** (5x)	4	1/8	2-1/2	959639	54.10	959639-C3	59.00		
.039 (1 mm)	**.005**	**.325** (8x)	4	1/8	2-1/2	949839	60.30	949839-C3	65.20		
.039 (1 mm)	**.010**	**.203** (5x)	4	1/8	2-1/2	964339	54.10	964339-C3	59.00		
.039 (1 mm)	**.010**	**.325** (8x)	4	1/8	2-1/2	938039	60.30	938039-C3	65.20		
.040	**.005**	**.203** (5x)	4	1/8	2-1/2	959640	54.10	959640-C3	59.00		
.040	**.005**	**.325** (8x)	4	1/8	2-1/2	949840	60.30	949840-C3	65.20		
.047 (3/64)	**.005**	**.250** (5x)	4	1/8	2-1/2	959647	29.80	959647-C3	34.70		
.047 (3/64)	**.005**	**.375** (8x)	4	1/8	2-1/2	949847	33.80	949847-C3	38.70		
.047 (3/64)	**.010**	**.187** (4x)	4	1/8	2-1/2	787347	28.60	787347-C3	33.50		
.047 (3/64)	**.010**	**.250** (5x)	4	1/8	2-1/2	964347	29.80	964347-C3	34.70		
.047 (3/64)	**.010**	**.375** (8x)	4	1/8	2-1/2	938047	33.80	938047-C3	38.70		
.047 (3/64)	**.015**	**.250** (5x)	4	1/8	2-1/2	885047	29.80	885047-C3	34.70		
.047 (3/64)	**.015**	**.375** (8x)	4	1/8	2-1/2	888247	33.80	888247-C3	38.70		
.050	**.005**	**.250** (5x)	4	1/8	2-1/2	959650	29.80	959650-C3	34.70		
.050	**.005**	**.400** (8x)	4	1/8	2-1/2	949850	33.80	949850-C3	38.70		
.060	**.005**	**.312** (5x)	4	1/8	2-1/2	959660	29.80	959660-C3	34.70		
.060	**.005**	**.500** (8x)	4	1/8	2-1/2	949860	33.80	949860-C3	38.70		

continued on next page

NEW SIZES!

MINIATURE END MILLS

Corner Radius – Long Flute (cont.)

continued from previous page

CUTTER DIAMETER	CORNER RADIUS	LENGTH OF CUT	FLUTES	SHANK DIA.	OAL	UNCOATED		AlTiN COATED		AMORPHOUS DIAMOND		
D_1 $^{+.0005''}_{-.0005''}$	R $^{+.001''}_{-.001''}$	L_2 $^{+.010''}_{-.000''}$		D_2	L_1	4 FL	PRICE	4 FL	PRICE	4 FL	PRICE	
.062 (1/16)	**.005**	**.250** (4x)	4	1/8	2-1/2	787562	28.60	787562-C3	33.50			
.062 (1/16)	**.005**	**.312** (5x)	4	1/8	2-1/2	959662	29.80	959662-C3	34.70			
.062 (1/16)	**.005**	**.375** (6x)	4	1/8	2-1/2	801162	31.60	801162-C3	36.50			
.062 (1/16)	**.005**	**.437** (7x)	4	1/8	2-1/2	800962	32.00	800962-C3	36.90			
.062 (1/16)	**.005**	**.500** (8x)	4	1/8	2-1/2	949862	33.80	949862-C3	38.70			
.062 (1/16)	**.005**	**.625** (10x)	4	1/8	2-1/2	870562	39.40	870562-C3	44.30			
.062 (1/16)	**.008**	**.312** (5x)	4	1/8	2-1/2	884262	30.00	884262-C3	34.90			
.062 (1/16)	**.008**	**.500** (8x)	4	1/8	2-1/2	887462	33.80	887462-C3	38.70			
.062 (1/16)	**.010**	**.250** (4x)	4	1/8	2-1/2	787362	28.60	787362-C3	33.50			
.062 (1/16)	**.010**	**.312** (5x)	4	1/8	2-1/2	964362	29.80	964362-C3	34.70	964362-C4	42.20	NEW
.062 (1/16)	**.010**	**.500** (8x)	4	1/8	2-1/2	938062	33.80	938062-C3	38.70	938062-C4	46.20	NEW
.062 (1/16)	**.010**	**.625** (10x)	4	1/8	2-1/2	849262	39.40	849262-C3	44.30			
.062 (1/16)	**.015**	**.312** (5x)	4	1/8	2-1/2	885062	29.80	885062-C3	34.70			
.062 (1/16)	**.015**	**.500** (8x)	4	1/8	2-1/2	888262	33.80	888262-C3	38.70			
.062 (1/16)	**.020**	**.312** (5x)	4	1/8	2-1/2	885862	29.80	885862-C3	34.70	885862-C4	42.20	NEW
.062 (1/16)	**.020**	**.500** (8x)	4	1/8	2-1/2	889062	33.80	889062-C3	38.70			
.062 (1/16)	**.020**	**.625** (10x)	4	1/8	2-1/2	762662	39.40	762662-C3	44.30			NEW
.078 (5/64)	**.005**	**.406** (5x)	4	1/8	2-1/2	959678	29.80	959678-C3	34.70			
.078 (5/64)	**.005**	**.625** (8x)	4	1/8	2-1/2	949878	33.80	949878-C3	38.70			
.078 (5/64)	**.010**	**.312** (4x)	4	1/8	2-1/2	787378	28.60	787378-C3	33.50			
.078 (5/64)	**.010**	**.406** (5x)	4	1/8	2-1/2	964378	29.80	964378-C3	34.70	964378-C4	42.20	NEW
.078 (5/64)	**.010**	**.625** (8x)	4	1/8	2-1/2	938078	33.80	938078-C3	38.70			
.078 (5/64)	**.015**	**.406** (5x)	4	1/8	2-1/2	885078	29.80	885078-C3	34.70			
.078 (5/64)	**.015**	**.625** (8x)	4	1/8	2-1/2	888278	33.80	888278-C3	38.70			
.078 (5/64)	**.020**	**.406** (5x)	4	1/8	2-1/2	885878	29.80	885878-C3	34.70			
.078 (5/64)	**.020**	**.625** (8x)	4	1/8	2-1/2	889078	33.80	889078-C3	38.70			
.093 (3/32)	**.005**	**.375** (4x)	4	1/8	2-1/2	787593	28.60	787593-C3	33.50			
.093 (3/32)	**.005**	**.500** (5x)	4	1/8	2-1/2	959693	29.80	959693-C3	34.70			
.093 (3/32)	**.005**	**.585** (6x)	4	1/8	2-1/2	801193	31.60	801193-C3	36.50			
.093 (3/32)	**.005**	**.670** (7x)	4	1/8	2-1/2	800993	32.00	800993-C3	36.90			
.093 (3/32)	**.005**	**.750** (8x)	4	1/8	2-1/2	949893	33.80	949893-C3	38.70			
.093 (3/32)	**.005**	**.950** (10x)	4	1/8	2-1/2	870593	39.40	870593-C3	44.30			
.093 (3/32)	**.008**	**.500** (5x)	4	1/8	2-1/2	884293	30.00	884293-C3	34.90			
.093 (3/32)	**.008**	**.750** (8x)	4	1/8	2-1/2	887493	33.80	887493-C3	38.70			
.093 (3/32)	**.010**	**.375** (4x)	4	1/8	2-1/2	787393	28.60	787393-C3	33.50			
.093 (3/32)	**.010**	**.500** (5x)	4	1/8	2-1/2	964393	29.80	964393-C3	34.70	964393-C4	42.20	NEW
.093 (3/32)	**.010**	**.750** (8x)	4	1/8	2-1/2	938093	33.80	938093-C3	38.70			
.093 (3/32)	**.010**	**.950** (10x)	4	1/8	2-1/2	849293	39.40	849293-C3	44.30			
.093 (3/32)	**.015**	**.500** (5x)	4	1/8	2-1/2	885093	29.80	885093-C3	34.70			
.093 (3/32)	**.015**	**.750** (8x)	4	1/8	2-1/2	888293	33.80	888293-C3	38.70			
.093 (3/32)	**.020**	**.500** (5x)	4	1/8	2-1/2	885893	29.80	885893-C3	34.70			
.093 (3/32)	**.020**	**.750** (8x)	4	1/8	2-1/2	889093	33.80	889093-C3	38.70			
.093 (3/32)	**.020**	**.950** (10x)	4	1/8	2-1/2	762693	39.40	762693-C3	44.30			NEW
.093 (3/32)	**.030**	**.500** (5x)	4	1/8	2-1/2	886693	29.80	886693-C3	34.70			
.093 (3/32)	**.030**	**.750** (8x)	4	1/8	2-1/2	889893	33.80	889893-C3	38.70			

continued on next page

MINIATURE END MILLS

Corner Radius – Long Flute (cont.)

continued from previous page

	CUTTER DIAMETER	CORNER RADIUS	LENGTH OF CUT	FLUTES	SHANK DIA.	OAL	UNCOATED		AlTiN COATED		AMORPHOUS DIAMOND	
	D_1 $^{+.0005''}_{-.0005''}$	R $^{+.001''}_{-.001''}$	L_2 $^{+.010''}_{-.000''}$		D_2	L_1	4 FL	PRICE	4 FL	PRICE	4 FL	PRICE
	.100	**.010**	**.500** (5x)	4	1/8	2-1/2	964400	29.80	964400-C3	34.70		
	.100	**.010**	**.800** (8x)	4	1/8	2-1/2	938100	33.80	938100-C3	38.70		
	.109 (7/64)	**.005**	**.570** (5x)	4	1/8	2-1/2	912502	29.80	912502-C3	34.70		
	.118 (3 mm)	**.005**	**.625** (5x)	4	1/8	2-1/2	912505	29.80	912505-C3	34.70		
	.118 (3 mm)	**.005**	**.950** (8x)	4	1/8	2-1/2	905305	33.80	905305-C3	38.70		
	.118 (3 mm)	**.010**	**.625** (5x)	4	1/8	2-1/2	912605	29.80	912605-C3	34.70		
	.118 (3 mm)	**.010**	**.950** (8x)	4	1/8	2-1/2	905405	33.80	905405-C3	38.70		
	D_1 $^{+.000''}_{-.002''}$	R $^{+.001''}_{-.001''}$	L_2 $^{+.030''}_{-.000''}$				4 FL	PRICE	4 FL	PRICE	4 FL	PRICE
	.125 (1/8)	**.005**	**.625** (5x)	4	1/8	2-1/2	950905	28.10	950905-C3	33.00		
	.125 (1/8)	**.005**	**1.000** (8x)	4	1/8	2-1/2	981905	30.80	981905-C3	35.70		
NEW	.125 (1/8)	**.010**	**.625** (5x)	4	1/8	2-1/2	950910	28.10	950910-C3	33.00	950910-C4	40.50
	.125 (1/8)	**.010**	**1.000** (8x)	4	1/8	2-1/2	981910	30.80	981910-C3	35.70		
	.125 (1/8)	**.015**	**.625** (5x)	4	1/8	2-1/2	950915	28.10	950915-C3	33.00		
	.125 (1/8)	**.015**	**1.000** (8x)	4	1/8	2-1/2	981915	30.80	981915-C3	35.70		
	.125 (1/8)	**.020**	**.625** (5x)	4	1/8	2-1/2	950920	28.10	950920-C3	33.00		
	.125 (1/8)	**.020**	**1.000** (8x)	4	1/8	2-1/2	981920	30.80	981920-C3	35.70		
NEW	.125 (1/8)	**.020**	**1.250** (10x)	4	1/8	3	762220	36.10	762220-C3	41.00		
NEW	.125 (1/8)	**.030**	**.625** (5x)	4	1/8	2-1/2	950930	28.10	950930-C3	33.00	950930-C4	40.50
	.125 (1/8)	**.030**	**1.000** (8x)	4	1/8	2-1/2	981930	30.80	981930-C3	35.70		
	.125 (1/8)	**.040**	**.625** (5x)	4	1/8	2-1/2	950940	28.10	950940-C3	33.00		
	.140 (9/64)	**.010**	**.750** (5x)	4	3/16	3	793610	34.80	793610-C3	40.10		
	.140 (9/64)	**.015**	**.750** (5x)	4	3/16	3	793615	34.80	793615-C3	40.10		
	.156 (5/32)	**.010**	**.750** (5x)	4	3/16	3	830910	34.80	830910-C3	40.10		
	.156 (5/32)	**.030**	**.750** (5x)	4	3/16	3	830930	34.80	830930-C3	40.10		
	.187 (3/16)	**.005**	**1.000** (5x)	4	3/16	3	932405	33.10	932405-C3	38.40		
	.187 (3/16)	**.010**	**1.000** (5x)	4	3/16	3	932410	33.10	932410-C3	38.40		
	.187 (3/16)	**.010**	**1.680** (8x)	4	3/16	3	830810	34.00	830810-C3	39.30		
NEW	.187 (3/16)	**.020**	**1.000** (5x)	4	3/16	3	932420	33.10	932420-C3	38.40		
NEW	.187 (3/16)	**.020**	**1.500** (8x)	4	3/16	3	830820	34.00	830820-C3	39.30		
NEW	.187 (3/16)	**.030**	**1.000** (5x)	4	3/16	3	932430	33.10	932430-C3	38.40	932430-C4	50.20
NEW	.187 (3/16)	**.030**	**1.500** (8x)	4	3/16	3	830830	34.00	830830-C3	39.30		
	.187 (3/16)	**.040**	**1.000** (5x)	4	3/16	3	932450	33.10	932450-C3	38.40		
	.250 (1/4)	**.005**	**1.250** (5x)	4	1/4	4	917105	37.00	917105-C3	45.40		
	.250 (1/4)	**.010**	**1.250** (5x)	4	1/4	4	917110	37.00	917110-C3	45.40		
NEW	.250 (1/4)	**.020**	**1.250** (5x)	4	1/4	4	917120	37.00	917120-C3	45.40		
NEW	.250 (1/4)	**.020**	**2.000** (8x)	4	1/4	4	763020	38.30	763020-C3	46.70		
NEW	.250 (1/4)	**.030**	**1.250** (5x)	4	1/4	4	917130	37.00	917130-C3	45.40	917130-C4	56.40
NEW	.250 (1/4)	**.030**	**2.000** (8x)	4	1/4	4	763030	38.30	763030-C3	46.70		
	.250 (1/4)	**.040**	**1.250** (5x)	4	1/4	4	917140	37.00	917140-C3	45.40		
	.375 (3/8)	**.005**	**2.000** (5x)	4	3/8	4	800805	50.10	800805-C3	63.10		
	.375 (3/8)	**.010**	**2.000** (5x)	4	3/8	4	800810	50.10	800810-C3	63.10		
	.375 (3/8)	**.040**	**2.000** (5x)	4	3/8	4	800840	50.10	800840-C3	63.10		

NEW SIZES!

MINIATURE END MILLS

Corner Radius – Long Reach, Standard Flute



- Corner radius for improved strength
- Length of cut = 3x diameter
- Center cutting
- Solid carbide
- CNC ground in the USA



Reduced Neck Diameter to Avoid Heeling

CUTTER DIAMETER	CORNER RADIUS	LENGTH OF CUT	OVERALL REACH	SHANK DIAMETER	OVERALL LENGTH	UNCOATED			AlTiN COATED		
D_1 +.0005″ −.0005″	R +.001″ −.001″	L_2 +.010″ −.000″	L_3 +.010″ −.000″	D_2	L_1	2 FL	4 FL	PRICE	4 FL	PRICE	
.020	**.005**	.060	**.100** (5x)	1/8	1-1/2		864120	45.90	864120-C3	50.80	NEW
.020	**.005**	.060	**.160** (8x)	1/8	1-1/2		865720	46.80	865720-C3	51.70	NEW
.031 (1/32)	**.005**	.093	**.156** (5x)	1/8	1-1/2	864131	875231	44.80	875231-C3	49.70	
.031 (1/32)	**.005**	.093	**.250** (8x)	1/8	1-1/2	865731	876831	45.60	876831-C3	50.50	
.031 (1/32)	**.010**	.093	**.156** (5x)	1/8	1-1/2	864931	876031	44.80	876031-C3	49.70	
.031 (1/32)	**.010**	.093	**.250** (8x)	1/8	1-1/2	866531	877631	45.60	877631-C3	50.50	
.039 (1 mm)	**.005**	.117	**.325** (8x)	1/8	1-1/2		865739	45.60	865739-C3	50.50	NEW
.047 (3/64)	**.005**	.141	**.250** (5x)	1/8	1-1/2	864147	875247	43.40	875247-C3	48.30	
.047 (3/64)	**.005**	.141	**.375** (8x)	1/8	1-1/2	865747	876847	44.30	876847-C3	49.20	
.047 (3/64)	**.010**	.141	**.250** (5x)	1/8	1-1/2	864947	876047	43.40	876047-C3	48.30	
.047 (3/64)	**.010**	.141	**.375** (8x)	1/8	1-1/2	866547	877647	44.30	877647-C3	49.20	
.062 (1/16)	**.005**	.186	**.312** (5x)	1/8	1-1/2	864162	875262	43.40	875262-C3	48.30	
.062 (1/16)	**.005**	.186	**.500** (8x)	1/8	1-1/2	865762	876862	44.30	876862-C3	49.20	
.062 (1/16)	**.010**	.186	**.312** (5x)	1/8	1-1/2	864962	876062	43.40	876062-C3	48.30	
.062 (1/16)	**.010**	.186	**.500** (8x)	1/8	1-1/2	866562	877662	44.30	877662-C3	49.20	
.062 (1/16)	**.020**	.186	**.312** (5x)	1/8	1-1/2		764362	43.40	764362-C3	48.30	NEW
.062 (1/16)	**.020**	.186	**.500** (8x)	1/8	1-1/2		759362	44.30	759362-C3	49.20	NEW
.078 (5/64)	**.005**	.234	**.406** (5x)	1/8	1-1/2	864178	875278	43.40	875278-C3	48.30	
.078 (5/64)	**.005**	.234	**.625** (8x)	1/8	2	865778	876878	44.80	876878-C3	49.70	
.078 (5/64)	**.010**	.234	**.406** (5x)	1/8	1-1/2	864978	876078	43.40	876078-C3	48.30	
.078 (5/64)	**.010**	.234	**.625** (8x)	1/8	2	866578	877678	44.80	877678-C3	49.70	
.093 (3/32)	**.005**	.279	**.500** (5x)	1/8	1-1/2	864193	875293	44.30	875293-C3	49.20	
.093 (3/32)	**.005**	.279	**.750** (8x)	1/8	2	865793	876893	44.80	876893-C3	49.70	
.093 (3/32)	**.010**	.279	**.500** (5x)	1/8	1-1/2	864993	876093	44.30	876093-C3	49.20	
.093 (3/32)	**.010**	.279	**.750** (8x)	1/8	2	866593	877693	44.80	877693-C3	49.70	
.093 (3/32)	**.020**	.279	**.500** (5x)	1/8	1-1/2		764393	44.30	764393-C3	49.20	NEW
.093 (3/32)	**.020**	.279	**.750** (8x)	1/8	2		759393	44.80	759393-C3	49.70	NEW
.093 (3/32)	**.030**	.279	**.500** (5x)	1/8	1-1/2		762793	44.30	762793-C3	49.20	NEW
.093 (3/32)	**.030**	.279	**.750** (8x)	1/8	2		762093	44.80	762093-C3	49.70	NEW
.118 (3 mm)	**.010**	.354	**.950** (8x)	1/8	2		866605	45.30	866605-C3	50.20	NEW

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MINIATURE END MILLS

Corner Radius – Long Reach, Standard Flute (cont.)

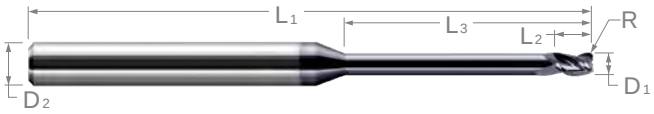
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	CUTTER DIAMETER	CORNER RADIUS	LENGTH OF CUT	OVERALL REACH	SHANK DIAMETER	OVERALL LENGTH	UNCOATED			ALTiN COATED	
	D_1 +.000″ −.002″	R +.001″ −.001″	L_2 +.030″ −.000″	L_3 +.030″ −.000″	D_2	L_1	2 FL	4 FL	PRICE	4 FL	PRICE
	.125 (1/8)	**.005**	.375	**.625** (5x)	1/8	1-1/2	864208	875308	44.30	875308-C3	49.20
	.125 (1/8)	**.005**	.375	**1.000** (8x)	1/8	2	865808	876908	44.30	876908-C3	49.20
	.125 (1/8)	**.010**	.375	**.625** (5x)	1/8	1-1/2	865008	876108	44.30	876108-C3	49.20
	.125 (1/8)	**.010**	.375	**1.000** (8x)	1/8	2	866608	877708	44.30	877708-C3	49.20
NEW	.125 (1/8)	**.020**	.375	**.625** (5x)	1/8	1-1/2		764408	44.30	764408-C3	49.20
NEW	.125 (1/8)	**.020**	.375	**1.000** (8x)	1/8	2-1/2		759408	44.30	759408-C3	49.20
NEW	.125 (1/8)	**.030**	.375	**.625** (5x)	1/8	1-1/2		762808	44.30	762808-C3	49.20
NEW	.125 (1/8)	**.030**	.375	**1.000** (8x)	1/8	2-1/2		762108	44.30	762108-C3	49.20
	.187 (3/16)	**.010**	.563	**1.000** (5x)	3/16	2		876112	51.70	876112-C3	57.00
	.187 (3/16)	**.010**	.563	**1.500** (8x)	3/16	2-1/2		877712	51.70	877712-C3	57.00
	.250 (1/4)	**.010**	.750	**1.250** (5x)	1/4	2-1/2		876116	57.00	876116-C3	64.20
	.250 (1/4)	**.010**	.750	**2.000** (8x)	1/4	4		877716	58.10	877716-C3	66.50

NEW SIZES!

MINIATURE END MILLS

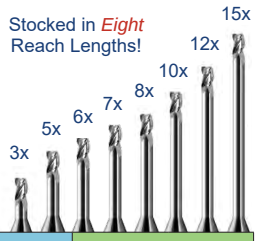
Corner Radius – Long Reach, Stub Flute



- **Long length design for deep cavities**
- Corner radius for improved strength
- Length of cut = 1½ x diameter
- Solid carbide
- CNC ground in the USA



Reduced Neck Diameter to Avoid Heeling



CORNER RADIUS

CUTTER DIA.	CORNER RADIUS	LOC	OVERALL REACH	FLUTES	SHANK DIA.	OAL	UNCOATED		AlTiN COATED		AMORPHOUS DIAMOND	
D_1 +.0005" −.0005"	R +.001" −.001"	L_2 +.010" −.000"	L_3 +.010" −.000"		D_2	L_1	TOOL #	PRICE	TOOL #	PRICE	TOOL #	PRICE
.010	**.003**	.015	**.050** (5x)	3	1/8	2-1/2	968210	55.60	968210-C3	60.50		
.010	**.003**	.015	**.080** (8x)	3	1/8	2-1/2	972710	56.50	972710-C3	61.40		
.015 (1/64)	**.003**	.022	**.078** (5x)	3	1/8	2-1/2	968215	49.70	968215-C3	54.60		
.015 (1/64)	**.003**	.022	**.125** (8x)	3	1/8	2-1/2	972715	51.00	972715-C3	55.90		
.015 (1/64)	**.005**	.022	**.078** (5x)	3	1/8	2-1/2	37115	49.90	37115-C3	54.80		
.015 (1/64)	**.005**	.022	**.125** (8x)	3	1/8	2-1/2	38315	51.00	38315-C3	55.90		
.020 (.5 mm)	**.003**	.030	**.100** (5x)	3	1/8	2-1/2	968220	48.10	968220-C3	53.00		
.020 (.5 mm)	**.005**	.030	**.100** (5x)	3	1/8	2-1/2	37120	48.10	37120-C3	53.00		
.020 (.5 mm)	**.005**	.030	**.160** (8x)	3	1/8	2-1/2	38320	49.50	38320-C3	54.40		
.020 (.5 mm)	**.005**	.030	**.200** (10x)	3	1/8	2-1/2	917820	51.80	917820-C3	56.70		
.025	**.005**	.037	**.125** (5x)	3	1/8	2-1/2	37125	48.10	37125-C3	53.00		
.025	**.005**	.037	**.203** (8x)	3	1/8	2-1/2	38325	49.50	38325-C3	54.40	38325-C4	61.90
.025	**.005**	.037	**.250** (10x)	3	1/8	2-1/2	917825	51.80	917825-C3	56.70		
.030	**.005**	.045	**.156** (5x)	3	1/8	2-1/2	37130	41.40	37130-C3	46.30		
.030	**.005**	.045	**.250** (8x)	3	1/8	2-1/2	38330	42.50	38330-C3	47.40		
.031 (1/32)	**.003**	.046	**.156** (5x)	3	1/8	2-1/2	968231	41.40	968231-C3	46.30		
.031 (1/32)	**.003**	.046	**.250** (8x)	3	1/8	2-1/2	972731	42.50	972731-C3	47.40		
.031 (1/32)	**.005**	.046	**.156** (5x)	3	1/8	2-1/2	37131	41.40	37131-C3	46.30	37131-C4	53.80
.031 (1/32)	**.005**	.046	**.156** (5x)	4	1/8	2-1/2	800531	44.40	800531-C3	49.30		
.031 (1/32)	**.005**	.046	**.250** (8x)	3	1/8	2-1/2	38331	42.50	38331-C3	47.40	38331-C4	54.90
.031 (1/32)	**.005**	.046	**.250** (8x)	4	1/8	2-1/2	800331	45.40	800331-C3	50.30		
.031 (1/32)	**.005**	.046	**.312** (10x)	3	1/8	2-1/2	917831	44.90	917831-C3	49.80		
.031 (1/32)	**.005**	.046	**.375** (12x)	3	1/8	2-1/2	39431	44.90	39431-C3	49.80	39431-C4	57.30
.031 (1/32)	**.008**	.046	**.156** (5x)	3	1/8	2-1/2	912731	41.40	912731-C3	46.30		
.031 (1/32)	**.008**	.046	**.250** (8x)	3	1/8	2-1/2	909331	42.50	909331-C3	47.40		
.031 (1/32)	**.010**	.046	**.093** (3x)	3	1/8	2-1/2	925631	41.40	925631-C3	46.30		
.031 (1/32)	**.010**	.046	**.156** (5x)	3	1/8	2-1/2	41531	41.40	41531-C3	46.30		
.031 (1/32)	**.010**	.046	**.250** (8x)	3	1/8	2-1/2	41731	42.50	41731-C3	47.40		
.031 (1/32)	**.010**	.046	**.312** (10x)	3	1/8	2-1/2	953731	44.90	953731-C3	49.80		
.031 (1/32)	**.010**	.046	**.375** (12x)	3	1/8	2-1/2	41931	44.90	41931-C3	49.80		
.031 (1/32)	**.010**	.046	**.470** (15x)	3	1/8	2-1/2	947831	51.60	947831-C3	56.50		
.039 (1 mm)	**.005**	.059	**.203** (5x)	3	1/8	2-1/2	37139	41.40	37139-C3	46.30		
.039 (1 mm)	**.005**	.059	**.325** (8x)	3	1/8	2-1/2	38339	42.50	38339-C3	47.40		
.039 (1 mm)	**.010**	.059	**.325** (8x)	3	1/8	2-1/2	41739	42.50	41739-C3	47.40		
.040	**.005**	.060	**.203** (5x)	3	1/8	2-1/2	37140	41.40	37140-C3	46.30		
.040	**.005**	.060	**.325** (8x)	3	1/8	2-1/2	38340	42.50	38340-C3	47.40		
.040	**.010**	.060	**.203** (5x)	3	1/8	2-1/2	41540	41.40	41540-C3	46.30		
.040	**.010**	.060	**.325** (8x)	3	1/8	2-1/2	41740	42.50	41740-C3	47.40		
.047 (3/64)	**.005**	.070	**.250** (5x)	3	1/8	2-1/2	37147	40.70	37147-C3	45.60	37147-C4	53.10
.047 (3/64)	**.005**	.070	**.375** (8x)	3	1/8	2-1/2	38347	41.60	38347-C3	46.50	38347-C4	54.00
.047 (3/64)	**.005**	.070	**.480** (10x)	3	1/8	2-1/2	917847	43.90	917847-C3	48.80		
.047 (3/64)	**.005**	.070	**.570** (12x)	3	1/8	2-1/2	39447	43.90	39447-C3	48.80	39447-C4	56.30

continued on next page

NEW SIZES!

MINIATURE END MILLS

Corner Radius – Long Reach, Stub Flute (cont.)

continued from previous page

	CUTTER DIA. D_1 +.0005″ −.0005″	CORNER RADIUS R +.001″ −.001″	LOC L_2 +.010″ −.000″	OVERALL REACH L_3 +.010″ −.000″	FLUTES	SHANK DIA. D_2	OAL L_1	UNCOATED TOOL #	UNCOATED PRICE	AlTiN COATED TOOL #	AlTiN COATED PRICE	AMORPHOUS DIAMOND TOOL #	AMORPHOUS DIAMOND PRICE
	.047 (3/64)	**.010**	.070	**.141** (3x)	3	1/8	2-1/2	925647	40.70	925647-C3	45.60		
	.047 (3/64)	**.010**	.070	**.250** (5x)	3	1/8	2-1/2	41547	40.70	41547-C3	45.60	41547-C4	53.10
	.047 (3/64)	**.010**	.070	**.375** (8x)	3	1/8	2-1/2	41747	41.60	41747-C3	46.50		
	.047 (3/64)	**.010**	.070	**.480** (10x)	3	1/8	2-1/2	953747	43.90	953747-C3	48.80		
	.047 (3/64)	**.010**	.070	**.570** (12x)	3	1/8	2-1/2	41947	43.30	41947-C3	48.20		
	.047 (3/64)	**.010**	.070	**.710** (15x)	3	1/8	2-1/2	947847	49.40	947847-C3	54.30		
	.047 (3/64)	**.015**	.070	**.250** (5x)	3	1/8	2-1/2	42747	40.70	42747-C3	45.60		
	.047 (3/64)	**.015**	.070	**.375** (8x)	3	1/8	2-1/2	42947	41.60	42947-C3	46.50		
	.050	**.005**	.075	**.250** (5x)	3	1/8	2-1/2	37150	40.70	37150-C3	45.60		
	.050	**.005**	.075	**.400** (8x)	3	1/8	2-1/2	38350	41.60	38350-C3	46.50		
	.050	**.010**	.075	**.250** (5x)	3	1/8	2-1/2	41550	40.70	41550-C3	45.60		
	.050	**.010**	.075	**.400** (8x)	3	1/8	2-1/2	41750	41.60	41750-C3	46.50		
	.060	**.005**	.090	**.312** (5x)	3	1/8	2-1/2	37160	40.70	37160-C3	45.60		
	.060	**.005**	.090	**.500** (8x)	3	1/8	2-1/2	38360	41.60	38360-C3	46.50		
	.060	**.010**	.090	**.312** (5x)	3	1/8	2-1/2	41560	40.70	41560-C3	45.60		
	.060	**.010**	.090	**.500** (8x)	3	1/8	2-1/2	41760	41.60	41760-C3	46.50		
	.060	**.015**	.090	**.500** (8x)	3	1/8	2-1/2	42960	41.60	42960-C3	46.50		
	.060	**.020**	.090	**.500** (8x)	3	1/8	2-1/2	970160	41.60	970160-C3	46.50		
	.062 (1/16)	**.003**	.093	**.312** (5x)	3	1/8	2-1/2	968262	40.70	968262-C3	45.60		
	.062 (1/16)	**.003**	.093	**.500** (8x)	3	1/8	2-1/2	972762	41.60	972762-C3	46.50		
	.062 (1/16)	**.005**	.093	**.312** (5x)	3	1/8	2-1/2	37162	40.70	37162-C3	45.60	37162-C4	53.10
	.062 (1/16)	**.005**	.093	**.312** (5x)	4	1/8	2-1/2	800562	43.60	800562-C3	48.50		
	.062 (1/16)	**.005**	.093	**.500** (8x)	3	1/8	2-1/2	38362	41.60	38362-C3	46.50	38362-C4	54.00
	.062 (1/16)	**.005**	.093	**.500** (8x)	4	1/8	2-1/2	800362	44.60	800362-C3	49.50		
	.062 (1/16)	**.005**	.093	**.625** (10x)	3	1/8	2-1/2	917862	43.90	917862-C3	48.80		
	.062 (1/16)	**.005**	.093	**.750** (12x)	3	1/8	2-1/2	39462	43.90	39462-C3	48.80		
	.062 (1/16)	**.008**	.093	**.312** (5x)	3	1/8	2-1/2	912762	40.70	912762-C3	45.60		
	.062 (1/16)	**.008**	.093	**.500** (8x)	3	1/8	2-1/2	909362	41.60	909362-C3	46.50		
	.062 (1/16)	**.010**	.093	**.187** (3x)	3	1/8	2-1/2	925662	40.70	925662-C3	45.60		
	.062 (1/16)	**.010**	.093	**.312** (5x)	3	1/8	2-1/2	41562	40.70	41562-C3	45.60	41562-C4	53.10
NEW	.062 (1/16)	**.010**	.093	**.375** (6x)	3	1/8	2-1/2	768462	40.70	768462-C3	45.60		
NEW	.062 (1/16)	**.010**	.093	**.437** (7x)	3	1/8	2-1/2	766862	41.60	766862-C3	46.50		
	.062 (1/16)	**.010**	.093	**.500** (8x)	3	1/8	2-1/2	41762	41.60	41762-C3	46.50	41762-C4	54.00
	.062 (1/16)	**.010**	.093	**.625** (10x)	3	1/8	2-1/2	953762	43.90	953762-C3	48.80		
	.062 (1/16)	**.010**	.093	**.750** (12x)	3	1/8	2-1/2	41962	43.90	41962-C3	48.80	41962-C4	56.30
	.062 (1/16)	**.010**	.093	**.950** (15x)	3	1/8	2-1/2	947862	49.40	947862-C3	54.30		
	.062 (1/16)	**.012**	.093	**.312** (5x)	3	1/8	2-1/2	901962	40.70	901962-C3	45.60		
	.062 (1/16)	**.012**	.093	**.500** (8x)	3	1/8	2-1/2	913562	41.60	913562-C3	46.50		
NEW	.062 (1/16)	**.015**	.093	**.312** (5x)	3	1/8	2-1/2	42762	40.70	42762-C3	45.60	42762-C4	53.10
NEW	.062 (1/16)	**.015**	.093	**.500** (8x)	3	1/8	2-1/2	42962	41.60	42962-C3	46.50	42962-C4	54.00
	.062 (1/16)	**.015**	.093	**.625** (10x)	3	1/8	2-1/2	965662	43.90	965662-C3	48.80		
	.062 (1/16)	**.015**	.093	**.750** (12x)	3	1/8	2-1/2	43162	43.90	43162-C3	48.80		
	.062 (1/16)	**.020**	.093	**.312** (5x)	3	1/8	2-1/2	953562	40.70	953562-C3	45.60	953562-C4	53.10
	.062 (1/16)	**.020**	.093	**.500** (8x)	3	1/8	2-1/2	970162	41.60	970162-C3	46.50	970162-C4	54.00
	.062 (1/16)	**.020**	.093	**.625** (10x)	3	1/8	2-1/2	923262	43.90	923262-C3	48.80		
	.062 (1/16)	**.020**	.093	**.750** (12x)	3	1/8	2-1/2	872662	43.90	872662-C3	48.80		

continued on next page

NEW SIZES!

MINIATURE END MILLS

Corner Radius – Long Reach, Stub Flute (cont.)

continued from previous page

CUTTER DIA.	CORNER RADIUS	LOC	OVERALL REACH	FLUTES	SHANK DIA.	OAL	UNCOATED		AlTiN COATED		AMORPHOUS DIAMOND		
D_1 +.0005" −.0005"	R +.001" −.001"	L_2 +.010" −.000"	L_3 +.010" −.000"		D_2	L_1	TOOL #	PRICE	TOOL #	PRICE	TOOL #	PRICE	
.070	**.005**	.105	**.375** (5x)	3	1/8	2-1/2	37170	40.70	37170-C3	45.60			
.070	**.005**	.105	**.570** (8x)	3	1/8	2-1/2	38370	41.60	38370-C3	46.50			
.070	**.010**	.105	**.375** (5x)	3	1/8	2-1/2	41570	40.70	41570-C3	45.60			
.070	**.010**	.105	**.570** (8x)	3	1/8	2-1/2	41770	41.60	41770-C3	46.50			
.078 (5/64)	**.005**	.117	**.406** (5x)	3	1/8	2-1/2	37178	40.70	37178-C3	45.60			
.078 (5/64)	**.005**	.117	**.625** (8x)	3	1/8	2-1/2	38378	41.60	38378-C3	46.50			
.078 (5/64)	**.005**	.117	**.800** (10x)	3	1/8	2-1/2	917878	43.90	917878-C3	48.80			
.078 (5/64)	**.005**	.117	**.940** (12x)	3	1/8	2-1/2	39478	43.90	39478-C3	48.80			
.078 (5/64)	**.010**	.117	**.406** (5x)	3	1/8	2-1/2	41578	40.70	41578-C3	45.60	41578-C4	53.10	
.078 (5/64)	**.010**	.117	**.475** (6x)	3	1/8	2-1/2	768478	40.70	768478-C3	45.60			NEW
.078 (5/64)	**.010**	.117	**.550** (7x)	3	1/8	2-1/2	766878	41.60	766878-C3	46.50			NEW
.078 (5/64)	**.010**	.117	**.625** (8x)	3	1/8	2-1/2	41778	41.60	41778-C3	46.50	41778-C4	54.00	
.078 (5/64)	**.010**	.117	**.800** (10x)	3	1/8	2-1/2	953778	43.90	953778-C3	48.80			
.078 (5/64)	**.010**	.117	**.940** (12x)	3	1/8	2-1/2	41978	43.90	41978-C3	48.80	41978-C4	56.30	
.078 (5/64)	**.015**	.117	**.234** (3x)	3	1/8	2-1/2	944978	40.70	944978-C3	45.60			
.078 (5/64)	**.015**	.117	**.406** (5x)	3	1/8	2-1/2	42778	40.70	42778-C3	45.60			
.078 (5/64)	**.015**	.117	**.625** (8x)	3	1/8	2-1/2	42978	41.60	42978-C3	46.50			
.078 (5/64)	**.015**	.117	**.800** (10x)	3	1/8	2-1/2	965678	43.90	965678-C3	48.80			
.078 (5/64)	**.015**	.117	**.940** (12x)	3	1/8	2-1/2	43178	43.90	43178-C3	48.80			
.078 (5/64)	**.015**	.117	**1.187** (15x)	3	1/8	2-1/2	939378	49.40	939378-C3	54.30			
.078 (5/64)	**.020**	.117	**.406** (5x)	3	1/8	2-1/2	953578	40.70	953578-C3	45.60			
.078 (5/64)	**.020**	.117	**.625** (8x)	3	1/8	2-1/2	970178	41.60	970178-C3	46.50			
.078 (5/64)	**.020**	.117	**.800** (10x)	3	1/8	2-1/2	923278	43.90	923278-C3	48.80			
.080	**.005**	.120	**.406** (5x)	3	1/8	2-1/2	37180	40.70	37180-C3	45.60			
.080	**.005**	.120	**.650** (8x)	3	1/8	2-1/2	38380	41.60	38380-C3	46.50			
.080	**.010**	.120	**.406** (5x)	3	1/8	2-1/2	41580	40.70	41580-C3	45.60			
.080	**.010**	.120	**.650** (8x)	3	1/8	2-1/2	41780	41.60	41780-C3	46.50			
.090	**.005**	.135	**.450** (5x)	3	1/8	2-1/2	37190	40.70	37190-C3	45.60			
.090	**.005**	.135	**.750** (8x)	3	1/8	2-1/2	38390	41.60	38390-C3	46.50			
.090	**.010**	.135	**.450** (5x)	3	1/8	2-1/2	41590	40.70	41590-C3	45.60			
.090	**.010**	.135	**.750** (8x)	3	1/8	2-1/2	41790	41.60	41790-C3	46.50			
.093 (3/32)	**.003**	.139	**.500** (5x)	3	1/8	2-1/2	968293	40.70	968293-C3	45.60			
.093 (3/32)	**.003**	.139	**.750** (8x)	3	1/8	2-1/2	972793	41.60	972793-C3	46.50			
.093 (3/32)	**.005**	.139	**.500** (5x)	3	1/8	2-1/2	37193	40.70	37193-C3	45.60	37193-C4	53.10	
.093 (3/32)	**.005**	.139	**.500** (5x)	4	1/8	2-1/2	800593	43.60	800593-C3	48.50			
.093 (3/32)	**.005**	.139	**.750** (8x)	3	1/8	2-1/2	38393	41.60	38393-C3	46.50			
.093 (3/32)	**.005**	.139	**.750** (8x)	4	1/8	2-1/2	800393	44.60	800393-C3	49.50			
.093 (3/32)	**.005**	.139	**.950** (10x)	3	1/8	2-1/2	917893	43.90	917893-C3	48.80			
.093 (3/32)	**.005**	.139	**1.125** (12x)	3	1/8	2-1/2	39493	43.90	39493-C3	48.80			
.093 (3/32)	**.008**	.139	**.500** (5x)	3	1/8	2-1/2	912793	40.70	912793-C3	45.60			
.093 (3/32)	**.008**	.139	**.750** (8x)	3	1/8	2-1/2	909393	41.40	909393-C3	46.30			
.093 (3/32)	**.010**	.139	**.500** (5x)	3	1/8	2-1/2	41593	40.70	41593-C3	45.60	41593-C4	53.10	
.093 (3/32)	**.010**	.139	**.750** (8x)	3	1/8	2-1/2	41793	41.60	41793-C3	46.50			
.093 (3/32)	**.010**	.139	**.950** (10x)	3	1/8	2-1/2	953793	43.90	953793-C3	48.80			
.093 (3/32)	**.010**	.139	**1.125** (12x)	3	1/8	2-1/2	41993	43.90	41993-C3	48.80			
.093 (3/32)	**.012**	.139	**.500** (5x)	3	1/8	2-1/2	901993	40.70	901993-C3	45.60			
.093 (3/32)	**.012**	.139	**.750** (8x)	3	1/8	2-1/2	913593	41.60	913593-C3	46.50			

continued on next page

NEW SIZES!

MINIATURE END MILLS

Corner Radius – Long Reach, Stub Flute (cont.)

continued from previous page

	CUTTER DIA.	CORNER RADIUS	LOC	OVERALL REACH	FLUTES	SHANK DIA.	OAL	UNCOATED		AlTiN COATED		AMORPHOUS DIAMOND	
	D_1 +.0005″ −.0005″	R +.001″ −.001″	L_2 +.010″ −.000″	L_3 +.010″ −.000″		D_2	L_1	TOOL #	PRICE	TOOL #	PRICE	TOOL #	PRICE
	.093 (3/32)	**.015**	.139	**.279** (3x)	3	1/8	2-1/2	944993	40.70	944993-C3	45.60		
	.093 (3/32)	**.015**	.139	**.500** (5x)	3	1/8	2-1/2	42793	40.70	42793-C3	45.60	42793-C4	53.10
NEW	.093 (3/32)	**.015**	.139	**.585** (6x)	3	1/8	2-1/2	765893	40.70	765893-C3	45.60		
NEW	.093 (3/32)	**.015**	.139	**.670** (7x)	3	1/8	2-1/2	766093	41.60	766093-C3	46.50		
	.093 (3/32)	**.015**	.139	**.750** (8x)	3	1/8	2-1/2	42993	41.60	42993-C3	46.50	42993-C4	54.00
	.093 (3/32)	**.015**	.139	**.950** (10x)	3	1/8	2-1/2	965693	43.90	965693-C3	48.80		
	.093 (3/32)	**.015**	.139	**1.125** (12x)	3	1/8	2-1/2	43193	43.90	43193-C3	48.80	43193-C4	56.30
	.093 (3/32)	**.015**	.139	**1.400** (15x)	3	1/8	3	939393	49.40	939393-C3	54.30		
	.093 (3/32)	**.020**	.139	**.500** (5x)	3	1/8	2-1/2	953593	40.70	953593-C3	45.60		
	.093 (3/32)	**.020**	.139	**.750** (8x)	3	1/8	2-1/2	970193	41.60	970193-C3	46.50		
	.093 (3/32)	**.020**	.139	**.950** (10x)	3	1/8	2-1/2	923293	43.90	923293-C3	48.80		
	.093 (3/32)	**.030**	.139	**.500** (5x)	3	1/8	2-1/2	42193	40.70	42193-C3	45.60	42193-C4	53.10
	.093 (3/32)	**.030**	.139	**.750** (8x)	3	1/8	2-1/2	42393	41.60	42393-C3	46.50		
	.093 (3/32)	**.030**	.139	**.950** (10x)	3	1/8	2-1/2	921493	43.90	921493-C3	48.80		
	.100	**.005**	.150	**.500** (5x)	3	1/8	2-1/2	37200	40.70	37200-C3	45.60		
	.100	**.005**	.150	**.800** (8x)	3	1/8	2-1/2	38400	41.60	38400-C3	46.50		
	.100	**.010**	.150	**.500** (5x)	3	1/8	2-1/2	41600	40.70	41600-C3	45.60		
	.100	**.010**	.150	**.800** (8x)	3	1/8	2-1/2	41800	41.60	41800-C3	46.50		
	.109 (7/64)	**.005**	.163	**.570** (5x)	3	1/8	2-1/2	37202	40.70	37202-C3	45.60		
	.109 (7/64)	**.005**	.163	**.900** (8x)	3	1/8	2-1/2	38402	41.60	38402-C3	46.50		
	.109 (7/64)	**.010**	.163	**.570** (5x)	3	1/8	2-1/2	41602	40.70	41602-C3	45.60		
	.109 (7/64)	**.010**	.163	**.900** (8x)	3	1/8	2-1/2	41802	41.60	41802-C3	46.50		
	.118 (3 mm)	**.005**	.177	**.950** (8x)	3	1/8	2-1/2	38405	41.60	38405-C3	46.50		
	.118 (3 mm)	**.010**	.177	**.950** (8x)	3	1/8	2-1/2	41805	41.60	41805-C3	46.50		

	D_1 +.000″ −.002″	R +.001″ −.001″	L_2 +.030″ −.000″	L_3 +.030″ −.000″		D_2	L_1	TOOL #	PRICE	TOOL #	PRICE	TOOL #	PRICE
	.125 (1/8)	**.005**	.187	**.625** (5x)	3	1/8	2-1/2	37208	40.70	37208-C3	45.60	37208-C4	53.10
	.125 (1/8)	**.005**	.187	**1.000** (8x)	3	1/8	2-1/2	38408	41.60	38408-C3	46.50		
	.125 (1/8)	**.005**	.187	**1.250** (10x)	3	1/8	2-1/2	917908	45.60	917908-C3	50.50		
	.125 (1/8)	**.005**	.187	**1.500** (12x)	3	1/8	3	39508	44.80	39508-C3	49.70		
	.125 (1/8)	**.008**	.187	**.625** (5x)	3	1/8	2-1/2	912808	40.70	912808-C3	45.60		
	.125 (1/8)	**.008**	.187	**1.000** (8x)	3	1/8	2-1/2	909408	41.40	909408-C3	46.30		
	.125 (1/8)	**.010**	.187	**.375** (3x)	3	1/8	2-1/2	925708	40.70	925708-C3	45.60		
	.125 (1/8)	**.010**	.187	**.625** (5x)	3	1/8	2-1/2	41608	40.70	41608-C3	45.60	41608-C4	53.10
	.125 (1/8)	**.010**	.187	**.625** (5x)	4	1/8	2-1/2	800208	44.90	800208-C3	49.80		
NEW	.125 (1/8)	**.010**	.187	**.750** (6x)	3	1/8	2-1/2	768508	40.70	768508-C3	45.60		
NEW	.125 (1/8)	**.010**	.187	**.875** (7x)	3	1/8	2-1/2	766908	41.60	766908-C3	46.50		
	.125 (1/8)	**.010**	.187	**1.000** (8x)	3	1/8	2-1/2	41808	41.60	41808-C3	46.50		
	.125 (1/8)	**.010**	.187	**1.000** (8x)	4	1/8	2-1/2	800008	45.80	800008-C3	50.70		
	.125 (1/8)	**.010**	.187	**1.250** (10x)	3	1/8	2-1/2	953808	44.60	953808-C3	49.50		
	.125 (1/8)	**.010**	.187	**1.500** (12x)	3	1/8	3	42008	44.80	42008-C3	49.70		
	.125 (1/8)	**.010**	.187	**1.875** (15x)	3	1/8	3	947908	50.70	947908-C3	55.60		
	.125 (1/8)	**.015**	.187	**.625** (5x)	3	1/8	2-1/2	42808	40.70	42808-C3	45.60	42808-C4	53.10
	.125 (1/8)	**.015**	.187	**1.000** (8x)	3	1/8	2-1/2	43008	41.60	43008-C3	46.50	43008-C4	54.00
	.125 (1/8)	**.015**	.187	**1.250** (10x)	3	1/8	2-1/2	965708	44.60	965708-C3	49.50		
	.125 (1/8)	**.015**	.187	**1.500** (12x)	3	1/8	3	43208	44.80	43208-C3	49.70	43208-C4	57.20
	.125 (1/8)	**.015**	.187	**1.875** (15x)	3	1/8	3	939408	50.50	939408-C3	55.40		

continued on next page

NEW SIZES!

MINIATURE END MILLS

Corner Radius – Long Reach, Stub Flute (cont.)

continued from previous page

CUTTER DIA.	CORNER RADIUS	LOC	OVERALL REACH	FLUTES	SHANK DIA.	OAL	UNCOATED		AlTiN COATED		AMORPHOUS DIAMOND		
D_1 +.000″ −.002″	R +.001″ −.001″	L_2 +.030″ −.000″	L_3 +.030″ −.000″		D_2	L_1	TOOL #	PRICE	TOOL #	PRICE	TOOL #	PRICE	
.125 (1/8)	**.020**	.187	**.625** (5x)	3	1/8	2-1/2	953608	40.70	953608-C3	45.60	953608-C4	53.10	
.125 (1/8)	**.020**	.187	**1.000** (8x)	3	1/8	2-1/2	970208	41.60	970208-C3	46.50			
.125 (1/8)	**.020**	.187	**1.250** (10x)	3	1/8	2-1/2	923308	44.60	923308-C3	49.50			
.125 (1/8)	**.025**	.187	**.625** (5x)	3	1/8	2-1/2	839908	40.70	839908-C3	45.60			
.125 (1/8)	**.025**	.187	**1.000** (8x)	3	1/8	2-1/2	840208	41.40	840208-C3	46.30			
.125 (1/8)	**.030**	.187	**.375** (3x)	3	1/8	2-1/2	827108	40.70	827108-C3	45.60			
.125 (1/8)	**.030**	.187	**.625** (5x)	3	1/8	2-1/2	42208	40.70	42208-C3	45.60	42208-C4	53.10	
.125 (1/8)	**.030**	.187	**1.000** (8x)	3	1/8	2-1/2	42408	41.60	42408-C3	46.50			
.125 (1/8)	**.030**	.187	**1.250** (10x)	3	1/8	2-1/2	921508	44.80	921508-C3	49.70			
.125 (1/8)	**.030**	.187	**1.500** (12x)	3	1/8	3	42608	44.80	42608-C3	49.70			
.125 (1/8)	**.030**	.187	**1.875** (15x)	3	1/8	3	919708	50.50	919708-C3	55.40			
.125 (1/8)	**.040**	.187	**.625** (5x)	3	1/8	2-1/2	930208	40.70	930208-C3	45.60			
.125 (1/8)	**.040**	.187	**1.000** (8x)	3	1/8	2-1/2	924308	41.40	924308-C3	46.30			
.140 (9/64)	**.010**	.220	**.750** (5x)	3	3/16	3	41609	40.70	41609-C3	46.00			
.140 (9/64)	**.010**	.220	**1.125** (8x)	3	3/16	3	41809	41.60	41809-C3	46.90			
.140 (9/64)	**.015**	.220	**.750** (5x)	3	3/16	3	42809	40.70	42809-C3	46.00			
.140 (9/64)	**.015**	.220	**1.125** (8x)	3	3/16	3	43009	41.60	43009-C3	46.90			
.156 (5/32)	**.010**	.234	**.750** (5x)	3	3/16	3	41610	44.80	41610-C3	50.10			
.156 (5/32)	**.010**	.234	**1.250** (8x)	3	3/16	3	41810	45.60	41810-C3	50.90			
.156 (5/32)	**.010**	.234	**1.570** (10x)	3	3/16	3	953810	48.50	953810-C3	53.80			
.156 (5/32)	**.015**	.234	**.750** (5x)	3	3/16	3	42810	44.80	42810-C3	50.10			
.156 (5/32)	**.015**	.234	**1.250** (8x)	3	3/16	3	43010	45.60	43010-C3	50.90			
.156 (5/32)	**.015**	.234	**1.570** (10x)	3	3/16	3	965710	48.50	965710-C3	53.80			
.156 (5/32)	**.020**	.234	**.750** (5x)	3	3/16	3	953610	44.80	953610-C3	50.10			
.156 (5/32)	**.020**	.234	**1.250** (8x)	3	3/16	3	970210	45.60	970210-C3	50.90			
.156 (5/32)	**.030**	.234	**.750** (5x)	3	3/16	3	42210	44.80	42210-C3	50.10			
.156 (5/32)	**.030**	.234	**1.250** (8x)	3	3/16	3	42410	45.60	42410-C3	50.90			
.187 (3/16)	**.005**	.281	**1.000** (5x)	3	3/16	3	37212	44.80	37212-C3	50.10			
.187 (3/16)	**.010**	.281	**1.000** (5x)	3	3/16	3	41612	44.80	41612-C3	50.10			
.187 (3/16)	**.010**	.281	**1.500** (8x)	3	3/16	3	41812	45.60	41812-C3	50.90			
.187 (3/16)	**.015**	.281	**1.000** (5x)	3	3/16	3	42812	44.80	42812-C3	50.10	42812-C4	61.90	
.187 (3/16)	**.015**	.281	**1.500** (8x)	3	3/16	3	43012	45.60	43012-C3	50.90	43012-C4	62.70	
.187 (3/16)	**.015**	.281	**1.875** (10x)	3	3/16	4	965712	48.50	965712-C3	55.70			
.187 (3/16)	**.015**	.281	**2.250** (12x)	3	3/16	4	43212	48.70	43212-C3	55.90	43212-C4	66.90	
.187 (3/16)	**.020**	.281	**1.000** (5x)	3	3/16	3	953612	44.80	953612-C3	50.10			
.187 (3/16)	**.020**	.281	**1.500** (8x)	3	3/16	3	970212	45.60	970212-C3	50.90			
.187 (3/16)	**.030**	.281	**1.000** (5x)	3	3/16	3	42212	44.80	42212-C3	50.10	42212-C4	61.90	
.187 (3/16)	**.030**	.281	**1.156** (6x)	3	3/16	3	766512	44.80	766512-C3	50.10			NEW
.187 (3/16)	**.030**	.281	**1.312** (7x)	3	3/16	3	765712	45.60	765712-C3	50.90			NEW
.187 (3/16)	**.030**	.281	**1.500** (8x)	3	3/16	3	42412	45.60	42412-C3	50.90	42412-C4	62.70	
.187 (3/16)	**.030**	.281	**1.875** (10x)	3	3/16	4	921512	48.70	921512-C3	55.90			
.187 (3/16)	**.030**	.281	**2.250** (12x)	3	3/16	4	42612	48.70	42612-C3	55.90			
.187 (3/16)	**.045**	.281	**1.000** (5x)	3	3/16	3	978812	44.80	978812-C3	50.10			
.187 (3/16)	**.045**	.281	**1.500** (8x)	3	3/16	3	961812	45.60	961812-C3	50.90			
.187 (3/16)	**.060**	.281	**1.000** (5x)	3	3/16	3	949112	44.80	949112-C3	50.10			
.187 (3/16)	**.060**	.281	**1.500** (8x)	3	3/16	3	866012	45.40	866012-C3	50.70			

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NEW SIZES!

MINIATURE END MILLS

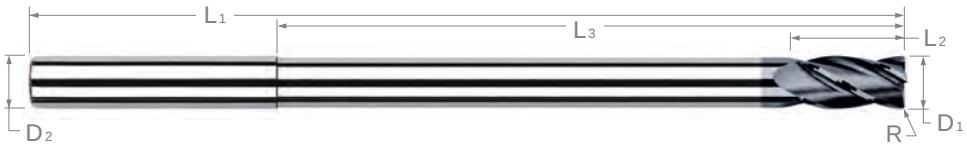
Corner Radius – Long Reach, Stub Flute (cont.)

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	CUTTER DIA.	CORNER RADIUS	LOC	OVERALL REACH	FLUTES	SHANK DIA.	OAL	UNCOATED		AlTiN COATED		AMORPHOUS DIAMOND	
	D_1 +.000″ −.002″	R +.001″ −.001″	L_2 +.030″ −.000″	L_3 +.030″ −.000″		D_2	L_1	TOOL #	PRICE	TOOL #	PRICE	TOOL #	PRICE
	.250 (1/4)	**.005**	.375	**1.250** (5x)	3	1/4	4	37216	49.50	37216-C3	54.80		
NEW	.250 (1/4)	**.005**	.375	**2.000** (8x)	3	1/4	4	38416	50.70	38416-C3	59.10		
	.250 (1/4)	**.010**	.375	**1.250** (5x)	3	1/4	4	41616	49.50	41616-C3	57.90		
NEW	.250 (1/4)	**.010**	.375	**2.000** (8x)	3	1/4	4	41816	50.70	41816-C3	59.10		
	.250 (1/4)	**.015**	.375	**1.250** (5x)	3	1/4	4	42816	49.50	42816-C3	57.90		
	.250 (1/4)	**.015**	.375	**2.000** (8x)	3	1/4	4	43016	50.70	43016-C3	59.10		
	.250 (1/4)	**.015**	.375	**3.000** (12x)	3	1/4	6	43216	56.90	43216-C3	66.40		
	.250 (1/4)	**.020**	.375	**1.250** (5x)	3	1/4	4	953616	49.50	953616-C3	57.90		
	.250 (1/4)	**.020**	.375	**2.000** (8x)	3	1/4	4	970216	50.70	970216-C3	59.10		
	.250 (1/4)	**.030**	.375	**1.250** (5x)	3	1/4	4	42216	49.50	42216-C3	57.90	42216-C4	68.90
	.250 (1/4)	**.030**	.375	**2.000** (8x)	3	1/4	4	42416	50.70	42416-C3	59.10	42416-C4	70.10
	.250 (1/4)	**.030**	.375	**3.000** (12x)	3	1/4	6	42616	56.90	42616-C3	66.40	42616-C4	85.00
	.250 (1/4)	**.045**	.375	**1.250** (5x)	3	1/4	4	978816	49.50	978816-C3	57.90		
NEW	.250 (1/4)	**.060**	.375	**1.250** (5x)	3	1/4	4	949116	49.50	949116-C3	57.90	949116-C4	68.90
NEW	.250 (1/4)	**.060**	.375	**2.000** (8x)	3	1/4	4	866016	50.70	866016-C3	59.10		
	.312 (5/16)	**.015**	.470	**1.625** (5x)	3	5/16	4	42820	78.80	42820-C3	88.90		
	.312 (5/16)	**.015**	.470	**2.500** (8x)	3	5/16	4	43020	80.20	43020-C3	90.30		
	.375 (3/8)	**.030**	.570	**2.000** (5x)	3	3/8	4	42224	83.40	42224-C3	96.40		
	.375 (3/8)	**.030**	.570	**3.000** (8x)	3	3/8	6	42424	113.10	42424-C3	127.80		
NEW	.375 (3/8)	**.060**	.570	**2.000** (5x)	3	3/8	4	949124	83.40	949124-C3	96.40		
NEW	.375 (3/8)	**.060**	.570	**3.000** (8x)	3	3/8	6	866024	113.10	866024-C3	127.80		

MINIATURE END MILLS

Corner Radius – Extra Long Length



- **Up to 8" overall length**
- Longest overall length carbide end mill available in stock
- Extended reach
- 4 flutes
- Center cutting
- Solid carbide
- CNC ground in the USA

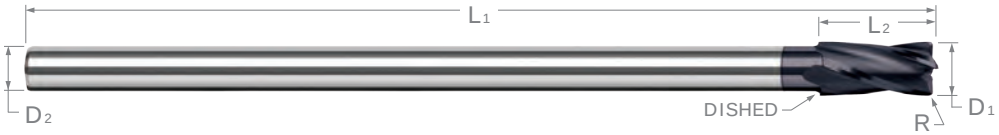
CUTTER DIAMETER	CORNER RADIUS	LENGTH OF CUT	OVERALL REACH	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN COATED	
D_1 $^{+.000''}_{-.002''}$	R $^{+.001''}_{-.001''}$	L_2 $^{+.030''}_{-.00''}$	L_3 $^{+.030''}_{-.000''}$	D_2	L_1	4 FL	PRICE	4 FL	PRICE
.250 (1/4)	**.015**	.375	4.375 (17.5x)	1/4	6	24016	91.50	24016-C3	101.00
.312 (5/16)	**.015**	.470	4.343 (14x)	5/16	6	24020	107.90	24020-C3	122.10
.375 (3/8)	**.030**	.562	4.312 (11.5x)	3/8	6	24024	122.40	24024-C3	137.10
.500 (1/2)	**.030**	.750	5.750 (11.5x)	1/2	8	24032	213.10	24032-C3	242.40
.625 (5/8)	**.030**	.937	5.687 (9x)	5/8	8	24040	359.60	24040-C3	385.40
.750 (3/4)	**.030**	1.125	5.625 (7.5x)	3/4	8	24048	443.80	24048-C3	473.80

View a comprehensive library of **Speeds & Feeds** charts for every Harvey Tool End Mill on the new Harveytool.com.

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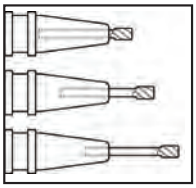
END MILLS

Corner Radius – Reduced Shank



- Reduced straight shank allows any chucking depth
- Solid carbide construction for maximum rigidity
- Long length design for deep cavity machining
- Corner radius for improved strength
- Length of cut = 1½ x diameter
- Center cutting
- 4 flutes
- Solid carbide
- CNC ground in the USA

Chuck at Any Depth!



	CUTTER DIAMETER	CORNER RADIUS	LENGTH OF CUT	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN COATED	
	D_1 +.000″ −.002″	R +.001″ −.001″	L_2 +.030″ −.000″	D_2 (h6)	L_1	4 FL	PRICE	4 FL	PRICE
NEW	**1/8**	.010	3/16	**3 mm**	2-1/2	17608	90.70	17608-C3	95.60
	1/8	.015	3/16	**3 mm**	2-1/2	829008	90.70	829008-C3	95.60
	5/32	.010	15/64	**1/8**	2-1/2	17610	90.70	17610-C3	96.00
	5/32	.015	15/64	**1/8**	2-1/2	829010	90.70	829010-C3	96.00
	3/16	.015	9/32	**1/8**	2-1/2	17612	90.70	17612-C3	96.00
	3/16	.015	9/32	**5/32**	2-1/2	17613	93.40	17613-C3	98.70
	3/16	.030	9/32	**1/8**	2-1/2	844912	93.40	844912-C3	98.70
	1/4	.015	3/8	**3/16**	3	17616	98.20	17616-C3	105.40
	1/4	.030	3/8	**3/16**	3	844916	98.20	844916-C3	103.50
	5/16	.015	15/32	**1/4**	4	17620	119.70	17620-C3	129.80
	5/16	.030	15/32	**1/4**	4	844920	119.70	844920-C3	129.80
	3/8	.015	9/16	**5/16**	4	829024	142.30	829024-C3	155.30
	3/8	.030	9/16	**5/16**	4	17624	142.30	17624-C3	155.30
NEW	**3/8**	.060	9/16	**5/16**	4	766324	143.50	766324-C3	156.50
	7/16	.015	21/32	**3/8**	6	829028	209.10	829028-C3	225.00
	7/16	.030	21/32	**3/8**	6	17628	209.10	17628-C3	225.00
	1/2	.015	3/4	**7/16**	6	829032	218.80	829032-C3	226.80
	1/2	.030	3/4	**7/16**	6	17632	218.80	17632-C3	233.00
NEW	**1/2**	.060	3/4	**7/16**	6	766332	219.90	766332-C3	234.10
	5/8	.030	15/16	**1/2**	6	17640	284.20	17640-C3	305.40
	3/4	.030	1-1/8	**5/8**	6	17648	350.70	17648-C3	373.00
NEW	**3/4**	.060	1-1/8	**5/8**	6	766348	353.00	766348-C3	375.30

For Square Reduced Shank, please see page 39.

For Ball Reduced Shank, please see page 60.

MINIATURE END MILLS

Corner Chamfer – Standard



4 Flutes



Standard Length 3x



- Chamfered corner creates consistent heat and wear along chamfer by distributing forces evenly
- 45° corner chamfer protects corners on the end mill and can create small chamfers and edge breaks
- Center cutting
- Solid carbide
- CNC ground in the USA

CORNER CHAMFER

CUTTER DIAMETER	CORNER CHAMFER	LENGTH OF CUT	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN COATED	
D_1 $^{+.0005''}_{-.0005''}$	L_4 $^{+.001''}_{-.001''}$	L_2 $^{+.010''}_{-.000''}$	D_2	L_1	4 FL	PRICE	4 FL	PRICE
.062 (1/16)	**.005**	.187 (3x)	1/8	1-1/2	805162	23.50	805162-C3	28.40
.078 (5/64)	**.005**	.234 (3x)	1/8	1-1/2	805178	23.50	805178-C3	28.40
.093 (3/32)	**.005**	.279 (3x)	1/8	1-1/2	805193	23.50	805193-C3	28.40
.093 (3/32)	**.010**	.279 (3x)	1/8	1-1/2	804993	23.50	804993-C3	28.40
D_1 $^{+.000''}_{-.002''}$	L_4 $^{+.001''}_{-.001''}$	L_2 $^{+.030''}_{-.000''}$	D_2	L_1	4 FL	PRICE	4 FL	PRICE
.125 (1/8)	**.005**	.375 (3x)	1/8	1-1/2	805208	23.50	805208-C3	28.40
.125 (1/8)	**.010**	.375 (3x)	1/8	1-1/2	805008	23.50	805008-C3	28.40
.125 (1/8)	**.020**	.375 (3x)	1/8	1-1/2	804808	23.50	804808-C3	28.40
.187 (3/16)	**.005**	.570 (3x)	3/16	2	805212	26.10	805212-C3	31.40
.187 (3/16)	**.010**	.570 (3x)	3/16	2	805012	26.10	805012-C3	31.40
.187 (3/16)	**.020**	.570 (3x)	3/16	2	804812	26.10	804812-C3	31.40
.250 (1/4)	**.005**	.750 (3x)	1/4	2-1/2	805216	32.10	805216-C3	39.30
.250 (1/4)	**.010**	.750 (3x)	1/4	2-1/2	805016	32.10	805016-C3	39.30
.250 (1/4)	**.020**	.750 (3x)	1/4	2-1/2	804816	32.10	804816-C3	39.30
.375 (3/8)	**.005**	1.125 (3x)	3/8	2-1/2	805224	46.90	805224-C3	56.40
.375 (3/8)	**.010**	1.125 (3x)	3/8	2-1/2	805024	46.90	805024-C3	56.40
.375 (3/8)	**.020**	1.125 (3x)	3/8	2-1/2	804824	46.90	804824-C3	56.40
.500 (1/2)	**.005**	1.500 (3x)	1/2	3	805232	72.40	805232-C3	86.60
.500 (1/2)	**.010**	1.500 (3x)	1/2	3	805032	72.40	805032-C3	86.60
.500 (1/2)	**.020**	1.500 (3x)	1/2	3	804832	72.40	804832-C3	86.60

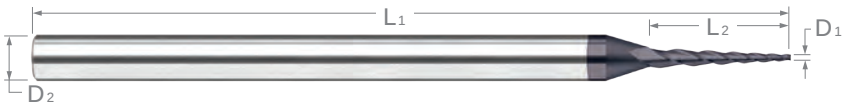
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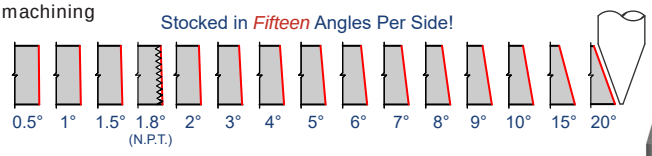
MINIATURE END MILLS

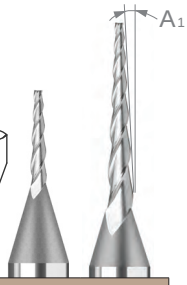
Tapered – Square



- Length of cut up to 10x end diameter
- Long length design for deep cavity machining
- 3 flutes
- Center cutting
- Solid carbide
- CNC ground in the USA

Stocked in *Fifteen* Angles Per Side!





ANGLE PER SIDE	CUTTER DIAMETER	LENGTH OF CUT	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN NANO COATED		TiB_2 COATED	
A_1 $^{+0°30'}_{-0°30'}$	D_1 $^{+.0005''}_{-.0005''}$	L_2 $^{+.020''}_{-.000''}$	D_2 (h6)	L_1	3 FL	PRICE	3 FL	PRICE	3 FL	PRICE
0.5°	.015 (1/64)	.078 (5x)	1/8	1-1/2	997015	42.10	997015-C6	49.30		
	.015 (1/64)	.150 (10x)	1/8	2-1/2	20515	69.30	20515-C6	76.50		
	.030	.156 (5x)	1/8	1-1/2	997030	36.50	997030-C6	43.70		
	.030	.300 (10x)	3/16	3	20530	62.80	20530-C6	70.50		
	.045	.250 (5x)	1/8	1-1/2	997045	36.50	997045-C6	43.70		
	.045	.450 (10x)	3/16	3	20545	62.80	20545-C6	70.50		
	.060	.312 (5x)	1/8	1-1/2	997060	36.50	997060-C6	43.70		
	.060	.600 (10x)	3/16	3	20560	62.80	20560-C6	70.50		
	.075	.750 (10x)	3/16	3	20575	62.80	20575-C6	70.50		
	.090	.500 (5x)	1/8	1-1/2	997090	36.50	997090-C6	43.70		
	.090	.900 (10x)	1/4	4	20590	68.30	20590-C6	78.90		
	.125 (1/8)	.625 (5x)	3/16	2	997099	56.70	997099-C6	64.40		
	.125 (1/8)	1.250 (10x)	1/4	4	20599	68.30	20599-C6	78.90		
1.0°	.015 (1/64)	.078 (5x)	1/8	1-1/2	992715	42.10	992715-C6	49.30		
	.015 (1/64)	.150 (10x)	1/8	2-1/2	20615	69.30	20615-C6	76.50		
	.030	.156 (5x)	1/8	1-1/2	992730	36.50	992730-C6	43.70	992730-C8	43.70
	.030	.300 (10x)	3/16	3	20630	62.80	20630-C6	70.50	20630-C8	70.00
	.045	.250 (5x)	1/8	1-1/2	992745	36.50	992745-C6	43.70		
	.045	.450 (10x)	3/16	3	20645	62.80	20645-C6	70.50		
	.060	.312 (5x)	1/8	1-1/2	992760	36.50	992760-C6	43.70		
	.060	.600 (10x)	3/16	3	20660	62.80	20660-C6	70.50		
	.075	.750 (10x)	3/16	3	20675	62.80	20675-C6	70.50		
	.090	.500 (5x)	1/8	1-1/2	992790	36.50	992790-C6	43.70		
	.090	.900 (10x)	1/4	4	20690	68.30	20690-C6	78.90		
	.125 (1/8)	.625 (5x)	3/16	2	992799	56.70	992799-C6	64.40		
	.125 (1/8)	1.250 (10x)	1/4	4	20699	68.30	20699-C6	78.90		
1.5°	.015 (1/64)	.078 (5x)	1/8	1-1/2	991815	42.10	991815-C6	49.30		
	.015 (1/64)	.150 (10x)	1/8	2-1/2	20715	69.30	20715-C6	76.50		
	.030	.156 (5x)	1/8	1-1/2	991830	36.50	991830-C6	43.70		
	.030	.300 (10x)	3/16	3	20730	62.80	20730-C6	70.50		
	.045	.250 (5x)	1/8	1-1/2	991845	36.50	991845-C6	43.70		
	.045	.450 (10x)	3/16	3	20745	62.80	20745-C6	70.50		
	.060	.312 (5x)	1/8	1-1/2	991860	36.50	991860-C6	43.70		
	.060	.600 (10x)	3/16	3	20760	62.80	20760-C6	70.50		
	.075	.750 (10x)	1/4	4	20775	69.60	20775-C6	80.20		
	.090	.500 (5x)	1/8	1-1/2	991890	36.50	991890-C6	43.70		
	.090	.900 (10x)	1/4	4	20790	68.30	20790-C6	78.90		
	.125 (1/8)	1.250 (10x)	1/4	4	20799	68.30	20799-C6	78.90		

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NEW SIZES!

MINIATURE END MILLS

Tapered – Square (cont.)

continued from previous page

ANGLE PER SIDE	CUTTER DIAMETER	LENGTH OF CUT	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN NANO COATED		TiB_2 COATED		
A_1 $^{+0°30'}_{-0°30'}$	D_1 $^{+.0005''}_{-.0005''}$	L_2 $^{+.020''}_{-.000''}$	D_2 (h6)	L_1	3 FL	PRICE	3 FL	PRICE	3 FL	PRICE	
1.8° (N.P.T.)	.200	.625 (3x)	1/4	2	912282	58.90	912282-C6	69.50			
	.300	.900 (3x)	3/8	2-1/2	912286	73.50	912286-C6	85.40			
	.400	1.250 (3x)	1/2	3	912292	98.80	912292-C6	114.20			
2.0°	.015 (1/64)	.078 (5x)	1/8	1-1/2	991015	42.10	991015-C6	49.30			
	.015 (1/64)	.150 (10x)	1/8	2-1/2	20815	69.30	20815-C6	76.50			
	.030	.156 (5x)	1/8	1-1/2	991030	36.50	991030-C6	43.70			
	.030	.300 (10x)	3/16	3	20830	62.80	20830-C6	70.50			
	.045	.250 (5x)	1/8	1-1/2	991045	36.50	991045-C6	43.70			
	.045	.450 (10x)	3/16	3	20845	62.80	20845-C6	70.50			
	.060	.312 (5x)	1/8	1-1/2	991060	36.50	991060-C6	43.70			
	.060	.600 (10x)	3/16	3	20860	62.80	20860-C6	70.50			
	.075	.750 (10x)	1/4	4	20875	69.60	20875-C6	80.20			
	.090	.500 (5x)	1/8	1-1/2	991090	36.50	991090-C6	43.70			
	.090	.900 (10x)	1/4	4	20890	68.30	20890-C6	78.90			
	.125 (1/8)	.625 (5x)	3/16	2	991099	56.70	991099-C6	64.40			
	.125 (1/8)	1.250 (10x)	1/4	4	20899	68.30	20899-C6	78.90			
3.0°	.015 (1/64)	.078 (5x)	1/8	1-1/2	990415	42.10	990415-C6	49.30			
	.015 (1/64)	.150 (10x)	1/8	2-1/2	20915	69.30	20915-C6	76.50			
	.030	.156 (5x)	1/8	1-1/2	990430	36.50	990430-C6	43.70	990430-C8	43.70	
	.030	.300 (10x)	3/16	3	20930	62.80	20930-C6	70.50	20930-C8	70.00	
	.045	.250 (5x)	1/8	1-1/2	990445	36.50	990445-C6	43.70			
	.045	.450 (10x)	3/16	3	20945	62.80	20945-C6	70.50			
	.060	.312 (5x)	1/8	1-1/2	990460	36.50	990460-C6	43.70			
	.060	.600 (10x)	3/16	3	20960	62.80	20960-C6	70.50			
	.075	.750 (10x)	1/4	4	20975	69.60	20975-C6	80.20			
	.090	.500 (5x)	3/16	2	990490	56.70	990490-C6	64.40			
	.090	.900 (10x)	1/4	4	20990	68.30	20990-C6	78.90			
	.125 (1/8)	.625 (5x)	1/4	2-1/2	990499	83.40	990499-C6	94.00			
	.125 (1/8)	1.190 (10x)	1/4	4	20999	68.30	20999-C6	78.90			
4.0°	.015 (1/64)	.150 (10x)	1/8	2-1/2	996215	69.30	996215-C6	76.50			
	.030	.300 (10x)	3/16	3	996230	62.80	996230-C6	70.50			
	.045	.450 (10x)	3/16	3	996245	62.80	996245-C6	70.50			
	.060	.600 (10x)	3/16	3	996260	62.80	996260-C6	70.50			
	.075	.750 (10x)	1/4	4	996275	69.60	996275-C6	80.20			
	.090	.900 (10x)	1/4	4	996290	69.60	996290-C6	80.20			
	.125 (1/8)	1.250 (10x)	3/8	4	996299	94.00	996299-C6	105.90			
5.0°	.010	.050 (5x)	1/8	1-1/2	989610	49.90	989610-C6	57.10			
	.010	.100 (10x)	1/8	2-1/2	27110	75.40	27110-C6	82.60			
	.015 (1/64)	.078 (5x)	1/8	1-1/2	989615	42.10	989615-C6	49.30			
	.015 (1/64)	.120 (8x)	1/8	1-1/2	761915	44.50	761915-C6	51.70			NEW
	.015 (1/64)	.150 (10x)	1/8	2-1/2	27115	69.30	27115-C6	76.50			
	.020	.100 (5x)	1/8	1-1/2	989620	41.20	989620-C6	48.40			
	.020	.200 (10x)	1/8	2-1/2	27120	68.00	27120-C6	75.20			
	.030	.156 (5x)	1/8	1-1/2	989630	36.50	989630-C6	43.70	989630-C8	43.70	
	.030	.300 (10x)	3/16	3	27130	62.80	27130-C6	70.50	27130-C8	70.00	
	.045	.250 (5x)	1/8	1-1/2	989645	36.50	989645-C6	43.70			
	.045	.450 (10x)	3/16	3	27145	62.80	27145-C6	70.50			

continued on next page

NEW SIZES!

MINIATURE END MILLS

Tapered – Square (cont.)

continued from previous page

ANGLE PER SIDE	CUTTER DIAMETER	LENGTH OF CUT	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN NANO COATED		TiB_2 COATED	
A_1 $^{+0°30'}_{-0°30'}$	D_1 $^{+.0005"}_{-.0005"}$	L_2 $^{+.020"}_{-.000"}$	D_2 (h6)	L_1	3 FL	PRICE	3 FL	PRICE	3 FL	PRICE
5.0°	.060	.312 (5x)	1/8	1-1/2	989660	36.50	989660-C6	43.70		
	.060	.600 (10x)	3/16	3	27160	62.80	27160-C6	70.50		
	.062 (1/16)	.312 (5x)	1/8	1-1/2	989662	36.50	989662-C6	43.70		
	.062 (1/16)	.620 (10x)	3/16	3	27162	62.80	27162-C6	70.50		
	.075	.375 (5x)	3/16	2	989675	56.70	989675-C6	64.40		
	.075	.750 (10x)	1/4	4	27175	69.60	27175-C6	80.20		
	.090	.500 (5x)	3/16	2	989690	56.70	989690-C6	64.40		
	.090	.900 (10x)	1/4	4	27190	68.30	27190-C6	78.90		
	.093 (3/32)	.500 (5x)	3/16	2	989693	56.70	989693-C6	64.40		
	.093 (3/32)	.930 (10x)	1/4	4	27193	68.30	27193-C6	78.90		
	.125 (1/8)	.625 (5x)	1/4	2-1/2	989699	83.40	989699-C6	94.00		
	.125 (1/8)	1.250 (10x)	3/8	4	27199	92.20	27199-C6	104.10		
	.187 (3/16)	1.000 (5x)	3/8	2-1/2	989681	92.20	989681-C6	104.10		
	.250 (1/4)	1.250 (5x)	1/2	3	989684	124.60	989684-C6	140.00		
6.0°	.015 (1/64)	.150 (10x)	1/8	2-1/2	993315	72.90	993315-C6	80.10		
	.030	.300 (10x)	3/16	3	993330	67.70	993330-C6	75.40		
NEW	.045	.250 (5x)	1/8	1-1/2	904345	59.30	904345-C6	66.50		
	.045	.450 (10x)	3/16	3	993345	67.70	993345-C6	75.40		
NEW	.060	.312 (5x)	3/16	2	904360	57.20	904360-C6	64.90		
	.060	.600 (10x)	3/16	3	993360	67.70	993360-C6	75.40		
	.090	.500 (5x)	1/4	2-1/2	904390	85.50	904390-C6	96.10		
	.125 (1/8)	.625 (5x)	5/16	2-1/2	904399	82.20	904399-C6	94.10		
7.0°	.015 (1/64)	.078 (5x)	1/8	1-1/2	922615	43.10	922615-C6	50.30		
	.015 (1/64)	.150 (10x)	1/8	2-1/2	28015	70.90	28015-C6	78.10		
	.030	.156 (5x)	1/8	1-1/2	922630	37.30	922630-C6	44.50		
	.030	.300 (10x)	3/16	3	28030	64.30	28030-C6	72.00		
	.045	.250 (5x)	1/8	1-1/2	922645	37.30	922645-C6	44.50		
	.045	.450 (10x)	3/16	3	28045	64.30	28045-C6	72.00		
	.060	.312 (5x)	3/16	2	922660	58.00	922660-C6	65.70		
	.060	.600 (10x)	1/4	4	28060	70.00	28060-C6	80.60		
	.075	.750 (10x)	3/8	4	28075	96.30	28075-C6	108.20		
	.090	.500 (5x)	1/4	2-1/2	922690	70.00	922690-C6	80.60		
	.090	.900 (10x)	3/8	4	28090	95.60	28090-C6	107.50		
	.125 (1/8)	.625 (5x)	5/16	2-1/2	922699	82.20	922699-C6	94.10		
8.0°	.015 (1/64)	.150 (10x)	1/8	2-1/2	995415	72.90	995415-C6	80.10		
	.030	.300 (10x)	3/16	3	995430	67.70	995430-C6	75.40		
	.045	.450 (10x)	3/16	3	995445	67.70	995445-C6	75.40		
	.060	.600 (10x)	1/4	4	995460	72.30	995460-C6	82.90		
	.090	.500 (5x)	1/4	2-1/2	903790	70.00	903790-C6	80.60		
	.125 (1/8)	.625 (5x)	5/16	2-1/2	903799	82.20	903799-C6	94.10		
9.0°	.015 (1/64)	.150 (10x)	1/8	2-1/2	992115	72.90	992115-C6	80.10		
	.030	.300 (10x)	3/16	3	992130	67.70	992130-C6	75.40		
	.045	.450 (10x)	3/16	3	992145	67.70	992145-C6	75.40		
	.060	.600 (10x)	1/4	4	992160	72.30	992160-C6	82.90		
	.090	.500 (5x)	1/4	2-1/2	902490	70.00	902490-C6	80.60		
	.125 (1/8)	.625 (5x)	3/8	2-1/2	902499	94.50	902499-C6	106.40		

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NEW SIZES!

MINIATURE END MILLS

Tapered – Square (cont.)

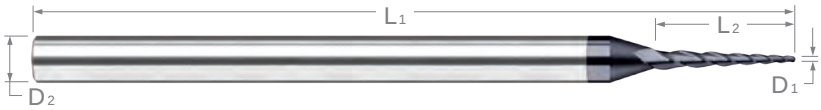
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ANGLE PER SIDE	CUTTER DIAMETER	LENGTH OF CUT	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN NANO COATED		TiB_2 COATED		
A_1 $^{+0°30'}_{-0°30'}$	D_1 $^{+.0005"}_{-.0005"}$	L_2 $^{+.020"}_{-.000"}$	D_2 (h6)	L_1	3 FL	PRICE	3 FL	PRICE	3 FL	PRICE	
10.0°	.010	.050 (5x)	1/8	1-1/2	988210	49.90	988210-C6	57.10			
	.010	.100 (10x)	1/8	2-1/2	29410	75.40	29410-C6	82.60			
	.015 (1/64)	.078 (5x)	1/8	1-1/2	988215	42.10	988215-C6	49.30			
	.015 (1/64)	.150 (10x)	1/8	2-1/2	29415	69.30	29415-C6	76.50			
	.020	.100 (5x)	1/8	1-1/2	988220	42.10	988220-C6	49.30			
	.020	.200 (10x)	1/8	2-1/2	29420	68.00	29420-C6	75.20			
	.030	.156 (5x)	1/8	1-1/2	988230	36.50	988230-C6	43.70	988230-C8	43.70	
	.030	.300 (10x)	3/16	3	29430	62.80	29430-C6	70.50	29430-C8	70.00	
	.045	.250 (5x)	3/16	2	988245	62.80	988245-C6	70.50			
	.045	.360 (8x)	3/16	3	760845	62.80	760845-C6	70.50			NEW
	.045	.450 (10x)	1/4	4	29445	69.60	29445-C6	80.20			
	.060	.312 (5x)	3/16	2	988260	62.80	988260-C6	70.50			
	.060	.600 (10x)	3/8	4	29460	92.20	29460-C6	104.10			
	.075	.375 (5x)	1/4	2-1/2	988275	66.10	988275-C6	76.70			
	.075	.750 (10x)	3/8	4	29475	94.00	29475-C6	105.90			
	.090	.500 (5x)	5/16	2-1/2	988290	78.20	988290-C6	90.10			
	.125 (1/8)	.625 (5x)	3/8	2-1/2	988299	92.20	988299-C6	104.10			
	.187 (3/16)	.890 (5x)	1/2	3	988281	124.60	988281-C6	140.00			
	.250 (1/4)	1.065 (5x)	5/8	3-1/2	988284	133.90	988284-C6	151.60			
15.0°	.015 (1/64)	.031 (3x)	1/8	1-1/2	799415	40.20	799415-C6	47.40			
	.015 (1/64)	.078 (5x)	1/8	1-1/2	919515	42.10	919515-C6	49.30			
	.015 (1/64)	.120 (8x)	1/8	1-1/2	799315	46.60	799315-C6	53.80			
	.015 (1/64)	.150 (10x)	1/8	1-1/2	41115	66.10	41115-C6	73.30			
	.030	.093 (3x)	1/8	1-1/2	799430	40.20	799430-C6	47.40			NEW
	.030	.156 (5x)	1/8	1-1/2	919530	42.10	919530-C6	49.30			
	.030	.240 (8x)	3/16	2	799330	46.60	799330-C6	54.30			NEW
	.030	.294 (10x)	3/16	2	41130	64.60	41130-C6	72.30			
	.045	.250 (5x)	3/16	2	919545	56.70	919545-C6	64.40			
	.045	.383 (8x)	1/4	2-1/2	41145	69.30	41145-C6	79.90			
	.060	.312 (5x)	1/4	2-1/2	919560	68.00	919560-C6	78.60			
	.060	.588 (10x)	3/8	2-1/2	41160	94.00	41160-C6	105.90			
	.075	.750 (10x)	1/2	3	41175	130.80	41175-C6	146.20			
	.090	.765 (8x)	1/2	3	41190	128.30	41190-C6	143.70			
	.125 (1/8)	.700 (5x)	1/2	3	41199	128.30	41199-C6	143.70			
20°	.015	.078 (5x)	1/8	1-1/2	832815	42.10	832815-C6	49.30			
	.015	.120 (8x)	1/8	1-1/2	799215	46.60	799215-C6	53.80			
	.030	.156 (5x)	3/16	2	832830	42.10	832830-C6	49.80			
	.030	.240 (8x)	1/4	2-1/2	799230	69.30	799230-C6	79.90			
	.045	.250 (5x)	1/4	2-1/2	832845	56.70	832845-C6	67.30			
	.045	.360 (8x)	5/16	2-1/2	799245	73.70	799245-C6	85.60			
	.060	.312 (5x)	5/16	2-1/2	832860	61.10	832860-C6	73.00			

For larger angles, please see Chamfer Cutters on page 275.

MINIATURE END MILLS

Tapered – Ball



- Stocked in 0.5° to 15° tapers
- Long length design for deep cavity machining
- 3 flutes
- Center cutting
- Solid carbide
- CNC ground in the USA

Stocked in *Thirteen* Angles Per Side!





ANGLE PER SIDE	CUTTER DIAMETER	LENGTH OF CUT	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN NANO COATED	
A_1 $^{+0°30'}_{-0°30'}$	D_1 $^{+.0005''}_{-.0005''}$	L_2 $^{+.020''}_{-.000''}$	D_2 (h6)	L_1	3 FL	PRICE	3 FL	PRICE
0.5°	.015 (1/64)	**.150** (10x)	1/8	2-1/2	21515	73.90	21515-C6	81.10
	.030	**.300** (10x)	3/16	3	21530	69.00	21530-C6	76.70
	.045	**.450** (10x)	3/16	3	21545	70.30	21545-C6	78.00
	.060	**.600** (10x)	3/16	3	21560	69.00	21560-C6	76.70
	.090	**.900** (10x)	1/4	4	21590	72.80	21590-C6	83.40
	.125 (1/8)	**1.250** (10x)	1/4	4	21599	72.80	21599-C6	83.40
1.0°	.015 (1/64)	**.150** (10x)	1/8	2-1/2	21615	73.90	21615-C6	81.10
	.030	**.156** (5x)	1/8	1-1/2	879830	40.70	879830-C6	47.90
	.030	**.300** (10x)	3/16	3	21630	69.00	21630-C6	76.70
	.045	**.450** (10x)	3/16	3	21645	70.30	21645-C6	78.00
	.060	**.312** (5x)	1/8	1-1/2	879860	40.70	879860-C6	47.90
	.060	**.600** (10x)	3/16	3	21660	69.00	21660-C6	76.70
	.090	**.900** (10x)	1/4	4	21690	72.80	21690-C6	83.40
	.125 (1/8)	**1.250** (10x)	1/4	4	21699	72.80	21699-C6	83.40
1.5°	.015 (1/64)	**.150** (10x)	1/8	2-1/2	21715	73.90	21715-C6	81.10
	.030	**.300** (10x)	3/16	3	21730	69.00	21730-C6	76.70
	.045	**.450** (10x)	3/16	3	21745	70.30	21745-C6	78.00
	.060	**.600** (10x)	3/16	3	21760	69.00	21760-C6	76.70
	.090	**.900** (10x)	1/4	4	21790	72.80	21790-C6	83.40
	.125 (1/8)	**1.250** (10x)	1/4	4	21799	72.80	21799-C6	83.40
2.0°	.015 (1/64)	**.150** (10x)	1/8	2-1/2	21815	73.90	21815-C6	81.10
	.030	**.300** (10x)	3/16	3	21830	69.00	21830-C6	76.70
	.045	**.450** (10x)	3/16	3	21845	70.30	21845-C6	78.00
	.060	**.600** (10x)	3/16	3	21860	69.00	21860-C6	76.70
	.090	**.900** (10x)	1/4	4	21890	72.80	21890-C6	83.40
	.125 (1/8)	**1.250** (10x)	1/4	4	21899	72.80	21899-C6	83.40
3.0°	.015 (1/64)	**.150** (10x)	1/8	2-1/2	21915	73.90	21915-C6	81.10
	.030	**.156** (5x)	1/8	1-1/2	880230	40.70	880230-C6	47.90
	.030	**.300** (10x)	3/16	3	21930	69.00	21930-C6	76.70
	.045	**.450** (10x)	3/16	3	21945	70.30	21945-C6	78.00
	.060	**.312** (5x)	1/8	1-1/2	880260	40.70	880260-C6	47.90
	.060	**.600** (10x)	3/16	3	21960	69.00	21960-C6	76.70
	.090	**.900** (10x)	1/4	4	21990	72.80	21990-C6	83.40
	.125 (1/8)	**1.190** (10x)	1/4	4	21999	72.80	21999-C6	83.40

continued on next page

MINIATURE END MILLS

Tapered – Ball (cont.)

continued from previous page

ANGLE PER SIDE	CUTTER DIAMETER	LENGTH OF CUT	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN NANO COATED	
A_1 $^{+0°30'}_{-0°30'}$	D_1 $^{+.0005"}_{-.0005"}$	L_2 $^{+.020"}_{-.000"}$	D_2 (h6)	L_1	3 FL	PRICE	3 FL	PRICE
4.0°	.015 (1/64)	**.150** (10x)	1/8	2-1/2	840415	75.70	840415-C6	82.90
	.030	**.300** (10x)	3/16	3	840430	70.60	840430-C6	78.30
	.060	**.600** (10x)	3/16	3	840460	70.60	840460-C6	78.30
	.090	**.900** (10x)	1/4	4	840490	74.60	840490-C6	85.20
5.0°	.015 (1/64)	**.150** (10x)	1/8	2-1/2	32615	73.90	32615-C6	81.10
	.030	**.156** (5x)	1/8	1-1/2	880630	40.70	880630-C6	47.90
	.030	**.300** (10x)	3/16	3	32630	69.00	32630-C6	76.70
	.045	**.450** (10x)	3/16	3	32645	70.30	32645-C6	78.00
	.060	**.312** (5x)	1/8	1-1/2	880660	40.70	880660-C6	47.90
	.060	**.600** (10x)	3/16	3	32660	69.00	32660-C6	76.70
	.090	**.900** (10x)	1/4	4	32690	72.80	32690-C6	83.40
	.125 (1/8)	**1.250** (10x)	3/8	4	32699	97.00	32699-C6	108.90
6.0°	.015 (1/64)	**.150** (10x)	1/8	2-1/2	835615	75.70	835615-C6	82.90
	.030	**.300** (10x)	3/16	3	835630	70.60	835630-C6	78.30
	.060	**.600** (10x)	3/16	3	835660	74.60	835660-C6	82.30
	.090	**.900** (10x)	3/8	4	835690	99.30	835690-C6	111.20
7.0°	.015 (1/64)	**.150** (10x)	1/8	2-1/2	34415	75.70	34415-C6	82.90
	.030	**.300** (10x)	3/16	3	34430	70.60	34430-C6	78.30
	.045	**.450** (10x)	3/16	3	34445	72.00	34445-C6	79.70
	.060	**.600** (10x)	1/4	4	34460	74.60	34460-C6	85.20
	.090	**.900** (10x)	3/8	4	34490	99.30	34490-C6	111.20
8.0°	.015 (1/64)	**.150** (10x)	1/8	2-1/2	853815	75.70	853815-C6	82.90
	.030	**.300** (10x)	3/16	3	853830	70.60	853830-C6	78.30
	.060	**.600** (10x)	1/4	4	853860	74.60	853860-C6	85.20
	.090	**.900** (10x)	3/8	4	853890	99.30	853890-C6	111.20
10.0°	.015 (1/64)	**.078** (5x)	1/8	1-1/2	881015	41.60	881015-C6	48.80
	.015 (1/64)	**.150** (10x)	1/8	2-1/2	35315	75.70	35315-C6	82.90
	.030	**.156** (5x)	1/8	1-1/2	881030	41.60	881030-C6	48.80
	.030	**.300** (10x)	3/16	3	35330	70.60	35330-C6	78.30
	.045	**.250** (5x)	3/16	2	881045	68.40	881045-C6	76.10
	.045	**.450** (10x)	1/4	4	35345	75.70	35345-C6	86.30
	.060	**.312** (5x)	3/16	2	881060	68.40	881060-C6	76.10
	.060	**.600** (10x)	3/8	4	35360	99.30	35360-C6	111.20
	.090	**.500** (5x)	5/16	2-1/2	881090	110.40	881090-C6	122.30
	.125 (1/8)	**.625** (5x)	3/8	2-1/2	881099	135.80	881099-C6	147.70
	.187 (3/16)	**.937** (5x)	1/2	3	881081	154.10	881081-C6	169.50
	.250 (1/4)	**1.177** (5x)	5/8	3-1/2	881084	167.20	881084-C6	183.00
15.0°	.015 (1/64)	**.078** (5x)	1/8	1-1/2	785915	41.60	785915-C6	48.80
	.015 (1/64)	**.150** (10x)	1/8	1-1/2	916115	76.10	916115-C6	83.30
	.030	**.156** (5x)	1/8	1-1/2	785930	41.60	785930-C6	48.80
	.030	**.300** (10x)	3/16	2	916130	70.90	916130-C6	78.60
	.045	**.402** (9x)	1/4	2-1/2	916145	76.10	916145-C6	86.70
	.060	**.600** (10x)	3/8	2-1/2	916160	100.00	916160-C6	111.90
20.0°	.015 (1/64)	**.078** (5x)	1/8	1-1/2	802115	41.60	802115-C6	48.80
	.030	**.156** (5x)	3/16	2	802130	67.80	802130-C6	75.50
	.045	**.250** (5x)	1/4	2-1/2	802145	76.10	802145-C6	86.70

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MATERIAL-SPECIFIC END MILLS

FERROUS MATERIALS

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End Mills for Hardened Steels *New Sizes!* mm & in 90



Recommended Materials:
hardened steels up to 68 Rc and high temperature alloys

HIGH TEMP ALLOYS

End Mills for High Temp Alloys *New Sizes!* mm & in 111



Recommended Materials:
titanium, inconel, nickel alloys, stainless steels, tool steels, and other difficult-to-machine materials

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Recommended Materials:
readily machinable medium alloy steels, stainless steels, and tool steels

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End Mills for Free Machining Steels mm & in 170



Recommended Materials:
free machining varieties of carbon steels and stainless steels

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Recommended Materials:
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Recommended Materials:
graphite, composites, green carbides, green ceramics

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Recommended Materials:
filled and unfilled plastics

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End Mills for Composites *New Sizes!* 238



Recommended Materials:
abrasive composites, fiber-reinforced materials, layered composites

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End Mills for Wood 245



Recommended Materials:
soft, hard, and engineered woods

NEW SIZES!

END MILLS FOR HARDENED STEELS

Square – For Steels Up to 55 Rc



5 Flute, Variable Helix Design

- **Designed to mill hardened tool, die, and mold steels up to 55Rc**
- Also excellent for stainless steel, inconel, titanium, and other high temperature alloys
- 5 flute, variable helix design (approx. 37°) for improved slotting and roughing
- Latest generation AlTiN Nano coating offers superior hardness and heat resistance
- Increased shank diameter to maintain strength and stiffness
- h6 shank tolerance for high precision tool holders
- Center cutting
- Solid carbide
- CNC ground in the USA

mm & in

CUTTER DIAMETER			LENGTH OF CUT	SHANK DIAMETER	OVERALL LENGTH	AlTiN NANO COATED		
D_1 +.0005″ −.0005″	+.00mm −.02mm	decimal equivalent	L_2 +.010″ −.000″ +.25mm −.00mm	D_2 (h6)	L_1	5 FL	PRICE	
.015 (1/64)		.0150	**.023** (1.5x)	1/4	2-1/2	907415-C6	73.50	
.015 (1/64)		.0150	**.045** (3x)	1/4	2-1/2	915915-C6	73.50	
.015 (1/64)		0.015	**.078** (5x)	1/4	2-1/2	885215-C6	77.00	NEW
.020		.0200	**.030** (1.5x)	1/4	2-1/2	907420-C6	73.50	
.020		.0200	**.060** (3x)	1/4	2-1/2	915920-C6	73.50	
.020		.0200	**.100** (5x)	1/4	2-1/2	885220-C6	77.00	
.025		.0250	**.038** (1.5x)	1/4	2-1/2	907425-C6	73.50	
.025		.0250	**.075** (3x)	1/4	2-1/2	915925-C6	73.50	
.030		.0300	**.045** (1.5x)	1/4	2-1/2	907430-C6	66.70	
.030		.0300	**.090** (3x)	1/4	2-1/2	915930-C6	66.70	
.031 (1/32)		.0310	**.025** (0.8x)	1/4	2-1/2	859431-C6	64.70	
.031 (1/32)		.0310	**.047** (1.5x)	1/4	2-1/2	907431-C6	61.90	
.031 (1/32)		.0310	**.093** (3x)	1/4	2-1/2	915931-C6	61.90	
.031 (1/32)		.0310	**.156** (5x)	1/4	2-1/2	885231-C6	67.50	
.035		.0350	**.053** (1.5x)	1/4	2-1/2	907435-C6	62.20	
.035		.0350	**.105** (3x)	1/4	2-1/2	915935-C6	62.20	
.039		.0390	**.117** (3x)	1/4	2-1/2	915939-C6	62.20	
	1.0 mm	.0393	**3.00 mm** (3x)	6 mm	63 mm	897822-C6	68.10	
.040		.0400	**.060** (1.5x)	1/4	2-1/2	907440-C6	61.90	
.040		.0400	**.120** (3x)	1/4	2-1/2	915940-C6	61.90	
.040		.0400	**.203** (5x)	1/4	2-1/2	885240-C6	67.50	
.045		.0450	**.068** (1.5x)	1/4	2-1/2	907445-C6	62.20	
.045		.0450	**.135** (3x)	1/4	2-1/2	915945-C6	62.20	
.047 (3/64)		.0470	**.071** (1.5x)	1/4	2-1/2	907447-C6	61.90	
.047 (3/64)		.0470	**.141** (3x)	1/4	2-1/2	915947-C6	61.90	
.047 (3/64)		.0470	**.187** (4x)	1/4	2-1/2	824947-C6	64.70	NEW
.047 (3/64)		.0470	**.250** (5x)	1/4	2-1/2	885247-C6	67.50	
.050		.0500	**.075** (1.5x)	1/4	2-1/2	907450-C6	61.90	
.050		.0500	**.150** (3x)	1/4	2-1/2	915950-C6	61.90	
.055		.0550	**.083** (1.5x)	1/4	2-1/2	907455-C6	62.20	
.055		.0550	**.165** (3x)	1/4	2-1/2	915955-C6	62.20	
.060		.0600	**.090** (1.5x)	1/4	2-1/2	907460-C6	61.90	
.060		.0600	**.180** (3x)	1/4	2-1/2	915960-C6	61.90	
.062 (1/16)		.0620	**.050** (0.8x)	1/4	2-1/2	859462-C6	64.70	
.062 (1/16)		.0620	**.093** (1.5x)	1/4	2-1/2	907462-C6	61.90	
.062 (1/16)		.0620	**.186** (3x)	1/4	2-1/2	915962-C6	61.90	
.062 (1/16)		.0620	**.250** (4x)	1/4	2-1/2	824962-C6	65.30	
.062 (1/16)		.0620	**.312** (5x)	1/4	2-1/2	885262-C6	67.50	
.070		.0700	**.105** (1.5x)	1/4	2-1/2	907470-C6	64.70	
.070		.0700	**.210** (3x)	1/4	2-1/2	915970-C6	64.70	

continued on next page

END MILLS FOR HARDENED STEELS

Square – For Steels Up to 55 Rc (cont.)

continued from previous page

mm & in

	CUTTER DIAMETER D_1 +.0005″ −.0005″	+.00mm −.02mm	decimal equivalent	LENGTH OF CUT L_2 +.010″ −.000″ +.25mm −.00mm	SHANK DIAMETER D_2 (h6)	OVERALL LENGTH L_1	AlTiN NANO COATED 5 FL	PRICE
	.078 (5/64)		.0780	**.117** (1.5x)	1/4	2-1/2	907478-C6	64.70
	.078 (5/64)		.0780	**.234** (3x)	1/4	2-1/2	915978-C6	64.70
NEW	.078 (5/64)		.0780	**.312** (4x)	1/4	2-1/2	824978-C6	67.60
	.078 (5/64)		.0780	**.406** (5x)	1/4	2-1/2	885278-C6	70.40
NEW		2.0 mm	.0787	**3.00 mm** (1.5x)	6 mm	63 mm	777845-C6	71.40
		2.0 mm	.0787	**6.00 mm** (3x)	6 mm	63 mm	897845-C6	71.40
	.080		.0800	**.120** (1.5x)	1/4	2-1/2	907480-C6	64.70
	.080		.0800	**.240** (3x)	1/4	2-1/2	915980-C6	64.70
	.090		.0900	**.135** (1.5x)	1/4	2-1/2	907490-C6	64.70
	.090		.0900	**.270** (3x)	1/4	2-1/2	915990-C6	64.70
	.093 (3/32)		.0930	**.074** (0.8x)	1/4	2-1/2	859493-C6	68.50
	.093 (3/32)		.0930	**.140** (1.5x)	1/4	2-1/2	907493-C6	65.70
	.093 (3/32)		.0930	**.279** (3x)	1/4	2-1/2	915993-C6	65.70
	.093 (3/32)		.0930	**.372** (4x)	1/4	2-1/2	824993-C6	69.00
	.093 (3/32)		.0930	**.500** (5x)	1/4	2-1/2	885293-C6	71.20
	.100		.1000	**.150** (1.5x)	1/4	2-1/2	907500-C6	65.70
	.100		.1000	**.300** (3x)	1/4	2-1/2	916000-C6	65.70
	.109 (7/64)		.1090	**.164** (1.5x)	1/4	2-1/2	907502-C6	66.20
	.109 (7/64)		.1090	**.327** (3x)	1/4	2-1/2	916002-C6	66.20
	.118		.1180	**.177** (1.5x)	1/4	2-1/2	907505-C6	66.70
	.118		.1180	**.354** (3x)	1/4	2-1/2	916005-C6	66.70
		3.0 mm	.1181	**9.00 mm** (3x)	6 mm	63 mm	897857-C6	72.80

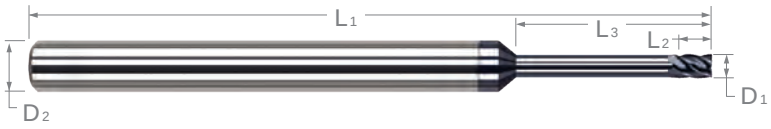
	D_1 +.000″ −.002″	+.00mm −.04mm	decimal equivalent	L_2 +.030″ −.000″ +.75mm −.00mm	D_2 (h6)	L_1	5 FL	PRICE
	.125 (1/8)		.1250	**.100** (0.8x)	1/4	2-1/2	859508-C6	69.30
	.125 (1/8)		.1250	**.187** (1.5x)	1/4	2-1/2	907508-C6	66.40
	.125 (1/8)		.1250	**.375** (3x)	1/4	2-1/2	916008-C6	66.40
	.125 (1/8)		.1250	**.500** (4x)	1/4	2-1/2	825008-C6	69.80
	.125 (1/8)		.1250	**.625** (5x)	1/4	2-1/2	885308-C6	72.00
	.140 (9/64)		.1406	**.220** (1.5x)	1/4	2-1/2	907509-C6	69.90
	.140 (9/64)		.1406	**.425** (3x)	1/4	2-1/2	916009-C6	69.90
	.156 (5/32)		.1562	**.235** (1.5x)	1/4	2-1/2	907510-C6	66.40
	.156 (5/32)		.1562	**.468** (3x)	1/4	2-1/2	916010-C6	66.40
	.156 (5/32)		.1562	**.625** (4x)	1/4	2-1/2	825010-C6	69.80
	.156 (5/32)		.1562	**.750** (5x)	1/4	3	885310-C6	72.00
	.187 (3/16)		.1875	**.285** (1.5x)	1/4	2-1/2	907512-C6	69.00
	.187 (3/16)		.1875	**.562** (3x)	1/4	2-1/2	916012-C6	69.00
	.187 (3/16)		.1875	**1.000** (5x)	1/4	3	885312-C6	76.00
		6.0 mm	.2362	**18.00 mm** (3x)	6 mm	63 mm	897866-C6	73.10
	.250 (1/4)		.2500	**.375** (1.5x)	1/4	2-1/2	907516-C6	76.90
	.250 (1/4)		.2500	**.750** (3x)	1/4	2-1/2	916016-C6	76.90
	.250 (1/4)		.2500	**1.250** (5x)	1/4	4	885316-C6	83.60
	.312 (5/16)		.3125	**.470** (1.5x)	5/16	2-1/2	907520-C6	83.80
	.312 (5/16)		.3125	**1.000** (3x)	5/16	2-1/2	916020-C6	83.80
	.375 (3/8)		.3750	**.570** (1.5x)	3/8	2-1/2	907524-C6	96.80
	.375 (3/8)		.3750	**1.125** (3x)	3/8	2-1/2	916024-C6	96.80
	.500 (1/2)		.5000	**.750** (1.5x)	1/2	3	907532-C6	116.90
	.500 (1/2)		.5000	**1.500** (3x)	1/2	3	916032-C6	116.90

PLEASE SEE SPEEDS & FEEDS ON PAGE 97

NEW SIZES!

END MILLS FOR HARDENED STEELS

Square – For Steels Up to 55 Rc – Long Reach, Stub Flute



5 Flute, Variable Helix Design

- **Designed to mill hardened tool, die, and mold steels up to 55Rc**
- Also excellent for stainless steel, inconel, titanium, and other high temperature alloys
- 5 flute, variable helix design (approx. 37°) for improved slotting and roughing
- Stub flute for maximum rigidity
- Latest generation AlTiN Nano coating offers superior hardness and heat resistance
- Increased shank diameter to maintain strength and stiffness
- h6 shank tolerance for high precision tool holders
- Center cutting
- Solid carbide
- CNC ground in the USA

CUTTER DIAMETER	LENGTH OF CUT	OVERALL REACH	SHANK DIAMETER	OVERALL LENGTH	AlTiN NANO COATED	
D_1 $^{+.0005''}_{-.0005''}$	L_2 $^{+.010''}_{-.000''}$	L_3 $^{+.010''}_{-.000''}$	D_2 (h6)	L_1	5 FL	PRICE
.031 (1/32)	.047	**.156** (5x)	1/4	2-1/2	825331-C6	69.80
.031 (1/32)	.047	**.250** (8x)	1/4	2-1/2	819031-C6	75.30
.047 (3/64)	.071	**.250** (5x)	1/4	2-1/2	825347-C6	69.80 NEW
.047 (3/64)	.071	**.375** (8x)	1/4	2-1/2	819047-C6	75.30 NEW
.062 (1/16)	.093	**.312** (5x)	1/4	2-1/2	825362-C6	69.80
.062 (1/16)	.093	**.500** (8x)	1/4	2-1/2	819062-C6	75.30
.078 (5/64)	.117	**.406** (5x)	1/4	2-1/2	825378-C6	69.80 NEW
.078 (5/64)	.117	**.625** (8x)	1/4	2-1/2	819078-C6	75.30 NEW
.093 (3/32)	.140	**.500** (5x)	1/4	2-1/2	825393-C6	73.60
.093 (3/32)	.140	**.750** (8x)	1/4	2-1/2	819093-C6	79.10

D_1 $^{+.000''}_{-.002''}$	L_2 $^{+.030''}_{-.000''}$	L_3 $^{+.030''}_{-.000''}$	D_2 (h6)	L_1	5 FL	PRICE
.125 (1/8)	.187	**.625** (5x)	1/4	2-1/2	825408-C6	74.30
.125 (1/8)	.187	**1.000** (8x)	1/4	2-1/2	819108-C6	79.90
.187 (3/16)	.285	**1.000** (5x)	1/4	3	825412-C6	78.30
.187 (3/16)	.285	**1.500** (8x)	1/4	3	819112-C6	83.80
.250 (1/4)	.375	**1.250** (5x)	1/4	4	825416-C6	81.30 NEW
.250 (1/4)	.375	**2.000** (8x)	1/4	4	819116-C6	86.90 NEW

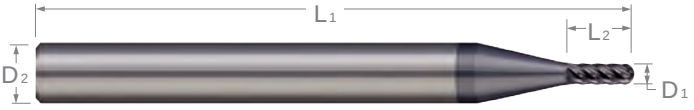
PLEASE SEE SPEEDS & FEEDS ON PAGE 98

View a comprehensive library of **Speeds & Feeds** charts for every Harvey Tool End Mill on the new Harveytool.com.

Access **Simulation Files** in DXF format for every Harvey Tool product, downloadable now from the new Harveytool.com.

END MILLS FOR HARDENED STEELS

Ball – For Steels Up to 55 Rc



6 Flute, Variable Helix Design

- **Designed to mill hardened tool, die, and mold steels up to 55Rc**
- Also excellent for stainless steel, inconel, titanium, and other high temperature alloys
- 6 flute, variable helix design (approx. 37°) for improved slotting and roughing
- Ball profile for maximum strength
- Latest generation AlTiN Nano coating offers superior hardness and heat resistance
- Increased shank diameter to maintain strength and stiffness
- h6 shank tolerance for high precision tool holders
- Center cutting
- Solid carbide
- CNC ground in the USA

CUTTER DIAMETER	LENGTH OF CUT	SHANK DIAMETER	OVERALL LENGTH	AlTiN NANO COATED	
D_1 $^{+.0005''}_{-.0005''}$	L_2 $^{+.010''}_{-.000''}$	D_2 (h6)	L_1	6 FL	PRICE
.031 (1/32)	.047 (1.5x)	1/4	2-1/2	798131-C6	44.90
.031 (1/32)	.093 (3x)	1/4	2-1/2	843431-C6	44.90
.047 (3/64)	.071 (1.5x)	1/4	2-1/2	798147-C6	44.90
.047 (3/64)	.141 (3x)	1/4	2-1/2	843447-C6	44.90
.062 (1/16)	.093 (1.5x)	1/4	2-1/2	798162-C6	42.50
.062 (1/16)	.186 (3x)	1/4	2-1/2	843462-C6	42.50
.062 (1/16)	.312 (5x)	1/4	2-1/2	789462-C6	48.10
.078 (5/64)	.117 (1.5x)	1/4	2-1/2	798178-C6	42.50
.078 (5/64)	.234 (3x)	1/4	2-1/2	843478-C6	42.50
.093 (3/32)	.140 (1.5x)	1/4	2-1/2	798193-C6	42.50
.093 (3/32)	.279 (3x)	1/4	2-1/2	843493-C6	42.50
.093 (3/32)	.500 (5x)	1/4	2-1/2	789493-C6	48.10
D_1 $^{+.000''}_{-.002''}$	L_2 $^{+.030''}_{-.000''}$	D_2 (h6)	L_1	6 FL	PRICE
.125 (1/8)	.187 (1.5x)	1/4	2-1/2	798208-C6	39.00
.125 (1/8)	.375 (3x)	1/4	2-1/2	843508-C6	39.00
.125 (1/8)	.625 (5x)	1/4	2-1/2	789508-C6	44.60
.156 (5/32)	.468 (3x)	1/4	2-1/2	843510-C6	40.20
.187 (3/16)	.285 (1.5x)	1/4	2-1/2	798212-C6	41.50
.187 (3/16)	.562 (3x)	1/4	2-1/2	843512-C6	41.50
.187 (3/16)	1.000 (5x)	1/4	3	789512-C6	48.30
.250 (1/4)	.375 (1.5x)	1/4	2-1/2	798216-C6	50.20
.250 (1/4)	.750 (3x)	1/4	2-1/2	843516-C6	50.20
.375 (3/8)	1.125 (3x)	3/8	2-1/2	843524-C6	79.30

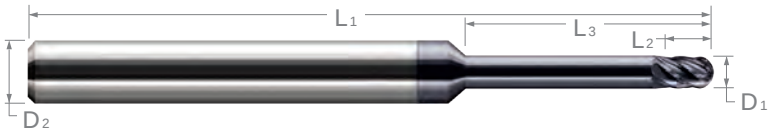
SPEEDS & FEEDS (End Mills for Hardened Steels – Ball – For Steels Up to 55Rc)

Important Note: Values in table are in inches and are based on standard (3x Dia) length of cut end mills. For shorter length of cuts, table values of IPT must be increased (for 1.5x, increase to 112%). For longer lengths of cut, table values of IPT and DOC must be reduced (for 5x, reduce to 85%). For complete speeds and feeds charts, please see www.harveytool.com.

Material	Hardness	SFM		Chip Load Per Tooth (IPT) By Cutter Diameter												Depth of Cut	
				.015	.031	.047	.062	.078	.093	.125	.187	.250	.312	.375	.500	Radial	Axial
Hardened Steels Titanium Alloys Nickel Alloys	38-44 Rc	100	Slotting	.00003	.00006	.00009	.00012	.00015	.00018	.00024	.00036	.00049	.00061	.00073	.00097	1 x Dia	.30 x Dia
			Profiling	.00004	.00007	.00011	.00015	.00018	.00022	.00029	.00044	.00059	.00073	.00088	.00118	.3 x Dia	.5 x Dia
	45-55 Rc	60	Slotting	.00002	.00004	.00006	.00008	.00010	.00012	.00016	.00023	.00031	.00039	.00047	.00062	1 x Dia	.15 x Dia
			Profiling	.00002	.00004	.00006	.00008	.00011	.00013	.00017	.00026	.00034	.00043	.00051	.00068	.15 x Dia	.5 x Dia

END MILLS FOR HARDENED STEELS

Ball – For Steels Up to 55 Rc – Long Reach, Stub Flute



6 Flute, Variable Helix Design

- **Designed to mill hardened tool, die, and mold steels up to 55Rc**
- Also excellent for stainless steel, Inconel, titanium, and other high temperature alloys
- 6 flute, variable helix design (approx. 37°) for improved slotting and roughing
- Stub flute for maximum rigidity
- Latest generation AlTiN Nano coating offers superior hardness and heat resistance
- Increased shank diameter to maintain strength and stiffness
- h6 shank tolerance for high precision tool holders
- Center cutting
- Solid carbide
- CNC ground in the USA

CUTTER DIAMETER	LENGTH OF CUT	OVERALL REACH	SHANK DIAMETER	OVERALL LENGTH	AlTiN NANO COATED	
D_1 $^{+.0005''}_{-.0005''}$	L_2 $^{+.010''}_{-.000''}$	L_3 $^{+.010''}_{-.000''}$	D_2 (h6)	L_1	6 FL	PRICE
.031 (1/32)	.047	**.156** (5x)	1/4	2-1/2	786231-C6	71.10
.031 (1/32)	.047	**.250** (8x)	1/4	2-1/2	786031-C6	76.80
.062 (1/16)	.093	**.312** (5x)	1/4	2-1/2	786262-C6	71.10
.062 (1/16)	.093	**.500** (8x)	1/4	2-1/2	786062-C6	76.80
.093 (3/32)	.140	**.500** (5x)	1/4	2-1/2	786293-C6	75.00
.093 (3/32)	.140	**.750** (8x)	1/4	2-1/2	786093-C6	80.70
D_1 $^{+.000''}_{-.002''}$	L_2 $^{+.030''}_{-.000''}$	L_3 $^{+.030''}_{-.000''}$	D_2 (h6)	L_1	6 FL	PRICE
.125 (1/8)	.187	**.625** (5x)	1/4	2-1/2	786308-C6	75.80
.125 (1/8)	.187	**1.000** (8x)	1/4	2-1/2	786108-C6	81.40
.187 (3/16)	.285	**1.000** (5x)	1/4	3	786312-C6	79.90
.187 (3/16)	.285	**1.500** (8x)	1/4	3	786112-C6	85.50

SPEEDS & FEEDS (End Mills for Hardened Steels – Ball – For Steels Up to 55Rc – Long Reach, Stub Flute)

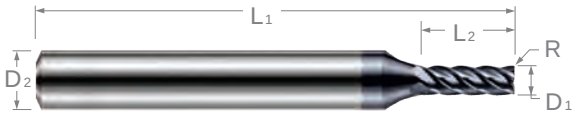
Important Note: Values in tables are in inches and are based on reached (8x Dia) end mills. For shorter reaches, tables values of IPT must be increased (for 5x, increase 125%). For complete speeds and feeds charts, please see www.harveytool.com.

Material	Hardness	SFM		Chip Load Per Tooth (IPT) By Cutter Diameter												Depth of Cut	
				.015	.031	.047	.062	.078	.093	.125	.187	.250	.312	.375	.500	Radial	Axial
Hardened Steels	38 - 44 Rc	100	Slotting	.00003	.00005	.00008	.00011	.00013	.00016	.00022	.00032	.00043	.00054	.00065	.00086	1 x Dia	.28 x Dia
			Profiling	.00003	.00006	.00010	.00013	.00016	.00019	.00026	.00039	.00052	.00065	.00078	.00105	1 x Dia	.28 x Dia
Titanium Alloys	45 - 55 Rc	60	Slotting	.00002	.00003	.00005	.00007	.00009	.00010	.00014	.00021	.00028	.00035	.00041	.00055	1 x Dia	.14 x Dia
Nickel Alloys			Profiling	.00002	.00004	.00006	.00008	.00009	.00011	.00015	.00023	.00030	.00038	.00046	.00061	1 x Dia	.14 x Dia

NEW SIZES!

END MILLS FOR HARDENED STEELS

Corner Radius – For Steels Up to 55 Rc



5 Flute, Variable Helix Design

- **Designed to mill hardened tool, die, and mold steels up to 55Rc**
- Also excellent for stainless steel, inconel, titanium, and other high temperature alloys
- 5 flute, variable helix design (approx. 37°) for improved slotting and roughing
- Corner radius for improved strength
- Latest generation AlTiN Nano coating offers superior hardness and heat resistance
- Increased shank diameter to maintain strength and stiffness
- h6 shank tolerance for high precision tool holders
- Center cutting
- Solid carbide
- CNC ground in the USA

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	CUTTER DIAMETER			CORNER RADIUS	LENGTH OF CUT	SHANK DIAMETER	OVERALL LENGTH	AlTiN NANO COATED	
	D_1 +.0005″ −.0005″	+.00mm −.02mm	decimal equivalent	R +.001″ −.001″ +.025mm −.025mm	L_2 +.010″ −.000″ +.25mm −.00mm	D_2 (h6)	L_1	5 FL	PRICE
NEW	.015 (1/64)		.0150	**.003**	.045 (3x)	1/4	2-1/2	760415-C6	62.80
NEW	.020		.0200	**.005**	.030 (1.5x)	1/4	2-1/2	920420-C6	61.90
	.020		.0200	**.005**	.060 (3x)	1/4	2-1/2	933220-C6	62.80
	.031 (1/32)		.0310	**.005**	.047 (1.5x)	1/4	2-1/2	920431-C6	61.90
	.031 (1/32)		.0310	**.005**	.093 (3x)	1/4	2-1/2	933231-C6	61.90
	.031 (1/32)		.0310	**.005**	.156 (5x)	1/4	2-1/2	851731-C6	67.50
	.031 (1/32)		.0310	**.010**	.093 (3x)	1/4	2-1/2	852131-C6	61.90
	.039		.0390	**.005**	.117 (3x)	1/4	2-1/2	933239-C6	62.20
		1.0 mm	.0393	**.20 mm**	3.00 mm (3x)	6 mm	63 mm	894622-C6	68.10
	.040		.0400	**.005**	.060 (1.5x)	1/4	2-1/2	920440-C6	62.20
	.040		.0400	**.005**	.120 (3x)	1/4	2-1/2	933240-C6	62.20
	.047 (3/64)		.0470	**.005**	.071 (1.5x)	1/4	2-1/2	920447-C6	61.90
	.047 (3/64)		.0470	**.005**	.141 (3x)	1/4	2-1/2	933247-C6	61.90
	.047 (3/64)		.0470	**.005**	.250 (5x)	1/4	2-1/2	851747-C6	67.50
	.047 (3/64)		.0470	**.010**	.141 (3x)	1/4	2-1/2	852147-C6	61.90
	.050		.0500	**.005**	.150 (3x)	1/4	2-1/2	933250-C6	62.20
NEW	.060		.0600	**.005**	.090 (1.5x)	1/4	2-1/2	920460-C6	61.90
	.060		.0600	**.005**	.180 (3x)	1/4	2-1/2	933260-C6	62.20
	.062 (1/16)		.0620	**.005**	.093 (1.5x)	1/4	2-1/2	920462-C6	61.90
	.062 (1/16)		.0620	**.005**	.186 (3x)	1/4	2-1/2	933262-C6	61.90
	.062 (1/16)		.0620	**.005**	.312 (5x)	1/4	2-1/2	851762-C6	67.50
NEW	.062 (1/16)		.0620	**.010**	.093 (1.5x)	1/4	2-1/2	872762-C6	61.90
	.062 (1/16)		.0620	**.010**	.186 (3x)	1/4	2-1/2	852162-C6	61.90
	.062 (1/16)		.0620	**.020**	.186 (3x)	1/4	2-1/2	813562-C6	61.90
	.070		.0700	**.005**	.210 (3x)	1/4	2-1/2	933270-C6	65.20
	.078 (5/64)		.0780	**.005**	.117 (1.5x)	1/4	2-1/2	920478-C6	64.70
	.078 (5/64)		.0780	**.005**	.234 (3x)	1/4	2-1/2	933278-C6	64.70
	.078 (5/64)		.0780	**.005**	.406 (5x)	1/4	2-1/2	851778-C6	70.40
	.078 (5/64)		.0780	**.010**	.117 (1.5x)	1/4	2-1/2	872778-C6	64.70
	.078 (5/64)		.0780	**.010**	.234 (3x)	1/4	2-1/2	852178-C6	64.70
		2.0 mm	.0787	**.20 mm**	6.00 mm (3x)	6 mm	63 mm	894645-C6	71.40
	.080		.0800	**.005**	.240 (3x)	1/4	2-1/2	933280-C6	66.20

continued on next page

NEW SIZES!

END MILLS FOR HARDENED STEELS

Corner Radius – For Steels Up to 55 Rc (cont.)

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CUTTER DIAMETER			CORNER RADIUS	LENGTH OF CUT	SHANK DIAMETER	OVERALL LENGTH	AlTiN NANO COATED	
D_1 +.0005″ −.0005″	+.00mm −.02mm	decimal equivalent	R +.001″ −.001″ +.025mm −.025mm	L_2 +.010″ −.000″ +.25mm −.00mm	D_2 (h6)	L_1	5 FL	PRICE
.090		.0900	**.005**	.270 (3x)	1/4	2-1/2	933290-C6	66.20
.093 (3/32)		.0930	**.005**	.140 (1.5x)	1/4	2-1/2	920493-C6	65.70
.093 (3/32)		.0930	**.005**	.279 (3x)	1/4	2-1/2	933293-C6	65.70
.093 (3/32)		.0930	**.005**	.500 (5x)	1/4	2-1/2	851793-C6	71.20
.093 (3/32)		.0930	**.010**	.140 (1.5x)	1/4	2-1/2	872793-C6	65.70
.093 (3/32)		.0930	**.010**	.279 (3x)	1/4	2-1/2	852193-C6	65.70
.093 (3/32)		.0930	**.015**	.279 (3x)	1/4	2-1/2	852793-C6	65.70
.093 (3/32)		.0930	**.020**	.279 (3x)	1/4	2-1/2	813593-C6	65.70
.093 (3/32)		.0930	**.030**	.279 (3x)	1/4	2-1/2	853293-C6	65.70
.100		.1000	**.005**	.300 (3x)	1/4	2-1/2	933300-C6	66.20
.109 (7/64)		.1090	**.005**	.327 (3x)	1/4	2-1/2	933302-C6	65.70
.118		.1180	**.005**	.354 (3x)	1/4	2-1/2	933305-C6	66.70
	3.0 mm	.1181	**.20 mm**	9.00 mm (3x)	6 mm	63 mm	894657-C6	72.80

D_1 +.000″ −.002″	+.00mm −.04mm	decimal equivalent	R +.001″ −.001″ +.025mm −.025mm	L_2 +.030″ −.000″ +.75mm −.00mm	D_2 (h6)	L_1	5 FL	PRICE	
.125 (1/8)		.1250	**.005**	.187 (1.5x)	1/4	2-1/2	920508-C6	66.40	
.125 (1/8)		.1250	**.005**	.375 (3x)	1/4	2-1/2	933308-C6	66.40	
.125 (1/8)		.1250	**.005**	.625 (5x)	1/4	2-1/2	851808-C6	72.00	
.125 (1/8)		.1250	**.010**	.187 (1.5x)	1/4	2-1/2	872808-C6	66.40	
.125 (1/8)		.1250	**.010**	.375 (3x)	1/4	2-1/2	852208-C6	66.40	
.125 (1/8)		.1250	**.010**	.625 (5x)	1/4	2-1/2	781608-C6	72.00	
.125 (1/8)		.1250	**.015**	.187 (1.5x)	1/4	2-1/2	798008-C6	66.40	
.125 (1/8)		.1250	**.015**	.375 (3x)	1/4	2-1/2	852808-C6	66.40	
.125 (1/8)		.1250	**.020**	.375 (3x)	1/4	2-1/2	813608-C6	66.40	
.125 (1/8)		.1250	**.030**	.187 (1.5x)	1/4	2-1/2	761308-C6	66.40	NEW
.125 (1/8)		.1250	**.030**	.375 (3x)	1/4	2-1/2	853308-C6	66.40	
.140 (9/64)		.1406	**.005**	.220 (1.5x)	1/4	2-1/2	920509-C6	66.40	NEW
.140 (9/64)		.1406	**.005**	.425 (3x)	1/4	2-1/2	933309-C6	66.40	NEW
.156 (5/32)		.1562	**.005**	.235 (1.5x)	1/4	2-1/2	920510-C6	66.40	
.156 (5/32)		.1562	**.005**	.468 (3x)	1/4	2-1/2	933310-C6	66.40	
.156 (5/32)		.1562	**.005**	.750 (5x)	1/4	3	851810-C6	72.00	
.156 (5/32)		.1562	**.015**	.468 (3x)	1/4	2-1/2	852810-C6	66.40	
.156 (5/32)		.1562	**.030**	.468 (3x)	1/4	2-1/2	853310-C6	66.40	
.187 (3/16)		.1875	**.005**	.285 (1.5x)	1/4	2-1/2	920512-C6	69.00	
.187 (3/16)		.1875	**.005**	.562 (3x)	1/4	2-1/2	933312-C6	69.00	
.187 (3/16)		.1875	**.005**	1.000 (5x)	1/4	3	851812-C6	76.00	
.187 (3/16)		.1875	**.010**	.562 (3x)	1/4	2-1/2	852212-C6	69.00	
.187 (3/16)		.1875	**.015**	.562 (3x)	1/4	2-1/2	852812-C6	69.00	
.187 (3/16)		.1875	**.030**	.285 (1.5x)	1/4	2-1/2	761312-C6	69.00	NEW
.187 (3/16)		.1875	**.030**	.562 (3x)	1/4	2-1/2	853312-C6	69.00	
.187 (3/16)		.1875	**.060**	.562 (3x)	1/4	2-1/2	800712-C6	69.00	
	6.0 mm	.2362	**.20 mm**	18.00 mm (3x)	6 mm	63 mm	894666-C6	73.10	

continued on next page

END MILLS FOR HARDENED STEELS

Corner Radius – For Steels Up to 55 Rc (cont.)

continued from previous page

mm & in

	CUTTER DIAMETER		CORNER RADIUS	LENGTH OF CUT	SHANK DIAMETER	OVERALL LENGTH	AlTiN NANO COATED	
	D_1 +.000″ −.002″ / +.00mm −.04mm	decimal equivalent	R +.001″ −.001″ / +.025mm −.025mm	L_2 +.030″ −.000″ / +.75mm −.00mm	D_2 (h6)	L_1	5 FL	PRICE
	.250 (1/4)	.2500	**.005**	.375 (1.5x)	1/4	2-1/2	920516-C6	76.90
	.250 (1/4)	.2500	**.005**	.750 (3x)	1/4	2-1/2	933316-C6	76.90
	.250 (1/4)	.2500	**.005**	1.250 (5x)	1/4	4	851816-C6	83.60
	.250 (1/4)	.2500	**.010**	.750 (3x)	1/4	2-1/2	852216-C6	76.90
NEW	.250 (1/4)	.2500	**.015**	.375 (1.5x)	1/4	2-1/2	798016-C6	76.90
	.250 (1/4)	.2500	**.015**	.750 (3x)	1/4	2-1/2	852816-C6	76.90
	.250 (1/4)	.2500	**.030**	.750 (3x)	1/4	2-1/2	853316-C6	76.90
	.375 (3/8)	.3750	**.015**	1.125 (3x)	3/8	2-1/2	852824-C6	99.20
	.500 (1/2)	.5000	**.015**	1.500 (3x)	1/2	3	852832-C6	119.90
	.500 (1/2)	.5000	**.030**	1.500 (3x)	1/2	3	853332-C6	119.90

SPEEDS & FEEDS (End Mills for Hardened Steels – Square & Corner Radius – For Steels Up to 55Rc)

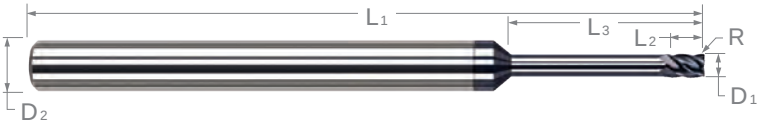
Important Note: Values in table are in inches and are based on standard (3x Dia) length of cut end mills. For shorter lengths of cuts, table values of IPT must be increased (for 0.8x, increase to 125%; for 1.5x, increase to 110%). For longer lengths of cut, table values of IPT and DOC must be reduced (for 4x, reduce to 90%; for 5x, reduce to 85%). For complete speeds and feeds charts, please see www.harveytool.com.

Material	Hardness	SFM		Chip Load Per Tooth (IPT) By Cutter Diameter												Depth of Cut	
				.015	.031	.047	.062	.078	.093	.125	.187	.250	.312	.375	.500	Radial	Axial
Hardened Steels Titanium Alloys Nickel Alloys	38-44 Rc	100	Slotting	.00003	.00007	.00010	.00013	.00017	.00020	.00027	.00040	.00054	.00067	.00081	.00108	1 x Dia	.30 x Dia
			Profiling	.00004	.00008	.00012	.00016	.00020	.00024	.00033	.00049	.00065	.00082	.00098	.00131	.3 x Dia	.5 x Dia
	45-55 Rc	60	Slotting	.00002	.00004	.00006	.00009	.00011	.00013	.00017	.00026	.00035	.00043	.00052	.00069	1 x Dia	.15 x Dia
			Profiling	.00002	.00005	.00007	.00009	.00012	.00014	.00019	.00028	.00038	.00047	.00057	.00076	.15 x Dia	.5 x Dia

NEW SIZES!

END MILLS FOR HARDENED STEELS

Corner Radius – For Steels Up to 55 Rc – Long Reach, Stub Flute



5 Flute, Variable Helix Design

- **Designed to mill hardened tool, die, and mold steels up to 55Rc**
- Also excellent for stainless steel, inconel, titanium, and other high temperature alloys
- 5 flute, variable helix design (approx. 37°) for improved slotting and roughing
- Stub flute for maximum rigidity
- Latest generation AlTiN Nano coating offers superior hardness and heat resistance
- Increased shank diameter to maintain strength and stiffness
- h6 shank tolerance for high precision tool holders
- Center cutting
- Solid carbide
- CNC ground in the USA

CUTTER DIAMETER	CORNER RADIUS	LENGTH OF CUT	OVERALL REACH	SHANK DIAMETER	OVERALL LENGTH	AlTiN NANO COATED		
D_1 +.0005″ −.0005″	R +.001″ −.001″	L_2 +.010″ −.000″	L_3 +.010″ −.000″	D_2 (h6)	L_1	5 FL	PRICE	
.031 (1/32)	**.005**	.047	**.156** (5x)	1/4	2-1/2	812731-C6	69.80	
.031 (1/32)	**.005**	.047	**.250** (8x)	1/4	2-1/2	812531-C6	75.30	
.047 (3/64)	**.005**	.071	**.250** (5x)	1/4	2-1/2	812747-C6	69.80	NEW
.047 (3/64)	**.005**	.071	**.375** (8x)	1/4	2-1/2	812547-C6	75.30	NEW
.062 (1/16)	**.005**	.093	**.312** (5x)	1/4	2-1/2	812762-C6	69.80	
.062 (1/16)	**.005**	.093	**.500** (8x)	1/4	2-1/2	812562-C6	75.30	
.062 (1/16)	**.010**	.093	**.312** (5x)	1/4	2-1/2	761562-C6	69.80	NEW
.062 (1/16)	**.010**	.093	**.500** (8x)	1/4	2-1/2	763762-C6	75.30	NEW
.078 (5/64)	**.005**	.117	**.406** (5x)	1/4	2-1/2	812778-C6	69.80	NEW
.078 (5/64)	**.005**	.117	**.625** (8x)	1/4	2-1/2	812578-C6	75.30	NEW
.093 (3/32)	**.005**	.140	**.500** (5x)	1/4	2-1/2	812793-C6	73.60	
.093 (3/32)	**.005**	.140	**.750** (8x)	1/4	2-1/2	812593-C6	79.10	
.093 (3/32)	**.010**	.140	**.500** (5x)	1/4	2-1/2	761593-C6	73.60	NEW
.093 (3/32)	**.010**	.140	**.750** (8x)	1/4	2-1/2	763793-C6	79.10	NEW

D_1 +.000″ −.002″	R +.001″ −.001″	L_2 +.030″ −.000″	L_3 +.030″ −.000″	D_2 (h6)	L_1	5 FL	PRICE	
.125 (1/8)	**.005**	.187	**.625** (5x)	1/4	2-1/2	812808-C6	74.30	
.125 (1/8)	**.005**	.187	**1.000** (8x)	1/4	2-1/2	812608-C6	79.90	
.125 (1/8)	**.010**	.187	**.625** (5x)	1/4	2-1/2	761608-C6	74.30	NEW
.125 (1/8)	**.010**	.187	**1.000** (8x)	1/4	2-1/2	763808-C6	79.90	NEW
.187 (3/16)	**.005**	.285	**1.000** (5x)	1/4	3	812812-C6	78.30	
.187 (3/16)	**.005**	.285	**1.500** (8x)	1/4	3	812612-C6	83.80	
.250 (1/4)	**.005**	.375	**1.250** (5x)	1/4	4	812816-C6	84.80	NEW
.250 (1/4)	**.005**	.375	**2.000** (8x)	1/4	4	812616-C6	90.40	NEW

SPEEDS & FEEDS (End Mills for Hardened Steels – Square & Corner Radius – For Steels Up to 55Rc – Long Reach, Stub Flute)

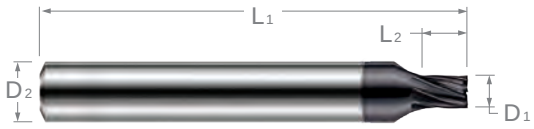
Important Note: Values in tables are in inches and are based on reached (8x Dia) end mills. For shorter reaches, tables values of IPT must be increased (for 5x, increase 125%). For complete speeds and feeds charts, please see www.harveytool.com.

Material	Hardness	SFM		Chip Load Per Tooth (IPT) By Cutter Diameter											Depth of Cut	
				.015	.031	.047	.062	.078	.093	.125	.187	.250	.312	.375	.500	Radial	Axial
Hardened Steels Titanium Alloys Nickel Alloys	38-44 Rc	100	Slotting	.00003	.00006	.00009	.00012	.00015	.00018	.00024	.00036	.00048	.00060	.00072	.00096	1 x Dia	.28 x Dia
			Profiling	.00003	.00007	.00011	.00014	.00018	.00022	.00029	.00043	.00058	.00072	.00087	.00116	1 x Dia	.28 x Dia
	45-55 Rc	60	Slotting	.00002	.00004	.00006	.00008	.00010	.00011	.00015	.00023	.00031	.00038	.00046	.00061	1 x Dia	.14 x Dia
			Profiling	.00002	.00004	.00006	.00008	.00011	.00013	.00017	.00025	.00034	.00042	.00051	.00068	1 x Dia	.14 x Dia

NEW SIZES!

END MILLS FOR HARDENED STEELS

Square – For Steels 45 - 68 Rc



7 Flute, Variable Helix Design

- **Designed to mill hardened steels between 45Rc and 68Rc (including stainless, tool, and mold steels)**
- 7 flute, variable helix design (approx. 20°) and specialized geometry for improved material removal rates
- Latest generation AlTiN Nano coating offers superior hardness and heat resistance
- h6 shank tolerance for high precision tool holders
- End cutting (not center cutting)
- Solid carbide
- CNC ground in the USA

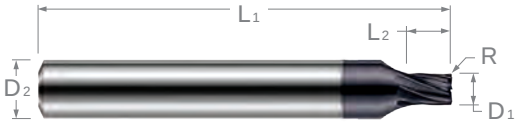
	CUTTER DIAMETER	LENGTH OF CUT	SHANK DIAMETER	OVERALL LENGTH	AlTiN NANO COATED	
	D_1 $^{+.0005''}_{-.0005''}$	L_2 $^{+.010''}_{-.000''}$	D_2 (h6)	L_1	7 FL	PRICE
	.031 (1/32)	.047 (1.5x)	1/4	2-1/2	835131-C6	64.60
	.031 (1/32)	.093 (3x)	1/4	2-1/2	854831-C6	64.60
NEW	.040	.120 (3x)	1/4	2-1/2	854840-C6	64.60
NEW	.047 (3/64)	.071 (1.5x)	1/4	2-1/2	835147-C6	64.60
	.047 (3/64)	.141 (3x)	1/4	2-1/2	854847-C6	64.60
NEW	.060	.180 (3x)	1/4	2-1/2	854860-C6	64.60
	.062 (1/16)	.093 (1.5x)	1/4	2-1/2	835162-C6	64.60
	.062 (1/16)	.186 (3x)	1/4	2-1/2	854862-C6	64.60
	.062 (1/16)	.312 (5x)	1/4	2-1/2	797762-C6	64.60
	.078 (5/64)	.117 (1.5x)	1/4	2-1/2	835178-C6	68.20
	.078 (5/64)	.234 (3x)	1/4	2-1/2	854878-C6	68.20
	.093 (3/32)	.140 (1.5x)	1/4	2-1/2	835193-C6	68.90
	.093 (3/32)	.279 (3x)	1/4	2-1/2	854893-C6	68.90
NEW	.093 (3/32)	.500 (5x)	1/4	2-1/2	797793-C6	70.80

	D_1 $^{+.000''}_{-.002''}$	L_2 $^{+.030''}_{-.000''}$	D_2 (h6)	L_1	7 FL	PRICE
	.125 (1/8)	.187 (1.5x)	1/4	2-1/2	835208-C6	69.80
	.125 (1/8)	.375 (3x)	1/4	2-1/2	854808-C6	69.80
	.125 (1/8)	.625 (5x)	1/4	2-1/2	797808-C6	71.70
	.156 (5/32)	.235 (1.5x)	1/4	2-1/2	835210-C6	75.40
	.156 (5/32)	.468 (3x)	1/4	2-1/2	854810-C6	75.40
	.187 (3/16)	.285 (1.5x)	1/4	2-1/2	835212-C6	72.60
	.187 (3/16)	.562 (3x)	1/4	2-1/2	854812-C6	72.60
	.250 (1/4)	.375 (1.5x)	1/4	2-1/2	835216-C6	80.80
	.250 (1/4)	.750 (3x)	1/4	2-1/2	854816-C6	80.80
NEW	.250 (1/4)	1.250 (5x)	1/4	4	797816-C6	84.50
	.375 (3/8)	.570 (1.5x)	3/8	2-1/2	835224-C6	100.80
	.375 (3/8)	1.125 (3x)	3/8	2-1/2	854824-C6	100.80
NEW	.500 (1/2)	.750 (1.5x)	1/2	3	835232-C6	122.60
	.500 (1/2)	1.500 (3x)	1/2	3	854832-C6	122.60

PLEASE SEE SPEEDS & FEEDS ON PAGE 101

END MILLS FOR HARDENED STEELS

Corner Radius – For Steels 45 - 68 Rc



7 Flute, Variable Helix Design

- **Designed to mill hardened steels between 45Rc and 68Rc (including stainless, tool, and mold steels)**
- 7 flute, variable helix design (approx. 20°) and specialized geometry for improved material removal rates
- Latest generation AlTiN Nano coating offers superior hardness and heat resistance
- Corner radius for improved strength
- h6 shank tolerance for high precision tool holders
- End cutting (not center cutting)
- Solid carbide
- CNC ground in the USA

mm & in

CUTTER DIAMETER	CORNER RADIUS	LENGTH OF CUT	SHANK DIAMETER	OVERALL LENGTH	AlTiN NANO COATED	
D_1 $^{+.0005''}_{-.0005''}$	R $^{+.001''}_{-.001''}$	L_2 $^{+.010''}_{-.000''}$	D_2 (h6)	L_1	7 FL	PRICE
.030	**.005**	.045 (1.5x)	1/4	2-1/2	903130-C6	70.60
.030	**.005**	.090 (3x)	1/4	2-1/2	910830-C6	70.60
.031 (1/32)	**.005**	.047 (1.5x)	1/4	2-1/2	903131-C6	68.40
.031 (1/32)	**.005**	.093 (3x)	1/4	2-1/2	910831-C6	68.40
.031 (1/32)	**.005**	.156 (5x)	1/4	2-1/2	845231-C6	74.00
.040	**.005**	.120 (3x)	1/4	2-1/2	910840-C6	70.60
.047 (3/64)	**.005**	.071 (1.5x)	1/4	2-1/2	903147-C6	68.40
.047 (3/64)	**.005**	.141 (3x)	1/4	2-1/2	910847-C6	68.40
.050	**.005**	.150 (3x)	1/4	2-1/2	910850-C6	70.60
.060	**.005**	.180 (3x)	1/4	2-1/2	910860-C6	70.60
.062 (1/16)	**.005**	.093 (1.5x)	1/4	2-1/2	903162-C6	68.40
.062 (1/16)	**.005**	.186 (3x)	1/4	2-1/2	910862-C6	68.40
.062 (1/16)	**.005**	.312 (5x)	1/4	2-1/2	845262-C6	74.00
.062 (1/16)	**.010**	.186 (3x)	1/4	2-1/2	850562-C6	68.40
.070	**.005**	.210 (3x)	1/4	2-1/2	910870-C6	70.60
.078 (5/64)	**.005**	.117 (1.5x)	1/4	2-1/2	903178-C6	71.80
.078 (5/64)	**.005**	.234 (3x)	1/4	2-1/2	910878-C6	71.80
.080	**.005**	.240 (3x)	1/4	2-1/2	910880-C6	74.10
.090	**.005**	.270 (3x)	1/4	2-1/2	910890-C6	74.10
.093 (3/32)	**.005**	.140 (1.5x)	1/4	2-1/2	903193-C6	72.40
.093 (3/32)	**.005**	.279 (3x)	1/4	2-1/2	910893-C6	72.40
.093 (3/32)	**.005**	.500 (5x)	1/4	2-1/2	845293-C6	78.00
.093 (3/32)	**.010**	.279 (3x)	1/4	2-1/2	850593-C6	72.40
.100	**.005**	.300 (3x)	1/4	2-1/2	910900-C6	74.10
.109 (7/64)	**.005**	.327 (3x)	1/4	2-1/2	910902-C6	74.10
.118	**.005**	.354 (3x)	1/4	2-1/2	910905-C6	74.10

D_1 $^{+.000''}_{-.002''}$	R $^{+.001''}_{-.001''}$	L_2 $^{+.030''}_{-.000''}$	D_2 (h6)	L_1	7 FL	PRICE
.125 (1/8)	**.005**	.187 (1.5x)	1/4	2-1/2	903208-C6	73.50
.125 (1/8)	**.005**	.375 (3x)	1/4	2-1/2	910908-C6	73.50
.125 (1/8)	**.005**	.625 (5x)	1/4	2-1/2	845308-C6	73.50
.125 (1/8)	**.010**	.375 (3x)	1/4	2-1/2	850608-C6	73.50
.125 (1/8)	**.015**	.187 (1.5x)	1/4	2-1/2	879108-C6	73.50
.125 (1/8)	**.015**	.375 (3x)	1/4	2-1/2	882308-C6	73.50
.125 (1/8)	**.030**	.375 (3x)	1/4	2-1/2	883508-C6	73.50

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END MILLS FOR HARDENED STEELS

Corner Radius – For Steels 45 - 68 Rc (cont.)

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continued from previous page

CUTTER DIAMETER	CORNER RADIUS	LENGTH OF CUT	SHANK DIAMETER	OVERALL LENGTH	AlTiN NANO COATED	
D_1 $^{+.000''}_{-.002''}$	R $^{+.001''}_{-.001''}$	L_2 $^{+.030''}_{-.000''}$	D_2 (h6)	L_1	7 FL	PRICE
.140 (9/64)	**.005**	.425 (3x)	1/4	2-1/2	910909-C6	75.80
.156 (5/32)	**.005**	.235 (1.5x)	1/4	2-1/2	903210-C6	73.50
.156 (5/32)	**.005**	.468 (3x)	1/4	2-1/2	910910-C6	73.50
.187 (3/16)	**.005**	.285 (1.5x)	1/4	2-1/2	903212-C6	76.50
.187 (3/16)	**.005**	.562 (3x)	1/4	2-1/2	910912-C6	76.50
.187 (3/16)	**.010**	.562 (3x)	1/4	2-1/2	850612-C6	76.50
.187 (3/16)	**.015**	.285 (1.5x)	1/4	2-1/2	879112-C6	76.50
.187 (3/16)	**.015**	.562 (3x)	1/4	2-1/2	882312-C6	76.50
.250 (1/4)	**.005**	.375 (1.5x)	1/4	2-1/2	903216-C6	85.10
.250 (1/4)	**.005**	.750 (3x)	1/4	2-1/2	910916-C6	85.10
.250 (1/4)	**.010**	.750 (3x)	1/4	2-1/2	850616-C6	85.10
.250 (1/4)	**.015**	.375 (1.5x)	1/4	2-1/2	879116-C6	85.10
.250 (1/4)	**.015**	.750 (3x)	1/4	2-1/2	882316-C6	85.10
.250 (1/4)	**.030**	.750 (3x)	1/4	2-1/2	883516-C6	85.10
.312 (5/16)	**.015**	1.000 (3x)	5/16	2-1/2	882320-C6	88.50
.312 (5/16)	**.030**	1.000 (3x)	5/16	2-1/2	883520-C6	88.50
.375 (3/8)	**.015**	.570 (1.5x)	3/8	2-1/2	879124-C6	95.70
.375 (3/8)	**.015**	1.125 (3x)	3/8	2-1/2	882324-C6	95.70
.375 (3/8)	**.030**	.570 (1.5x)	3/8	2-1/2	868024-C6	95.70
.375 (3/8)	**.030**	1.125 (3x)	3/8	2-1/2	883524-C6	95.70
.500 (1/2)	**.015**	.750 (1.5x)	1/2	3	879132-C6	106.00
.500 (1/2)	**.015**	1.500 (3x)	1/2	3	882332-C6	106.00
.500 (1/2)	**.030**	.750 (1.5x)	1/2	3	868032-C6	106.00
.500 (1/2)	**.030**	1.500 (3x)	1/2	3	883532-C6	106.00

SPEEDS & FEEDS (End Mills for Hardened Steels – For Steels 45 - 68Rc)

Important Note: Values intable are in inches and are based on standard (3x Dia) length of cut end mills. For shorter lengths of cuts, table values of IPT must be increased (for 1.5x, increase to 110%). For longer lengths of cut, table values of IPT and DOC must be reduced (for 5x, reduce to 90%). For complete speeds and feeds charts, please see www.harveytool.com.

Material	Hardness	SFM		Chip Load Per Tooth (IPT) By Cutter Diameter												Depth of Cut	
				.015	.031	.047	.062	.078	.093	.125	.187	.250	.312	.375	.500	Radial	Axial
Hardened Steels Titanium Alloys Nickel Alloys	45 - 55 Rc	60	Semi-Roughing	.00004	.00008	.00012	.00015	.00019	.00023	.00031	.00047	.00062	.00078	.00094	.00125	.15 x Dia	.25 x Dia
			Finishing	.00005	.00009	.00014	.00019	.00024	.00028	.00038	.00056	.00076	.00094	.00113	.00151	.08 x Dia	.5 x Dia
	56 - 68 Rc	50	Semi-Roughing	.00003	.00006	.00009	.00012	.00016	.00019	.00025	.00037	.00050	.00062	.00075	.00100	.12 x Dia	.20 x Dia
			Finishing	.00003	.00007	.00010	.00014	.00017	.00020	.00027	.00041	.00055	.00069	.00082	.00110	.08 x Dia	.5 x Dia

END MILLS FOR HARDENED STEELS

Finishers – Ball





Stub Flute and Large Rigid Core

- **Designed to profile and finish hardened tool, die, and mold steels 46Rc to 68Rc**
- Select carbide grade for improved edge retention
- Latest generation AlTiN Nano coating offers superior hardness and heat resistance
- Geometry includes stub flute, large rigid core diameter, and eccentric relief
- Increased shank diameter to maintain strength and stiffness
- h6 shank tolerance for high precision tool holders
- Center cutting (3 flutes to center)
- Reduced neck diameter to avoid heeling
- CNC ground in the USA

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CUTTER DIAMETER			LENGTH OF CUT	OVERALL REACH	SHANK DIAMETER	OVERALL LENGTH	AlTiN NANO 2 FLUTE		AlTiN NANO 3 FLUTE	
D_1 +.0000″ −.0006″	D_1 +.000mm −.014mm	D_1 decimal equivalent	L_2 +.010″ −.000″ +.125mm −.000mm	L_3 +.010″ −.000″ +.125mm −.000mm	D_2 (h6)	L_1	2 FL	PRICE	3 FL	PRICE
.008		.0080	.006	**.012** (1.5x)	1/4	2-1/2	37808-C6	100.80		
.008		.0080	.006	**.025** (3x)	1/4	2-1/2	31408-C6	100.80		
.008		.0080	.006	**.040** (5x)	1/4	2-1/2	38708-C6	105.70		
.010		.0100	.008	**.015** (1.5x)	1/4	2-1/2	37810-C6	91.50		
.010		.0100	.008	**.031** (3x)	1/4	2-1/2	31410-C6	91.50		
.010		.0100	.008	**.050** (5x)	1/4	2-1/2	38710-C6	95.80		
.015 (1/64)		.0150	.012	-	1/4	2-1/2	958315-C6	77.20		
.015 (1/64)		.0150	.012	**.023** (1.5x)	1/4	2-1/2	37815-C6	73.10		
.015 (1/64)		.0150	.012	**.047** (3x)	1/4	2-1/2	31415-C6	73.10	813115-C6	77.90
.015 (1/64)		.0150	.012	**.062** (4x)	1/4	2-1/2	881515-C6	75.80		
.015 (1/64)		.0150	.012	**.078** (5x)	1/4	2-1/2	38715-C6	75.80	812915-C6	80.50
.015 (1/64)		.0150	.012	**.125** (8x)	1/4	2-1/2	32015-C6	80.20		
.015 (1/64)		.0150	.012	**.187** (12x)	1/4	2-1/2	33815-C6	98.60		
.020		.0200	.016	-	1/4	2-1/2	958320-C6	77.20		
.020		.0200	.016	**.031** (1.5x)	1/4	2-1/2	37820-C6	73.10		
.020		.0200	.016	**.062** (3x)	1/4	2-1/2	31420-C6	73.10		
.020		.0200	.016	**.080** (4x)	1/4	2-1/2	881520-C6	75.80		
.020		.0200	.016	**.100** (5x)	1/4	2-1/2	38720-C6	75.80		
.020		.0200	.016	**.160** (8x)	1/4	2-1/2	32020-C6	76.50		
.020		.0200	.016	**.200** (10x)	1/4	2-1/2	919120-C6	88.30		
.025		.0250	.020	**.038** (1.5x)	1/4	2-1/2	37825-C6	73.10		
.025		.0250	.020	**.075** (3x)	1/4	2-1/2	31425-C6	73.10		
.025		.0250	.020	**.125** (5x)	1/4	2-1/2	38725-C6	75.80		
.031 (1/32)		.0310	.025	-	1/4	2-1/2	958331-C6	66.40		
.031 (1/32)		.0310	.025	**.047** (1.5x)	1/4	2-1/2	37831-C6	62.50		
.031 (1/32)		.0310	.025	**.093** (3x)	1/4	2-1/2	31431-C6	62.50	813131-C6	67.30
.031 (1/32)		.0310	.025	**.125** (4x)	1/4	2-1/2	881531-C6	66.40		
.031 (1/32)		.0310	.025	**.156** (5x)	1/4	2-1/2	38731-C6	68.40	812931-C6	73.10
.031 (1/32)		.0310	.025	**.187** (6x)	1/4	2-1/2	858031-C6	69.80		
.031 (1/32)		.0310	.025	**.218** (7x)	1/4	2-1/2	863231-C6	70.90		
.031 (1/32)		.0310	.025	**.250** (8x)	1/4	2-1/2	32031-C6	72.10		
.031 (1/32)		.0310	.025	**.312** (10x)	1/4	2-1/2	919131-C6	84.60		
.031 (1/32)		.0310	.025	**.375** (12x)	1/4	2-1/2	33831-C6	84.60		
.031 (1/32)		.0310	.025	**.470** (15x)	1/4	2-1/2	973231-C6	97.20		

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END MILLS FOR HARDENED STEELS

Finishers – Ball (cont.)

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continued from previous page

CUTTER DIAMETER			LENGTH OF CUT	OVERALL REACH	SHANK DIAMETER	OVERALL LENGTH	AlTiN NANO 2 FLUTE		AlTiN NANO 3 FLUTE	
D_1 +.0000″ −.0006″	D_1 +.000mm −.014mm	D_1 decimal equivalent	L_2 +.010″ −.000″ +.125mm −.000mm	L_3 +.010″ −.000″ +.125mm −.000mm	D_2 (h6)	L_1	2 FL	PRICE	3 FL	PRICE
.039		.0390	.031	-	1/4	2-1/2	958339-C6	66.40		
.039		.0390	.031	**.062** (1.5x)	1/4	2-1/2	37839-C6	62.50		
.039		.0390	.031	**.117** (3x)	1/4	2-1/2	31439-C6	62.50		
.039		.0390	.031	**.156** (4x)	1/4	2-1/2	881539-C6	68.40		
.039		.0390	.031	**.203** (5x)	1/4	2-1/2	38739-C6	68.40		
.039		.0390	.031	**.312** (8x)	1/4	2-1/2	32039-C6	72.10		
.039		.0390	.031	**.468** (12x)	1/4	2-1/2	33839-C6	84.60		
	1.0 mm	.0393	.80 mm	**3.00 mm** (3x)	6 mm	63 mm	882922-C6	68.40		
	1.0 mm	.0393	.80 mm	**5.00 mm** (5x)	6 mm	63 mm	881722-C6	74.10		
.040		.0400	.032	**.062** (1.5x)	1/4	2-1/2	37840-C6	62.50		
.040		.0400	.032	**.125** (3x)	1/4	2-1/2	31440-C6	62.50		
.047 (3/64)		.0470	.038	-	1/4	2-1/2	958347-C6	66.40		
.047 (3/64)		.0470	.038	**.071** (1.5x)	1/4	2-1/2	37847-C6	62.50		
.047 (3/64)		.0470	.038	**.141** (3x)	1/4	2-1/2	31447-C6	62.50	813147-C6	67.30
.047 (3/64)		.0470	.038	**.187** (4x)	1/4	2-1/2	881547-C6	68.40		
.047 (3/64)		.0470	.038	**.250** (5x)	1/4	2-1/2	38747-C6	68.40	812947-C6	73.10
.047 (3/64)		.0470	.038	**.375** (8x)	1/4	2-1/2	32047-C6	72.10		
.047 (3/64)		.0470	.038	**.470** (10x)	1/4	2-1/2	919147-C6	84.60		
.047 (3/64)		.0470	.038	**.564** (12x)	1/4	2-1/2	33847-C6	84.60		
.047 (3/64)		.0470	.038	**.710** (15x)	1/4	2-1/2	973247-C6	97.20		
.050		.0500	.040	**.078** (1.5x)	1/4	2-1/2	37850-C6	62.50		
.050		.0500	.040	**.150** (3x)	1/4	2-1/2	31450-C6	62.50		
.060		.0600	.048	**.093** (1.5x)	1/4	2-1/2	37860-C6	62.50		
.060		.0600	.048	**.180** (3x)	1/4	2-1/2	31460-C6	62.50		
.062 (1/16)		.0620	.050	-	1/4	2-1/2	958362-C6	66.40		
.062 (1/16)		.0620	.050	**.093** (1.5x)	1/4	2-1/2	37862-C6	62.50		
.062 (1/16)		.0620	.050	**.187** (3x)	1/4	2-1/2	31462-C6	62.50	813162-C6	67.30
.062 (1/16)		.0620	.050	**.250** (4x)	1/4	2-1/2	881562-C6	66.40		
.062 (1/16)		.0620	.050	**.312** (5x)	1/4	2-1/2	38762-C6	68.40	812962-C6	73.10
.062 (1/16)		.0620	.050	**.375** (6x)	1/4	2-1/2	858062-C6	69.80		
.062 (1/16)		.0620	.050	**.437** (7x)	1/4	2-1/2	863262-C6	70.90		
.062 (1/16)		.0620	.050	**.500** (8x)	1/4	2-1/2	32062-C6	72.10		
.062 (1/16)		.0620	.050	**.625** (10x)	1/4	2-1/2	919162-C6	92.10		
.062 (1/16)		.0620	.050	**.750** (12x)	1/4	4	33862-C6	92.10		
.062 (1/16)		.0620	.050	**.950** (15x)	1/4	4	973262-C6	105.00		
.078 (5/64)		.0780	.062	-	1/4	2-1/2	958378-C6	66.40		
.078 (5/64)		.0780	.062	**.117** (1.5x)	1/4	2-1/2	37878-C6	62.50		
.078 (5/64)		.0780	.062	**.234** (3x)	1/4	2-1/2	31478-C6	62.50	813178-C6	67.30
.078 (5/64)		.0780	.062	**.312** (4x)	1/4	2-1/2	881578-C6	68.40		
.078 (5/64)		.0780	.062	**.406** (5x)	1/4	2-1/2	38778-C6	68.40	812978-C6	73.10
.078 (5/64)		.0780	.062	**.625** (8x)	1/4	2-1/2	32078-C6	72.10		
.078 (5/64)		.0780	.062	**.781** (10x)	1/4	2-1/2	919178-C6	92.10		
.078 (5/64)		.0780	.062	**.937** (12x)	1/4	4	33878-C6	92.10		
.078 (5/64)		.0780	.062	**1.187** (15x)	1/4	4	973278-C6	105.00		

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END MILLS FOR HARDENED STEELS

Finishers – Ball (cont.)

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continued from previous page

CUTTER DIAMETER			LENGTH OF CUT	OVERALL REACH	SHANK DIAMETER	OVERALL LENGTH	AlTiN NANO 2 FLUTE		AlTiN NANO 3 FLUTE	
D_1 +.0000″ −.0006″	+.000mm −.014mm	decimal equivalent	L_2 +.010″ −.000″ +.125mm −.000mm	L_3 +.010″ −.000″ +.125mm −.000mm	D_2 (h6)	L_1	2 FL	PRICE	3 FL	PRICE
	2.0 mm	.0787	1.60 mm	**6.00 mm** (3x)	6 mm	63 mm	882945-C6	68.40		
	2.0 mm	.0787	1.60 mm	**10.00 mm** (5x)	6 mm	63 mm	881745-C6	74.10		
.093 (3/32)		.0930	.074	-	1/4	2-1/2	958393-C6	66.40		
.093 (3/32)		.0930	.074	**.140** (1.5x)	1/4	2-1/2	37893-C6	62.50		
.093 (3/32)		.0930	.074	**.281** (3x)	1/4	2-1/2	31493-C6	62.50	813193-C6	67.30
.093 (3/32)		.0930	.074	**.375** (4x)	1/4	2-1/2	881593-C6	66.40		
.093 (3/32)		.0930	.074	**.500** (5x)	1/4	2-1/2	38793-C6	68.40	812993-C6	73.10
.093 (3/32)		.0930	.074	**.585** (6x)	1/4	2-1/2	858093-C6	69.80		
.093 (3/32)		.0930	.074	**.670** (7x)	1/4	2-1/2	863293-C6	70.90		
.093 (3/32)		.0930	.074	**.750** (8x)	1/4	2-1/2	32093-C6	72.10		
.093 (3/32)		.0930	.074	**.937** (10x)	1/4	4	919193-C6	92.10		
.093 (3/32)		.0930	.074	**1.125** (12x)	1/4	4	33893-C6	92.10		
.093 (3/32)		.0930	.074	**1.400** (15x)	1/4	4	973293-C6	105.00		
.118		.1180	.094	**.177** (1.5x)	1/4	2-1/2	37905-C6	70.10		
.118		.1180	.094	**.354** (3x)	1/4	2-1/2	31505-C6	70.10		
.118		.1180	.094	**.625** (5x)	1/4	2-1/2	38805-C6	79.60		
	3.0 mm	.1181	2.40 mm	**9.00 mm** (3x)	6 mm	63 mm	882957-C6	75.80		
	3.0 mm	.1181	2.40 mm	**15.00 mm** (5x)	6 mm	63 mm	881757-C6	85.50		
.125 (1/8)		.1250	.100	-	1/4	2-1/2	958408-C6	74.10		
.125 (1/8)		.1250	.100	**.187** (1.5x)	1/4	2-1/2	37908-C6	70.10		
.125 (1/8)		.1250	.100	**.375** (3x)	1/4	2-1/2	31508-C6	70.10	813208-C6	74.80
.125 (1/8)		.1250	.100	**.500** (4x)	1/4	2-1/2	881608-C6	77.70		
.125 (1/8)		.1250	.100	**.625** (5x)	1/4	2-1/2	38808-C6	79.60	813008-C6	84.40
.125 (1/8)		.1250	.100	**.750** (6x)	1/4	2-1/2	858108-C6	81.20		
.125 (1/8)		.1250	.100	**.875** (7x)	1/4	2-1/2	863308-C6	82.80		
.125 (1/8)		.1250	.100	**1.000** (8x)	1/4	2-1/2	32108-C6	84.40		
.125 (1/8)		.1250	.100	**1.250** (10x)	1/4	4	919208-C6	99.60		
.125 (1/8)		.1250	.100	**1.500** (12x)	1/4	4	33908-C6	99.60		
.125 (1/8)		.1250	.100	**1.875** (15x)	1/4	4	973308-C6	112.40		

D_1 +.000″ −.001″	+.000mm −.018mm	decimal equivalent	L_2 +.020″ −.000″ +.500mm −.000mm	L_3 +.020″ −.000″ +.500mm −.000mm	D_2 (h6)	L_1	2 FL	PRICE	3 FL	PRICE
.156 (5/32)		.1560	.125	**.235** (1.5x)	1/4	2-1/2	37910-C6	70.10		
.156 (5/32)		.1560	.125	**.470** (3x)	1/4	2-1/2	31510-C6	70.10		
.156 (5/32)		.1560	.125	**.750** (5x)	1/4	2-1/2	38810-C6	79.60		
.187 (3/16)		.1870	.150	-	1/4	2-1/2	958412-C6	74.10		
.187 (3/16)		.1870	.150	**.285** (1.5x)	1/4	2-1/2	37912-C6	70.10		
.187 (3/16)		.1870	.150	**.570** (3x)	1/4	2-1/2	31512-C6	70.10	813212-C6	74.80
.187 (3/16)		.1870	.150	**.750** (4x)	1/4	2-1/2	881612-C6	79.60		
.187 (3/16)		.1870	.150	**1.000** (5x)	1/4	2-1/2	38812-C6	79.60	813012-C6	84.40
.187 (3/16)		.1870	.150	**1.500** (8x)	1/4	4	32112-C6	93.20		
.187 (3/16)		.1870	.150	**2.250** (12x)	1/4	4	33912-C6	112.40		

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END MILLS FOR HARDENED STEELS

Finishers – Ball (cont.)

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CUTTER DIAMETER			LENGTH OF CUT	OVERALL REACH	SHANK DIAMETER	OVERALL LENGTH	AlTiN NANO 2 FLUTE		AlTiN NANO 3 FLUTE	
D_1 +.000″ −.001″	+.000mm −.018mm	decimal equivalent	L_2 +.020″ −.000″ +.500mm −.000mm	L_3 +.020″ −.000″ +.500mm −.000mm	D_2 (h6)	L_1	2 FL	PRICE	3 FL	PRICE
	6.0 mm	.2362	4.80 mm	**18.00 mm** (3x)	6 mm	63 mm	882966-C6	75.80		
	6.0 mm	.2362	4.80 mm	**30.00 mm** (5x)	6 mm	63 mm	881766-C6	85.50		
.250 (1/4)		.2500	.200	-	1/4	2-1/2	958416-C6	74.10		
.250 (1/4)		.2500	.200	**.375** (1.5x)	1/4	2-1/2	37916-C6	70.10		
.250 (1/4)		.2500	.200	**.750** (3x)	1/4	2-1/2	31516-C6	79.60	813216-C6	84.40
.250 (1/4)		.2500	.200	**1.000** (4x)	1/4	2-1/2	881616-C6	79.60		
.250 (1/4)		.2500	.200	**1.250** (5x)	1/4	2-1/2	38816-C6	79.60	813016-C6	84.40
.250 (1/4)		.2500	.200	**1.500** (6x)	1/4	3	858116-C6	86.40		
.250 (1/4)		.2500	.200	**1.750** (7x)	1/4	3	863316-C6	86.40		
.250 (1/4)		.2500	.200	**2.000** (8x)	1/4	4	32116-C6	93.20		
.312 (5/16)		.3120	.250	**.470** (1.5x)	5/16	2-1/2	37920-C6	91.80		
.312 (5/16)		.3120	.250	**1.000** (3x)	5/16	2-1/2	31520-C6	97.10		
.375 (3/8)		.3750	.300	**.570** (1.5x)	3/8	2-1/2	37924-C6	98.80		
.375 (3/8)		.3750	.300	**1.125** (3x)	3/8	2-1/2	31524-C6	104.20		

GUIDELINES FOR MILLING HARDENED STEELS

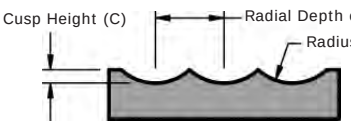
- Rigid machining enhances tool life by centering and balancing tool holders, which minimizes vibration.
- Mist or air coolant is recommended for material hardness of 45Rc or more.
- Enter workpiece slowly by ramping or helical interpolation to avoid potential chipping or breakage.
- Climb Milling will extend tool life and improve workpiece finish.

SPEEDS & FEEDS (End Mills for Hardened Steels – Ball)

Important Note: Values in table are in inches and are based on 2 flute end mills. For end mills with more flutes, table values of IPT must be reduced (for 3 Flutes, reduce to 90%). For complete speeds and feeds charts, please see www.harveytool.com.

Material Hardness	SFM		Chip Load Per Tooth (IPT) By Cutter Diameter												Depth of Cut	
			.015	.031	.047	.062	.078	.093	.125	.187	.250	.312	.375	.500	Radial*	Axial
45-55 Rc	700	Finishing (.8x Reach)	.00028	.00058	.00088	.00116	.00146	.00174	.00234	.00350	.00468	.00584	.00702	.00936	.10 x Dia	.04 x Dia
		Finishing (1.5x Reach)	.00027	.00056	.00084	.00111	.00140	.00167	.00224	.00335	.00449	.00560	.00673	.00897	.10 x Dia	.04 x Dia
		Finishing (3x Reach)	.00026	.00053	.00081	.00106	.00134	.00160	.00215	.00321	.00429	.00535	.00644	.00858	.10 x Dia	.04 x Dia
		Finishing (4x Reach)	.00025	.00051	.00077	.00102	.00128	.00152	.00205	.00306	.00410	.00511	.00614	.00819	.10 x Dia	.04 x Dia
		Finishing (5x Reach)	.00023	.00048	.00073	.00097	.00122	.00145	.00195	.00292	.00390	.00487	.00585	.00780	.10 x Dia	.04 x Dia
		Finishing (6x Reach)	.00022	.00046	.00070	.00093	.00117	.00139	.00187	.00280	.00374	.00467	.00562	.00749	.10 x Dia	.03 x Dia
		Finishing (7x Reach)	.00022	.00044	.00067	.00089	.00112	.00133	.00179	.00268	.00359	.00448	.00538	.00718	.10 x Dia	.03 x Dia
		Finishing (8x Reach)	.00021	.00043	.00065	.00085	.00107	.00128	.00172	.00257	.00343	.00428	.00515	.00686	.10 x Dia	.03 x Dia
		Finishing (10x Reach)	.00019	.00039	.00059	.00077	.00097	.00116	.00156	.00233	.00312	.00389	.00468	.00624	.10 x Dia	.02 x Dia
		Finishing (12x Reach)	.00016	.00034	.00051	.00068	.00085	.00102	.00137	.00204	.00273	.00341	.00410	.00546	.08 x Dia	.02 x Dia
		Finishing (15x Reach)	.00015	.00031	.00048	.00063	.00079	.00094	.00127	.00190	.00254	.00316	.00380	.00507	.08 x Dia	.01 x Dia
56-68 Rc	600	Finishing (.8x Reach)	.00022	.00046	.00070	.00093	.00117	.00139	.00187	.00280	.00374	.00467	.00562	.00749	.07 x Dia	.04 x Dia
		Finishing (1.5x Reach)	.00022	.00044	.00067	.00089	.00112	.00133	.00179	.00268	.00359	.00448	.00538	.00718	.07 x Dia	.04 x Dia
		Finishing (3x Reach)	.00021	.00043	.00065	.00085	.00107	.00128	.00172	.00257	.00343	.00428	.00515	.00686	.07 x Dia	.04 x Dia
		Finishing (4x Reach)	.00020	.00041	.00062	.00081	.00102	.00122	.00164	.00245	.00328	.00409	.00491	.00655	.07 x Dia	.04 x Dia
		Finishing (5x Reach)	.00019	.00039	.00059	.00077	.00097	.00116	.00156	.00233	.00312	.00389	.00468	.00624	.07 x Dia	.04 x Dia
		Finishing (6x Reach)	.00018	.00037	.00056	.00074	.00093	.00111	.00150	.00224	.00300	.00374	.00449	.00599	.07 x Dia	.03 x Dia
		Finishing (7x Reach)	.00017	.00036	.00054	.00071	.00090	.00107	.00144	.00215	.00287	.00358	.00431	.00574	.07 x Dia	.03 x Dia
		Finishing (8x Reach)	.00016	.00034	.00052	.00068	.00086	.00102	.00137	.00205	.00275	.00343	.00412	.00549	.07 x Dia	.03 x Dia
		Finishing (10x Reach)	.00015	.00031	.00047	.00062	.0078	.00093	.00125	.00187	.00250	.00312	.00374	.00499	.07 x Dia	.02 x Dia
		Finishing (12x Reach)	.00013	.00027	.00041	.00054	.00068	.00081	.00109	.00163	.00218	.00273	.00328	.00437	.06 x Dia	.02 x Dia
		Finishing (15x Reach)	.00012	.00025	.00038	.00050	.00063	.00075	.00101	.00152	.00203	.00253	.00304	.00406	.06 x Dia	.01 x Dia

* Operator must consider proper Radial Depth of Cut since it relates directly to cusp height and part finish



$$P = 2\,[R^2-(C-R)^2]^{½}$$

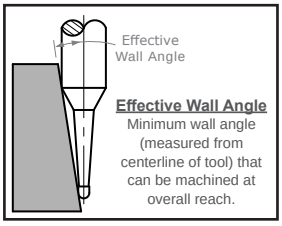
$$C = R-[R^2-(P^2/4)]^{½}$$

END MILLS FOR HARDENED STEELS

Finishers – Ball – Tapered Reach



- **Designed to profile and finish hardened tool, die, and mold steels 46Rc to 68Rc**
- Solid tapered neck for increased rigidity and strength
- Select carbide grade for improved edge retention
- Latest generation AlTiN Nano coating offers superior hardness and heat resistance
- Geometry includes stub flute, large rigid core diameter, and eccentric relief
- Increased shank diameter to maintain strength and stiffness
- h6 shank tolerance for high precision tool holders
- 2 flutes
- Center cutting
- CNC ground in the USA

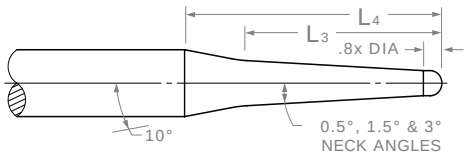


Effective Wall Angle
Minimum wall angle (measured from centerline of tool) that can be machined at overall reach.

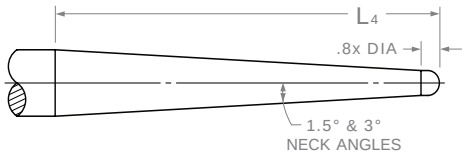
NECK ANGLE	CUTTER DIAMETER	LENGTH OF CUT	TYPE	TAPERED REACH	OVERALL REACH	EFFECTIVE WALL ANGLE	SHANK DIAMETER	OVERALL LENGTH	AlTiN NANO COATED	
	D_1 +.0000″ −.0006″	L_2 +.010″ −.000″		L_3	L_4		D_2 (h6)	L_1	2 FL	PRICE
0.5°	.031 (1/32)	.025	I	**.093**	**.757**	8.4°	1/4	2-1/2	998703-C6	65.90
	.031 (1/32)	.025	I	**.156**	**.817**	7.8°	1/4	2-1/2	998706-C6	71.50
	.031 (1/32)	.025	I	**.250**	**.906**	7.0°	1/4	2-1/2	998709-C6	74.30
	.047 (3/64)	.038	I	**.156**	**.772**	7.7°	1/4	2-1/2	998712-C6	65.90
	.047 (3/64)	.038	I	**.250**	**.862**	6.9°	1/4	2-1/2	998715-C6	71.50
	.047 (3/64)	.038	I	**.375**	**.981**	6.1°	1/4	2-1/2	998718-C6	74.30
	.062 (1/16)	.050	I	**.312**	**.879**	6.4°	1/4	2-1/2	998721-C6	65.90
	.062 (1/16)	.050	I	**.500**	**1.057**	5.3°	1/4	2-1/2	998724-C6	71.50
	.062 (1/16)	.050	I	**.750**	**1.295**	4.3°	1/4	2-1/2	998727-C6	74.30
	.078 (5/64)	.062	I	**.437**	**.953**	5.4°	1/4	2-1/2	998730-C6	65.90
	.078 (5/64)	.062	I	**.625**	**1.131**	4.5°	1/4	2-1/2	998733-C6	71.50
	.078 (5/64)	.062	I	**1.000**	**1.488**	3.4°	1/4	3	998736-C6	82.20
	.093 (3/32)	.074	I	**.500**	**.971**	4.9°	1/4	2-1/2	998739-C6	65.90
	.093 (3/32)	.074	I	**.750**	**1.208**	3.9°	1/4	2-1/2	998742-C6	71.50
	.093 (3/32)	.074	I	**1.125**	**1.565**	3.0°	1/4	3	998745-C6	82.20
	.125 (1/8)	.100	I	**.625**	**1.000**	3.9°	1/4	2-1/2	998748-C6	69.90
	.125 (1/8)	.100	I	**1.000**	**1.357**	2.8°	1/4	2-1/2	998751-C6	72.00
	.125 (1/8)	.100	I	**1.500**	**1.832**	2.1°	1/4	3	998754-C6	82.60

continued on next page

TYPE I



TYPE II



END MILLS FOR HARDENED STEELS

Finishers – Ball – Tapered Reach (cont.)

continued from previous page

NECK ANGLE	CUTTER DIAMETER	LENGTH OF CUT	TYPE	TAPERED REACH	OVERALL REACH	EFFECTIVE WALL ANGLE	SHANK DIAMETER	OVERALL LENGTH	AlTiN NANO COATED	
	D_1 $^{+.0000''}_{-.0006''}$	L_2 $^{+.010''}_{-.000''}$		L_3	L_4		D_2 (h6)	L_1	2 FL	PRICE
1.5°	.031 (1/32)	.025	I	**.250**	**.875**	7.3°	1/4	2-1/2	997407-C6	71.50
	.031 (1/32)	.025	I	**.500**	**1.088**	5.9°	1/4	2-1/2	997414-C6	74.30
	.047 (3/64)	.038	I	**.375**	**.938**	6.4°	1/4	2-1/2	997421-C6	71.50
	.062 (1/16)	.050	I	**.500**	**1.004**	5.6°	1/4	2-1/2	997428-C6	71.50
	.062 (1/16)	.050	I	**1.000**	**1.429**	3.9°	1/4	3	997435-C6	82.20
	.078 (5/64)	.062	I	**.625**	**1.066**	4.8°	1/4	2-1/2	997442-C6	71.50
	.078 (5/64)	.062	I	**1.250**	**1.599**	3.2°	1/4	3	997449-C6	82.20
	.093 (3/32)	.074	I	**.750**	**1.132**	4.2°	1/4	2-1/2	997456-C6	71.50
	.093 (3/32)	.074	I	**1.500**	**1.771**	2.7°	1/4	3	997463-C6	82.20
	.125 (1/8)	.100	I	**1.000**	**1.258**	3.0°	1/4	2-1/2	997470-C6	72.00
	.125 (1/8)	.100	II	**2.487**	**2.487**	1.5°	1/4	4	997477-C6	82.60
3.0°	.031 (1/32)	.025	I	**.312**	**.714**	8.9°	1/4	2-1/2	994907-C6	73.90
	.031 (1/32)	.025	I	**.750**	**1.067**	6.0°	1/4	2-1/2	994914-C6	76.00
	.047 (3/64)	.038	I	**.875**	**1.140**	5.2°	1/4	2-1/2	994921-C6	73.90
	.047 (3/64)	.038	I	**1.250**	**1.442**	4.1°	1/4	3	994928-C6	82.20
	.062 (1/16)	.050	I	**.875**	**1.114**	5.0°	1/4	2-1/2	994935-C6	73.90
	.062 (1/16)	.050	II	**1.844**	**1.844**	3.0°	1/4	3	994942-C6	82.20
	.078 (5/64)	.062	I	**1.125**	**1.288**	4.0°	1/4	2-1/2	994949-C6	73.90
	.078 (5/64)	.062	II	**1.703**	**1.703**	3.0°	1/4	3	994956-C6	82.20
	.093 (3/32)	.074	I	**1.000**	**1.162**	4.1°	1/4	2-1/2	994963-C6	73.90
	.093 (3/32)	.074	II	**1.572**	**1.572**	3.0°	1/4	3	994970-C6	82.20
	.125 (1/8)	.100	II	**1.293**	**1.293**	2.9°	1/4	2-1/2	994977-C6	81.10
	.125 (1/8)	.100	II	**2.485**	**2.485**	3.0°	3/8	4	994984-C6	117.70



★★★★★

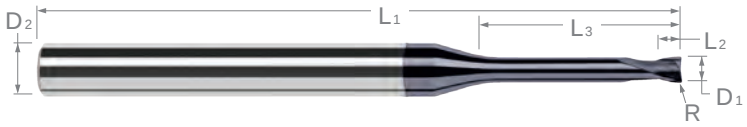
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END MILLS FOR HARDENED STEELS

Finishers – Corner Radius





Reduced Neck Diameter to Avoid Heeling

- **Designed to profile and finish hardened tool, die, and mold steels 46Rc to 68Rc**
- Select carbide grade for improved edge retention
- Latest generation AlTiN Nano coating offers superior hardness and heat resistance
- Geometry includes stub flute, large rigid core diameter, and eccentric relief
- Increased shank diameter to maintain strength and stiffness
- h6 shank tolerance for high precision tool holders
- Center cutting
- CNC ground in the USA

CUTTER DIAMETER	CORNER RADIUS	LENGTH OF CUT	OVERALL REACH	SHANK DIAMETER	OVERALL LENGTH	AlTiN NANO 2 FLUTE		AlTiN NANO 4 FLUTE	
D_1 $^{+.0000''}_{-.0006''}$	R $^{+.0002''}_{-.0002''}$	L_2 $^{+.010''}_{-.000''}$	L_3 $^{+.010''}_{-.000''}$	D_2 (h6)	L_1	2 FL	PRICE	4 FL	PRICE
.010	**.002**	.008	**.015** (1.5x)	1/4	2-1/2	40210-C6	89.50		
.010	**.002**	.008	**.031** (3x)	1/4	2-1/2	30610-C6	89.50		
.015 (1/64)	**.002**	.012	**.023** (1.5x)	1/4	2-1/2	40215-C6	70.10	951415-C6	71.20
.015 (1/64)	**.002**	.012	**.047** (3x)	1/4	2-1/2	30615-C6	70.10		
.015 (1/64)	**.002**	.012	**.078** (5x)	1/4	2-1/2	40615-C6	79.10		
.015 (1/64)	**.002**	.012	**.125** (8x)	1/4	2-1/2	31015-C6	79.60		
.015 (1/64)	**.002**	.012	**.187** (12x)	1/4	2-1/2	33015-C6	93.70		
.020	**.004**	.016	**.031** (1.5x)	1/4	2-1/2	40220-C6	70.10	951420-C6	71.20
.020	**.004**	.016	**.062** (3x)	1/4	2-1/2	30620-C6	70.10	938720-C6	71.20
.020	**.004**	.016	**.100** (5x)	1/4	2-1/2	40620-C6	75.80	996320-C6	76.90
.025	**.004**	.020	**.038** (1.5x)	1/4	2-1/2	40225-C6	70.10		
.025	**.004**	.020	**.075** (3x)	1/4	2-1/2	30625-C6	70.10		
.025	**.004**	.020	**.125** (5x)	1/4	2-1/2	40625-C6	75.80		
.031 (1/32)	**.005**	.025	**.047** (1.5x)	1/4	2-1/2	40231-C6	61.90	951431-C6	63.10
.031 (1/32)	**.005**	.025	**.093** (3x)	1/4	2-1/2	30631-C6	61.90	938731-C6	63.10
.031 (1/32)	**.005**	.025	**.156** (5x)	1/4	2-1/2	40631-C6	67.00	996331-C6	68.40
.031 (1/32)	**.005**	.025	**.250** (8x)	1/4	2-1/2	31031-C6	70.90	999031-C6	72.10
.031 (1/32)	**.005**	.025	**.375** (12x)	1/4	2-1/2	33031-C6	80.20		
.031 (1/32)	**.005**	.025	**.470** (15x)	1/4	2-1/2	942431-C6	93.90		
.031 (1/32)	**.010**	.025	**.093** (3x)	1/4	2-1/2	982631-C6	64.10		
.031 (1/32)	**.010**	.025	**.156** (5x)	1/4	2-1/2	957431-C6	69.40		
.039 (1 mm)	**.005**	.031	**.062** (1.5x)	1/4	2-1/2	40239-C6	61.90	951439-C6	63.10
.039 (1 mm)	**.005**	.031	**.117** (3x)	1/4	2-1/2	30639-C6	61.90	938739-C6	63.10
.039 (1 mm)	**.005**	.031	**.203** (5x)	1/4	2-1/2	40639-C6	67.00	996339-C6	68.40
.039 (1 mm)	**.005**	.031	**.312** (8x)	1/4	2-1/2	31039-C6	70.90		
.039 (1 mm)	**.005**	.031	**.468** (12x)	1/4	2-1/2	33039-C6	80.20		
.047 (3/64)	**.008**	.038	**.071** (1.5x)	1/4	2-1/2	40247-C6	61.90		
.047 (3/64)	**.008**	.038	**.141** (3x)	1/4	2-1/2	30647-C6	61.90	938747-C6	63.10
.047 (3/64)	**.008**	.038	**.250** (5x)	1/4	2-1/2	40647-C6	67.00	996347-C6	68.40
.047 (3/64)	**.008**	.038	**.375** (8x)	1/4	2-1/2	31047-C6	70.90	999047-C6	72.10
.047 (3/64)	**.008**	.038	**.564** (12x)	1/4	2-1/2	33047-C6	80.20		
.047 (3/64)	**.008**	.038	**.710** (15x)	1/4	2-1/2	942447-C6	93.90		

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END MILLS FOR HARDENED STEELS

Finishers – Corner Radius (cont.)

continued from previous page

CUTTER DIAMETER	CORNER RADIUS	LENGTH OF CUT	OVERALL REACH	SHANK DIAMETER	OVERALL LENGTH	AlTiN NANO 2 FLUTE		AlTiN NANO 4 FLUTE	
D_1 $^{+.0000''}_{-.0006''}$	R $^{+.0002''}_{-.0002''}$	L_2 $^{+.010''}_{-.000''}$	L_3 $^{+.010''}_{-.000''}$	D_2 (h6)	L_1	2 FL	PRICE	4 FL	PRICE
.062 (1/16)	**.005**	.050	**.187** (3x)	1/4	2-1/2	893162-C6	61.90		
.062 (1/16)	**.010**	.050	**-**	1/4	2-1/2	870362-C6	60.40	862262-C6	61.50
.062 (1/16)	**.010**	.050	**.093** (1.5x)	1/4	2-1/2	40262-C6	61.90	951462-C6	63.10
.062 (1/16)	**.010**	.050	**.187** (3x)	1/4	2-1/2	30662-C6	61.90	938762-C6	63.10
.062 (1/16)	**.010**	.050	**.250** (4x)	1/4	2-1/2	784162-C6	64.10	783762-C6	65.40
.062 (1/16)	**.010**	.050	**.312** (5x)	1/4	2-1/2	40662-C6	67.00	996362-C6	68.40
.062 (1/16)	**.010**	.050	**.375** (6x)	1/4	2-1/2	783362-C6	68.30	782562-C6	69.70
.062 (1/16)	**.010**	.050	**.437** (7x)	1/4	2-1/2	782962-C6	69.50	782162-C6	70.70
.062 (1/16)	**.010**	.050	**.500** (8x)	1/4	2-1/2	31062-C6	70.90	999062-C6	72.10
.062 (1/16)	**.010**	.050	**.750** (12x)	1/4	4	33062-C6	90.10	924162-C6	91.30
.062 (1/16)	**.010**	.050	**.950** (15x)	1/4	4	942462-C6	103.40		
.062 (1/16)	**.020**	.050	**.187** (3x)	1/4	2-1/2	991562-C6	64.10		
.062 (1/16)	**.020**	.050	**.312** (5x)	1/4	2-1/2	953162-C6	69.40		
.078 (5/64)	**.010**	.062	**.117** (1.5x)	1/4	2-1/2	40278-C6	61.90		
.078 (5/64)	**.010**	.062	**.234** (3x)	1/4	2-1/2	30678-C6	61.90	938778-C6	63.10
.078 (5/64)	**.010**	.062	**.406** (5x)	1/4	2-1/2	40678-C6	67.00	996378-C6	68.40
.078 (5/64)	**.010**	.062	**.625** (8x)	1/4	2-1/2	31078-C6	70.90	999078-C6	72.10
.078 (5/64)	**.010**	.062	**.937** (12x)	1/4	4	33078-C6	90.10		
.093 (3/32)	**.005**	.074	**.281** (3x)	1/4	2-1/2	893193-C6	61.90		
.093 (3/32)	**.010**	.074	**.281** (3x)	1/4	2-1/2	982693-C6	61.90		
.093 (3/32)	**.015**	.074	**-**	1/4	2-1/2	850893-C6	60.40		
.093 (3/32)	**.015**	.074	**.140** (1.5x)	1/4	2-1/2	40293-C6	61.90	951493-C6	63.10
.093 (3/32)	**.015**	.074	**.281** (3x)	1/4	2-1/2	30693-C6	61.90	938793-C6	63.10
.093 (3/32)	**.015**	.074	**.375** (4x)	1/4	2-1/2	783993-C6	64.10	783593-C6	65.40
.093 (3/32)	**.015**	.074	**.500** (5x)	1/4	2-1/2	40693-C6	67.00	996393-C6	68.40
.093 (3/32)	**.015**	.074	**.585** (6x)	1/4	2-1/2	783193-C6	68.30	782393-C6	69.70
.093 (3/32)	**.015**	.074	**.670** (7x)	1/4	2-1/2	782793-C6	69.50	781993-C6	70.70
.093 (3/32)	**.015**	.074	**.750** (8x)	1/4	2-1/2	31093-C6	70.90	999093-C6	72.10
.093 (3/32)	**.015**	.074	**1.125** (12x)	1/4	4	33093-C6	90.10	924193-C6	91.30
.093 (3/32)	**.030**	.074	**.281** (3x)	1/4	2-1/2	963393-C6	64.10		
.093 (3/32)	**.030**	.074	**.500** (5x)	1/4	2-1/2	946393-C6	69.40		
.118 (3 mm)	**.015**	.094	**.177** (1.5x)	1/4	2-1/2	40305-C6	66.40		
.118 (3 mm)	**.015**	.094	**.354** (3x)	1/4	2-1/2	30705-C6	66.40		
.125 (1/8)	**.005**	.100	**.375** (3x)	1/4	2-1/2	893208-C6	66.40		
.125 (1/8)	**.010**	.100	**.375** (3x)	1/4	2-1/2	982708-C6	66.40		
.125 (1/8)	**.015**	.100	**-**	1/4	2-1/2	850908-C6	64.80		
.125 (1/8)	**.015**	.100	**.187** (1.5x)	1/4	2-1/2	40308-C6	66.40	951508-C6	67.50
.125 (1/8)	**.015**	.100	**.375** (3x)	1/4	2-1/2	30708-C6	66.40	938808-C6	67.50
.125 (1/8)	**.015**	.100	**.500** (4x)	1/4	2-1/2	784008-C6	69.60	783608-C6	72.00
.125 (1/8)	**.015**	.100	**.625** (5x)	1/4	2-1/2	40708-C6	72.80	996408-C6	79.60
.125 (1/8)	**.015**	.100	**.750** (6x)	1/4	2-1/2	783208-C6	74.40	782408-C6	81.00
.125 (1/8)	**.015**	.100	**.875** (7x)	1/4	2-1/2	782808-C6	75.90	782008-C6	82.20
.125 (1/8)	**.015**	.100	**1.000** (8x)	1/4	2-1/2	31108-C6	77.20	999108-C6	83.80
.125 (1/8)	**.015**	.100	**1.500** (12x)	1/4	4	33108-C6	96.50	924208-C6	103.90
.125 (1/8)	**.030**	.100	**.375** (3x)	1/4	2-1/2	963408-C6	68.60		
.125 (1/8)	**.030**	.100	**.625** (5x)	1/4	2-1/2	946408-C6	75.30	781808-C6	82.10

continued on next page

END MILLS FOR HARDENED STEELS

Finishers – Corner Radius (cont.)

continued from previous page

CUTTER DIAMETER	CORNER RADIUS	LENGTH OF CUT	OVERALL REACH	SHANK DIAMETER	OVERALL LENGTH	AlTiN NANO 2 FLUTE		AlTiN NANO 4 FLUTE	
D_1 $^{+.000''}_{-.001''}$	R $^{+.0005''}_{-.0005''}$	L_2 $^{+.020''}_{-.000''}$	L_3 $^{+.020''}_{-.000''}$	D_2 (h6)	L_1	2 FL	PRICE	4 FL	PRICE
.156 (5/32)	**.015**	.125	**.235** (1.5x)	1/4	2-1/2	40310-C6	66.40		
.156 (5/32)	**.015**	.125	**.470** (3x)	1/4	2-1/2	30710-C6	66.40		
.187 (3/16)	**.015**	.150	**.285** (1.5x)	1/4	2-1/2	40312-C6	66.40	951512-C6	67.50
.187 (3/16)	**.015**	.150	**.570** (3x)	1/4	2-1/2	30712-C6	66.40	938812-C6	67.50
.187 (3/16)	**.015**	.150	**1.000** (5x)	1/4	2-1/2	40712-C6	72.80	996412-C6	79.60
.187 (3/16)	**.015**	.150	**1.500** (8x)	1/4	4	31112-C6	87.00		
.187 (3/16)	**.015**	.150	**2.250** (12x)	1/4	4	33112-C6	103.40		
.187 (3/16)	**.060**	.150	**.570** (3x)	1/4	2-1/2	939212-C6	76.20	934412-C6	82.80
.250 (1/4)	**.015**	.200	**.375** (1.5x)	1/4	2-1/2	40316-C6	66.40	951516-C6	67.50
.250 (1/4)	**.015**	.200	**.750** (3x)	1/4	2-1/2	30716-C6	69.60	938816-C6	76.00
.250 (1/4)	**.015**	.200	**1.000** (4x)	1/4	2-1/2	784016-C6	71.20	783616-C6	77.50
.250 (1/4)	**.015**	.200	**1.250** (5x)	1/4	2-1/2	40716-C6	72.80		
.250 (1/4)	**.015**	.200	**2.000** (8x)	1/4	4	31116-C6	87.00		
.250 (1/4)	**.060**	.200	**.750** (3x)	1/4	2-1/2	939216-C6	76.20	934416-C6	82.80
.312 (5/16)	**.030**	.250	**1.000** (3x)	5/16	2-1/2			938820-C6	83.80
.375 (3/8)	**.030**	.300	**.570** (1.5x)	3/8	2-1/2			951524-C6	93.00
.375 (3/8)	**.030**	.300	**1.125** (3x)	3/8	2-1/2			938824-C6	96.80
.375 (3/8)	**.030**	.300	**2.000** (5x)	3/8	4			996424-C6	100.50
.500 (1/2)	**.030**	.400	**1.500** (3x)	1/2	3			938832-C6	121.00

GUIDELINES FOR MILLING HARDENED STEELS

- Rigid machining centers and balanced tool holders that minimize vibration and TIR will enhance tool life.
- Mist or air coolant is recommended for material hardness of 45Rc or more.
- Enter workpiece slowly by ramping or helical interpolation to avoid potential chipping or breakage.
- Climb Milling will extend tool life and improve workpiece finish.

SPEEDS & FEEDS (End Mills for Hardened Steels – Corner Radius)

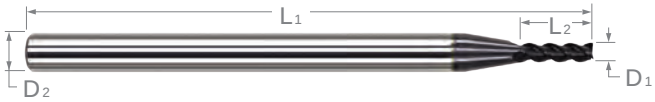
Important Note: Values in table are in inches and based on 2 flute end mills. For end mills with more flutes, table values of IPT must be reduced (for 4 flutes, reduce to 80%). For complete speeds and feeds charts, please see www.harveytool.com.

Material Hardness	SFM		Chip Load Per Tooth (IPT) By Cutter Diameter												Depth of Cut	
			.015	.031	.047	.062	.078	.093	.125	.187	.250	.312	.375	.500	Radial	Axial
45-55 Rc	700	Finishing (0.8x Reach)	.00014	.00029	.00044	.00058	.00073	.00087	.00117	.00175	.00234	.00292	.00351	.00468	.35 x Dia	.02 x Dia
		Finishing (1.5x Reach)	.00013	.00028	.00042	.00056	.00070	.00083	.00112	.00168	.00224	.00280	.00336	.00449	.35 x Dia	.02 x Dia
		Finishing (3x Reach)	.00013	.00027	.00040	.00053	.00067	.00080	.00107	.00160	.00215	.00268	.00322	.00429	.35 x Dia	.02 x Dia
		Finishing (4x Reach)	.00013	.00025	.00039	.00050	.00064	.00077	.00103	.00153	.00205	.00255	.00308	.00410	.35 x Dia	.02 x Dia
		Finishing (5x Reach)	.00012	.00024	.00037	.00048	.00061	.00073	.00098	.00146	.00195	.00243	.00293	.00390	.35 x Dia	.02 x Dia
		Finishing (6x Reach)	.00012	.00023	.00036	.00046	.00059	.00070	.00094	.00140	.00187	.00233	.00281	.00374	.35 x Dia	.02 x Dia
		Finishing (7x Reach)	.00011	.00022	.00034	.00044	.00056	.00067	.00090	.00134	.00179	.00224	.00270	.00359	.35 x Dia	.02 x Dia
		Finishing (8x Reach)	.00010	.00021	.00032	.00043	.00054	.00064	.00086	.00128	.00172	.00214	.00257	.00343	.35 x Dia	.02 x Dia
		Finishing (12x Reach)	.00008	.00017	.00026	.00034	.00043	.00051	.00068	.00102	.00137	.00170	.00205	.00273	.35 x Dia	.01 x Dia
		Finishing (15x Reach)	.00008	.00016	.00024	.00031	.00040	.00047	.00063	.00095	.00127	.00158	.00190	.00254	.35 x Dia	.01 x Dia
56-68 Rc	600	Finishing (0.8x Reach)	.00011	.00023	.00035	.00046	.00058	.00070	.00094	.00140	.00187	.00234	.00281	.00374	.25 x Dia	.02 x Dia
		Finishing (1.5x Reach)	.00011	.00022	.00034	.00044	.00056	.00067	.00090	.00134	.00179	.00224	.00269	.00359	.25 x Dia	.02 x Dia
		Finishing (3x Reach)	.00010	.00021	.00032	.00043	.00054	.00064	.00086	.00128	.00172	.00214	.00257	.00343	.25 x Dia	.02 x Dia
		Finishing (4x Reach)	.00009	.00020	.00030	.00041	.00051	.00061	.00082	.00123	.00164	.00205	.00246	.00328	.25 x Dia	.02 x Dia
		Finishing (5x Reach)	.00009	.00019	.00029	.00039	.00049	.00058	.00078	.00117	.00156	.00195	.00234	.00312	.25 x Dia	.02 x Dia
		Finishing (6x Reach)	.00009	.00018	.00028	.00037	.00047	.00056	.00075	.00112	.00150	.00187	.00225	.00300	.25 x Dia	.02 x Dia
		Finishing (7x Reach)	.00008	.00017	.00027	.00036	.00045	.00053	.00072	.00108	.00144	.00179	.00215	.00287	.25 x Dia	.02 x Dia
		Finishing (8x Reach)	.00008	.00017	.00026	.00034	.00043	.00051	.00069	.00103	.00137	.00171	.00206	.00275	.25 x Dia	.02 x Dia
		Finishing (12x Reach)	.00007	.00014	.00021	.00027	.00034	.00041	.00055	.00082	.00109	.00136	.00164	.00218	.25 x Dia	.01 x Dia
		Finishing (15x Reach)	.00006	.00013	.00019	.00025	.00032	.00038	.00051	.00076	.00101	.00127	.00152	.00203	.25 x Dia	.01 x Dia

NEW SIZES!

VARIABLE HELIX END MILLS FOR HIGH TEMP ALLOYS

Square



- Optimized for titanium alloys, inconel, nickel alloys, and other high-temperature materials with outstanding performance in difficult-to-machine steels, stainless steels, and tool steels
- Variable helix design (approx. 34°) reduces chatter and harmonics and increases material removal rates
- Latest generation AlTiN Nano coating offers superior hardness and heat resistance
- h6 shank tolerance for high precision tool holders
- Suitable for steels up to 45Rc
- Center cutting
- Solid carbide
- CNC ground in the USA

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	CUTTER DIAMETER			LENGTH OF CUT	FLUTES	SHANK DIAMETER	OVERALL LENGTH	AlTiN NANO COATED	
	D_1 +.0005″ −.0005″	+.00mm −.02mm	decimal equivalent	L_2 +.010″ −.000″ +.25mm −.00mm		D_2 (h6)	L_1	TOOL #	PRICE
		.2 mm	.0078	**.60 mm** (3x)	3	4 mm	50 mm	942804-C6	58.50
	.010		.0100	**.015** (1.5x)	3	1/8	1-1/2	973710-C6	55.20
	.010		.0100	**.030** (3x)	3	1/8	1-1/2	967010-C6	54.70
	.010		.0100	**.050** (5x)	3	1/8	2-1/2	990710-C6	63.20
	.015 (1/64)		.0150	**.012** (0.8x)	3	1/8	1-1/2	888015-C6	45.90
	.015 (1/64)		.0150	**.023** (1.5x)	3	1/8	1-1/2	973715-C6	45.30
	.015 (1/64)		.0150	**.023** (1.5x)	4	1/8	1-1/2	841615-C6	47.20
	.015 (1/64)		.0150	**.045** (3x)	3	1/8	1-1/2	967015-C6	44.80
	.015 (1/64)		.0150	**.045** (3x)	4	1/8	1-1/2	875415-C6	46.70
	.015 (1/64)		.0150	**.062** (4x)	3	1/8	2-1/2	886215-C6	52.90
	.015 (1/64)		.0150	**.078** (5x)	3	1/8	2-1/2	990715-C6	55.00
		.4 mm	.0157	**1.20 mm** (3x)	3	4 mm	50 mm	942809-C6	43.20
		.5 mm	.0196	**.40 mm** (0.8x)	3	4 mm	50 mm	848011-C6	44.50
		.5 mm	.0196	**.75 mm** (1.5x)	3	4 mm	50 mm	954511-C6	43.20
		.5 mm	.0196	**1.50 mm** (3x)	3	4 mm	50 mm	942811-C6	43.20
	.020		.0200	**.016** (0.8x)	3	1/8	1-1/2	888020-C6	40.30
	.020		.0200	**.030** (1.5x)	3	1/8	1-1/2	973720-C6	39.70
	.020		.0200	**.060** (3x)	3	1/8	1-1/2	967020-C6	39.30
	.020		.0200	**.060** (3x)	4	1/8	1-1/2	875420-C6	41.20
	.020		.0200	**.080** (4x)	3	1/8	2-1/2	886220-C6	44.50
	.020		.0200	**.100** (5x)	3	1/8	2-1/2	990720-C6	46.70
	.020		.0200	**.100** (5x)	4	1/8	2-1/2	852920-C6	48.60
		.6 mm	.0236	**1.80 mm** (3x)	3	4 mm	50 mm	942813-C6	42.00
	.025		.0250	**.038** (1.5x)	3	1/8	1-1/2	973725-C6	38.30
	.025		.0250	**.075** (3x)	3	1/8	1-1/2	967025-C6	37.90
	.025		.0250	**.075** (3x)	4	1/8	1-1/2	875425-C6	39.70
NEW	.025		.0250	**.100** (4x)	3	1/8	2-1/2	886225-C6	45.10
	.025		.0250	**.125** (5x)	3	1/8	2-1/2	990725-C6	45.10
	.030		.0300	**.024** (0.8x)	3	1/8	1-1/2	888030-C6	37.40
	.030		.0300	**.045** (1.5x)	3	1/8	1-1/2	973730-C6	38.30
	.030		.0300	**.090** (3x)	3	1/8	1-1/2	967030-C6	37.90
	.030		.0300	**.090** (3x)	4	1/8	1-1/2	875430-C6	39.70
	.030		.0300	**.125** (4x)	3	1/8	2-1/2	886230-C6	45.10
	.030		.0300	**.156** (5x)	3	1/8	2-1/2	990730-C6	45.10
	.031 (1/32)		.0310	**.025** (0.8x)	3	1/8	1-1/2	888031-C6	34.10
	.031 (1/32)		.0310	**.047** (1.5x)	3	1/8	1-1/2	973731-C6	32.70
	.031 (1/32)		.0310	**.047** (1.5x)	4	1/8	1-1/2	841631-C6	34.20
	.031 (1/32)		.0310	**.093** (3x)	3	1/8	1-1/2	967031-C6	32.30
	.031 (1/32)		.0310	**.093** (3x)	4	1/8	1-1/2	875431-C6	34.20
	.031 (1/32)		.0310	**.125** (4x)	3	1/8	2-1/2	886231-C6	38.80
	.031 (1/32)		.0310	**.156** (5x)	3	1/8	2-1/2	990731-C6	41.00
	.031 (1/32)		.0310	**.156** (5x)	4	1/8	2-1/2	852931-C6	42.80

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NEW SIZES!

VARIABLE HELIX END MILLS FOR HIGH TEMP ALLOYS

Square (cont.)

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CUTTER DIAMETER			LENGTH OF CUT	FLUTES	SHANK DIAMETER	OVERALL LENGTH	AlTiN NANO COATED		
D_1 +.0005″ −.0005″	+.00mm −.02mm	decimal equivalent	L_2 +.010″ −.000″ +.25mm −.00mm		D_2 (h6)	L_1	TOOL #	PRICE	
	.8 mm	.0314	**2.40 mm** (3x)	3	4 mm	50 mm	942818-C6	36.40	
	.8 mm	.0314	**4.00 mm** (5x)	3	4 mm	50 mm	910518-C6	38.30	NEW
.035		.0350	**.028** (0.8x)	3	1/8	1-1/2	888035-C6	32.90	
.035		.0350	**.053** (1.5x)	3	1/8	1-1/2	973735-C6	32.70	
.035		.0350	**.053** (1.5x)	4	1/8	1-1/2	841635-C6	34.60	
.035		.0350	**.105** (3x)	3	1/8	1-1/2	967035-C6	32.30	
.035		.0350	**.105** (3x)	4	1/8	1-1/2	875435-C6	34.20	
.035		.0350	**.140** (4x)	3	1/8	2-1/2	886235-C6	38.80	
.035		.0350	**.187** (5x)	3	1/8	2-1/2	990735-C6	41.00	
	1.0 mm	.0393	**.80 mm** (0.8x)	3	4 mm	50 mm	848022-C6	37.20	
	1.0 mm	.0393	**1.50 mm** (1.5x)	3	4 mm	50 mm	954522-C6	37.10	
	1.0 mm	.0393	**3.00 mm** (3x)	3	4 mm	50 mm	942822-C6	36.40	
	1.0 mm	.0393	**3.00 mm** (3x)	4	4 mm	50 mm	821322-C6	38.30	
	1.0 mm	.0393	**4.00 mm** (4x)	3	4 mm	50 mm	820722-C6	41.10	
	1.0 mm	.0393	**5.00 mm** (5x)	3	4 mm	50 mm	910522-C6	45.00	
.040		.0400	**.032** (0.8x)	3	1/8	1-1/2	888040-C6	32.90	
.040		.0400	**.060** (1.5x)	3	1/8	1-1/2	973740-C6	32.70	
.040		.0400	**.060** (1.5x)	4	1/8	1-1/2	841640-C6	34.60	
.040		.0400	**.120** (3x)	3	1/8	1-1/2	967040-C6	32.30	
.040		.0400	**.120** (3x)	4	1/8	1-1/2	875440-C6	34.20	
.040		.0400	**.160** (4x)	3	1/8	2-1/2	886240-C6	39.00	
.040		.0400	**.203** (5x)	3	1/8	2-1/2	990740-C6	41.00	
.045		.0450	**.068** (1.5x)	3	1/8	1-1/2	973745-C6	32.70	
.045		.0450	**.135** (3x)	3	1/8	1-1/2	967045-C6	32.30	
.045		.0450	**.135** (3x)	4	1/8	1-1/2	875445-C6	34.20	
.045		.0450	**.225** (5x)	3	1/8	2-1/2	990745-C6	41.00	
.047 (3/64)		.0470	**.038** (0.8x)	3	1/8	1-1/2	888047-C6	35.70	
.047 (3/64)		.0470	**.071** (1.5x)	3	1/8	1-1/2	973747-C6	32.70	
.047 (3/64)		.0470	**.071** (1.5x)	4	1/8	1-1/2	841647-C6	34.40	
.047 (3/64)		.0470	**.141** (3x)	3	1/8	1-1/2	967047-C6	32.30	
.047 (3/64)		.0470	**.141** (3x)	4	1/8	1-1/2	875447-C6	34.20	
.047 (3/64)		.0470	**.187** (4x)	3	1/8	2-1/2	886247-C6	38.80	
.047 (3/64)		.0470	**.250** (5x)	3	1/8	2-1/2	990747-C6	41.00	
.047 (3/64)		.0470	**.250** (5x)	4	1/8	2-1/2	852947-C6	42.80	
	1.2 mm	.0472	**3.50 mm** (3x)	3	4 mm	50 mm	942827-C6	36.40	
.050		.0500	**.040** (0.8x)	3	1/8	1-1/2	888050-C6	31.90	
.050		.0500	**.075** (1.5x)	3	1/8	1-1/2	973750-C6	32.70	
.050		.0500	**.150** (3x)	3	1/8	1-1/2	967050-C6	32.30	
.050		.0500	**.150** (3x)	4	1/8	1-1/2	875450-C6	34.20	
.050		.0500	**.250** (5x)	3	1/8	2-1/2	990750-C6	41.00	
.055		.0550	**.083** (1.5x)	3	1/8	1-1/2	973755-C6	32.70	
.055		.0550	**.165** (3x)	3	1/8	1-1/2	967055-C6	32.30	
.055		.0550	**.165** (3x)	4	1/8	1-1/2	875455-C6	34.20	
.055		.0550	**.275** (5x)	3	1/8	2-1/2	990755-C6	41.00	
	1.4 mm	.0551	**4.00 mm** (3x)	3	4 mm	50 mm	942831-C6	34.20	
	1.5 mm	.0590	**2.20 mm** (1.5x)	3	4 mm	50 mm	954533-C6	34.80	
	1.5 mm	.0590	**4.50 mm** (3x)	3	4 mm	50 mm	942833-C6	34.20	
	1.5 mm	.0590	**4.50 mm** (3x)	4	4 mm	50 mm	821333-C6	36.10	NEW
	1.5 mm	.0590	**7.50 mm** (5x)	3	4 mm	50 mm	910533-C6	43.10	
.060		.0600	**.048** (0.8x)	3	1/8	1-1/2	888060-C6	31.90	
.060		.0600	**.090** (1.5x)	3	1/8	1-1/2	973760-C6	32.70	
.060		.0600	**.180** (3x)	3	1/8	1-1/2	967060-C6	32.30	

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VARIABLE HELIX END MILLS FOR HIGH TEMP ALLOYS

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CUTTER DIAMETER D_1 +.0005″ −.0005″	+.00mm −.02mm	decimal equivalent	LENGTH OF CUT L_2 +.010″ −.000″ +.25mm −.00mm	FLUTES	SHANK DIAMETER D_2 (h6)	OVERALL LENGTH L_1	AlTiN NANO COATED TOOL #	PRICE
.060		.0600	**.180** (3x)	4	1/8	1-1/2	875460-C6	34.20
.060		.0600	**.312** (5x)	3	1/8	2-1/2	990760-C6	41.00
.062 (1/16)		.0620	**.050** (0.8x)	3	1/8	1-1/2	888062-C6	33.60
.062 (1/16)		.0620	**.050** (0.8x)	4	1/8	1-1/2	790562-C6	35.40
.062 (1/16)		.0620	**.093** (1.5x)	3	1/8	1-1/2	973762-C6	30.50
.062 (1/16)		.0620	**.093** (1.5x)	4	1/8	1-1/2	841662-C6	32.20
.062 (1/16)		.0620	**.186** (3x)	3	1/8	1-1/2	967062-C6	30.20
.062 (1/16)		.0620	**.186** (3x)	4	1/8	1-1/2	875462-C6	32.10
.062 (1/16)		.0620	**.250** (4x)	3	1/8	2-1/2	886262-C6	37.20
.062 (1/16)		.0620	**.250** (4x)	4	1/8	2-1/2	790762-C6	39.10
.062 (1/16)		.0620	**.312** (5x)	3	1/8	2-1/2	990762-C6	39.30
.062 (1/16)		.0620	**.312** (5x)	4	1/8	2-1/2	852962-C6	41.20
	1.6 mm	.0629	**5.00 mm** (3x)	3	4 mm	50 mm	942836-C6	34.90
.065		.0650	**.195** (3x)	3	1/8	1-1/2	967065-C6	34.80
.070		.0700	**.105** (1.5x)	3	1/8	1-1/2	973770-C6	30.50
.070		.0700	**.210** (3x)	3	1/8	1-1/2	967070-C6	30.20
NEW .070		.0700	**.210** (3x)	4	1/8	1-1/2	875470-C6	32.10
.070		.0700	**.375** (5x)	3	1/8	2-1/2	990770-C6	39.30
	1.8 mm	.0708	**5.50 mm** (3x)	3	4 mm	50 mm	942840-C6	34.90
.075		.0750	**.225** (3x)	3	1/8	1-1/2	967075-C6	34.80
.078 (5/64)		.0780	**.062** (0.8x)	3	1/8	1-1/2	888078-C6	33.60
.078 (5/64)		.0780	**.118** (1.5x)	3	1/8	1-1/2	973778-C6	30.50
.078 (5/64)		.0780	**.118** (1.5x)	4	1/8	1-1/2	841678-C6	32.20
.078 (5/64)		.0780	**.234** (3x)	3	1/8	1-1/2	967078-C6	30.20
.078 (5/64)		.0780	**.234** (3x)	4	1/8	1-1/2	875478-C6	32.10
.078 (5/64)		.0780	**.312** (4x)	3	1/8	2-1/2	886278-C6	37.20
.078 (5/64)		.0780	**.406** (5x)	3	1/8	2-1/2	990778-C6	39.30
.078 (5/64)		.0780	**.406** (5x)	4	1/8	2-1/2	852978-C6	41.20
	2.0 mm	.0787	**3.00 mm** (1.5x)	3	4 mm	50 mm	954545-C6	34.80
	2.0 mm	.0787	**6.00 mm** (3x)	3	4 mm	50 mm	942845-C6	34.20
NEW	2.0 mm	.0787	**6.00 mm** (3x)	4	4 mm	50 mm	821345-C6	36.10
	2.0 mm	.0787	**10.00 mm** (5x)	3	4 mm	50 mm	910545-C6	43.10
.080		.0800	**.120** (1.5x)	3	1/8	1-1/2	973780-C6	30.50
.080		.0800	**.240** (3x)	3	1/8	1-1/2	967080-C6	30.20
.080		.0800	**.406** (5x)	3	1/8	2-1/2	990780-C6	39.30
.085		.0850	**.255** (3x)	3	1/8	1-1/2	967085-C6	34.80
.090		.0900	**.135** (1.5x)	3	1/8	1-1/2	973790-C6	30.50
.090		.0900	**.135** (1.5x)	4	1/8	1-1/2	841690-C6	32.20
.090		.0900	**.270** (3x)	3	1/8	1-1/2	967090-C6	30.20
.090		.0900	**.450** (5x)	3	1/8	2-1/2	990790-C6	39.30
.093 (3/32)		.0930	**.074** (0.8x)	3	1/8	1-1/2	888093-C6	33.60
.093 (3/32)		.0930	**.140** (1.5x)	3	1/8	1-1/2	973793-C6	30.50
.093 (3/32)		.0930	**.140** (1.5x)	4	1/8	1-1/2	841693-C6	32.20
.093 (3/32)		.0930	**.279** (3x)	3	1/8	1-1/2	967093-C6	30.20
.093 (3/32)		.0930	**.279** (3x)	4	1/8	1-1/2	875493-C6	32.10
.093 (3/32)		.0930	**.375** (4x)	3	1/8	2-1/2	886293-C6	37.20
.093 (3/32)		.0930	**.375** (4x)	4	1/8	2-1/2	790793-C6	39.10
.093 (3/32)		.0930	**.500** (5x)	3	1/8	2-1/2	990793-C6	39.30
.093 (3/32)		.0930	**.500** (5x)	4	1/8	2-1/2	852993-C6	41.20
.095		.0950	**.285** (3x)	3	1/8	1-1/2	967095-C6	34.00
	2.5 mm	.0984	**3.70 mm** (1.5x)	3	4 mm	50 mm	954551-C6	34.80
	2.5 mm	.0984	**7.50 mm** (3x)	3	4 mm	50 mm	942851-C6	34.20

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NEW SIZES!

VARIABLE HELIX END MILLS FOR HIGH TEMP ALLOYS

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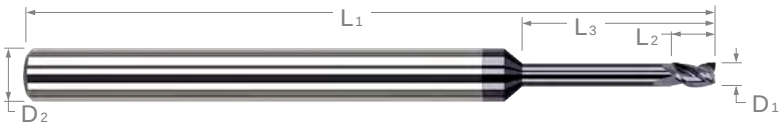
CUTTER DIAMETER			LENGTH OF CUT	FLUTES	SHANK DIAMETER	OVERALL LENGTH	AlTiN NANO COATED		
D_1 +.0005″ −.0005″	+.00mm −.02mm	decimal equivalent	L_2 +.010″ −.000″ +.25mm −.00mm		D_2 (h6)	L_1	TOOL #	PRICE	
	2.5 mm	.0984	**7.50 mm** (3x)	4	4 mm	50 mm	821351-C6	36.10	NEW
	2.5 mm	.0984	**12.00 mm** (5x)	3	4 mm	50 mm	910551-C6	43.10	
.100		.1000	**.150** (1.5x)	3	1/8	1-1/2	973800-C6	30.50	
.100		.1000	**.300** (3x)	3	1/8	1-1/2	967100-C6	30.20	
.100		.1000	**.500** (5x)	3	1/8	2-1/2	990800-C6	39.30	
.109 (7/64)		.1090	**.164** (1.5x)	3	1/8	1-1/2	973802-C6	30.50	
.109 (7/64)		.1090	**.327** (3x)	3	1/8	1-1/2	967102-C6	30.20	
.109 (7/64)		.1090	**.327** (3x)	4	1/8	1-1/2	875502-C6	32.10	NEW
.109 (7/64)		.1090	**.570** (5x)	3	1/8	2-1/2	990802-C6	39.30	
	3.0 mm	.1181	**2.40 mm** (0.8x)	3	4 mm	50 mm	848057-C6	34.70	
	3.0 mm	.1181	**4.50 mm** (1.5x)	3	4 mm	50 mm	954557-C6	34.80	
	3.0 mm	.1181	**9.00 mm** (3x)	3	4 mm	50 mm	942857-C6	34.20	
	3.0 mm	.1181	**15.00 mm** (5x)	3	4 mm	50 mm	910557-C6	43.10	

D_1 +.000″ −.002″	+.00mm −.04mm	decimal equivalent	L_2 +.030″ −.000″ +.75mm −.00mm		D_2 (h6)	L_1	TOOL #	PRICE	
.125 (1/8)		.1250	**.100** (0.8x)	4	1/8	1-1/2	888108-C6	33.60	
.125 (1/8)		.1250	**.187** (1.5x)	4	1/8	1-1/2	973808-C6	28.70	
.125 (1/8)		.1250	**.375** (3x)	4	1/8	1-1/2	967108-C6	28.70	
.125 (1/8)		.1250	**.500** (4x)	4	1/8	2-1/2	886308-C6	37.20	
.125 (1/8)		.1250	**.625** (5x)	4	1/8	2-1/2	990808-C6	39.30	
.140 (9/64)		.1406	**.220** (1.5x)	4	3/16	2	973809-C6	32.90	
.140 (9/64)		.1406	**.425** (3x)	4	3/16	2	967109-C6	32.90	
.140 (9/64)		.1406	**.750** (5x)	4	3/16	3	990809-C6	41.70	
.156 (5/32)		.1562	**.125** (0.8x)	4	3/16	2	888110-C6	32.30	
.156 (5/32)		.1562	**.235** (1.5x)	4	3/16	2	973810-C6	32.90	
.156 (5/32)		.1562	**.470** (3x)	4	3/16	2	967110-C6	32.90	
.156 (5/32)		.1562	**.625** (4x)	4	3/16	3	886310-C6	34.80	
.156 (5/32)		.1562	**.750** (5x)	4	3/16	3	990810-C6	41.70	
	4.0 mm	.1574	**12.00 mm** (3x)	4	6 mm	63 mm	942861-C6	43.20	
.172 (11/64)		.1718	**.505** (3x)	4	3/16	2	967111-C6	34.80	NEW
.187 (3/16)		.1875	**.150** (0.8x)	4	3/16	2	888112-C6	36.20	
.187 (3/16)		.1875	**.285** (1.5x)	4	3/16	2	973812-C6	31.20	
.187 (3/16)		.1875	**.562** (3x)	4	3/16	2	967112-C6	31.20	
.187 (3/16)		.1875	**.750** (4x)	4	3/16	3	886312-C6	39.90	
.187 (3/16)		.1875	**1.000** (5x)	4	3/16	3	990812-C6	41.70	
.218 (7/32)		.2187	**.330** (1.5)	4	1/4	2-1/2	973814-C6	43.00	NEW
.218 (7/32)		.2187	**.660** (3x)	4	1/4	2-1/2	967114-C6	43.00	
	6.0 mm	.2362	**18.00 mm** (3x)	4	6 mm	63 mm	942866-C6	43.20	
.250 (1/4)		.2500	**.200** (0.8x)	4	1/4	2-1/2	888116-C6	44.40	
.250 (1/4)		.2500	**.375** (1.5x)	4	1/4	2-1/2	973816-C6	39.10	
.250 (1/4)		.2500	**.750** (3x)	4	1/4	2-1/2	967116-C6	39.10	
.250 (1/4)		.2500	**1.000** (4x)	4	1/4	4	886316-C6	48.00	
.250 (1/4)		.2500	**1.250** (5x)	4	1/4	4	990816-C6	49.90	
.312 (5/16)		.3125	**1.000** (3x)	4	5/16	2-1/2	967120-C6	54.50	
.375 (3/8)		.3750	**.570** (1.5x)	4	3/8	2-1/2	973824-C6	63.10	
.375 (3/8)		.3750	**1.125** (3x)	4	3/8	2-1/2	967124-C6	63.10	
	10.0 mm	.3937	**30.0 mm** (3x)	4	10 mm	75 mm	942873-C6	68.70	
.500 (1/2)		.5000	**.750** (1.5x)	4	1/2	3	973832-C6	81.50	
.500 (1/2)		.5000	**1.500** (3x)	4	1/2	3	967132-C6	81.50	

PLEASE SEE SPEEDS & FEEDS ON PAGE 131

VARIABLE HELIX END MILLS FOR HIGH TEMP ALLOYS

Square – Long Reach, Stub Flute



- Optimized for titanium alloys, inconel, nickel alloys, and other high-temperature materials with outstanding performance in difficult-to-machine steels, stainless steels, and tool steels
- Long reach design for deep cavities
- Reduced neck diameter to avoid heeling
- Variable helix design (approx. 34°) reduces chatter and harmonics and increases material removal rates
- Latest generation AlTiN Nano coating offers superior hardness and heat resistance
- h6 shank tolerance for high precision tool holders
- Suitable for steels up to 45Rc
- Center cutting
- Solid carbide
- CNC ground in the USA

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CUTTER DIAMETER			LENGTH OF CUT	OVERALL REACH	FLUTES	SHANK DIAMETER	OVERALL LENGTH	AlTiN NANO COATED	
D_1			L_2	L_3		D_2 (h6)	L_1	TOOL #	PRICE
+.0005″ −.0005″	+.00mm −.02mm	decimal equivalent	+.010″ −.000″ +.25mm −.00mm	+.010″ −.000″ +.25mm −.00mm					
.010		.0100	.015	**.050** (5x)	3	1/8	2-1/2	985310-C6	67.30
.010		.0100	.015	**.080** (8x)	3	1/8	2-1/2	978210-C6	68.60
.015 (1/64)		.0150	.023	**.078** (5x)	3	1/8	2-1/2	985315-C6	58.10
.015 (1/64)		.0150	.023	**.125** (8x)	3	1/8	2-1/2	978215-C6	59.20
.020		.0200	.030	**.060** (3x)	3	1/8	1-1/2	940520-C6	54.40
.020		.0200	.030	**.100** (5x)	3	1/8	2-1/2	985320-C6	55.60
.020		.0200	.030	**.100** (5x)	4	1/8	2-1/2	791320-C6	57.60
.020		.0200	.030	**.120** (6x)	3	1/8	2-1/2	895520-C6	55.60
.020		.0200	.030	**.140** (7x)	3	1/8	2-1/2	880720-C6	56.70
.020		.0200	.030	**.160** (8x)	3	1/8	2-1/2	978220-C6	56.70
.020		.0200	.030	**.200** (10x)	3	1/8	2-1/2	935720-C6	62.00
.025		.0250	.038	**.125** (5x)	3	1/8	2-1/2	985325-C6	55.60
.025		.0250	.038	**.203** (8x)	3	1/8	2-1/2	978225-C6	56.70
.030		.0300	.045	**.156** (5x)	3	1/8	2-1/2	985330-C6	55.60
.030		.0300	.045	**.250** (8x)	3	1/8	2-1/2	978230-C6	56.70
.031 (1/32)		.0310	.047	**.093** (3x)	3	1/8	1-1/2	940531-C6	50.40
.031 (1/32)		.0310	.047	**.156** (5x)	3	1/8	2-1/2	985331-C6	51.50
.031 (1/32)		.0310	.047	**.187** (6x)	3	1/8	2-1/2	895531-C6	51.50
.031 (1/32)		.0310	.047	**.218** (7x)	3	1/8	2-1/2	880731-C6	52.70
.031 (1/32)		.0310	.047	**.250** (8x)	3	1/8	2-1/2	978231-C6	52.70
.031 (1/32)		.0310	.047	**.250** (8x)	4	1/8	2-1/2	812331-C6	54.70
.031 (1/32)		.0310	.047	**.312** (10x)	3	1/8	2-1/2	935731-C6	57.80
.031 (1/32)		.0310	.047	**.375** (12x)	3	1/8	2-1/2	901331-C6	59.60
.031 (1/32)		.0310	.047	**.470** (15x)	3	1/8	2-1/2	851531-C6	60.80
.035		.0350	.053	**.187** (5x)	3	1/8	2-1/2	985335-C6	50.40
	1.0 mm	.0393	1.50 mm	**5.0 mm** (5x)	3	4 mm	50 mm	905022-C6	56.70
	1.0 mm	.0393	1.50 mm	**8.0 mm** (8x)	3	4 mm	50 mm	911422-C6	57.00
.040		.0400	.060	**.203** (5x)	3	1/8	2-1/2	985340-C6	50.40
.040		.0400	.060	**.325** (8x)	3	1/8	2-1/2	978240-C6	51.50
.045		.0450	.068	**.225** (5x)	3	1/8	2-1/2	985345-C6	50.40

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VARIABLE HELIX END MILLS FOR HIGH TEMP ALLOYS

Square – Long Reach, Stub Flute (cont.)

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CUTTER DIAMETER			LENGTH OF CUT	OVERALL REACH	FLUTES	SHANK DIAMETER	OVERALL LENGTH	AlTiN NANO COATED	
D_1 +.0005″ −.0005″	+.00mm −.02mm	decimal equivalent	L_2 +.010″ −.000″ +.25mm −.00mm	L_3 +.010″ −.000″ +.25mm −.00mm		D_2 (h6)	L_1	TOOL #	PRICE
.047 (3/64)		.0470	.071	**.250** (5x)	3	1/8	2-1/2	985347-C6	50.40
.047 (3/64)		.0470	.071	**.281** (6x)	3	1/8	2-1/2	895547-C6	50.40
.047 (3/64)		.0470	.071	**.328** (7x)	3	1/8	2-1/2	880747-C6	51.50
.047 (3/64)		.0470	.071	**.375** (8x)	3	1/8	2-1/2	978247-C6	51.50
.047 (3/64)		.0470	.071	**.375** (8x)	4	1/8	2-1/2	812347-C6	53.50
.047 (3/64)		.0470	.071	**.480** (10x)	3	1/8	2-1/2	935747-C6	56.20
.050		.0500	.075	**.250** (5x)	3	1/8	2-1/2	985350-C6	50.40
.055		.0550	.083	**.275** (5x)	3	1/8	2-1/2	985355-C6	50.40
.060		.0600	.090	**.312** (5x)	3	1/8	2-1/2	985360-C6	50.40
.060		.0600	.090	**.500** (8x)	3	1/8	2-1/2	978260-C6	51.50
.062 (1/16)		.0620	.093	**.186** (3x)	3	1/8	1-1/2	940562-C6	50.40
.062 (1/16)		.0620	.093	**.312** (5x)	3	1/8	2-1/2	985362-C6	51.50
.062 (1/16)		.0620	.093	**.312** (5x)	4	1/8	2-1/2	791362-C6	53.50
.062 (1/16)		.0620	.093	**.375** (6x)	3	1/8	2-1/2	895562-C6	51.50
.062 (1/16)		.0620	.093	**.437** (7x)	3	1/8	2-1/2	880762-C6	52.70
.062 (1/16)		.0620	.093	**.500** (8x)	3	1/8	2-1/2	978262-C6	52.70
.062 (1/16)		.0620	.093	**.500** (8x)	4	1/8	2-1/2	812362-C6	54.70
.062 (1/16)		.0620	.093	**.625** (10x)	3	1/8	2-1/2	935762-C6	57.80
.062 (1/16)		.0620	.093	**.750** (12x)	3	1/8	2-1/2	901362-C6	59.60
.062 (1/16)		.0620	.093	**.950** (15x)	3	1/8	2-1/2	851562-C6	60.80
.070		.0700	.105	**.375** (5x)	3	1/8	2-1/2	985370-C6	54.60
.078 (5/64)		.0780	.118	**.406** (5x)	3	1/8	2-1/2	985378-C6	50.40
.078 (5/64)		.0780	.118	**.625** (8x)	3	1/8	2-1/2	978278-C6	51.50
.078 (5/64)		.0780	.118	**.625** (8x)	4	1/8	2-1/2	812378-C6	53.50
.078 (5/64)		.0780	.118	**.800** (10x)	3	1/8	2-1/2	935778-C6	56.20
	2.0 mm	.0787	3.00 mm	**10.0 mm** (5x)	3	4 mm	50 mm	905045-C6	57.50
	2.0 mm	.0787	3.00 mm	**16.0 mm** (8x)	3	4 mm	50 mm	911445-C6	58.10
.080		.0800	.120	**.406** (5x)	3	1/8	2-1/2	985380-C6	54.60
.090		.0900	.135	**.450** (5x)	3	1/8	2-1/2	985390-C6	54.60
.093 (3/32)		.0930	.140	**.279** (3x)	3	1/8	1-1/2	940593-C6	50.40
.093 (3/32)		.0930	.140	**.500** (5x)	3	1/8	2-1/2	985393-C6	51.50
.093 (3/32)		.0930	.140	**.585** (6x)	3	1/8	2-1/2	895593-C6	51.50
.093 (3/32)		.0930	.140	**.670** (7x)	3	1/8	2-1/2	880793-C6	52.70
.093 (3/32)		.0930	.140	**.750** (8x)	3	1/8	2-1/2	978293-C6	52.70
.093 (3/32)		.0930	.140	**.750** (8x)	4	1/8	2-1/2	812393-C6	54.70
.093 (3/32)		.0930	.140	**.950** (10x)	3	1/8	2-1/2	935793-C6	57.80
.093 (3/32)		.0930	.140	**1.125** (12x)	3	1/8	2-1/2	901393-C6	59.60
.093 (3/32)		.0930	.140	**1.400** (15x)	3	1/8	3	851593-C6	60.80
.100		.1000	.150	**.500** (5x)	3	1/8	2-1/2	985400-C6	50.40
.100		.1000	.150	**.800** (8x)	3	1/8	2-1/2	978300-C6	51.50
.109 (7/64)		.1090	.164	**.570** (5x)	3	1/8	2-1/2	985402-C6	50.40
.109 (7/64)		.1090	.164	**.900** (8x)	3	1/8	2-1/2	978302-C6	51.50
	3.0 mm	.1181	4.50 mm	**15.0 mm** (5x)	3	4 mm	50 mm	905057-C6	52.30
	3.0 mm	.1181	4.50 mm	**24.0 mm** (8x)	3	4 mm	50 mm	911457-C6	52.50

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VARIABLE HELIX END MILLS FOR HIGH TEMP ALLOYS

Square – Long Reach, Stub Flute (cont.)

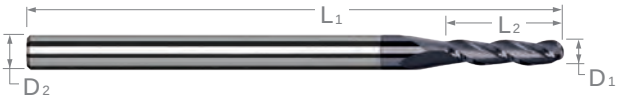
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CUTTER DIAMETER D_1 +.000″ −.002″	+.00mm −.04mm	decimal equivalent	LENGTH OF CUT L_2 +.030″ −.000″ +.75mm −.00mm	OVERALL REACH L_3 +.030″ −.000″ +.75mm −.00mm	FLUTES	SHANK DIAMETER D_2 (h6)	OVERALL LENGTH L_1	AlTiN NANO COATED TOOL #	PRICE
.125 (1/8)		.1250	.187	**.375** (3x)	4	1/8	1-1/2	940608-C6	50.40
.125 (1/8)		.1250	.187	**.625** (5x)	4	1/8	2-1/2	985408-C6	51.50
.125 (1/8)		.1250	.187	**.750** (6x)	4	1/8	2-1/2	895608-C6	51.50
.125 (1/8)		.1250	.187	**.875** (7x)	4	1/8	2-1/2	880808-C6	52.70
.125 (1/8)		.1250	.187	**1.000** (8x)	4	1/8	2-1/2	978308-C6	52.70
.125 (1/8)		.1250	.187	**1.250** (10x)	4	1/8	2-1/2	935808-C6	57.80
.125 (1/8)		.1250	.187	**1.500** (12x)	4	1/8	3	901408-C6	61.60
.140 (9/64)		.1406	.220	**.750** (5x)	4	3/16	3	985409-C6	58.90
.156 (5/32)		.1562	.235	**.750** (5x)	4	3/16	3	985410-C6	55.60
.156 (5/32)		.1562	.235	**1.250** (8x)	4	3/16	3	978310-C6	56.70
.156 (5/32)		.1562	.235	**1.570** (10x)	4	3/16	3	935810-C6	61.60
.187 (3/16)		.1875	.285	**1.000** (5x)	4	3/16	3	985412-C6	55.60
.187 (3/16)		.1875	.285	**1.500** (8x)	4	3/16	3	978312-C6	56.70
.187 (3/16)		.1875	.285	**1.875** (10x)	4	3/16	4	935812-C6	61.60
	6.0 mm	.2362	9.00mm	**30.0mm** (5x)	4	6 mm	63 mm	905066-C6	65.80
.250 (1/4)		.2500	.375	**1.250** (5x)	4	1/4	4	985416-C6	62.00
.250 (1/4)		.2500	.375	**2.000** (8x)	4	1/4	4	978316-C6	63.40
.375 (3/8)		.3750	.570	**2.000** (5x)	4	3/8	4	985424-C6	70.60

PLEASE SEE SPEEDS & FEEDS ON PAGE 123

VARIABLE HELIX END MILLS FOR HIGH TEMP ALLOYS

Ball



- Optimized for titanium alloys, inconel, nickel alloys, and other high-temperature materials with outstanding performance in difficult-to-machine steels, stainless steels, and tool steels
- Variable helix design (approx. 34°) reduces chatter and harmonics and increases material removal rates
- Latest generation AlTiN Nano coating offers superior hardness and heat resistance
- h6 shank tolerance for high precision tool holders
- Suitable for steels up to 45Rc
- Center cutting
- Solid carbide
- CNC ground in the USA

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CUTTER DIAMETER			LENGTH OF CUT	FLUTES	SHANK DIAMETER	OVERALL LENGTH	AlTiN NANO COATED	
D_1 +.0005″ −.0005″	+.00mm −.02mm	decimal equivalent	L_2 +.010″ −.000″ +.25mm −.00mm		D_2 (h6)	L_1	TOOL #	PRICE
	.2 mm	.0078	**.60 mm** (3x)	3	4 mm	50 mm	975304-C6	66.10
.010		.0100	**.015** (1.5x)	3	1/8	1-1/2	944210-C6	62.00
.010		.0100	**.030** (3x)	3	1/8	1-1/2	970510-C6	62.00
.010		.0100	**.050** (5x)	3	1/8	2-1/2	930610-C6	71.80
.015 (1/64)		.0150	**.023** (1.5x)	3	1/8	1-1/2	944215-C6	52.70
.015 (1/64)		.0150	**.045** (3x)	3	1/8	1-1/2	970515-C6	52.70
.015 (1/64)		.0150	**.078** (5x)	3	1/8	2-1/2	930615-C6	62.20
	.4 mm	.0157	**1.20 mm** (3x)	3	4 mm	50 mm	975309-C6	54.60
	.5 mm	.0196	**1.50 mm** (3x)	3	4 mm	50 mm	975311-C6	49.60
.020		.0200	**.016** (0.8x)	3	1/8	1-1/2	848120-C6	47.90
.020		.0200	**.030** (1.5x)	3	1/8	1-1/2	944220-C6	47.10
.020		.0200	**.060** (3x)	3	1/8	1-1/2	970520-C6	47.10
.020		.0200	**.060** (3x)	4	1/8	1-1/2	893020-C6	49.40
.020		.0200	**.080** (4x)	3	1/8	2-1/2	811220-C6	51.80
.020		.0200	**.100** (5x)	3	1/8	2-1/2	930620-C6	51.80
	.6 mm	.0236	**1.80 mm** (3x)	3	4 mm	50 mm	975313-C6	48.10
.025		.0250	**.038** (1.5x)	3	1/8	1-1/2	944225-C6	45.60
.025		.0250	**.075** (3x)	3	1/8	1-1/2	970525-C6	45.60
.025		.0250	**.125** (5x)	3	1/8	2-1/2	930625-C6	50.40
.030		.0300	**.045** (1.5x)	3	1/8	1-1/2	944230-C6	40.30
.030		.0300	**.090** (3x)	3	1/8	1-1/2	970530-C6	40.30
.030		.0300	**.156** (5x)	3	1/8	2-1/2	930630-C6	45.00
.031 (1/32)		.0310	**.025** (0.8x)	3	1/8	1-1/2	848131-C6	41.20
.031 (1/32)		.0310	**.047** (1.5x)	3	1/8	1-1/2	944231-C6	40.10
.031 (1/32)		.0310	**.047** (1.5x)	4	1/8	1-1/2	814531-C6	42.40
.031 (1/32)		.0310	**.093** (3x)	3	1/8	1-1/2	970531-C6	40.10
.031 (1/32)		.0310	**.093** (3x)	4	1/8	1-1/2	893031-C6	42.40
.031 (1/32)		.0310	**.125** (4x)	3	1/8	2-1/2	811231-C6	48.50
.031 (1/32)		.0310	**.156** (5x)	3	1/8	2-1/2	930631-C6	48.50
	.8 mm	.0314	**1.20 mm** (1.5x)	3	4 mm	50 mm	968018-C6	42.20
	.8 mm	.0314	**2.40 mm** (3x)	3	4 mm	50 mm	975318-C6	42.20
.035		.0350	**.105** (3x)	3	1/8	1-1/2	970535-C6	40.30
	1.0 mm	.0393	**.80 mm** (0.8x)	3	4 mm	50 mm	872422-C6	42.80
	1.0 mm	.0393	**1.50 mm** (1.5x)	3	4 mm	50 mm	968022-C6	42.20
	1.0 mm	.0393	**3.00 mm** (3x)	3	4 mm	50 mm	975322-C6	42.20
	1.0 mm	.0393	**3.00 mm** (3x)	4	4 mm	50 mm	793822-C6	44.60
	1.0 mm	.0393	**4.00 mm** (4x)	3	4 mm	50 mm	790122-C6	50.60
	1.0 mm	.0393	**5.00 mm** (5x)	3	4 mm	50 mm	911322-C6	50.60

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VARIABLE HELIX END MILLS FOR HIGH TEMP ALLOYS

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CUTTER DIAMETER			LENGTH OF CUT	FLUTES	SHANK DIAMETER	OVERALL LENGTH	AlTiN NANO COATED	
D_1 +.0005″ −.0005″	+.00mm −.02mm	decimal equivalent	L_2 +.010″ −.000″ +.25mm −.00mm		D_2 (h6)	L_1	TOOL #	PRICE
.040		.0400	**.060** (1.5x)	3	1/8	1-1/2	944240-C6	40.10
.040		.0400	**.120** (3x)	3	1/8	1-1/2	970540-C6	40.10
.040		.0400	**.120** (3x)	4	1/8	1-1/2	893040-C6	42.40
.040		.0400	**.160** (4x)	3	1/8	2-1/2	811240-C6	48.70
.040		.0400	**.203** (5x)	3	1/8	2-1/2	930640-C6	48.70
.045		.0450	**.135** (3x)	3	1/8	1-1/2	970545-C6	40.30
.047 (3/64)		.0470	**.038** (0.8x)	3	1/8	1-1/2	848147-C6	40.40
.047 (3/64)		.0470	**.071** (1.5x)	3	1/8	1-1/2	944247-C6	40.10
.047 (3/64)		.0470	**.141** (3x)	3	1/8	1-1/2	970547-C6	40.10
.047 (3/64)		.0470	**.141** (3x)	4	1/8	1-1/2	893047-C6	42.40
.047 (3/64)		.0470	**.250** (5x)	3	1/8	2-1/2	930647-C6	48.70
	1.2 mm	.0472	**1.80 mm** (1.5x)	3	4 mm	50 mm	968027-C6	42.20
	1.2 mm	.0472	**3.50 mm** (3x)	3	4 mm	50 mm	975327-C6	42.20
.050		.0500	**.075** (1.5x)	3	1/8	1-1/2	944250-C6	40.10
.050		.0500	**.150** (3x)	3	1/8	1-1/2	970550-C6	40.10
.050		.0500	**.250** (5x)	3	1/8	2-1/2	930650-C6	48.70
.055		.0550	**.165** (3x)	3	1/8	1-1/2	970555-C6	40.30
	1.4 mm	.0551	**2.10 mm** (1.5x)	3	4 mm	50 mm	968031-C6	42.20
	1.4 mm	.0551	**4.00 mm** (3x)	3	4 mm	50 mm	975331-C6	42.20
	1.5 mm	.0590	**2.20 mm** (1.5x)	3	4 mm	50 mm	968033-C6	42.20
	1.5 mm	.0590	**4.50 mm** (3x)	3	4 mm	50 mm	975333-C6	42.20
	1.5 mm	.0590	**7.50 mm** (5x)	3	4 mm	50 mm	911333-C6	50.60
.060		.0600	**.090** (1.5x)	3	1/8	1-1/2	944260-C6	40.10
.060		.0600	**.180** (3x)	3	1/8	1-1/2	970560-C6	40.10
.060		.0600	**.312** (5x)	3	1/8	2-1/2	930660-C6	48.70
.062 (1/16)		.0620	**.050** (0.8x)	3	1/8	1-1/2	848162-C6	38.90
.062 (1/16)		.0620	**.050** (0.8x)	4	1/8	1-1/2	787162-C6	41.20
.062 (1/16)		.0620	**.093** (1.5x)	3	1/8	1-1/2	944262-C6	37.80
.062 (1/16)		.0620	**.093** (1.5x)	4	1/8	1-1/2	814562-C6	40.10
.062 (1/16)		.0620	**.186** (3x)	3	1/8	1-1/2	970562-C6	37.80
.062 (1/16)		.0620	**.186** (3x)	4	1/8	1-1/2	893062-C6	40.10
.062 (1/16)		.0620	**.250** (4x)	3	1/8	2-1/2	811262-C6	46.50
.062 (1/16)		.0620	**.312** (5x)	3	1/8	2-1/2	930662-C6	46.50
.062 (1/16)		.0620	**.312** (5x)	4	1/8	2-1/2	778862-C6	48.80
	1.6 mm	.0629	**2.40 mm** (1.5x)	3	4 mm	50 mm	968036-C6	39.70
	1.6 mm	.0629	**5.00 mm** (3x)	3	4 mm	50 mm	975336-C6	39.70
.070		.0700	**.105** (1.5x)	3	1/8	1-1/2	944270-C6	38.30
.070		.0700	**.210** (3x)	3	1/8	1-1/2	970570-C6	38.30
.070		.0700	**.210** (3x)	4	1/8	1-1/2	893070-C6	40.60
.070		.0700	**.375** (5x)	3	1/8	2-1/2	930670-C6	45.50
	1.8 mm	.0708	**2.70 mm** (1.5x)	3	4 mm	50 mm	968040-C6	39.70
	1.8 mm	.0708	**5.50 mm** (3x)	3	4 mm	50 mm	975340-C6	39.70
.078 (5/64)		.0780	**.062** (0.8x)	3	1/8	1-1/2	848178-C6	38.90
.078 (5/64)		.0780	**.118** (1.5x)	3	1/8	1-1/2	944278-C6	37.80
.078 (5/64)		.0780	**.234** (3x)	3	1/8	1-1/2	970578-C6	37.80
.078 (5/64)		.0780	**.234** (3x)	4	1/8	1-1/2	893078-C6	40.10
.078 (5/64)		.0780	**.406** (5x)	3	1/8	2-1/2	930678-C6	46.00

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VARIABLE HELIX END MILLS FOR HIGH TEMP ALLOYS

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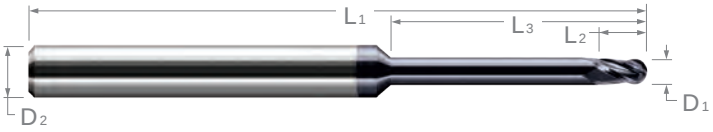
CUTTER DIAMETER D_1 +.0005″ −.0005″	+.00mm −.02mm	decimal equivalent	LENGTH OF CUT L_2 +.010″ −.000″ +.25mm −.00mm	FLUTES	SHANK DIAMETER D_2 (h6)	OVERALL LENGTH L_1	AlTiN NANO COATED TOOL #	PRICE
	2.0 mm	.0787	**3.00 mm** (1.5x)	3	4 mm	50 mm	968045-C6	39.70
	2.0 mm	.0787	**6.00 mm** (3x)	3	4 mm	50 mm	975345-C6	39.70
	2.0 mm	.0787	**10.00 mm** (5x)	3	4 mm	50 mm	911345-C6	48.10
.080		.0800	**.120** (1.5x)	3	1/8	1-1/2	944280-C6	38.30
.080		.0800	**.240** (3x)	3	1/8	1-1/2	970580-C6	38.30
.090		.0900	**.135** (1.5x)	3	1/8	1-1/2	944290-C6	38.30
.090		.0900	**.270** (3x)	3	1/8	1-1/2	970590-C6	38.30
.093 (3/32)		.0930	**.074** (0.8x)	3	1/8	1-1/2	848193-C6	38.90
.093 (3/32)		.0930	**.140** (1.5x)	3	1/8	1-1/2	944293-C6	37.80
.093 (3/32)		.0930	**.140** (1.5x)	4	1/8	1-1/2	814593-C6	40.10
.093 (3/32)		.0930	**.279** (3x)	3	1/8	1-1/2	970593-C6	37.80
.093 (3/32)		.0930	**.279** (3x)	4	1/8	1-1/2	893093-C6	40.10
.093 (3/32)		.0930	**.375** (4x)	3	1/8	2-1/2	811293-C6	46.50
.093 (3/32)		.0930	**.500** (5x)	3	1/8	2-1/2	930693-C6	46.50
	2.5 mm	.0984	**3.70 mm** (1.5x)	3	4 mm	50 mm	968051-C6	41.80
	2.5 mm	.0984	**7.50 mm** (3x)	3	4 mm	50 mm	975351-C6	41.80
.100		.1000	**.150** (1.5x)	3	1/8	1-1/2	944300-C6	38.00
.100		.1000	**.300** (3x)	3	1/8	1-1/2	970600-C6	38.00
.100		.1000	**.500** (5x)	3	1/8	2-1/2	930700-C6	46.60
.109 (7/64)		.1090	**.327** (3x)	3	1/8	1-1/2	970602-C6	40.30
	3.0 mm	.1181	**4.50 mm** (1.5x)	3	4 mm	50 mm	968057-C6	39.70
	3.0 mm	.1181	**9.00 mm** (3x)	3	4 mm	50 mm	975357-C6	39.70
	3.0 mm	.1181	**9.00 mm** (3x)	4	4 mm	50 mm	793857-C6	42.00
	3.0 mm	.1181	**15.00 mm** (5x)	3	4 mm	50 mm	911357-C6	48.10

D_1 +.000″ −.002″	+.00mm −.04mm	decimal equivalent	L_2 +.030″ −.000″ +.75mm −.00mm	FLUTES	D_2 (h6)	L_1	TOOL #	PRICE
.125 (1/8)		.1250	**.100** (0.8x)	4	1/8	1-1/2	848208-C6	38.90
.125 (1/8)		.1250	**.187** (1.5x)	4	1/8	1-1/2	944308-C6	35.70
.125 (1/8)		.1250	**.375** (3x)	4	1/8	1-1/2	970608-C6	35.70
.125 (1/8)		.1250	**.500** (4x)	4	1/8	2-1/2	811308-C6	46.50
.125 (1/8)		.1250	**.625** (5x)	4	1/8	2-1/2	930708-C6	46.50
.140 (9/64)		.1406	**.220** (1.5x)	4	3/16	2	944309-C6	48.70
.140 (9/64)		.1406	**.425** (3x)	4	3/16	2	970609-C6	48.70
.156 (5/32)		.1562	**.235** (1.5x)	4	3/16	2	944310-C6	40.30
.156 (5/32)		.1562	**.470** (3x)	4	3/16	2	970610-C6	40.30
.156 (5/32)		.1562	**.750** (5x)	4	3/16	3	930710-C6	49.10
.187 (3/16)		.1875	**.150** (0.8x)	4	3/16	2	848212-C6	41.40
.187 (3/16)		.1875	**.285** (1.5x)	4	3/16	2	944312-C6	37.90
.187 (3/16)		.1875	**.562** (3x)	4	3/16	2	970612-C6	37.90
.187 (3/16)		.1875	**.750** (4x)	4	3/16	3	811312-C6	41.40
.187 (3/16)		.1875	**1.000** (5x)	4	3/16	3	930712-C6	49.10
	6.0 mm	.2362	**18.00 mm** (3x)	4	6 mm	63 mm	975372-C6	52.60
.250 (1/4)		.2500	**.200** (0.8x)	4	1/4	2-1/2	848216-C6	50.00
.250 (1/4)		.2500	**.375** (1.5x)	4	1/4	2-1/2	944316-C6	45.90
.250 (1/4)		.2500	**.750** (3x)	4	1/4	2-1/2	970616-C6	45.90
.250 (1/4)		.2500	**1.000** (4x)	4	1/4	4	811316-C6	55.20
.250 (1/4)		.2500	**1.250** (5x)	4	1/4	4	930716-C6	57.50
.375 (3/8)		.3750	**1.125** (3x)	4	3/8	2-1/2	970624-C6	71.60

PLEASE SEE SPEEDS & FEEDS ON PAGE 131

VARIABLE HELIX END MILLS FOR HIGH TEMP ALLOYS

Ball – Long Reach, Stub Flute



- Optimized for titanium alloys, inconel, nickel alloys, and other high-temperature materials with outstanding performance in difficult-to-machine steels, stainless steels, and tool steels
- Long reach design for deep cavities
- Reduced neck diameter to avoid heeling
- Variable helix design (approx. 34°) reduces chatter and harmonics and increases material removal rates
- Latest generation AlTiN Nano coating offers superior hardness and heat resistance
- Suitable for steels up to 45Rc
- h6 shank tolerance for high precision tool holders
- Center cutting
- Solid carbide
- CNC ground in the USA

IMPROVES PERFORMANCE

Contour Profiling



Tipped Multi-Axis Machining



mm & in

CUTTER DIAMETER			LENGTH OF CUT	OVERALL REACH	FLUTES	SHANK DIAMETER	OVERALL LENGTH	AlTiN NANO COATED	
D_1 +.0005″ −.0005″	+.00mm −.02mm	decimal equivalent	L_2 +.010″ −.000″ +.25mm −.00mm	L_3 +.010″ −.000″ +.25mm −.00mm		D_2 (h6)	L_1	4 FL	PRICE
.015 (1/64)		.0150	.022	**.078** (5x)	4	1/8	2-1/2	63615-C6	65.80
.015 (1/64)		.0150	.022	**.125** (8x)	4	1/8	2-1/2	56115-C6	67.00
.015 (1/64)		.0150	.022	**.187** (12x)	4	1/8	2-1/2	64815-C6	71.40
	.4 mm	.0157	.60 mm	**2.0 mm** (5x)	4	4 mm	50 mm	988709-C6	71.70
	.4 mm	.0157	.60 mm	**3.2 mm** (8x)	4	4 mm	50 mm	974009-C6	72.80
	.4 mm	.0157	.60 mm	**4.8 mm** (12x)	4	4 mm	50 mm	981309-C6	78.10
	.5 mm	.0196	.75 mm	**2.5 mm** (5x)	4	4 mm	50 mm	988711-C6	69.40
	.5 mm	.0196	.75 mm	**4.0 mm** (8x)	4	4 mm	50 mm	974011-C6	70.40
	.5 mm	.0196	.75 mm	**6.0 mm** (12x)	4	4 mm	50 mm	981311-C6	75.40
	.5 mm	.0196	.75 mm	**8.0 mm** (16x)	4	4 mm	50 mm	976511-C6	78.80
.020		.0200	.030	**.100** (5x)	4	1/8	2-1/2	63620-C6	62.80
.020		.0200	.030	**.160** (8x)	4	1/8	2-1/2	56120-C6	64.10
.020		.0200	.030	**.250** (12x)	4	1/8	2-1/2	64820-C6	68.70
	.6 mm	.0236	.90 mm	**3.0 mm** (5x)	4	4 mm	50 mm	988713-C6	67.60
	.6 mm	.0236	.90 mm	**4.8 mm** (8x)	4	4 mm	50 mm	974013-C6	69.10
	.6 mm	.0236	.90 mm	**7.2 mm** (12x)	4	4 mm	50 mm	981313-C6	73.70
.025		.0250	.037	**.125** (5x)	4	1/8	2-1/2	63625-C6	61.20
.025		.0250	.037	**.203** (8x)	4	1/8	2-1/2	56125-C6	62.50
.025		.0250	.037	**.312** (12x)	4	1/8	2-1/2	64825-C6	67.30
.031 (1/32)		.0310	.047	**.093** (3x)	4	1/8	1-1/2	929031-C6	56.00
.031 (1/32)		.0310	.047	**.156** (5x)	4	1/8	2-1/2	63631-C6	57.50
.031 (1/32)		.0310	.047	**.187** (6x)	4	1/8	2-1/2	797531-C6	57.50
.031 (1/32)		.0310	.047	**.250** (8x)	4	1/8	2-1/2	56131-C6	58.90
.031 (1/32)		.0310	.047	**.312** (10x)	4	1/8	2-1/2	887231-C6	60.00
.031 (1/32)		.0310	.047	**.375** (12x)	4	1/8	2-1/2	64831-C6	60.70
.031 (1/32)		.0310	.047	**.470** (15x)	4	1/8	2-1/2	953331-C6	63.70
	.8 mm	.0314	1.20 mm	**4.0 mm** (5x)	4	4 mm	50 mm	988718-C6	63.10
	.8 mm	.0314	1.20 mm	**6.5 mm** (8x)	4	4 mm	50 mm	974018-C6	64.50
	.8 mm	.0314	1.20 mm	**9.5 mm** (12x)	4	4 mm	50 mm	981318-C6	66.10
.035		.0350	.052	**.187** (5x)	4	1/8	2-1/2	63635-C6	57.50

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VARIABLE HELIX END MILLS FOR HIGH TEMP ALLOYS

Ball – Long Reach, Stub Flute (cont.)

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CUTTER DIAMETER			LENGTH OF CUT	OVERALL REACH	FLUTES	SHANK DIAMETER	OVERALL LENGTH	AlTiN NANO COATED	
D_1 +.0005″ −.0005″	+.00mm −.02mm	decimal equivalent	L_2 +.010″ −.000″ +.25mm −.00mm	L_3 +.010″ −.000″ +.25mm −.00mm		D_2 (h6)	L_1	4 FL	PRICE
	1.0 mm	.0393	1.50 mm	**5.0 mm** (5x)	4	4 mm	50 mm	988722-C6	63.10
	1.0 mm	.0393	1.50 mm	**8.0 mm** (8x)	4	4 mm	50 mm	974022-C6	64.50
	1.0 mm	.0393	1.50 mm	**12.0 mm** (12x)	4	4 mm	50 mm	981322-C6	66.10
	1.0 mm	.0393	1.50 mm	**16.0 mm** (16x)	4	4 mm	50 mm	976522-C6	69.40
.040		.0400	.060	**.203** (5x)	4	1/8	2-1/2	63640-C6	57.50
.040		.0400	.060	**.325** (8x)	4	1/8	2-1/2	56140-C6	58.90
.045		.0450	.067	**.225** (5x)	4	1/8	2-1/2	63645-C6	57.50
.047 (3/64)		.0470	.070	**.250** (5x)	4	1/8	2-1/2	63647-C6	57.50
.047 (3/64)		.0470	.070	**.375** (8x)	4	1/8	2-1/2	56147-C6	58.90
.047 (3/64)		.0470	.070	**.480** (10x)	4	1/8	2-1/2	887247-C6	60.00
.047 (3/64)		.0470	.070	**.570** (12x)	4	1/8	2-1/2	64847-C6	60.70
.050		.0500	.075	**.250** (5x)	4	1/8	2-1/2	63650-C6	57.50
.050		.0500	.075	**.400** (8x)	4	1/8	2-1/2	56150-C6	58.90
.055		.0550	.082	**.275** (5x)	4	1/8	2-1/2	63655-C6	57.50
	1.5 mm	.0590	2.20 mm	**7.5 mm** (5x)	4	4 mm	50 mm	988733-C6	63.10
	1.5 mm	.0590	2.20 mm	**12.0 mm** (8x)	4	4 mm	50 mm	974033-C6	64.50
	1.5 mm	.0590	2.20 mm	**18.0 mm** (12x)	4	4 mm	50 mm	981333-C6	66.10
	1.5 mm	.0590	2.20 mm	**24.0 mm** (16x)	4	4 mm	63 mm	976533-C6	69.40
.060		.0600	.090	**.312** (5x)	4	1/8	2-1/2	63660-C6	57.50
.060		.0600	.090	**.500** (8x)	4	1/8	2-1/2	56160-C6	58.90
.062 (1/16)		.0620	.093	**.186** (3x)	4	1/8	1-1/2	929062-C6	56.00
.062 (1/16)		.0620	.093	**.312** (5x)	4	1/8	2-1/2	63662-C6	57.50
.062 (1/16)		.0620	.093	**.375** (6x)	4	1/8	2-1/2	797562-C6	57.50
.062 (1/16)		.0620	.093	**.500** (8x)	4	1/8	2-1/2	56162-C6	58.90
.062 (1/16)		.0620	.093	**.625** (10x)	4	1/8	2-1/2	887262-C6	60.00
.062 (1/16)		.0620	.093	**.750** (12x)	4	1/8	2-1/2	64862-C6	60.70
.062 (1/16)		.0620	.093	**.950** (15x)	4	1/8	2-1/2	953362-C6	63.70
.070		.0700	.105	**.375** (5x)	4	1/8	2-1/2	63670-C6	57.50
.070		.0700	.105	**.570** (8x)	4	1/8	2-1/2	56170-C6	58.90
.078 (5/64)		.0780	.117	**.406** (5x)	4	1/8	2-1/2	63678-C6	57.50
.078 (5/64)		.0780	.117	**.625** (8x)	4	1/8	2-1/2	56178-C6	58.90
.078 (5/64)		.0780	.117	**.940** (12x)	4	1/8	2-1/2	64878-C6	60.70
	2.0 mm	.0787	3.00 mm	**10.0 mm** (5x)	4	4 mm	50 mm	988745-C6	62.90
	2.0 mm	.0787	3.00 mm	**16.0 mm** (8x)	4	4 mm	50 mm	974045-C6	64.30
	2.0 mm	.0787	3.00 mm	**24.0 mm** (12x)	4	4 mm	63 mm	981345-C6	66.10
	2.0 mm	.0787	3.00 mm	**32.0 mm** (16x)	4	4 mm	63 mm	976545-C6	69.40
.093 (3/32)		.0930	.139	**.279** (3x)	4	1/8	1-1/2	929093-C6	56.00
.093 (3/32)		.0930	.139	**.500** (5x)	4	1/8	2-1/2	63693-C6	57.50
.093 (3/32)		.0930	.139	**.585** (6x)	4	1/8	2-1/2	797593-C6	57.50
.093 (3/32)		.0930	.139	**.750** (8x)	4	1/8	2-1/2	56193-C6	58.90
.093 (3/32)		.0930	.139	**.950** (10x)	4	1/8	2-1/2	887293-C6	60.00
.093 (3/32)		.0930	.139	**1.125** (12x)	4	1/8	2-1/2	64893-C6	60.70
.093 (3/32)		.0930	.139	**1.400** (15x)	4	1/8	3	953393-C6	63.70

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VARIABLE HELIX END MILLS FOR HIGH TEMP ALLOYS

Ball – Long Reach, Stub Flute (cont.)

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CUTTER DIAMETER D_1 +.0005″ −.0005″	+.00mm −.02mm	decimal equivalent	LENGTH OF CUT L_2 +.010″ −.000″ +.25mm −.00mm	OVERALL REACH L_3 +.010″ −.000″ +.25mm −.00mm	FLUTES	SHANK DIAMETER D_2 (h6)	OVERALL LENGTH L_1	AlTiN NANO COATED 4 FL	PRICE
.100		.1000	.150	**.500** (5x)	4	1/8	2-1/2	63700-C6	56.90
.100		.1000	.150	**.800** (8x)	4	1/8	2-1/2	56200-C6	58.10
	3.0 mm	.1181	4.50 mm	**15.0 mm** (5x)	4	4 mm	50 mm	988757-C6	59.70
	3.0 mm	.1181	4.50 mm	**24.0 mm** (8x)	4	4 mm	50 mm	974057-C6	61.10

D_1 +.000″ −.002″	decimal equivalent	L_2 +.030″ −.000″	L_3 +.030″ −.000″	FLUTES	D_2 (h6)	L_1	4 FL	PRICE
.125 (1/8)	.1250	.187	**.375** (3x)	4	1/8	1-1/2	929108-C6	56.00
.125 (1/8)	.1250	.187	**.625** (5x)	4	1/8	2-1/2	63708-C6	57.10
.125 (1/8)	.1250	.187	**.750** (6x)	4	1/8	2-1/2	797608-C6	57.10
.125 (1/8)	.1250	.187	**1.000** (8x)	4	1/8	2-1/2	56208-C6	58.30
.125 (1/8)	.1250	.187	**1.250** (10x)	4	1/8	3	887308-C6	60.00
.125 (1/8)	.1250	.187	**1.500** (12x)	4	1/8	3	64908-C6	60.70
.156 (5/32)	.1562	.234	**.750** (5x)	4	3/16	3	63710-C6	61.90
.156 (5/32)	.1562	.234	**1.250** (8x)	4	3/16	3	56210-C6	63.10
.156 (5/32)	.1562	.234	**1.570** (10x)	4	3/16	4	887310-C6	66.00
.187 (3/16)	.1875	.281	**1.000** (5x)	4	3/16	3	63712-C6	62.80
.187 (3/16)	.1875	.281	**1.500** (8x)	4	3/16	3	56212-C6	64.20
.187 (3/16)	.1875	.281	**1.875** (10x)	4	3/16	4	887312-C6	67.20
.250 (1/4)	.2500	.375	**1.250** (5x)	4	1/4	4	63716-C6	69.60
.250 (1/4)	.2500	.375	**2.000** (8x)	4	1/4	4	56216-C6	70.90
.250 (1/4)	.2500	.375	**2.500** (10x)	4	1/4	6	887316-C6	82.50
.375 (3/8)	.3750	.570	**2.000** (5x)	4	3/8	4	63724-C6	86.70

SPEEDS & FEEDS (Variable Helix – Long Reach, Stub Flute for High Temp Alloys)

Important Note: Values in table are in inches and are based on 4 flute, reached (8x Dia) end mills. For 3 flutes, table values of IPT must be increased to 105% before adjustments for different reaches. For shorter reaches, table values of IPT must be increased (for 3x, increase to 135%; for 5x, increase to 125%; for 6x, increase to 120%; for 7x, increase to 110%). For longer reaches, table values of IPT and DOC must be reduced (for 10x, reduce to 90%; for 12x, reduce to 80%; for 15x, reduce to 75%). For complete speeds and feeds charts, please see www.harveytool.com

Material	Hardness (HBn)	SFM
Stainless Steels: 40x, 41x, 42x, 43x, 44x, 13-8, 15-5, 15-7, 17-4, 17-7 **Tool Steels**: D, H, M, T, S series	275 - 300	160
	300 - 350	140
	350 - 400	100
	400 - 425	80
Titanium: All alloys	275 - 300	200
	300 - 350	125
	350 - 400	75
	400 - 425	75
Nickel Alloys: Inconel, Hastelloy, Waspalloy, Monel, Nimonic, Haynes, Discoloy, Incoloy	275 - 300	80
	300 - 350	60
	350 - 400	50
	400 - 425	40

Chip Load Per Tooth (IPT) By Cutter Diameter	.015	.031	.047	.062	.078	.093	.125	.187	.250	.312	.375	.500
Slotting	.00004	.00008	.00012	.00016	.00021	.00025	.00033	.00049	.00066	.00086	.00104	.00139
Roughing	.00005	.00010	.00016	.00021	.00026	.00031	.00042	.00063	.00084	.00110	.00132	.00176
Finishing	.00007	.00014	.00021	.00027	.00034	.00041	.00055	.00082	.00110	.00144	.00173	.00231
Max	.00008	.00016	.00025	.00033	.00041	.00049	.00066	.00099	.00132	.00173	.00208	.00277

Radial Depth of Cut*:
Slotting: 1x Dia
Roughing: .28x Dia
Finishing: .1x Dia

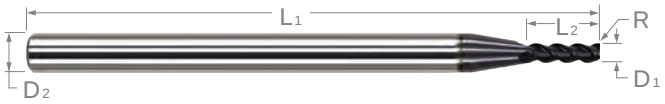
Axial Depth of Cut*:
Slotting: .28x Dia
Roughing: .5x - .7x Dia
Finishing: .5x - 1x Dia

* If less than minimum Axial or Radial DOC values are used, increased feed rates are possible. If greater than maximum Axial and Radial DOC values are used, decreased feed rates may be needed.

NEW SIZES!

VARIABLE HELIX END MILLS FOR HIGH TEMP ALLOYS

Corner Radius



- Optimized for titanium alloys, inconel, nickel alloys, and other high-temperature materials with outstanding performance in difficult-to-machine steels, stainless steels, and tool steels
- Variable helix design (approx. 34°) reduces chatter and harmonics and increases material removal rates
- Latest generation AlTiN Nano coating offers superior hardness and heat resistance
- h6 shank tolerance for high precision tool holders
- Suitable for steels up to 45Rc
- Center cutting
- Solid carbide
- CNC ground in the USA

mm & in

CUTTER DIAMETER D_1 +.0005″ −.0005″	CUTTER DIAMETER D_1 +.00mm −.02mm	CUTTER DIAMETER D_1 decimal equivalent	CORNER RADIUS R +.001″ −.001″ / +.025mm −.025mm	LENGTH OF CUT L_2 +.010″ −.000″ / +.25mm −.00mm	FLUTES	SHANK DIAMETER D_2 (h6)	OVERALL LENGTH L_1	AlTiN NANO COATED TOOL #	AlTiN NANO COATED PRICE
	.2 mm	.0078	**.05 mm**	.30 mm (1.5x)	3	4 mm	50 mm	984104-C6	58.60
	.2 mm	.0078	**.05 mm**	.60 mm (3x)	3	4 mm	50 mm	979304-C6	58.60
.010		.0100	**.003**	.015 (1.5x)	3	1/8	1-1/2	52210-C6	55.20
.010		.0100	**.003**	.030 (3x)	3	1/8	1-1/2	46810-C6	55.60
	.3 mm	.0118	**.08 mm**	.45 mm (1.5x)	3	4 mm	50 mm	984106-C6	57.10
	.3 mm	.0118	**.08 mm**	.90 mm (3x)	3	4 mm	50 mm	979306-C6	57.10
.015 (1/64)		.0150	**.003**	.012 (0.8x)	3	1/8	1-1/2	954215-C6	48.50
.015 (1/64)		.0150	**.003**	.022 (1.5x)	3	1/8	1-1/2	52215-C6	45.80
.015 (1/64)		.0150	**.003**	.045 (3x)	3	1/8	1-1/2	46815-C6	45.80
.015 (1/64)		.0150	**.003**	.078 (5x)	3	1/8	2-1/2	53615-C6	55.50
.015 (1/64)		.0150	**.005**	.045 (3x)	3	1/8	1-1/2	936415-C6	52.10
	.4 mm	.0157	**.08 mm**	.60 mm (1.5x)	3	4 mm	50 mm	984109-C6	49.10
	.4 mm	.0157	**.08 mm**	1.20 mm (3x)	3	4 mm	50 mm	979309-C6	49.10
	.5 mm	.0196	**.10 mm**	.75 mm (1.5x)	3	4 mm	50 mm	984111-C6	43.90
	.5 mm	.0196	**.10 mm**	1.50 mm (3x)	3	4 mm	50 mm	979311-C6	43.90
	.5 mm	.0196	**.10 mm**	2.50 mm (5x)	3	4 mm	50 mm	965811-C6	55.70
.020		.0200	**.004**	.016 (0.8x)	3	1/8	1-1/2	954220-C6	42.80
.020		.0200	**.004**	.030 (1.5x)	3	1/8	1-1/2	52220-C6	40.30
.020		.0200	**.004**	.060 (3x)	3	1/8	1-1/2	46820-C6	40.30
.020		.0200	**.004**	.060 (3x)	4	1/8	1-1/2	786620-C6	42.60
.020		.0200	**.004**	.100 (5x)	3	1/8	2-1/2	53620-C6	49.30
	.6 mm	.0236	**.10 mm**	.90 mm (1.5x)	3	4 mm	50 mm	984113-C6	42.50
	.6 mm	.0236	**.10 mm**	1.80 mm (3x)	3	4 mm	50 mm	979313-C6	42.50
.025		.0250	**.004**	.020 (0.8x)	3	1/8	1-1/2	954225-C6	41.70
.025		.0250	**.004**	.038 (1.5x)	3	1/8	1-1/2	52225-C6	39.10
.025		.0250	**.004**	.075 (3x)	3	1/8	1-1/2	46825-C6	39.10
.025		.0250	**.004**	.075 (3x)	4	1/8	1-1/2	786625-C6	41.40
.025		.0250	**.004**	.125 (5x)	3	1/8	2-1/2	53625-C6	47.70
	.7 mm	.0275	**.10 mm**	2.10 mm (3x)	3	4 mm	50 mm	979315-C6	42.50
.030		.0300	**.004**	.045 (1.5x)	3	1/8	1-1/2	52230-C6	39.10
.030		.0300	**.004**	.090 (3x)	3	1/8	1-1/2	46830-C6	39.10
.030		.0300	**.004**	.156 (5x)	3	1/8	2-1/2	53630-C6	47.70 NEW

continued on next page

VARIABLE HELIX END MILLS FOR HIGH TEMP ALLOYS

Corner Radius (cont.)

mm & in

continued from previous page

CUTTER DIAMETER			CORNER RADIUS	LENGTH OF CUT		FLUTES	SHANK DIAMETER	OVERALL LENGTH	AlTiN NANO COATED	
D_1 +.0005″ −.0005″	+.00mm −.02mm	decimal equivalent	R +.001″ −.001″ +.025mm −.025mm	L_2 +.010″ −.000″ +.25mm −.00mm			D_2 (h6)	L_1	TOOL #	PRICE
.031 (1/32)		.0310	**.003**	.047	(1.5x)	3	1/8	1-1/2	853631-C6	35.90
.031 (1/32)		.0310	**.003**	.093	(3x)	3	1/8	1-1/2	923631-C6	33.00
.031 (1/32)		.0310	**.005**	.025	(0.8x)	3	1/8	1-1/2	954231-C6	34.30
.031 (1/32)		.0310	**.005**	.047	(1.5x)	3	1/8	1-1/2	52231-C6	33.30
.031 (1/32)		.0310	**.005**	.047	(1.5x)	4	1/8	1-1/2	795531-C6	35.20
.031 (1/32)		.0310	**.005**	.093	(3x)	3	1/8	1-1/2	46831-C6	33.30
.031 (1/32)		.0310	**.005**	.093	(3x)	4	1/8	1-1/2	850731-C6	35.20
.031 (1/32)		.0310	**.005**	.125	(4x)	3	1/8	2-1/2	796731-C6	37.10
.031 (1/32)		.0310	**.005**	.156	(5x)	3	1/8	2-1/2	53631-C6	41.40
.031 (1/32)		.0310	**.005**	.156	(5x)	4	1/8	2-1/2	796931-C6	44.30
.031 (1/32)		.0310	**.008**	.047	(1.5x)	3	1/8	1-1/2	847831-C6	36.10
.031 (1/32)		.0310	**.008**	.093	(3x)	3	1/8	1-1/2	848431-C6	36.10
.031 (1/32)		.0310	**.010**	.047	(1.5x)	3	1/8	1-1/2	912931-C6	35.90
.031 (1/32)		.0310	**.010**	.093	(3x)	3	1/8	1-1/2	950731-C6	36.10
.031 (1/32)		.0310	**.010**	.156	(5x)	3	1/8	2-1/2	869831-C6	44.30
	.8 mm	.0314	**.10 mm**	1.20 mm	(1.5x)	3	4 mm	50 mm	984118-C6	36.90
	.8 mm	.0314	**.10 mm**	2.40 mm	(3x)	3	4 mm	50 mm	979318-C6	36.90
.035		.0350	**.005**	.053	(1.5x)	3	1/8	1-1/2	52235-C6	33.30
.035		.0350	**.005**	.105	(3x)	3	1/8	1-1/2	46835-C6	33.30
.035		.0350	**.005**	.187	(5x)	3	1/8	2-1/2	53635-C6	41.40
.035		.0350	**.010**	.105	(3x)	3	1/8	1-1/2	950735-C6	36.10
	.9 mm	.0354	**.10 mm**	2.70 mm	(3x)	3	4 mm	50 mm	979320-C6	36.90
	1.0 mm	.0393	**.10 mm**	1.50 mm	(1.5x)	3	4 mm	50 mm	984122-C6	36.90
	1.0 mm	.0393	**.10 mm**	3.00 mm	(3x)	3	4 mm	50 mm	979322-C6	36.90
	1.0 mm	.0393	**.10 mm**	5.00 mm	(5x)	3	4 mm	50 mm	965822-C6	45.60
	1.0 mm	.0393	**.30 mm**	3.00 mm	(3x)	3	4 mm	50 mm	843322-C6	36.90
.040		.0400	**.003**	.120	(3x)	3	1/8	1-1/2	923640-C6	33.30
.040		.0400	**.005**	.032	(0.8x)	3	1/8	1-1/2	954240-C6	35.90
.040		.0400	**.005**	.060	(1.5x)	3	1/8	1-1/2	52240-C6	33.30
.040		.0400	**.005**	.120	(3x)	3	1/8	1-1/2	46840-C6	33.30
.040		.0400	**.005**	.203	(5x)	3	1/8	2-1/2	53640-C6	41.40
.040		.0400	**.010**	.120	(3x)	3	1/8	1-1/2	950740-C6	36.10
	1.1 mm	.0433	**.10 mm**	3.00 mm	(3x)	3	4 mm	50 mm	979324-C6	36.90
.045		.0450	**.005**	.068	(1.5x)	3	1/8	1-1/2	52245-C6	33.30
.045		.0450	**.005**	.135	(3x)	3	1/8	1-1/2	46845-C6	33.30
.045		.0450	**.005**	.225	(5x)	3	1/8	2-1/2	53645-C6	41.40
.047 (3/64)		.0470	**.003**	.141	(3x)	3	1/8	1-1/2	923647-C6	33.00
.047 (3/64)		.0470	**.005**	.038	(0.8x)	3	1/8	1-1/2	954247-C6	34.30
.047 (3/64)		.0470	**.005**	.071	(1.5x)	3	1/8	1-1/2	52247-C6	33.30
.047 (3/64)		.0470	**.005**	.071	(1.5x)	4	1/8	1-1/2	795547-C6	35.20
.047 (3/64)		.0470	**.005**	.141	(3x)	3	1/8	1-1/2	46847-C6	33.30
.047 (3/64)		.0470	**.005**	.141	(3x)	4	1/8	1-1/2	850747-C6	35.20
.047 (3/64)		.0470	**.005**	.187	(4x)	3	1/8	2-1/2	796747-C6	37.10
.047 (3/64)		.0470	**.005**	.250	(5x)	3	1/8	2-1/2	53647-C6	41.40
.047 (3/64)		.0470	**.005**	.250	(5x)	4	1/8	2-1/2	796947-C6	44.30
.047 (3/64)		.0470	**.010**	.071	(1.5x)	3	1/8	1-1/2	912947-C6	35.90
.047 (3/64)		.0470	**.010**	.141	(3x)	3	1/8	1-1/2	950747-C6	36.10
.047 (3/64)		.0470	**.015**	.071	(1.5x)	3	1/8	1-1/2	975647-C6	33.30
.047 (3/64)		.0470	**.015**	.141	(3x)	3	1/8	1-1/2	964147-C6	36.10

continued on next page

NEW SIZES!

VARIABLE HELIX END MILLS FOR HIGH TEMP ALLOYS

Corner Radius (cont.)

mm & in

continued from previous page

CUTTER DIAMETER D_1 +.0005″ −.0005″	D_1 +.00mm −.02mm	D_1 decimal equivalent	CORNER RADIUS R +.001″ −.001″ / +.025mm −.025mm	LENGTH OF CUT L_2 +.010″ −.000″ / +.25mm −.00mm	FLUTES	SHANK DIAMETER D_2 (h6)	OVERALL LENGTH L_1	AlTiN NANO COATED TOOL #	PRICE
	1.2 mm	.0472	**.10 mm**	1.80 mm (1.5x)	3	4 mm	50 mm	984127-C6	36.90
	1.2 mm	.0472	**.10 mm**	3.50 mm (3x)	3	4 mm	50 mm	979327-C6	36.90
.050		.0500	**.005**	.040 (0.8x)	3	1/8	1-1/2	954250-C6	35.90
.050		.0500	**.005**	.075 (1.5x)	3	1/8	1-1/2	52250-C6	33.00
.050		.0500	**.005**	.150 (3x)	3	1/8	1-1/2	46850-C6	33.00
.050		.0500	**.005**	.250 (5x)	3	1/8	2-1/2	53650-C6	41.40
.050		.0500	**.010**	.075 (1.5x)	3	1/8	1-1/2	912950-C6	35.90
.050		.0500	**.010**	.150 (3x)	3	1/8	1-1/2	950750-C6	36.10
.050		.0500	**.015**	.075 (1.5x)	3	1/8	1-1/2	975650-C6	36.10
.050		.0500	**.015**	.150 (3x)	3	1/8	1-1/2	964150-C6	34.30
	1.3 mm	.0511	**.10 mm**	4.00 mm (3x)	3	4 mm	50 mm	979329-C6	36.90
.055		.0550	**.005**	.083 (1.5x)	3	1/8	1-1/2	52255-C6	33.00
.055		.0550	**.005**	.165 (3x)	3	1/8	1-1/2	46855-C6	33.00
.055		.0550	**.005**	.275 (5x)	3	1/8	2-1/2	53655-C6	41.40
.055		.0550	**.010**	.083 (1.5x)	3	1/8	1-1/2	912955-C6	35.90
.055		.0550	**.010**	.165 (3x)	3	1/8	1-1/2	950755-C6	36.10
.055		.0550	**.015**	.083 (1.5x)	3	1/8	1-1/2	975655-C6	36.10
.055		.0550	**.015**	.165 (3x)	3	1/8	1-1/2	964155-C6	36.10
	1.4 mm	.0551	**.10 mm**	2.10 mm (1.5x)	3	4 mm	50 mm	984131-C6	36.90
	1.4 mm	.0551	**.10 mm**	4.00 mm (3x)	3	4 mm	50 mm	979331-C6	36.90
	1.5 mm	.0590	**.20 mm**	2.20 mm (1.5x)	3	4 mm	50 mm	984133-C6	34.60
	1.5 mm	.0590	**.20 mm**	4.50 mm (3x)	3	4 mm	50 mm	979333-C6	34.60
	1.5 mm	.0590	**.20 mm**	7.50 mm (5x)	3	4 mm	50 mm	965833-C6	42.30
.060		.0600	**.005**	.090 (1.5x)	3	1/8	1-1/2	908860-C6	33.00
.060		.0600	**.005**	.180 (3x)	3	1/8	1-1/2	936460-C6	33.00
.060		.0600	**.005**	.312 (5x)	3	1/8	2-1/2	869060-C6	41.40
.060		.0600	**.010**	.048 (0.8x)	3	1/8	1-1/2	954260-C6	35.90
.060		.0600	**.010**	.090 (1.5x)	3	1/8	1-1/2	52260-C6	33.00
.060		.0600	**.010**	.180 (3x)	3	1/8	1-1/2	46860-C6	33.00
.060		.0600	**.010**	.312 (5x)	3	1/8	2-1/2	53660-C6	41.40
.060		.0600	**.015**	.090 (1.5x)	3	1/8	1-1/2	975660-C6	33.30
.060		.0600	**.015**	.180 (3x)	3	1/8	1-1/2	964160-C6	33.30
.060		.0600	**.020**	.090 (1.5x)	3	1/8	1-1/2	931760-C6	33.70
.060		.0600	**.020**	.180 (3x)	3	1/8	1-1/2	959260-C6	34.00
.062 (1/16)		.0620	**.003**	.093 (1.5x)	3	1/8	1-1/2	853662-C6	31.00
.062 (1/16)		.0620	**.003**	.186 (3x)	3	1/8	1-1/2	923662-C6	31.00
.062 (1/16)		.0620	**.005**	.093 (1.5x)	3	1/8	1-1/2	908862-C6	31.00
.062 (1/16)		.0620	**.005**	.093 (1.5x)	4	1/8	1-1/2	795562-C6	33.30
.062 (1/16)		.0620	**.005**	.186 (3x)	3	1/8	1-1/2	936462-C6	31.00
.062 (1/16)		.0620	**.005**	.186 (3x)	4	1/8	1-1/2	850762-C6	33.30
.062 (1/16)		.0620	**.005**	.312 (5x)	3	1/8	2-1/2	869062-C6	39.50
.062 (1/16)		.0620	**.008**	.093 (1.5x)	3	1/8	1-1/2	847862-C6	31.00
.062 (1/16)		.0620	**.008**	.186 (3x)	3	1/8	1-1/2	848462-C6	31.00
.062 (1/16)		.0620	**.010**	.050 (0.8x)	3	1/8	1-1/2	954262-C6	31.00
.062 (1/16)		.0620	**.010**	.093 (1.5x)	3	1/8	1-1/2	52262-C6	31.00
.062 (1/16)		.0620	**.010**	.093 (1.5x)	4	1/8	1-1/2	797162-C6	35.20
.062 (1/16)		.0620	**.010**	.186 (3x)	3	1/8	1-1/2	46862-C6	31.00
.062 (1/16)		.0620	**.010**	.186 (3x)	4	1/8	1-1/2	856462-C6	35.20
.062 (1/16)		.0620	**.010**	.250 (4x)	3	1/8	2-1/2	796562-C6	36.50

continued on next page

VARIABLE HELIX END MILLS FOR HIGH TEMP ALLOYS

Corner Radius (cont.)

mm & in continued from previous page

CUTTER DIAMETER			CORNER RADIUS	LENGTH OF CUT	FLUTES	SHANK DIAMETER	OVERALL LENGTH	AlTiN NANO COATED	
D_1 +.0005″ −.0005″	+.00mm −.02mm	decimal equivalent	R +.001″ −.001″ +.025mm −.025mm	L_2 +.010″ −.000″ +.25mm −.00mm		D_2 (h6)	L_1	TOOL #	PRICE
.062 (1/16)		.0620	**.010**	.312 (5x)	3	1/8	2-1/2	53662-C6	39.70
.062 (1/16)		.0620	**.010**	.312 (5x)	4	1/8	2-1/2	797362-C6	43.60
.062 (1/16)		.0620	**.015**	.093 (1.5x)	3	1/8	1-1/2	975662-C6	31.00
.062 (1/16)		.0620	**.015**	.186 (3x)	3	1/8	1-1/2	964162-C6	31.00
.062 (1/16)		.0620	**.015**	.312 (5x)	3	1/8	2-1/2	860262-C6	39.70
.062 (1/16)		.0620	**.020**	.093 (1.5x)	3	1/8	1-1/2	931762-C6	34.10
.062 (1/16)		.0620	**.020**	.186 (3x)	3	1/8	1-1/2	959262-C6	37.40
.062 (1/16)		.0620	**.020**	.186 (3x)	4	1/8	1-1/2	786462-C6	38.90
.062 (1/16)		.0620	**.020**	.312 (5x)	3	1/8	2-1/2	870662-C6	39.70
	1.6 mm	.0629	**.20 mm**	2.40 mm (1.5x)	3	4 mm	50 mm	984136-C6	34.60
	1.6 mm	.0629	**.20 mm**	5.00 mm (3x)	3	4 mm	50 mm	979336-C6	34.60
	1.7 mm	.0669	**.20 mm**	5.00 mm (3x)	3	4 mm	50 mm	979338-C6	34.60
.070		.0700	**.005**	.210 (3x)	3	1/8	1-1/2	936470-C6	31.00
.070		.0700	**.010**	.105 (1.5x)	3	1/8	1-1/2	52270-C6	31.00
.070		.0700	**.010**	.210 (3x)	3	1/8	1-1/2	46870-C6	31.00
.070		.0700	**.010**	.375 (5x)	3	1/8	2-1/2	53670-C6	39.70
	1.8 mm	.0708	**.20 mm**	2.70 mm (1.5x)	3	4 mm	50 mm	984140-C6	34.60
	1.8 mm	.0708	**.20 mm**	5.50 mm (3x)	3	4 mm	50 mm	979340-C6	34.60
	1.9 mm	.0748	**.20 mm**	5.50 mm (3x)	3	4 mm	50 mm	979342-C6	34.60
.078 (5/64)		.0780	**.003**	.234 (3x)	3	1/8	1-1/2	923678-C6	31.60
.078 (5/64)		.0780	**.005**	.117 (1.5x)	3	1/8	1-1/2	908878-C6	31.00
.078 (5/64)		.0780	**.005**	.117 (1.5x)	4	1/8	1-1/2	795578-C6	33.30
.078 (5/64)		.0780	**.005**	.234 (3x)	3	1/8	1-1/2	936478-C6	31.00
.078 (5/64)		.0780	**.005**	.406 (5x)	3	1/8	2-1/2	869078-C6	39.50
.078 (5/64)		.0780	**.010**	.062 (0.8x)	3	1/8	1-1/2	954278-C6	31.00
.078 (5/64)		.0780	**.010**	.117 (1.5x)	3	1/8	1-1/2	52278-C6	31.00
.078 (5/64)		.0780	**.010**	.117 (1.5x)	4	1/8	1-1/2	797178-C6	35.20
.078 (5/64)		.0780	**.010**	.234 (3x)	3	1/8	1-1/2	46878-C6	31.00
.078 (5/64)		.0780	**.010**	.234 (3x)	4	1/8	1-1/2	856478-C6	35.20
.078 (5/64)		.0780	**.010**	.312 (4x)	3	1/8	2-1/2	796578-C6	37.10
.078 (5/64)		.0780	**.010**	.406 (5x)	3	1/8	2-1/2	53678-C6	39.50
.078 (5/64)		.0780	**.010**	.406 (5x)	4	1/8	2-1/2	797378-C6	44.20
.078 (5/64)		.0780	**.015**	.117 (1.5x)	3	1/8	1-1/2	975678-C6	34.40
.078 (5/64)		.0780	**.015**	.234 (3x)	3	1/8	1-1/2	964178-C6	34.40
.078 (5/64)		.0780	**.020**	.117 (1.5x)	3	1/8	1-1/2	931778-C6	37.40
.078 (5/64)		.0780	**.020**	.234 (3x)	3	1/8	1-1/2	959278-C6	37.40
.078 (5/64)		.0780	**.020**	.406 (5x)	3	1/8	2-1/2	870678-C6	46.40
.078 (5/64)		.0780	**.025**	.234 (3x)	3	1/8	1-1/2	848878-C6	37.40
	2.0 mm	.0787	**.20 mm**	3.00 mm (1.5x)	3	4 mm	50 mm	984145-C6	34.60
	2.0 mm	.0787	**.20 mm**	6.00 mm (3x)	3	4 mm	50 mm	979345-C6	34.60
	2.0 mm	.0787	**.20 mm**	10.00 mm (5x)	3	4 mm	50 mm	965845-C6	42.30
	2.0 mm	.0787	**.50 mm**	6.00 mm (3x)	3	4 mm	50 mm	842545-C6	34.60
.080		.0800	**.010**	.120 (1.5x)	3	1/8	1-1/2	52280-C6	31.00
.080		.0800	**.010**	.240 (3x)	3	1/8	1-1/2	46880-C6	31.00
.090		.0900	**.010**	.135 (1.5x)	3	1/8	1-1/2	52290-C6	31.00
.090		.0900	**.010**	.270 (3x)	3	1/8	1-1/2	46890-C6	31.00

continued on next page

NEW SIZES!

VARIABLE HELIX END MILLS FOR HIGH TEMP ALLOYS

Corner Radius (cont.)

mm & in

continued from previous page

CUTTER DIAMETER			CORNER RADIUS	LENGTH OF CUT	FLUTES	SHANK DIAMETER	OVERALL LENGTH	AlTiN NANO COATED		
D_1 +.0005″ −.0005″	+.00mm −.02mm	decimal equivalent	R +.001″ −.001″ +.025mm −.025mm	L_2 +.010″ −.000″ +.25mm −.00mm		D_2 (h6)	L_1	TOOL #	PRICE	
.093 (3/32)		.0930	**.003**	.279 (3x)	3	1/8	1-1/2	923693-C6	30.50	
.093 (3/32)		.0930	**.005**	.140 (1.5x)	3	1/8	1-1/2	908893-C6	31.00	
.093 (3/32)		.0930	**.005**	.140 (1.5x)	4	1/8	1-1/2	795593-C6	35.20	
.093 (3/32)		.0930	**.005**	.279 (3x)	3	1/8	1-1/2	936493-C6	31.00	
.093 (3/32)		.0930	**.005**	.279 (3x)	4	1/8	1-1/2	850793-C6	35.20	
.093 (3/32)		.0930	**.005**	.500 (5x)	3	1/8	2-1/2	869093-C6	39.40	
.093 (3/32)		.0930	**.008**	.140 (1.5x)	3	1/8	1-1/2	847893-C6	31.00	
.093 (3/32)		.0930	**.008**	.279 (3x)	3	1/8	1-1/2	848493-C6	31.00	
.093 (3/32)		.0930	**.010**	.074 (0.8x)	3	1/8	1-1/2	954293-C6	31.00	
.093 (3/32)		.0930	**.010**	.140 (1.5x)	3	1/8	1-1/2	52293-C6	31.00	
.093 (3/32)		.0930	**.010**	.140 (1.5x)	4	1/8	1-1/2	797193-C6	35.20	
.093 (3/32)		.0930	**.010**	.279 (3x)	3	1/8	1-1/2	46893-C6	31.00	
.093 (3/32)		.0930	**.010**	.279 (3x)	4	1/8	1-1/2	856493-C6	35.20	
.093 (3/32)		.0930	**.010**	.375 (4x)	3	1/8	2-1/2	796593-C6	37.10	
.093 (3/32)		.0930	**.010**	.500 (5x)	3	1/8	2-1/2	53693-C6	39.50	
.093 (3/32)		.0930	**.010**	.500 (5x)	4	1/8	2-1/2	797393-C6	44.20	
.093 (3/32)		.0930	**.015**	.140 (1.5x)	3	1/8	1-1/2	975693-C6	31.00	
.093 (3/32)		.0930	**.015**	.279 (3x)	3	1/8	1-1/2	964193-C6	31.00	
.093 (3/32)		.0930	**.020**	.140 (1.5x)	3	1/8	1-1/2	931793-C6	31.00	
.093 (3/32)		.0930	**.020**	.279 (3x)	3	1/8	1-1/2	959293-C6	31.00	
.093 (3/32)		.0930	**.020**	.500 (5x)	3	1/8	2-1/2	870693-C6	39.50	NEW
.093 (3/32)		.0930	**.025**	.279 (3x)	3	1/8	1-1/2	848893-C6	37.50	
.093 (3/32)		.0930	**.030**	.140 (1.5x)	3	1/8	1-1/2	929393-C6	37.50	
.093 (3/32)		.0930	**.030**	.279 (3x)	3	1/8	1-1/2	943893-C6	37.50	
.093 (3/32)		.0930	**.030**	.500 (5x)	3	1/8	2-1/2	871493-C6	45.80	
	2.5 mm	.0984	**.20 mm**	3.70 mm (1.5x)	3	4 mm	50 mm	984151-C6	32.00	
	2.5 mm	.0984	**.20 mm**	7.50 mm (3x)	3	4 mm	50 mm	979351-C6	34.60	
	2.5 mm	.0984	**.20 mm**	12.00 mm (5x)	3	4 mm	50 mm	965851-C6	42.30	
.100		.1000	**.005**	.150 (1.5x)	3	1/8	1-1/2	908800-C6	31.00	
.100		.1000	**.005**	.300 (3x)	3	1/8	1-1/2	936500-C6	31.00	
.100		.1000	**.010**	.150 (1.5x)	3	1/8	1-1/2	52300-C6	31.00	
.100		.1000	**.010**	.300 (3x)	3	1/8	1-1/2	46900-C6	31.00	
.100		.1000	**.010**	.500 (5x)	3	1/8	2-1/2	53700-C6	39.70	
.100		.1000	**.015**	.150 (1.5x)	3	1/8	1-1/2	907700-C6	34.40	
.100		.1000	**.015**	.300 (3x)	3	1/8	1-1/2	964200-C6	34.40	
.100		.1000	**.020**	.150 (1.5x)	3	1/8	1-1/2	931800-C6	37.40	
.100		.1000	**.020**	.300 (3x)	3	1/8	1-1/2	959300-C6	37.40	
.100		.1000	**.030**	.150 (1.5x)	3	1/8	1-1/2	929400-C6	37.50	
.100		.1000	**.030**	.300 (3x)	3	1/8	1-1/2	943900-C6	37.50	
.109 (7/64)		.1090	**.005**	.327 (3x)	3	1/8	1-1/2	936502-C6	31.00	
.109 (7/64)		.1090	**.010**	.327 (3x)	3	1/8	1-1/2	46902-C6	31.00	
.109 (7/64)		.1090	**.015**	.327 (3x)	3	1/8	1-1/2	964202-C6	34.40	
.118		.1180	**.010**	.177 (1.5x)	3	1/8	1-1/2	52305-C6	31.00	
.118		.1180	**.010**	.354 (3x)	3	1/8	1-1/2	46905-C6	31.00	
	3.0 mm	.1181	**.20 mm**	4.50 mm (1.5x)	3	4 mm	50 mm	984157-C6	34.60	
	3.0 mm	.1181	**.20 mm**	9.00 mm (3x)	3	4 mm	50 mm	979357-C6	34.60	
	3.0 mm	.1181	**.20 mm**	15.00 mm (5x)	3	4 mm	50 mm	965857-C6	42.30	
	3.0 mm	.1181	**.50 mm**	15.00 mm (5x)	3	4 mm	50 mm	760957-C6	42.30	NEW
	3.0 mm	.1181	**1.00 mm**	9.00 mm (3x)	3	4 mm	50 mm	842157-C6	40.60	

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VARIABLE HELIX END MILLS FOR HIGH TEMP ALLOYS

Corner Radius (cont.)

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continued from previous page

	CUTTER DIAMETER		CORNER RADIUS	LENGTH OF CUT	FLUTES	SHANK DIAMETER	OVERALL LENGTH	AlTiN NANO COATED	
	D_1 +.000″ −.002″	+.00mm −.04mm decimal equivalent	R +.001″ −.001″ +.025mm −.025mm	L_2 +.030″ −.000″ +.75mm −.00mm		D_2 (h6)	L_1	TOOL #	PRICE
	.125 (1/8)	.1250	**.003**	.375 (3x)	4	1/8	1-1/2	923708-C6	30.80
	.125 (1/8)	.1250	**.005**	.100 (0.8x)	4	1/8	1-1/2	840608-C6	30.80
	.125 (1/8)	.1250	**.005**	.187 (1.5x)	4	1/8	1-1/2	908908-C6	30.80
	.125 (1/8)	.1250	**.005**	.375 (3x)	4	1/8	1-1/2	936508-C6	30.80
	.125 (1/8)	.1250	**.005**	.625 (5x)	4	1/8	2-1/2	869108-C6	39.70
	.125 (1/8)	.1250	**.008**	.187 (1.5x)	4	1/8	1-1/2	847908-C6	30.80
	.125 (1/8)	.1250	**.008**	.375 (3x)	4	1/8	1-1/2	848508-C6	30.80
	.125 (1/8)	.1250	**.010**	.187 (1.5x)	4	1/8	1-1/2	913008-C6	29.20
	.125 (1/8)	.1250	**.010**	.375 (3x)	4	1/8	1-1/2	950808-C6	29.20
	.125 (1/8)	.1250	**.010**	.625 (5x)	4	1/8	2-1/2	869908-C6	39.70
	.125 (1/8)	.1250	**.015**	.100 (0.8x)	4	1/8	1-1/2	954308-C6	31.00
	.125 (1/8)	.1250	**.015**	.187 (1.5x)	4	1/8	1-1/2	52308-C6	29.20
	.125 (1/8)	.1250	**.015**	.375 (3x)	4	1/8	1-1/2	46908-C6	29.20
	.125 (1/8)	.1250	**.015**	.500 (4x)	4	1/8	2-1/2	796408-C6	34.80
	.125 (1/8)	.1250	**.015**	.625 (5x)	4	1/8	2-1/2	53708-C6	39.70
NEW	.125 (1/8)	.1250	**.020**	.100 (0.8x)	4	1/8	1-1/2	816408-C6	31.00
	.125 (1/8)	.1250	**.020**	.187 (1.5x)	4	1/8	1-1/2	931808-C6	35.30
	.125 (1/8)	.1250	**.020**	.375 (3x)	4	1/8	1-1/2	959308-C6	35.30
	.125 (1/8)	.1250	**.020**	.625 (5x)	4	1/8	2-1/2	870708-C6	45.10
	.125 (1/8)	.1250	**.025**	.375 (3x)	4	1/8	1-1/2	848908-C6	35.50
	.125 (1/8)	.1250	**.030**	.187 (1.5x)	4	1/8	1-1/2	929408-C6	35.50
	.125 (1/8)	.1250	**.030**	.375 (3x)	4	1/8	1-1/2	943908-C6	35.50
	.125 (1/8)	.1250	**.030**	.625 (5x)	4	1/8	2-1/2	871508-C6	46.20
	.125 (1/8)	.1250	**.040**	.375 (3x)	4	1/8	1-1/2	844008-C6	37.40
	.140 (9/64)	.1406	**.010**	.425 (3x)	4	3/16	2	950809-C6	36.70
	.140 (9/64)	.1406	**.015**	.220 (1.5x)	4	3/16	2	52309-C6	36.70
	.140 (9/64)	.1406	**.015**	.425 (3x)	4	3/16	2	46909-C6	36.90
	.140 (9/64)	.1406	**.015**	.750 (5x)	4	3/16	3	53709-C6	46.00
	.140 (9/64)	.1406	**.020**	.425 (3x)	4	3/16	2	959309-C6	36.90
	.156 (5/32)	.1562	**.005**	.235 (1.5x)	4	3/16	2	908956-C6	33.30
	.156 (5/32)	.1562	**.005**	.470 (3x)	4	3/16	2	936510-C6	33.30
	.156 (5/32)	.1562	**.010**	.235 (1.5x)	4	3/16	2	913010-C6	31.60
	.156 (5/32)	.1562	**.010**	.470 (3x)	4	3/16	2	950810-C6	31.60
	.156 (5/32)	.1562	**.015**	.125 (0.8x)	4	3/16	2	954310-C6	33.60
	.156 (5/32)	.1562	**.015**	.235 (1.5x)	4	3/16	2	52310-C6	33.30
	.156 (5/32)	.1562	**.015**	.470 (3x)	4	3/16	2	46910-C6	33.30
	.156 (5/32)	.1562	**.015**	.750 (5x)	4	3/16	3	53710-C6	43.10
NEW	.156 (5/32)	.1562	**.020**	.470 (3x)	4	3/16	2	959310-C6	33.30
	.156 (5/32)	.1562	**.025**	.470 (3x)	4	3/16	2	848910-C6	33.30
	.156 (5/32)	.1562	**.030**	.235 (1.5x)	4	3/16	2	929410-C6	31.60
	.156 (5/32)	.1562	**.030**	.470 (3x)	4	3/16	2	943910-C6	31.60
	.156 (5/32)	.1562	**.030**	.750 (5x)	4	3/16	3	871510-C6	42.20
	4.0 mm	.1574	**.40 mm**	6.00 mm (1.5x)	4	6 mm	63 mm	984161-C6	37.10
	4.0 mm	.1574	**.40 mm**	12.00 mm (3x)	4	6 mm	63 mm	979361-C6	37.10

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NEW SIZES!

VARIABLE HELIX END MILLS FOR HIGH TEMP ALLOYS

Corner Radius (cont.)

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continued from previous page

CUTTER DIAMETER			CORNER RADIUS	LENGTH OF CUT		FLUTES	SHANK DIAMETER	OVERALL LENGTH	AlTiN NANO COATED		
D_1 +.000″ −.002″	D_1 +.00mm −.04mm	decimal equivalent	R +.001″ −.001″ +.025mm −.025mm	L_2 +.030″ −.000″ +.75mm −.00mm			D_2 (h6)	L_1	TOOL #	PRICE	
.187 (3/16)		.1875	**.005**	.285	(1.5x)	4	3/16	2	908910-C6	33.30	
.187 (3/16)		.1875	**.005**	.562	(3x)	4	3/16	2	936512-C6	33.30	
.187 (3/16)		.1875	**.005**	1.000	(5x)	4	3/16	3	869112-C6	42.70	
.187 (3/16)		.1875	**.008**	.562	(3x)	4	3/16	2	848512-C6	33.30	
.187 (3/16)		.1875	**.010**	.150	(0.8x)	4	3/16	2	763212-C6	34.90	NEW
.187 (3/16)		.1875	**.010**	.285	(1.5x)	4	3/16	2	913012-C6	31.60	
.187 (3/16)		.1875	**.010**	.562	(3x)	4	3/16	2	950812-C6	31.60	
.187 (3/16)		.1875	**.010**	1.000	(5x)	4	3/16	3	869912-C6	43.10	
.187 (3/16)		.1875	**.015**	.150	(0.8x)	4	3/16	2	954312-C6	33.60	
.187 (3/16)		.1875	**.015**	.285	(1.5x)	4	3/16	2	52312-C6	31.60	
.187 (3/16)		.1875	**.015**	.562	(3x)	4	3/16	2	46912-C6	31.60	
.187 (3/16)		.1875	**.015**	.750	(4x)	4	3/16	3	796412-C6	37.20	
.187 (3/16)		.1875	**.015**	1.000	(5x)	4	3/16	3	53712-C6	43.10	
.187 (3/16)		.1875	**.020**	.150	(0.8x)	4	3/16	2	816412-C6	40.80	NEW
.187 (3/16)		.1875	**.020**	.285	(1.5x)	4	3/16	2	931812-C6	37.40	
.187 (3/16)		.1875	**.020**	.562	(3x)	4	3/16	2	959312-C6	37.40	
.187 (3/16)		.1875	**.020**	1.000	(5x)	4	3/16	3	870712-C6	41.20	
.187 (3/16)		.1875	**.025**	.562	(3x)	4	3/16	2	848912-C6	42.70	
.187 (3/16)		.1875	**.030**	.285	(1.5x)	4	3/16	2	929412-C6	37.70	
.187 (3/16)		.1875	**.030**	.562	(3x)	4	3/16	2	943912-C6	39.00	
.187 (3/16)		.1875	**.030**	1.000	(5x)	4	3/16	3	871512-C6	42.70	
.187 (3/16)		.1875	**.040**	.562	(3x)	4	3/16	2	844012-C6	39.70	
.187 (3/16)		.1875	**.045**	.285	(1.5x)	4	3/16	2	857612-C6	39.70	
.187 (3/16)		.1875	**.045**	.562	(3x)	4	3/16	2	864512-C6	39.70	
.187 (3/16)		.1875	**.060**	.285	(1.5x)	4	3/16	2	845412-C6	37.40	
.187 (3/16)		.1875	**.060**	.562	(3x)	4	3/16	2	885612-C6	37.40	
.187 (3/16)		.1875	**.060**	1.000	(5x)	4	3/16	3	804412-C6	40.20	
	5.0 mm	0.1968	**.40 mm**	7.50 mm	(1.5x)	4	6 mm	63 mm	984164-C6	37.10	
	5.0 mm	0.1968	**.40 mm**	15.00 mm	(3x)	4	6 mm	63 mm	979364-C6	37.10	
	6.0 mm	0.2362	**.40 mm**	9.00 mm	(1.5x)	4	6 mm	63 mm	984166-C6	37.10	
	6.0 mm	0.2362	**.40 mm**	18.00 mm	(3x)	4	6 mm	63 mm	979366-C6	37.10	
.250 (1/4)		.2500	**.005**	.375	(1.5x)	4	1/4	2-1/2	908916-C6	41.70	
.250 (1/4)		.2500	**.005**	.750	(3x)	4	1/4	2-1/2	936516-C6	41.70	
.250 (1/4)		.2500	**.008**	.750	(3x)	4	1/4	2-1/2	848516-C6	41.70	
.250 (1/4)		.2500	**.010**	.375	(1.5x)	4	1/4	2-1/2	913016-C6	39.60	
.250 (1/4)		.2500	**.010**	.750	(3x)	4	1/4	2-1/2	950816-C6	39.60	
.250 (1/4)		.2500	**.015**	.200	(0.8x)	4	1/4	2-1/2	954316-C6	42.30	
.250 (1/4)		.2500	**.015**	.375	(1.5x)	4	1/4	2-1/2	52316-C6	39.90	
.250 (1/4)		.2500	**.015**	.750	(3x)	4	1/4	2-1/2	46916-C6	39.90	
.250 (1/4)		.2500	**.015**	1.250	(5x)	4	1/4	4	53716-C6	53.30	
.250 (1/4)		.2500	**.020**	.200	(0.8x)	4	1/4	2-1/2	816416-C6	47.50	
.250 (1/4)		.2500	**.020**	.375	(1.5x)	4	1/4	2-1/2	931816-C6	45.40	
.250 (1/4)		.2500	**.020**	.750	(3x)	4	1/4	2-1/2	959316-C6	45.40	
.250 (1/4)		.2500	**.025**	.750	(3x)	4	1/4	2-1/2	848916-C6	45.40	

continued on next page

VARIABLE HELIX END MILLS FOR HIGH TEMP ALLOYS

Corner Radius (cont.)

continued from previous page

	CUTTER DIAMETER		CORNER RADIUS	LENGTH OF CUT	FLUTES	SHANK DIAMETER	OVERALL LENGTH	AlTiN NANO COATED	
	D_1 +.000″ −.002″	+.00mm −.04mm decimal equivalent	R +.001″ −.001″ +.025mm −.025mm	L_2 +.030″ −.000″ +.75mm −.00mm		D_2 (h6)	L_1	TOOL #	PRICE
	.250 (1/4)	.2500	**.030**	.375 (1.5x)	4	1/4	2-1/2	929416-C6	45.40
	.250 (1/4)	.2500	**.030**	.750 (3x)	4	1/4	2-1/2	943916-C6	45.40
	.250 (1/4)	.2500	**.030**	1.250 (5x)	4	1/4	4	871516-C6	50.20
	.250 (1/4)	.2500	**.040**	.750 (3x)	4	1/4	2-1/2	844016-C6	48.10
	.250 (1/4)	.2500	**.045**	.750 (3x)	4	1/4	2-1/2	864516-C6	48.10
NEW	.250 (1/4)	.2500	**.060**	.375 (1.5x)	4	1/4	2-1/2	845416-C6	45.40
	.250 (1/4)	.2500	**.060**	.750 (3x)	4	1/4	2-1/2	885616-C6	45.40
	.312 (5/16)	.3125	**.015**	.470 (1.5x)	4	5/16	2-1/2	52320-C6	57.60
	.312 (5/16)	.3125	**.015**	1.000 (3x)	4	5/16	2-1/2	46920-C6	57.60
	.375 (3/8)	.3750	**.015**	.570 (1.5x)	4	3/8	2-1/2	52324-C6	66.40
	.375 (3/8)	.3750	**.015**	1.125 (3x)	4	3/8	2-1/2	46924-C6	66.40
NEW	.375 (3/8)	.3750	**.020**	.570 (1.5x)	4	3/8	2-1/2	931824-C6	71.90
	.375 (3/8)	.3750	**.030**	.570 (1.5x)	4	3/8	2-1/2	929424-C6	71.90
	.375 (3/8)	.3750	**.030**	1.125 (3x)	4	3/8	2-1/2	943924-C6	71.90
	.375 (3/8)	.3750	**.040**	1.125 (3x)	4	3/8	2-1/2	844024-C6	71.90
	.500 (1/2)	.5000	**.015**	.750 (1.5x)	4	1/2	3	816232-C6	85.80
	.500 (1/2)	.5000	**.030**	.750 (1.5x)	4	1/2	3	52332-C6	85.80

SPEEDS & FEEDS (Variable Helix for High Temp Alloys)

Important Note:Values in table are in inches and are based on 4 flute, standard (3x Dia) length of cut end mills. For 3 flutes, table values of IPT must be increased to 105% before adjustments for different lengths of cut. For shorter lengths of cut, table values of IPT must be increased (for 0.8x, increase to 115%; for 1.5x, increase to 108%). For longer lengths of cut, table values of IPT must be reduced (for 4x, reduce to 85%; for 5x, reduce to 70%). For complete speeds and feeds charts, please see www.harveytool.com.

Material	Hardness (HBn)	SFM
Stainless Steels: 40x, 41x, 42x, 43x, 44x, 13-8, 15-5, 15-7, 17-4, 17-7 **Tool Steels**: D, H, M, T, S series	275 - 300	160
	300 - 350	140
	350 - 400	100
	400 - 425	80
Titanium: All alloys	275 - 300	200
	300 - 350	125
	350 - 400	75
	400 - 425	75
Nickel Alloys: Inconel, Hastelloy, Waspalloy, Monel, Nimonic, Haynes, Discoloy, Incoloy	275 - 300	80
	300 - 350	60
	350 - 400	50
	400 - 425	40

Chip Load Per Tooth (IPT) By Cutter Diameter	.015	.031	.047	.062	.078	.093	.125	.187	.250	.312	.375	.500
Slotting	.00005	.00010	.00016	.00020	.00026	.00031	.00041	.00062	.00083	.00108	.00130	.00173
Roughing	.00006	.00013	.00020	.00026	.00033	.00039	.00053	.00079	.00105	.00138	.00165	.00221
Finishing	.00008	.00017	.00026	.00034	.00043	.00051	.00069	.00103	.00138	.00180	.00217	.00289
Max	.00010	.00020	.00031	.00041	.00051	.00061	.00083	.00123	.00165	.00216	.00260	.00347

Radial Depth of Cut*:
Slotting: 1x Dia
Roughing: .4x Dia
Finishing: .1x Dia

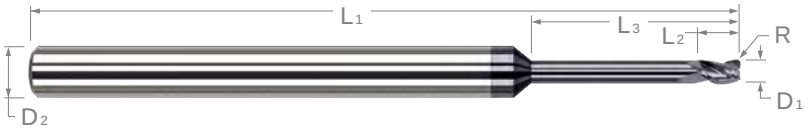
Axial Depth of Cut*:
Slotting: .4x Dia
Roughing: .5x - .7x Dia
Finishing: .5x - 1x Dia

* If less than minimum Axial or Radial DOC values are used, increased feed rates are possible. If greater than maximum Axial and Radial DOC values are used, decreased feed rates may be needed.

NEW SIZES!

VARIABLE HELIX END MILLS FOR HIGH TEMP ALLOYS

Corner Radius – Long Reach, Stub Flute





Reduced Neck Diameter to Avoid Heeling

- Optimized for titanium alloys, inconel, nickel alloys, and other high-temperature materials with outstanding performance in difficult-to-machine steels, stainless steels, and tool steels
- Long reach design for deep cavities
- Reduced neck diameter to avoid heeling
- Variable helix design (approx. 34°) reduces chatter and harmonics and increases material removal rates
- Latest generation AlTiN Nano coating offers superior hardness and heat resistance
- h6 shank tolerance for high precision tool holders
- Suitable for steels up to 45Rc
- Center cutting
- Solid carbide
- CNC ground in the USA

mm & in

CUTTER DIAMETER			CORNER RADIUS	LENGTH OF CUT	OVERALL REACH	FLUTES	SHANK DIAMETER	OVERALL LENGTH	AlTiN NANO COATED		
D_1 +.0005″ −.0005″	D_1 +.00mm −.02mm	decimal equivalent	R +.001″ −.001″ / +.025mm −.025mm	L_2 +.010″ −.000″ / +.25mm −.00mm	L_3 +.010″ −.000″ / +.25mm −.00mm		D_2 (h6)	L_1	TOOL #	PRICE	
.015 (1/64)		.0150	**.003**	.022	.045 (3x)	3	1/8	1-1/2	947615-C6	58.90	
.015 (1/64)		.0150	**.003**	.022	.078 (5x)	3	1/8	2-1/2	64415-C6	58.90	
.015 (1/64)		.0150	**.003**	.022	.125 (8x)	3	1/8	2-1/2	54815-C6	60.10	
.015 (1/64)		.0150	**.003**	.022	.187 (12x)	3	1/8	2-1/2	63015-C6	65.80	
.015 (1/64)		.0150	**.003**	.022	.225 (15x)	3	1/8	2-1/2	968915-C6	71.70	
	.4 mm	.0157	**.08 mm**	.60 mm	2.0 mm (5x)	3	4 mm	50 mm	980709-C6	65.80	
	.4 mm	.0157	**.08 mm**	.60 mm	3.2 mm (8x)	3	4 mm	50 mm	975009-C6	67.20	
	.4 mm	.0157	**.08 mm**	.60 mm	4.8 mm (12x)	3	4 mm	50 mm	987309-C6	71.70	
	.5 mm	.0196	**.10 mm**	.75 mm	2.5 mm (5x)	3	4 mm	50 mm	980711-C6	63.10	
	.5 mm	.0196	**.10 mm**	.75 mm	4.0 mm (8x)	3	4 mm	50 mm	975011-C6	64.50	
	.5 mm	.0196	**.10 mm**	.75 mm	6.0 mm (12x)	3	4 mm	50 mm	987311-C6	69.70	
	.5 mm	.0196	**.10 mm**	.75 mm	8.0 mm (16x)	3	4 mm	50 mm	971511-C6	72.80	
.020		.0200	**.004**	.030	.060 (3x)	3	1/8	1-1/2	947620-C6	56.00	
.020		.0200	**.004**	.030	.100 (5x)	3	1/8	2-1/2	64420-C6	56.20	
.020		.0200	**.004**	.030	.160 (8x)	3	1/8	2-1/2	54820-C6	57.50	
.020		.0200	**.004**	.030	.200 (10x)	3	1/8	2-1/2	932520-C6	60.40	NEW
.020		.0200	**.004**	.030	.250 (12x)	3	1/8	2-1/2	63020-C6	63.40	
	.6 mm	.0236	**.10 mm**	.90 mm	3.0 mm (5x)	3	4 mm	50 mm	980713-C6	62.00	
	.6 mm	.0236	**.10 mm**	.90 mm	4.8 mm (8x)	3	4 mm	50 mm	975013-C6	63.10	
	.6 mm	.0236	**.10 mm**	.90 mm	7.2 mm (12x)	3	4 mm	50 mm	987313-C6	67.40	
.025		.0250	**.004**	.038	.075 (3x)	3	1/8	1-1/2	947625-C6	54.30	
.025		.0250	**.004**	.038	.125 (5x)	3	1/8	2-1/2	64425-C6	55.00	
.025		.0250	**.004**	.038	.203 (8x)	3	1/8	2-1/2	54825-C6	56.00	
.025		.0250	**.004**	.038	.312 (12x)	3	1/8	2-1/2	63025-C6	61.90	
.031 (1/32)		.0310	**.005**	.047	.093 (3x)	3	1/8	1-1/2	947631-C6	51.80	
.031 (1/32)		.0310	**.005**	.047	.156 (5x)	3	1/8	2-1/2	64431-C6	52.10	
.031 (1/32)		.0310	**.005**	.047	.156 (5x)	4	1/8	2-1/2	812131-C6	54.10	
.031 (1/32)		.0310	**.005**	.047	.187 (6x)	3	1/8	2-1/2	796131-C6	54.10	
.031 (1/32)		.0310	**.005**	.047	.250 (8x)	3	1/8	2-1/2	54831-C6	53.30	
.031 (1/32)		.0310	**.005**	.047	.312 (10x)	3	1/8	2-1/2	932531-C6	54.60	
.031 (1/32)		.0310	**.005**	.047	.375 (12x)	3	1/8	2-1/2	63031-C6	55.60	
.031 (1/32)		.0310	**.005**	.047	.470 (15x)	3	1/8	2-1/2	968931-C6	60.90	
.031 (1/32)		.0310	**.010**	.047	.156 (5x)	3	1/8	2-1/2	917331-C6	51.50	
.031 (1/32)		.0310	**.010**	.047	.250 (8x)	3	1/8	2-1/2	908631-C6	53.30	
	.8 mm	.0314	**.10 mm**	1.20 mm	4.0 mm (5x)	3	4 mm	50 mm	980718-C6	57.00	
	.8 mm	.0314	**.10 mm**	1.20 mm	6.5 mm (8x)	3	4 mm	50 mm	975018-C6	58.50	
	.8 mm	.0314	**.10 mm**	1.20 mm	9.5 mm (12x)	3	4 mm	50 mm	987318-C6	60.10	

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VARIABLE HELIX END MILLS FOR HIGH TEMP ALLOYS

Corner Radius – Long Reach, Stub Flute (cont.)

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CUTTER DIAMETER			CORNER RADIUS	LENGTH OF CUT	OVERALL REACH	FLUTES	SHANK DIAMETER	OVERALL LENGTH	AlTiN NANO COATED	
D_1 +.0005″ −.0005″	D_1 +.00mm −.02mm	decimal equivalent	R +.001″ −.001″ +.025mm −.025mm	L_2 +.010″ −.000″ +.25mm −.00mm	L_3 +.010″ −.000″ +.25mm −.00mm		D_2 (h6)	L_1	TOOL #	PRICE
.035		.0350	**.005**	.053	.105 (3x)	3	1/8	1-1/2	947635-C6	51.80
.035		.0350	**.005**	.053	.187 (5x)	3	1/8	2-1/2	64435-C6	52.10
.035		.0350	**.005**	.053	.281 (8x)	3	1/8	2-1/2	54835-C6	53.30
.035		.0350	**.005**	.053	.350 (10x)	3	1/8	2-1/2	932535-C6	55.60
	1.0 mm	.0393	**.10 mm**	1.50 mm	5.0 mm (5x)	3	4 mm	50 mm	980722-C6	57.00
	1.0 mm	.0393	**.10 mm**	1.50 mm	8.0 mm (8x)	3	4 mm	50 mm	975022-C6	58.50
	1.0 mm	.0393	**.10 mm**	1.50 mm	12.0 mm (12x)	3	4 mm	50 mm	987322-C6	60.10
	1.0 mm	.0393	**.10 mm**	1.50 mm	16.0 mm (16x)	3	4 mm	50 mm	971522-C6	63.40
.040		.0400	**.005**	.060	.120 (3x)	3	1/8	1-1/2	947640-C6	51.80
.040		.0400	**.005**	.060	.203 (5x)	3	1/8	2-1/2	64440-C6	52.10
.040		.0400	**.005**	.060	.325 (8x)	3	1/8	2-1/2	54840-C6	53.30
.045		.0450	**.005**	.068	.135 (3x)	3	1/8	1-1/2	947645-C6	51.80
.045		.0450	**.005**	.068	.225 (5x)	3	1/8	2-1/2	64445-C6	52.10
.045		.0450	**.005**	.068	.375 (8x)	3	1/8	2-1/2	54845-C6	53.30
.047 (3/64)		.0470	**.005**	.070	.141 (3x)	3	1/8	1-1/2	947647-C6	51.80
.047 (3/64)		.0470	**.005**	.070	.250 (5x)	3	1/8	2-1/2	64447-C6	52.10
.047 (3/64)		.0470	**.005**	.070	.281 (6x)	3	1/8	2-1/2	796147-C6	52.10
.047 (3/64)		.0470	**.005**	.070	.375 (8x)	3	1/8	2-1/2	54847-C6	53.30
.047 (3/64)		.0470	**.005**	.070	.570 (12x)	3	1/8	2-1/2	63047-C6	55.60
.047 (3/64)		.0470	**.005**	.070	.710 (15x)	3	1/8	2-1/2	968947-C6	60.90
.047 (3/64)		.0470	**.010**	.070	.250 (5x)	3	1/8	2-1/2	917347-C6	52.10
.047 (3/64)		.0470	**.010**	.070	.375 (8x)	3	1/8	2-1/2	908647-C6	53.30
.050		.0500	**.005**	.075	.150 (3x)	3	1/8	1-1/2	947650-C6	51.80
.050		.0500	**.005**	.075	.250 (5x)	3	1/8	2-1/2	64450-C6	52.10
.050		.0500	**.005**	.075	.400 (8x)	3	1/8	2-1/2	54850-C6	53.30
.055		.0550	**.005**	.083	.275 (5x)	3	1/8	2-1/2	64455-C6	52.10
.055		.0550	**.005**	.083	.450 (8x)	3	1/8	2-1/2	54855-C6	53.30
	1.5 mm	.0590	**.20 mm**	2.20 mm	7.5 mm (5x)	3	4 mm	50 mm	980733-C6	57.00
	1.5 mm	.0590	**.20 mm**	2.20 mm	12.0 mm (8x)	3	4 mm	50 mm	975033-C6	58.50
	1.5 mm	.0590	**.20 mm**	2.20 mm	18.0 mm (12x)	3	4 mm	50 mm	987333-C6	60.10
	1.5 mm	.0590	**.20 mm**	2.20 mm	24.0 mm (16x)	3	4 mm	63 mm	971533-C6	63.40
.060		.0600	**.005**	.090	.312 (5x)	3	1/8	2-1/2	919860-C6	52.10
.060		.0600	**.005**	.090	.500 (8x)	3	1/8	2-1/2	915360-C6	53.30
.060		.0600	**.010**	.090	.312 (5x)	3	1/8	2-1/2	64460-C6	52.10
.060		.0600	**.010**	.090	.500 (8x)	3	1/8	2-1/2	54860-C6	53.30
.060		.0600	**.010**	.090	.625 (10x)	3	1/8	2-1/2	932560-C6	55.60
.062 (1/16)		.0620	**.005**	.093	.312 (5x)	3	1/8	2-1/2	919862-C6	51.50
.062 (1/16)		.0620	**.005**	.093	.500 (8x)	3	1/8	2-1/2	915362-C6	53.30
.062 (1/16)		.0620	**.005**	.093	.625 (10x)	3	1/8	2-1/2	884462-C6	53.90
.062 (1/16)		.0620	**.010**	.093	.186 (3x)	3	1/8	1-1/2	947662-C6	51.50
.062 (1/16)		.0620	**.010**	.093	.312 (5x)	3	1/8	2-1/2	64462-C6	52.10
.062 (1/16)		.0620	**.010**	.093	.312 (5x)	4	1/8	2-1/2	811862-C6	54.10
.062 (1/16)		.0620	**.010**	.093	.375 (6x)	3	1/8	2-1/2	795962-C6	54.10
.062 (1/16)		.0620	**.010**	.093	.500 (8x)	3	1/8	2-1/2	54862-C6	53.30
.062 (1/16)		.0620	**.010**	.093	.625 (10x)	3	1/8	2-1/2	932562-C6	54.60
.062 (1/16)		.0620	**.010**	.093	.750 (12x)	3	1/8	2-1/2	63062-C6	55.60
.062 (1/16)		.0620	**.010**	.093	.950 (15x)	3	1/8	2-1/2	968962-C6	60.90

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NEW SIZES!

VARIABLE HELIX END MILLS FOR HIGH TEMP ALLOYS

Corner Radius – Long Reach, Stub Flute (cont.)

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continued from previous page

CUTTER DIAMETER			CORNER RADIUS	LENGTH OF CUT	OVERALL REACH	FLUTES	SHANK DIAMETER	OVERALL LENGTH	AlTiN NANO COATED	
D_1 +.0005″ −.0005″	D_1 +.00mm −.02mm	decimal equivalent	R +.001″ −.001″ / +.025mm −.025mm	L_2 +.010″ −.000″ / +.25mm −.00mm	L_3 +.010″ −.000″ / +.25mm −.00mm		D_2 (h6)	L_1	TOOL #	PRICE
.062 (1/16)		.0620	**.015**	.093	.312 (5x)	3	1/8	2-1/2	902662-C6	51.50
.062 (1/16)		.0620	**.015**	.093	.500 (8x)	3	1/8	2-1/2	912062-C6	53.30
.062 (1/16)		.0620	**.020**	.093	.312 (5x)	3	1/8	2-1/2	866862-C6	51.50
.062 (1/16)		.0620	**.020**	.093	.500 (8x)	3	1/8	2-1/2	847562-C6	53.30
.078 (5/64)		.0780	**.005**	.117	.406 (5x)	3	1/8	2-1/2	919878-C6	52.10
.078 (5/64)		.0780	**.005**	.117	.625 (8x)	3	1/8	2-1/2	915378-C6	53.30
.078 (5/64)		.0780	**.010**	.117	.234 (3x)	3	1/8	1-1/2	947678-C6	51.50
.078 (5/64)		.0780	**.010**	.117	.406 (5x)	3	1/8	2-1/2	64478-C6	52.10
.078 (5/64)		.0780	**.010**	.117	.406 (5x)	4	1/8	2-1/2	811878-C6	54.10
.078 (5/64)		.0780	**.010**	.117	.475 (6x)	3	1/8	2-1/2	795978-C6	52.10
.078 (5/64)		.0780	**.010**	.117	.625 (8x)	3	1/8	2-1/2	54878-C6	53.30
.078 (5/64)		.0780	**.010**	.117	.940 (12x)	3	1/8	2-1/2	63078-C6	55.60
.078 (5/64)		.0780	**.010**	.117	1.187 (15x)	3	1/8	2-1/2	968978-C6	60.90
	2.0 mm	.0787	**.20 mm**	3.00 mm	10.0 mm (5x)	3	4 mm	50 mm	980745-C6	57.00
	2.0 mm	.0787	**.20 mm**	3.00 mm	16.0 mm (8x)	3	4 mm	50 mm	975045-C6	58.50
	2.0 mm	.0787	**.20 mm**	3.00 mm	24.0 mm (12x)	3	4 mm	63 mm	987345-C6	60.10
	2.0 mm	.0787	**.20 mm**	3.00 mm	32.0 mm (16x)	3	4 mm	63 mm	971545-C6	63.40
.093 (3/32)		.0930	**.005**	.139	.500 (5x)	3	1/8	2-1/2	919893-C6	51.50
.093 (3/32)		.0930	**.005**	.139	.750 (8x)	3	1/8	2-1/2	915393-C6	53.30
.093 (3/32)		.0930	**.010**	.139	.279 (3x)	3	1/8	1-1/2	947693-C6	51.50
.093 (3/32)		.0930	**.010**	.139	.500 (5x)	3	1/8	2-1/2	64493-C6	52.10
.093 (3/32)		.0930	**.010**	.139	.500 (5x)	4	1/8	2-1/2	811893-C6	54.10
.093 (3/32)		.0930	**.010**	.139	.585 (6x)	3	1/8	2-1/2	795993-C6	52.10
.093 (3/32)		.0930	**.010**	.139	.750 (8x)	3	1/8	2-1/2	54893-C6	53.30
.093 (3/32)		.0930	**.010**	.139	.950 (10x)	3	1/8	2-1/2	932593-C6	54.60
.093 (3/32)		.0930	**.010**	.139	1.125 (12x)	3	1/8	2-1/2	63093-C6	55.60
.093 (3/32)		.0930	**.010**	.139	1.400 (15x)	3	1/8	3	968993-C6	60.90
.093 (3/32)		.0930	**.015**	.139	.500 (5x)	3	1/8	2-1/2	902693-C6	51.50
.093 (3/32)		.0930	**.015**	.139	.750 (8x)	3	1/8	2-1/2	912093-C6	53.30
.093 (3/32)		.0930	**.020**	.139	.500 (5x)	3	1/8	2-1/2	866893-C6	51.50
.093 (3/32)		.0930	**.020**	.139	.750 (8x)	3	1/8	2-1/2	847593-C6	53.30
.093 (3/32)		.0930	**.030**	.139	.500 (5x)	3	1/8	2-1/2	910193-C6	51.50
.093 (3/32)		.0930	**.030**	.139	.750 (8x)	3	1/8	2-1/2	906493-C6	53.30
.100		.1000	**.010**	.150	.500 (5x)	3	1/8	2-1/2	64500-C6	51.50
.100		.1000	**.010**	.150	.800 (8x)	3	1/8	2-1/2	54900-C6	52.90
	3.0 mm	.1181	**.20 mm**	4.50 mm	15.0 mm (5x)	3	4 mm	50 mm	980757-C6	54.10
	3.0 mm	.1181	**.20 mm**	4.50 mm	24.0 mm (8x)	3	4 mm	50 mm	975057-C6	54.20

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NEW SIZES!

VARIABLE HELIX END MILLS FOR HIGH TEMP ALLOYS

Corner Radius – Long Reach, Stub Flute (cont.)

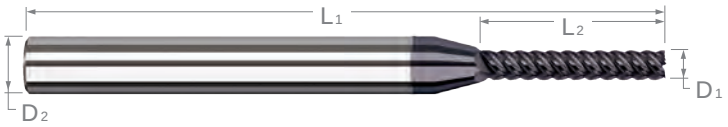
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	CUTTER DIAMETER		CORNER RADIUS	LENGTH OF CUT	OVERALL REACH	FLUTES	SHANK DIAMETER	OVERALL LENGTH	AlTiN NANO COATED	
	D_1 +.000″ −.002″	decimal equivalent	R +.001″ −.001″	L_2 +.030″ −.000″	L_3 +.030″ −.000″		D_2 (h6)	L_1	TOOL #	PRICE
	.125 (1/8)	.1250	**.005**	.187	.625 (5x)	4	1/8	2-1/2	919908-C6	48.50
	.125 (1/8)	.1250	**.005**	.187	1.000 (8x)	4	1/8	2-1/2	915408-C6	50.20
	.125 (1/8)	.1250	**.010**	.187	.625 (5x)	4	1/8	2-1/2	917408-C6	51.10
	.125 (1/8)	.1250	**.010**	.187	1.000 (8x)	4	1/8	2-1/2	908708-C6	52.90
	.125 (1/8)	.1250	**.015**	.187	.375 (3x)	4	1/8	1-1/2	947708-C6	49.20
	.125 (1/8)	.1250	**.015**	.187	.625 (5x)	4	1/8	2-1/2	64508-C6	51.50
	.125 (1/8)	.1250	**.015**	.187	.750 (6x)	4	1/8	2-1/2	795808-C6	51.50
	.125 (1/8)	.1250	**.015**	.187	1.000 (8x)	4	1/8	2-1/2	54908-C6	52.90
	.125 (1/8)	.1250	**.015**	.187	1.250 (10x)	4	1/8	2-1/2	932608-C6	54.60
	.125 (1/8)	.1250	**.015**	.187	1.500 (12x)	4	1/8	3	63108-C6	55.60
	.125 (1/8)	.1250	**.020**	.187	.625 (5x)	4	1/8	2-1/2	866908-C6	51.10
	.125 (1/8)	.1250	**.020**	.187	1.000 (8x)	4	1/8	2-1/2	847608-C6	52.90
	.125 (1/8)	.1250	**.030**	.187	.625 (5x)	4	1/8	2-1/2	910208-C6	51.10
	.125 (1/8)	.1250	**.030**	.187	1.000 (8x)	4	1/8	2-1/2	906508-C6	52.90
NEW	.140 (9/64)	.1406	**.015**	.220	.750 (5x)	4	3/16	3	64509-C6	56.90
NEW	.140 (9/64)	.1406	**.015**	.220	1.125 (8x)	4	3/16	3	54909-C6	58.10
NEW	.156 (5/32)	.1562	**.010**	.235	.750 (5x)	4	3/16	3	917410-C6	56.90
	.156 (5/32)	.1562	**.015**	.235	.750 (5x)	4	3/16	3	64510-C6	56.90
	.156 (5/32)	.1562	**.015**	.235	1.250 (8x)	4	3/16	3	54910-C6	58.10
	.156 (5/32)	.1562	**.015**	.235	1.875 (12x)	4	3/16	4	63110-C6	69.80
NEW	.156 (5/32)	.1562	**.030**	.235	.750 (5x)	4	3/16	3	910210-C6	56.90
	.187 (3/16)	.1875	**.005**	.281	1.000 (5x)	4	3/16	3	919912-C6	54.80
	.187 (3/16)	.1875	**.005**	.281	1.500 (8x)	4	3/16	3	915412-C6	56.10
NEW	.187 (3/16)	.1875	**.010**	.281	1.000 (5x)	4	3/16	3	917412-C6	57.50
NEW	.187 (3/16)	.1875	**.010**	.281	1.500 (8x)	4	3/16	3	908712-C6	58.90
	.187 (3/16)	.1875	**.015**	.281	1.000 (5x)	4	3/16	3	64512-C6	57.50
	.187 (3/16)	.1875	**.015**	.281	1.156 (6x)	4	3/16	3	795812-C6	57.50
	.187 (3/16)	.1875	**.015**	.281	1.500 (8x)	4	3/16	3	54912-C6	58.90
	.187 (3/16)	.1875	**.015**	.281	1.875 (10x)	4	3/16	4	932612-C6	68.00
	.187 (3/16)	.1875	**.015**	.281	2.250 (12x)	4	3/16	4	63112-C6	69.80
	.187 (3/16)	.1875	**.020**	.281	1.000 (5x)	4	3/16	3	866912-C6	57.10
	.187 (3/16)	.1875	**.020**	.281	1.500 (8x)	4	3/16	3	847612-C6	58.50
	.187 (3/16)	.1875	**.030**	.281	1.000 (5x)	4	3/16	3	910212-C6	57.10
	.187 (3/16)	.1875	**.030**	.281	1.500 (8x)	4	3/16	3	906512-C6	58.50
	.187 (3/16)	.1875	**.040**	.281	1.000 (5x)	4	3/16	3	785612-C6	57.10
	.187 (3/16)	.1875	**.040**	.281	1.500 (8x)	4	3/16	3	785412-C6	58.50
	.250 (1/4)	.2500	**.015**	.375	1.250 (5x)	4	1/4	4	64516-C6	63.90
	.250 (1/4)	.2500	**.015**	.375	2.000 (8x)	4	1/4	4	54916-C6	64.90
	.250 (1/4)	.2500	**.015**	.375	3.000 (12x)	4	1/4	6	63116-C6	78.10
	.250 (1/4)	.2500	**.030**	.375	1.250 (5x)	4	1/4	4	910216-C6	63.50
	.250 (1/4)	.2500	**.030**	.375	2.000 (8x)	4	1/4	4	906516-C6	64.50
	.375 (3/8)	.3750	**.015**	.570	2.000 (5x)	4	3/8	4	64524-C6	71.80

PLEASE SEE SPEEDS & FEEDS ON PAGE 123

VARIABLE HELIX END MILLS FOR HIGH TEMP ALLOYS

Finishers – Square



Up to 7 Flutes!

- Optimized for titanium alloys, inconel, nickel alloys, and other high-temperature materials with outstanding performance in difficult-to-machine steels, stainless steels, and tool steels
- Variable helix design (approx. 41°) reduces chatter and harmonics improving finish
- Large core and eccentric relief for improved tool life
- Latest generation AlTiN Nano coating offers superior hardness and heat resistance
- h6 shank tolerance for high precision tool holders
- End cutting (not center cutting) • Solid carbide • CNC ground in the USA

mm & in

CUTTER DIAMETER D_1 +.0005″ −.0005″	CUTTER DIAMETER D_1 +.00mm −.02mm	CUTTER DIAMETER D_1 decimal equivalent	LENGTH OF CUT L_2 +.010″ −.000″ / +.25mm −.00mm	FLUTES	SHANK DIAMETER D_2 (h6)	OVERALL LENGTH L_1	AlTiN NANO COATED TOOL #	AlTiN NANO COATED PRICE
	.2 mm	.0078	**.60 mm** (3x)	4	4 mm	50 mm	967604-C6	57.00
	.2 mm	.0078	**1.00 mm** (5x)	4	4 mm	50 mm	974504-C6	65.50
	.2 mm	.0078	**1.60 mm** (8x)	4	4 mm	50 mm	976104-C6	67.20
.010		.0100	**.030** (3x)	4	1/8	1-1/2	57810-C6	56.20
.010		.0100	**.050** (5x)	4	1/8	2-1/2	62610-C6	64.50
	.3 mm	.0118	**.90 mm** (3x)	4	4 mm	50 mm	967606-C6	52.60
.015 (1/64)		.0150	**.023** (1.5x)	4	1/8	1-1/2	946115-C6	44.80
.015 (1/64)		.0150	**.045** (3x)	4	1/8	1-1/2	57815-C6	44.80
.015 (1/64)		.0150	**.062** (4x)	4	1/8	2-1/2	890115-C6	55.60
.015 (1/64)		.0150	**.078** (5x)	4	1/8	2-1/2	62615-C6	55.60
.015 (1/64)		.0150	**.125** (8x)	4	1/8	2-1/2	59015-C6	57.10
.015 (1/64)		.0150	**.156** (10x)	4	1/8	2-1/2	941815-C6	66.70
	.4 mm	.0157	**1.20 mm** (3x)	4	4 mm	50 mm	967609-C6	50.00
	.4 mm	.0157	**2.00 mm** (5x)	4	4 mm	50 mm	974509-C6	58.60
	.4 mm	.0157	**3.20 mm** (8x)	4	4 mm	50 mm	976109-C6	60.40
	.5 mm	.0196	**1.50 mm** (3x)	4	4 mm	50 mm	967611-C6	50.00
	.5 mm	.0196	**2.50 mm** (5x)	4	4 mm	50 mm	974511-C6	57.80
	.5 mm	.0196	**4.00 mm** (8x)	4	4 mm	50 mm	976111-C6	59.30
.020		.0200	**.030** (1.5x)	4	1/8	1-1/2	946120-C6	43.90
.020		.0200	**.060** (3x)	4	1/8	1-1/2	57820-C6	43.90
.020		.0200	**.080** (4x)	4	1/8	2-1/2	890120-C6	55.30
.020		.0200	**.100** (5x)	4	1/8	2-1/2	62620-C6	55.30
.020		.0200	**.160** (8x)	4	1/8	2-1/2	59020-C6	56.90
.020		.0200	**.200** (10x)	4	1/8	2-1/2	941820-C6	66.10
	.6 mm	.0236	**1.80 mm** (3x)	4	4 mm	50 mm	967613-C6	50.00
	.6 mm	.0236	**3.00 mm** (5x)	4	4 mm	50 mm	974513-C6	57.80
	.6 mm	.0236	**4.80 mm** (8x)	4	4 mm	50 mm	976113-C6	59.30
.025		.0250	**.075** (3x)	4	1/8	1-1/2	57825-C6	41.20
.025		.0250	**.125** (5x)	4	1/8	2-1/2	62625-C6	53.30
.025		.0250	**.203** (8x)	4	1/8	2-1/2	59025-C6	55.00
.025		.0250	**.250** (10x)	4	1/8	2-1/2	941825-C6	64.30
	.7 mm	.0275	**2.10 mm** (3x)	4	4 mm	50 mm	967615-C6	49.80
.030		.0300	**.090** (3x)	6	1/8	1-1/2	57830-C6	41.20
.030		.0300	**.156** (5x)	6	1/8	2-1/2	62630-C6	53.30

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VARIABLE HELIX END MILLS FOR HIGH TEMP ALLOYS

Finishers – Square (cont.)

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CUTTER DIAMETER			LENGTH OF CUT	FLUTES	SHANK DIAMETER	OVERALL LENGTH	AlTiN NANO COATED	
D_1 +.0005″ −.0005″	+.00mm −.02mm	decimal equivalent	L_2 +.010″ −.000″ +.25mm −.00mm		D_2 (h6)	L_1	TOOL #	PRICE
.031 (1/32)		.0310	**.047** (1.5x)	6	1/8	1-1/2	946131-C6	36.90
.031 (1/32)		.0310	**.093** (3x)	6	1/8	1-1/2	57831-C6	36.90
.031 (1/32)		.0310	**.125** (4x)	6	1/8	2-1/2	890131-C6	51.00
.031 (1/32)		.0310	**.156** (5x)	6	1/8	2-1/2	62631-C6	51.00
.031 (1/32)		.0310	**.187** (6x)	6	1/8	2-1/2	868531-C6	51.60
.031 (1/32)		.0310	**.218** (7x)	6	1/8	2-1/2	881331-C6	51.60
.031 (1/32)		.0310	**.250** (8x)	6	1/8	2-1/2	59031-C6	52.50
.031 (1/32)		.0310	**.312** (10x)	6	1/8	2-1/2	941831-C6	61.60
.031 (1/31)		.0310	**.375** (12x)	6	1/8	2-1/2	69131-C6	66.10
	.8 mm	.0314	**2.40 mm** (3x)	6	4 mm	50 mm	967618-C6	44.90
	.8 mm	.0314	**4.00 mm** (5x)	6	4 mm	50 mm	974518-C6	52.60
	.8 mm	.0314	**6.50 mm** (8x)	6	4 mm	50 mm	976118-C6	54.20
.035		.0350	**.105** (3x)	6	1/8	1-1/2	57835-C6	39.70
.035		.0350	**.187** (5x)	6	1/8	2-1/2	62635-C6	41.60
	.9 mm	.0354	**2.70 mm** (3x)	6	4 mm	50 mm	967620-C6	43.70
	1.0 mm	.0393	**1.50 mm** (1.5x)	6	4 mm	50 mm	846722-C6	43.70
	1.0 mm	.0393	**3.00 mm** (3x)	6	4 mm	50 mm	967622-C6	43.70
	1.0 mm	.0393	**5.00 mm** (5x)	6	4 mm	50 mm	974522-C6	54.10
	1.0 mm	.0393	**8.00 mm** (8x)	6	4 mm	50 mm	976122-C6	56.70
	1.0 mm	.0393	**10.00 mm** (10x)	6	4 mm	50 mm	938322-C6	63.90
.040		.0400	**.060** (1.5x)	6	1/8	1-1/2	946140-C6	36.90
.040		.0400	**.120** (3x)	6	1/8	1-1/2	57840-C6	36.90
.040		.0400	**.160** (4x)	6	1/8	2-1/2	890140-C6	51.00
.040		.0400	**.203** (5x)	6	1/8	2-1/2	62640-C6	51.00
.040		.0400	**.325** (8x)	6	1/8	2-1/2	59040-C6	52.50
	1.1 mm	.0433	**3.00 mm** (3x)	6	4 mm	50 mm	967624-C6	42.10
.045		.0450	**.135** (3x)	6	1/8	1-1/2	57845-C6	39.70
.045		.0450	**.225** (5x)	6	1/8	2-1/2	62645-C6	41.60
.047 (3/64)		.0470	**.071** (1.5x)	6	1/8	1-1/2	946147-C6	37.80
.047 (3/64)		.0470	**.141** (3x)	6	1/8	1-1/2	57847-C6	36.90
.047 (3/64)		.0470	**.187** (4x)	6	1/8	2-1/2	890147-C6	51.00
.047 (3/64)		.0470	**.250** (5x)	6	1/8	2-1/2	62647-C6	51.00
.047 (3/64)		.0470	**.281** (6x)	6	1/8	2-1/2	868547-C6	51.60
.047 (3/64)		.0470	**.328** (7x)	6	1/8	2-1/2	881347-C6	51.60
.047 (3/64)		.0470	**.375** (8x)	6	1/8	2-1/2	59047-C6	52.50
.047 (3/64)		.0470	**.480** (10x)	6	1/8	2-1/2	941847-C6	61.60
.047 (3/64)		.0470	**.570** (12x)	6	1/8	2-1/2	69147-C6	66.10
	1.2 mm	.0472	**3.50 mm** (3x)	6	4 mm	50 mm	967627-C6	43.70
	1.2 mm	.0472	**6.00 mm** (5x)	6	4 mm	50 mm	974527-C6	54.10
	1.2 mm	.0472	**9.50 mm** (8x)	6	4 mm	50 mm	976127-C6	56.70
.050		.0500	**.075** (1.5x)	7	1/8	1-1/2	946150-C6	37.80
.050		.0500	**.150** (3x)	7	1/8	1-1/2	57850-C6	36.90
.050		.0500	**.250** (5x)	7	1/8	2-1/2	62650-C6	51.00
.050		.0500	**.400** (8x)	7	1/8	2-1/2	59050-C6	52.50

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VARIABLE HELIX END MILLS FOR HIGH TEMP ALLOYS

Finishers – Square (cont.)

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CUTTER DIAMETER			LENGTH OF CUT	FLUTES	SHANK DIAMETER	OVERALL LENGTH	AlTiN NANO COATED	
D_1 +.0005″ −.0005″	+.00mm −.02mm	decimal equivalent	L_2 +.010″ −.000″ +.25mm −.00mm		D_2 (h6)	L_1	TOOL #	PRICE
	1.3 mm	.0511	**4.00 mm** (3x)	7	4 mm	50 mm	967629-C6	43.70
.055		.0550	**.165** (3x)	7	1/8	1-1/2	57855-C6	39.10
.055		.0550	**.275** (5x)	7	1/8	2-1/2	62655-C6	40.50
	1.4 mm	.0551	**4.00 mm** (3x)	7	4 mm	50 mm	967631-C6	43.70
	1.4 mm	.0551	**7.00 mm** (5x)	7	4 mm	50 mm	974531-C6	54.10
	1.4 mm	.0551	**11.00 mm** (8x)	7	4 mm	50 mm	976131-C6	56.70
	1.5 mm	.0590	**2.20 mm** (1.5x)	7	4 mm	50 mm	846733-C6	42.20
	1.5 mm	.0590	**4.50 mm** (3x)	7	4 mm	50 mm	967633-C6	42.20
	1.5 mm	.0590	**7.50 mm** (5x)	7	4 mm	50 mm	974533-C6	52.60
	1.5 mm	.0590	**12.00 mm** (8x)	7	4 mm	50 mm	976133-C6	55.10
	1.5 mm	.0590	**15.00 mm** (10x)	7	4 mm	50 mm	938333-C6	65.20
.060		.0600	**.090** (1.5x)	7	1/8	1-1/2	946160-C6	36.40
.060		.0600	**.180** (3x)	7	1/8	1-1/2	57860-C6	36.40
.060		.0600	**.312** (5x)	7	1/8	2-1/2	62660-C6	47.10
.060		.0600	**.500** (8x)	7	1/8	2-1/2	59060-C6	48.70
.062 (1/16)		.0620	**.093** (1.5x)	7	1/8	1-1/2	946162-C6	36.40
.062 (1/16)		.0620	**.186** (3x)	7	1/8	1-1/2	57862-C6	36.40
.062 (1/16)		.0620	**.250** (4x)	7	1/8	2-1/2	890162-C6	48.10
.062 (1/16)		.0620	**.312** (5x)	7	1/8	2-1/2	62662-C6	48.10
.062 (1/16)		.0620	**.375** (6x)	7	1/8	2-1/2	868562-C6	48.80
.062 (1/16)		.0620	**.437** (7x)	7	1/8	2-1/2	881362-C6	48.80
.062 (1/16)		.0620	**.500** (8x)	7	1/8	2-1/2	59062-C6	49.60
.062 (1/16)		.0620	**.625** (10x)	7	1/8	2-1/2	941862-C6	62.70
.062 (1/16)		.0620	**.750** (12x)	7	1/8	2-1/2	69162-C6	70.40
.062 (1/16)		.0620	**.950** (15x)	7	1/8	2-1/2	68762-C6	88.60
	1.6 mm	.0629	**5.00 mm** (3x)	7	4 mm	50 mm	967636-C6	42.20
	1.6 mm	.0629	**8.00 mm** (5x)	7	4 mm	50 mm	974536-C6	52.60
	1.6 mm	.0629	**13.00 mm** (8x)	7	4 mm	50 mm	976136-C6	55.10
	1.7 mm	.0669	**5.00 mm** (3x)	7	4 mm	50 mm	967638-C6	42.20
.070		.0700	**.210** (3x)	7	1/8	1-1/2	57870-C6	34.40
.070		.0700	**.375** (5x)	7	1/8	2-1/2	62670-C6	48.10
.070		.0700	**.570** (8x)	7	1/8	2-1/2	59070-C6	49.60
	1.8 mm	.0708	**5.50 mm** (3x)	7	4 mm	50 mm	967640-C6	42.20
	1.8 mm	.0708	**9.00 mm** (5x)	7	4 mm	50 mm	974540-C6	52.60
	1.8 mm	.0708	**14.00 mm** (8x)	7	4 mm	50 mm	976140-C6	55.10
	1.9 mm	.0748	**5.50 mm** (3x)	7	4 mm	50 mm	967642-C6	42.20
.078 (5/64)		.0780	**.117** (1.5x)	7	1/8	1-1/2	946178-C6	34.40
.078 (5/64)		.0780	**.234** (3x)	7	1/8	1-1/2	57878-C6	34.40
.078 (5/64)		.0780	**.312** (4x)	7	1/8	2-1/2	890178-C6	48.10
.078 (5/64)		.0780	**.406** (5x)	7	1/8	2-1/2	62678-C6	48.10
.078 (5/64)		.0780	**.475** (6x)	7	1/8	2-1/2	868578-C6	48.80
.078 (5/64)		.0780	**.550** (7x)	7	1/8	2-1/2	881378-C6	48.80
.078 (5/64)		.0780	**.625** (8x)	7	1/8	2-1/2	59078-C6	49.60
.078 (5/64)		.0780	**.800** (10x)	7	1/8	2-1/2	941878-C6	62.70

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VARIABLE HELIX END MILLS FOR HIGH TEMP ALLOYS

Finishers – Square (cont.)

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CUTTER DIAMETER D_1 +.0005″ −.0005″	D_1 +.00mm −.02mm	D_1 decimal equivalent	LENGTH OF CUT L_2 +.010″ −.000″ +.25mm −.00mm	FLUTES	SHANK DIAMETER D_2 (h6)	OVERALL LENGTH L_1	AlTiN NANO COATED TOOL #	PRICE
.078 (5/64)		.0780	**.940** (12x)	7	1/8	2-1/2	69178-C6	70.40
.078 (5/64)		.0780	**1.187** (15x)	7	1/8	2-1/2	68778-C6	88.60
	2.0 mm	.0787	**3.00 mm** (1.5x)	7	4 mm	50 mm	846745-C6	42.20
	2.0 mm	.0787	**6.00 mm** (3x)	7	4 mm	50 mm	967645-C6	42.20
	2.0 mm	.0787	**10.00 mm** (5x)	7	4 mm	50 mm	974545-C6	52.30
	2.0 mm	.0787	**16.00 mm** (8x)	7	4 mm	50 mm	976145-C6	54.80
.080		.0800	**.120** (1.5x)	7	1/8	1-1/2	946180-C6	36.40
.080		.0800	**.240** (3x)	7	1/8	1-1/2	57880-C6	34.40
.080		.0800	**.406** (5x)	7	1/8	2-1/2	62680-C6	48.10
.080		.0800	**.650** (8x)	7	1/8	2-1/2	59080-C6	49.60
.090		.0900	**.270** (3x)	7	1/8	1-1/2	57890-C6	34.40
.090		.0900	**.450** (5x)	7	1/8	2-1/2	62690-C6	48.10
.090		.0900	**.750** (8x)	7	1/8	2-1/2	59090-C6	49.60
.093 (3/32)		.0930	**.074** (0.8x)	7	1/8	1-1/2	836593-C6	37.40
.093 (3/32)		.0930	**.140** (1.5x)	7	1/8	1-1/2	946193-C6	34.40
.093 (3/32)		.0930	**.279** (3x)	7	1/8	1-1/2	57893-C6	34.40
.093 (3/32)		.0930	**.375** (4x)	7	1/8	2-1/2	890193-C6	48.10
.093 (3/32)		.0930	**.500** (5x)	7	1/8	2-1/2	62693-C6	48.10
.093 (3/32)		.0930	**.585** (6x)	7	1/8	2-1/2	868593-C6	48.80
.093 (3/32)		.0930	**.670** (7x)	7	1/8	2-1/2	881393-C6	48.80
.093 (3/32)		.0930	**.750** (8x)	7	1/8	2-1/2	59093-C6	49.60
.093 (3/32)		.0930	**.950** (10x)	7	1/8	2-1/2	941893-C6	62.70
.093 (3/32)		.0930	**1.125** (12x)	7	1/8	2-1/2	69193-C6	70.40
.093 (3/32)		.0930	**1.400** (15x)	7	1/8	3	68793-C6	89.00
	2.5 mm	.0984	**7.50 mm** (3x)	7	4 mm	50 mm	967651-C6	42.20
.100		.1000	**.150** (1.5x)	7	1/8	1-1/2	960100-C6	34.60
.100		.1000	**.300** (3x)	7	1/8	1-1/2	57900-C6	34.40
.100		.1000	**.500** (5x)	7	1/8	2-1/2	62700-C6	48.10
.100		.1000	**.800** (8x)	7	1/8	2-1/2	59100-C6	49.60
.109 (7/64)		.1090	**.327** (3x)	7	1/8	1-1/2	57902-C6	34.40
.109 (7/64)		.1090	**.570** (5x)	7	1/8	2-1/2	62702-C6	48.10
.109 (7/64)		.1090	**.900** (8x)	7	1/8	2-1/2	59102-C6	51.60
	3.0 mm	.1181	**4.50 mm** (1.5x)	7	4 mm	50 mm	846757-C6	42.20
	3.0 mm	.1181	**9.00 mm** (3x)	7	4 mm	50 mm	967657-C6	42.20
	3.0 mm	.1181	**12.00 mm** (4x)	7	4 mm	50 mm	773057-C6	42.20
	3.0 mm	.1181	**15.00 mm** (5x)	7	4 mm	50 mm	974557-C6	43.60
	3.0 mm	.1181	**24.00 mm** (8x)	7	4 mm	50 mm	976157-C6	47.30

continued on next page

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VARIABLE HELIX END MILLS FOR HIGH TEMP ALLOYS

Finishers – Square (cont.)

mm & in continued from previous page

CUTTER DIAMETER			LENGTH OF CUT	FLUTES	SHANK DIAMETER	OVERALL LENGTH	AlTiN NANO COATED	
D_1 +.000″ −.002″	+.00mm −.04mm	decimal equivalent	L_2 +.030″ −.000″ +.75mm −.00mm		D_2 (h6)	L_1	TOOL #	PRICE
.125 (1/8)		.1250	**.100** (0.8x)	7	1/8	1-1/2	836608-C6	36.10
.125 (1/8)		.1250	**.187** (1.5x)	7	1/8	1-1/2	960108-C6	33.00
.125 (1/8)		.1250	**.375** (3x)	7	1/8	1-1/2	57908-C6	32.40
.125 (1/8)		.1250	**.500** (4x)	7	1/8	2-1/2	890208-C6	47.30
.125 (1/8)		.1250	**.625** (5x)	7	1/8	2-1/2	62708-C6	47.30
.125 (1/8)		.1250	**.750** (6x)	7	1/8	2-1/2	868608-C6	48.00
.125 (1/8)		.1250	**.875** (7x)	7	1/8	2-1/2	881408-C6	48.00
.125 (1/8)		.1250	**1.000** (8x)	7	1/8	2-1/2	59108-C6	48.80
.125 (1/8)		.1250	**1.250** (10x)	7	1/8	2-1/2	941908-C6	62.00
.125 (1/8)		.1250	**1.500** (12x)	7	1/8	3	69208-C6	69.90
.125 (1/8)		.1250	**1.875** (15x)	7	1/8	3	68808-C6	90.30
.140 (9/64)		.1406	**.425** (3x)	7	3/16	2	57909-C6	45.30
.140 (9/64)		.1406	**.750** (5x)	7	3/16	3	62709-C6	47.30
.140 (9/64)		.1406	**1.125** (8x)	7	3/16	3	59109-C6	50.40
.156 (5/32)		.1562	**.235** (1.5x)	7	3/16	2	960110-C6	37.40
.156 (5/32)		.1562	**.470** (3x)	7	3/16	2	57910-C6	36.90
.156 (5/32)		.1562	**.625** (4x)	7	3/16	3	890210-C6	36.90
.156 (5/32)		.1562	**.750** (5x)	7	3/16	3	62710-C6	49.80
.156 (5/32)		.1562	**1.250** (8x)	7	3/16	3	59110-C6	53.40
.187 (3/16)		.1875	**.150** (0.8x)	7	3/16	2	836612-C6	40.50
.187 (3/16)		.1875	**.285** (1.5x)	7	3/16	2	960112-C6	37.40
.187 (3/16)		.1875	**.570** (3x)	7	3/16	2	57912-C6	36.90
.187 (3/16)		.1875	**.750** (4x)	7	3/16	3	890212-C6	49.80
.187 (3/16)		.1875	**1.000** (5x)	7	3/16	3	62712-C6	49.80
.187 (3/16)		.1875	**1.156** (6x)	7	3/16	3	868612-C6	52.70
.187 (3/16)		.1875	**1.312** (7x)	7	3/16	3	881412-C6	52.70
.187 (3/16)		.1875	**1.500** (8x)	7	3/16	3	59112-C6	53.60
.218 (7/32)		.2187	**.660** (3x)	7	1/4	2-1/2	57814-C6	49.00
.218 (7/32)		.2187	**1.125** (5x)	7	1/4	4	62714-C6	62.10
	6.0 mm	.2362	**18.00 mm** (3x)	7	6 mm	63 mm	967666-C6	47.50
	6.0 mm	.2362	**30.00 mm** (5x)	7	6 mm	63 mm	974566-C6	50.40
.250 (1/4)		.2500	**.200** (0.8x)	7	1/4	2-1/2	836616-C6	51.80
.250 (1/4)		.2500	**.375** (1.5x)	7	1/4	2-1/2	960116-C6	48.70
.250 (1/4)		.2500	**.750** (3x)	7	1/4	2-1/2	57916-C6	47.90
.250 (1/4)		.2500	**1.000** (4x)	7	1/4	4	890216-C6	61.10
.250 (1/4)		.2500	**1.250** (5x)	7	1/4	4	62716-C6	61.10
.250 (1/4)		.2500	**1.500** (6x)	7	1/4	4	868616-C6	64.50
.250 (1/4)		.2500	**1.750** (7x)	7	1/4	4	881416-C6	64.50
.250 (1/4)		.2500	**2.000** (8x)	7	1/4	4	59116-C6	65.20
.312 (5/16)		.3125	**.470** (1.5x)	7	5/16	2-1/2	960120-C6	65.80
.312 (5/16)		.3125	**1.000** (3x)	7	5/16	2-1/2	57920-C6	64.90
.375 (3/8)		.3750	**.570** (1.5x)	7	3/8	2-1/2	960124-C6	74.70
.375 (3/8)		.3750	**1.125** (3x)	7	3/8	2-1/2	57924-C6	74.10
.375 (3/8)		.3750	**2.000** (5x)	7	3/8	4	62724-C6	94.00
.500 (1/2)		.5000	**.750** (1.5x)	7	1/2	3	960132-C6	96.00
.500 (1/2)		.5000	**1.500** (3x)	7	1/2	3	57932-C6	96.00

continued on next page

VARIABLE HELIX END MILLS FOR HIGH TEMP ALLOYS

Finishers – Square (cont.)

continued from previous page

SPEEDS & FEEDS (Finishers for High Temp Alloys)

Material	Hardness (HBn)	SFM		Chip Load Per Tooth (IPT) By Cutter Diameter									Depth of Cut	
				.015	.031	.047	.062	.078	.093	.125	.187	.250	Radial	Axial
Stainless Steels: 40x, 41x, 42x, 43x, 44x, 13-8, 15-5, 15-7, 17-4, 17-7	275 - 300 300 - 350	400 350	Finishing (0.8x LOC)	.00013	.00026	.00040	.00053	.00066	.00079	.00106	.00158	.00212	< .10x Dia	.5x - 1.5x Dia
			Finishing (1.5x LOC)	.00012	.00024	.00036	.00048	.00060	.00072	.00096	.00144	.00193	< .10x Dia	.5x - 1.5x Dia
			Finishing (3x LOC)	.00011	.00022	.00033	.00043	.00055	.00065	.00088	.00131	.00175	< .10x Dia	.5x - 3x Dia
			Finishing (4x LOC)	.00010	.00021	.00031	.00042	.00052	.00062	.00084	.00125	.00167	< .10x Dia	.5x - 4x Dia
			Finishing (5x LOC)	.00008	.00016	.00025	.00033	.00041	.00049	.00066	.00098	.00131	< .07x Dia	.5x - 5x Dia
			Finishing (6x LOC)	.00007	.00015	.00022	.00030	.00037	.00044	.00060	.00089	.00119	< .07x Dia	.5x - 6x Dia
			Finishing (7x LOC)	.00006	.00013	.00020	.00026	.00032	.00039	.00052	.00078	.00104	< .05x Dia	.5x - 7x Dia
			Finishing (8x LOC)	.00006	.00012	.00018	.00024	.00030	.00036	.00048	.00072	.00096	< .05x Dia	.5x - 8x Dia
			Finishing (10x LOC)	-	.00011	.00017	.00023	.00028	.00034	.00046	.00068	.00091	< .04x Dia	.5x - 10x Dia
			Finishing (12x LOC)	-	.00011	.00016	.00022	.00027	.00033	.00044	.00065	.00088	< .04x Dia	.5x - 12x Dia
			Finishing (15x LOC)	-	-	-	.00020	.00025	.00029	.00039	.00059	.00079	< .02x Dia	.5x - 15x Dia
Tool Steels: D, H, M, T, S series	300 - 350	500	Finishing (0.8x LOC)	.00013	.00026	.00040	.00053	.00066	.00079	.00106	.00158	.00212	< .10x Dia	.5x - 1.5x Dia
			Finishing (1.5x LOC)	.00012	.00024	.00036	.00048	.00060	.00072	.00096	.00144	.00193	< .10x Dia	.5x - 1.5x Dia
			Finishing (3x LOC)	.00011	.00022	.00033	.00043	.00055	.00065	.00088	.00131	.00175	< .10x Dia	.5x - 3x Dia
			Finishing (4x LOC)	.00010	.00021	.00031	.00042	.00052	.00062	.00084	.00125	.00167	< .10x Dia	.5x - 4x Dia
			Finishing (5x LOC)	.00008	.00016	.00025	.00033	.00041	.00049	.00066	.00098	.00131	< .07x Dia	.5x - 5x Dia
			Finishing (6x LOC)	.00007	.00015	.00022	.00030	.00037	.00044	.00060	.00089	.00119	< .07x Dia	.5x - 6x Dia
			Finishing (7x LOC)	.00006	.00013	.00020	.00026	.00032	.00039	.00052	.00078	.00104	< .05x Dia	.5x - 7x Dia
			Finishing (8x LOC)	.00006	.00012	.00018	.00024	.00030	.00036	.00048	.00072	.00096	< .05x Dia	.5x - 8x Dia
			Finishing (10x LOC)	-	.00011	.00017	.00023	.00028	.00034	.00046	.00068	.00091	< .04x Dia	.5x - 10x Dia
			Finishing (12x LOC)	-	.00011	.00016	.00022	.00027	.00033	.00044	.00065	.00088	< .04x Dia	.5x - 12x Dia
			Finishing (15x LOC)	-	-	-	.00020	.00025	.00029	.00039	.00059	.00079	< .02x Dia	.5x - 15x Dia
	350 - 400	250	Finishing (0.8x LOC)	.00010	.00021	.00032	.00042	.00053	.00063	.00085	.00127	.00169	< .10x Dia	.5x - 1.5x Dia
			Finishing (1.5x LOC)	.00009	.00019	.00029	.00038	.00048	.00057	.00077	.00115	.00154	< .10x Dia	.5x - 1.5x Dia
			Finishing (3x LOC)	.00008	.00017	.00026	.00035	.00044	.00052	.00070	.00105	.00140	< .10x Dia	.5x - 3x Dia
			Finishing (4x LOC)	.00008	.00017	.00025	.00033	.00042	.00050	.00067	.00100	.00134	< .10x Dia	.5x - 4x Dia
			Finishing (5x LOC)	.00006	.00013	.00020	.00026	.00033	.00039	.00053	.00079	.00105	< .07x Dia	.5x - 5x Dia
			Finishing (6x LOC)	.00006	.00012	.00018	.00024	.00030	.00035	.00048	.00071	.00095	< .07x Dia	.5x - 6x Dia
			Finishing (7x LOC)	.00005	.00010	.00016	.00021	.00026	.00031	.00042	.00062	.00083	< .05x Dia	.5x - 7x Dia
			Finishing (8x LOC)	.00005	.00010	.00014	.00019	.00024	.00029	.00039	.00058	.00077	< .05x Dia	.5x - 8x Dia
			Finishing (10x LOC)	-	.00009	.00014	.00018	.00023	.00027	.00036	.00054	.00073	< .04x Dia	.5x - 10x Dia
			Finishing (12x LOC)	-	.00009	.00013	.00017	.00022	.00026	.00035	.00052	.00070	< .04x Dia	.5x - 12x Dia
			Finishing (15x LOC)	-	-	-	.00016	.00020	.00023	.00032	.00047	.00063	< .02x Dia	.5x - 15x Dia
	400 - 540	200	Finishing (0.8x LOC)	.00008	.00017	.00026	.00034	.00043	.00051	.00069	.00103	.00138	< .10x Dia	.5x - 1.5x Dia
			Finishing (1.5x LOC)	.00008	.00016	.00024	.00031	.00039	.00047	.00063	.00094	.00125	< .10x Dia	.5x - 1.5x Dia
			Finishing (3x LOC)	.00007	.00014	.00021	.00028	.00035	.00042	.00057	.00085	.00114	< .10x Dia	.5x - 3x Dia
			Finishing (4x LOC)	.00007	.00013	.00020	.00027	.00034	.00040	.00054	.00081	.00109	< .10x Dia	.5x - 5x Dia
			Finishing (5x LOC)	.00005	.00011	.00016	.00021	.00027	.00032	.00043	.00064	.00085	< .07x Dia	.5x - 5x Dia
			Finishing (6x LOC)	.00005	.00010	.00015	.00019	.00024	.00029	.00039	.00058	.00077	< .07x Dia	.5x - 6x Dia
			Finishing (7x LOC)	.00004	.00008	.00013	.00017	.00021	.00025	.00034	.00050	.00067	< .05x Dia	.5x - 7x Dia
			Finishing (8x LOC)	.00004	.00008	.00012	.00016	.00020	.00023	.00031	.00047	.00063	< .05x Dia	.5x - 8x Dia
			Finishing (10x LOC)	-	.00007	.00011	.00015	.00018	.00022	.00030	.00044	.00059	< .04x Dia	.5x - 10x Dia
			Finishing (12x LOC)	-	.00007	.00011	.00014	.00018	.00021	.00028	.00043	.00057	< .04x Dia	.5x - 12x Dia
			Finishing (15x LOC)	-	-	-	.00013	.00016	.00019	.00026	.00038	.00051	< .02x Dia	.5x - 15x Dia

continued on next page



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VARIABLE HELIX END MILLS FOR HIGH TEMP ALLOYS

Finishers – Square (cont.)

continued from previous page

SPEEDS & FEEDS (Finishers for High Temp Alloys)

Material	Hardness (HBn)	SFM		Chip Load Per Tooth (IPT) By Cutter Diameter									Depth of Cut	
				.015	.031	.047	.062	.078	.093	.125	.187	.250	Radial	Axial
Titanium: All alloys	275 - 300 300 - 350	300 200	Finishing (0.8x LOC)	.00006	.00012	.00018	.00023	.00029	.00035	.00047	.00070	.00094	< .10x Dia	.5x - 1.5x Dia
			Finishing (1.5x LOC)	.00005	.00011	.00016	.00021	.00027	.00032	.00043	.00064	.00085	< .10x Dia	.5x - 1.5x Dia
			Finishing (3x LOC)	.00005	.00010	.00015	.00019	.00024	.00029	.00039	.00058	.00078	< .10x Dia	.5x - 3x Dia
			Finishing (4x LOC)	.00004	.00009	.00014	.00018	.00023	.00028	.00037	.00055	.00074	< .10x Dia	.5x - 4x Dia
			Finishing (5x LOC)	.00003	.00007	.00011	.00014	.00018	.00022	.00029	.00043	.00058	< .07x Dia	.5x - 5x Dia
			Finishing (6x LOC)	.00003	.00007	.00010	.00013	.00016	.00020	.00026	.00039	.00053	< .07x Dia	.5x - 6x Dia
			Finishing (7x LOC)	.00003	.00006	.00009	.00011	.00014	.00017	.00023	.00034	.00046	< .05x Dia	.5x - 7x Dia
			Finishing (8x LOC)	.00003	.00005	.00008	.00011	.00013	.00016	.00021	.00032	.00043	< .05x Dia	.5x - 8x Dia
			Finishing (10x LOC)	-	.00005	.00008	.00010	.00013	.00015	.00020	.00030	.00040	< .04x Dia	.5x - 10x Dia
			Finishing (12x LOC)	-	.00005	.00007	.00010	.00012	.00014	.00019	.00029	.00039	< .04x Dia	.5x - 12x Dia
			Finishing (15x LOC)	-	-	-	.00009	.00011	.00013	.00017	.00026	.00035	< .02x Dia	.5x - 15x Dia
	350 - 400 400 - 425	150 100	Finishing (0.8x LOC)	.00005	.00009	.00014	.00019	.00023	.00028	.00038	.00056	.00075	< .10x Dia	.5x - 1.5x Dia
			Finishing (1.5x LOC)	.00004	.00008	.00013	.00017	.00021	.00025	.00034	.00051	.00068	< .10x Dia	.5x - 1.5x Dia
			Finishing (3x LOC)	.00004	.00008	.00012	.00015	.00019	.00023	.00031	.00046	.00062	< .10x Dia	.5x - 3x Dia
			Finishing (4x LOC)	.00004	.00007	.00011	.00015	.00019	.00022	.00030	.00044	.00059	< .10x Dia	.5x - 4x Dia
			Finishing (5x LOC)	.00003	.00006	.00009	.00012	.00015	.00017	.00023	.00035	.00047	< .07x Dia	.5x - 5x Dia
			Finishing (6x LOC)	.00003	.00005	.00008	.00010	.00013	.00016	.00021	.00032	.00042	< .07x Dia	.5x - 6x Dia
			Finishing (7x LOC)	.00002	.00005	.00007	.00009	.00011	.00014	.00018	.00028	.00037	< .05x Dia	.5x - 7x Dia
			Finishing (8x LOC)	.00002	.00004	.00006	.00008	.00011	.00013	.00017	.00026	.00034	< .05x Dia	.5x - 8x Dia
			Finishing (10x LOC)	-	.00004	.00006	.00008	.00010	.00012	.00016	.00024	.00032	< .04x Dia	.5x - 10x Dia
			Finishing (12x LOC)	-	.00004	.00006	.00008	.00010	.00012	.00016	.00023	.00031	< .04x Dia	.5x - 12x Dia
			Finishing (15x LOC)	-	-	-	.00007	.00009	.00010	.00014	.00021	.00028	< .02x Dia	.5x - 15x Dia
Nickel Alloys: Inconel, Hastelloy, Waspalloy, Monel, Nimonic, Haynes, Discoloy, Incoloy	275 - 300 300 - 350	150 100	Finishing (0.8x LOC)	.00002	.00005	.00007	.00010	.00012	.00015	.00020	.00029	.00039	< .10x Dia	.5x - 1.5x Dia
			Finishing (1.5x LOC)	.00002	.00004	.00007	.00009	.00011	.00013	.00018	.00027	.00036	< .10x Dia	.5x - 1.5x Dia
			Finishing (3x LOC)	.00002	.00004	.00006	.00008	.00010	.00012	.00016	.00024	.00033	< .10x Dia	.5x - 3x Dia
			Finishing (4x LOC)	.00002	.00004	.00005	.00007	.00009	.00011	.00014	.00021	.00029	< .10x Dia	.5x - 4x Dia
			Finishing (5x LOC)	.00001	.00002	.00004	.00005	.00006	.00007	.00010	.00015	.00020	< .05x Dia	.5x - 5x Dia
			Finishing (6x LOC)	.00001	.00002	.00003	.00005	.00006	.00007	.00009	.00014	.00018	< .05x Dia	.5x - 6x Dia
			Finishing (7x LOC)	.00001	.00002	.00003	.00004	.00005	.00006	.00007	.00011	.00015	< .03x Dia	.5x - 7x Dia
			Finishing (8x LOC)	.00001	.00002	.00003	.00004	.00005	.00006	.00008	.00011	.00015	< .03x Dia	.5x - 8x Dia
			Finishing (10x LOC)	-	.00002	.00003	.00003	.00004	.00005	.00007	.00010	.00014	< .02x Dia	.5x - 10x Dia
			Finishing (12x LOC)	-	.00002	.00002	.00003	.00004	.00005	.00007	.00010	.00013	< .02x Dia	.5x - 12x Dia
			Finishing (15x LOC)	-	-	-	.00003	.00004	.00004	.00006	.00009	.00011	< .01x Dia	.5x - 15x Dia
	350 - 400 400 - 425	80 60	Finishing (0.8x LOC)	.00002	.00004	.00006	.00008	.00010	.00012	.00016	.00024	.00031	< .10x Dia	.5x - 1.5x Dia
			Finishing (1.5x LOC)	.00002	.00004	.00005	.00007	.00009	.00011	.00014	.00021	.00029	< .10x Dia	.5x - 1.5x Dia
			Finishing (3x LOC)	.00002	.00003	.00005	.00006	.00008	.00010	.00013	.00019	.00026	< .10x Dia	.5x - 3x Dia
			Finishing (4x LOC)	.00001	.00003	.00004	.00006	.00007	.00009	.00011	.00017	.00023	< .10x Dia	.5x - 4x Dia
			Finishing (5x LOC)	.00001	.00002	.00003	.00004	.00005	.00006	.00008	.00012	.00016	< .05x Dia	.5x - 5x Dia
			Finishing (6x LOC)	.00001	.00002	.00003	.00004	.00005	.00005	.00007	.00011	.00015	< .05x Dia	.5x - 6x Dia
			Finishing (7x LOC)	.00001	.00001	.00002	.00003	.00004	.00004	.00006	.00009	.00012	< .03x Dia	.5x - 7x Dia
			Finishing (8x LOC)	.00001	.00002	.00002	.00003	.00004	.00005	.00006	.00009	.00012	< .03x Dia	.5x - 8x Dia
			Finishing (10x LOC)	-	.00001	.00002	.00003	.00003	.00004	.00006	.00008	.00011	< .02x Dia	.5x - 10x Dia
			Finishing (12x LOC)	-	.00001	.00002	.00003	.00003	.00004	.00005	.00008	.00010	< .02x Dia	.5x - 12x Dia
			Finishing (15x LOC)	-	-	-	.00002	.00003	.00003	.00005	.00007	.00009	< .01x Dia	.5x - 15x Dia

VARIABLE HELIX END MILLS FOR HIGH TEMP ALLOYS

Finishers – Square – Long Reach



- Optimized for titanium alloys, inconel, nickel alloys, and other high-temperature materials with outstanding performance in difficult-to-machine steels, stainless steels, and tool steels
- Long reach design for deep cavities and increased rigidity
- Reduced neck diameter to avoid heeling
- Length of cut = 3x diameter
- Variable helix design (approx. 41°) reduces chatter and harmonics improving finish
- Large core and eccentric relief for improved tool life
- Latest generation AlTiN Nano coating offers superior hardness and heat resistance
- h6 shank tolerance for high precision tool holders
- End cutting (not center cutting)
- Solid carbide
- CNC ground in the USA

mm & in

CUTTER DIAMETER			LENGTH OF CUT	OVERALL REACH	FLUTES	SHANK DIAMETER	OVERALL LENGTH	AlTiN NANO COATED	
D_1 +.0005″ −.0005″	+.00mm −.02mm	decimal equivalent	L_2 +.010″ −.000″ +.25mm −.00mm	L_3 +.010″ −.000″ +.25mm −.00mm		D_2 (h6)	L_1	TOOL #	PRICE
.015 (1/64)		.0150	.045	**.078** (5x)	4	1/8	2-1/2	940715-C6	59.20
.015 (1/64)		.0150	.045	**.125** (8x)	4	1/8	2-1/2	962115-C6	61.20
.015 (1/64)		.0150	.045	**.187** (12x)	4	1/8	2-1/2	951815-C6	64.50
.020		.0200	.060	**.160** (8x)	4	1/8	2-1/2	962120-C6	53.50
.025		.0250	.075	**.203** (8x)	4	1/8	2-1/2	962125-C6	53.50
.031 (1/32)		.0310	.093	**.156** (5x)	6	1/8	2-1/2	940731-C6	52.10
.031 (1/32)		.0310	.093	**.187** (6x)	6	1/8	2-1/2	792531-C6	52.10
.031 (1/32)		.0310	.093	**.250** (8x)	6	1/8	2-1/2	962131-C6	53.50
.031 (1/32)		.0310	.093	**.312** (10x)	6	1/8	2-1/2	862831-C6	55.30
.031 (1/32)		.0310	.093	**.375** (12x)	6	1/8	2-1/2	951831-C6	56.90
	1.0 mm	.0393	3.00 mm	**8.0 mm** (8x)	6	4 mm	50 mm	924722-C6	54.00
.040		.0400	.120	**.325** (8x)	6	1/8	2-1/2	962140-C6	53.50
.047 (3/64)		.0470	.141	**.250** (5x)	6	1/8	2-1/2	940747-C6	52.10
.047 (3/64)		.0470	.141	**.375** (8x)	6	1/8	2-1/2	962147-C6	53.50
.047 (3/64)		.0470	.141	**.570** (12x)	6	1/8	2-1/2	951847-C6	56.90
.050		.0500	.150	**.250** (5x)	7	1/8	2-1/2	940750-C6	52.10
.050		.0500	.150	**.400** (8x)	7	1/8	2-1/2	962150-C6	53.50
	1.5 mm	.0590	4.50 mm	**12.0 mm** (8x)	7	4 mm	50 mm	924733-C6	54.00
.060		.0600	.180	**.500** (8x)	7	1/8	2-1/2	962160-C6	53.50
.062 (1/16)		.0620	.186	**.312** (5x)	7	1/8	2-1/2	940762-C6	49.80
.062 (1/16)		.0620	.186	**.375** (6x)	7	1/8	2-1/2	792562-C6	49.80
.062 (1/16)		.0620	.186	**.500** (8x)	7	1/8	2-1/2	962162-C6	51.30
.062 (1/16)		.0620	.186	**.625** (10x)	7	1/8	2-1/2	862862-C6	53.10
.062 (1/16)		.0620	.186	**.750** (12x)	7	1/8	2-1/2	951862-C6	54.80
.070		.0700	.210	**.570** (8x)	7	1/8	2-1/2	962170-C6	51.30
.078 (5/64)		.0780	.234	**.406** (5x)	7	1/8	2-1/2	940778-C6	49.80
.078 (5/64)		.0780	.234	**.625** (8x)	7	1/8	2-1/2	962178-C6	51.30
.078 (5/64)		.0780	.234	**.940** (12x)	7	1/8	2-1/2	951878-C6	54.80
	2.0 mm	.0787	6.00 mm	**16.0 mm** (8x)	7	4 mm	50 mm	924745-C6	51.80
.080		.0800	.240	**.650** (8x)	7	1/8	2-1/2	962180-C6	51.30

continued on next page

VARIABLE HELIX END MILLS FOR HIGH TEMP ALLOYS

Finishers – Square – Long Reach (cont.)

continued from previous page

CUTTER DIAMETER			LENGTH OF CUT	OVERALL REACH	FLUTES	SHANK DIAMETER	OVERALL LENGTH	AlTiN NANO COATED	
D_1 +.0005″ −.0005″	+.00mm −.02mm	decimal equivalent	L_2 +.010″ −.000″ +.25mm −.00mm	L_3 +.010″ −.000″ +.25mm −.00mm		D_2 (h6)	L_1	TOOL #	PRICE
.090		.0900	.270	**.750** (8x)	7	1/8	2-1/2	962190-C6	51.30
.093 (3/32)		.0930	.279	**.500** (5x)	7	1/8	2-1/2	940793-C6	49.80
.093 (3/32)		.0930	.279	**.585** (6x)	7	1/8	2-1/2	792593-C6	49.80
.093 (3/32)		.0930	.279	**.750** (8x)	7	1/8	2-1/2	962193-C6	51.30
.093 (3/32)		.0930	.279	**.950** (10x)	7	1/8	2-1/2	862893-C6	53.10
.093 (3/32)		.0930	.279	**1.125** (12x)	7	1/8	2-1/2	951893-C6	54.80
.100		.1000	.300	**.800** (8x)	7	1/8	2-1/2	962200-C6	51.30
.109 (7/64)		0.1094	.327	**.570** (5x)	7	1/8	2-1/2	940802-C6	49.80
.109 (7/64)		0.1094	.327	**.900** (8x)	7	1/8	2-1/2	962202-C6	51.30
	3.0 mm	.1181	9.00 mm	**24.0 mm** (8x)	7	4 mm	50 mm	924757-C6	51.80

D_1 +.000″ −.002″		L_2 +.030″ −.000″	L_3 +.030″ −.000″		D_2 (h6)	L_1	TOOL #	PRICE
.125 (1/8)	.1250	.375	**.625** (5x)	7	1/8	2-1/2	940808-C6	48.10
.125 (1/8)	.1250	.375	**.750** (6x)	7	1/8	2-1/2	792608-C6	48.10
.125 (1/8)	.1250	.375	**1.000** (8x)	7	1/8	2-1/2	962208-C6	49.50
.125 (1/8)	.1250	.375	**1.250** (10x)	7	1/8	3	862908-C6	51.10
.125 (1/8)	.1250	.375	**1.500** (12x)	7	1/8	3	951908-C6	52.70
.156 (5/32)	.1562	.470	**.750** (5x)	7	3/16	3	940810-C6	48.10
.156 (5/32)	.1562	.470	**1.250** (8x)	7	3/16	3	962210-C6	49.50
.187 (3/16)	.1875	.570	**1.000** (5x)	7	3/16	3	940812-C6	51.00
.187 (3/16)	.1875	.570	**1.500** (8x)	7	3/16	3	962212-C6	52.30
.250 (1/4)	.2500	.750	**1.250** (5x)	7	1/4	4	940816-C6	61.60
.250 (1/4)	.2500	.750	**2.000** (8x)	7	1/4	4	962216-C6	63.60

VARIABLE HELIX END MILLS FOR HIGH TEMP ALLOYS

Finishers – Square – Long Reach (cont.)

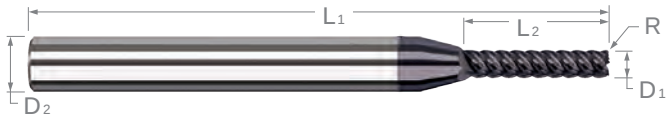
SPEEDS & FEEDS (Finishers – Long Reach for High Temp Alloys)

Material	Hardness (HBn)	SFM		Chip Load Per Tooth (IPT) By Cutter Diameter									Depth of Cut	
				.015	.031	.047	.062	.078	.093	.125	.187	.250	Radial	Axial
Stainless Steels: 40x, 41x, 42x, 43x, 44x, 13-8, 15-5, 15-7, 17-4, 17-7	275 - 300 300 - 350	400 350	Finishing (5x Reach)	0.00009	0.00020	0.00030	0.00039	0.00049	0.00059	0.00079	0.00118	0.00158	< .10x Dia	.5x - 3x Dia
			Finishing (6x Reach)	0.00009	0.00018	0.00028	0.00037	0.00046	0.00055	0.00074	0.00111	0.00148	< .07x Dia	.5x - 3x Dia
			Finishing (8x Reach)	0.00008	0.00016	0.00025	0.00032	0.00041	0.00049	0.00065	0.00098	0.00131	< .07x Dia	.5x - 3x Dia
			Finishing (10x Reach)	0.00007	0.00015	0.00023	0.00031	0.00039	0.00046	0.00062	0.00093	0.00124	< .05x Dia	.5x - 3x Dia
			Finishing (12x Reach)	0.00007	0.00015	0.00022	0.00029	0.00037	0.00044	0.00059	0.00088	0.00118	< .05x Dia	.5x - 3x Dia
Tool Steels: D, H, M, T, S series	300 - 350	500	Finishing (5x Reach)	0.00009	0.00020	0.00030	0.00039	0.00049	0.00059	0.00079	0.00118	0.00158	< .10x Dia	.5x - 3x Dia
			Finishing (6x Reach)	0.00009	0.00018	0.00028	0.00037	0.00046	0.00055	0.00074	0.00111	0.00148	< .07x Dia	.5x - 3x Dia
			Finishing (8x Reach)	0.00008	0.00016	0.00025	0.00032	0.00041	0.00049	0.00065	0.00098	0.00131	< .07x Dia	.5x - 3x Dia
			Finishing (10x Reach)	0.00007	0.00015	0.00023	0.00031	0.00039	0.00046	0.00062	0.00093	0.00124	< .05x Dia	.5x - 3x Dia
			Finishing (12x Reach)	0.00007	0.00015	0.00022	0.00029	0.00037	0.00044	0.00059	0.00088	0.00118	< .05x Dia	.5x - 3x Dia
	350 - 400	250	Finishing (5x Reach)	0.00008	0.00016	0.00024	0.00031	0.00039	0.00047	0.00063	0.00094	0.00126	< .10x Dia	.5x - 3x Dia
			Finishing (6x Reach)	0.00007	0.00015	0.00022	0.00029	0.00037	0.00044	0.00059	0.00089	0.00118	< .07x Dia	.5x - 3x Dia
			Finishing (8x Reach)	0.00006	0.00013	0.00020	0.00026	0.00033	0.00039	0.00052	0.00078	0.00105	< .07x Dia	.5x - 3x Dia
			Finishing (10x Reach)	0.00006	0.00012	0.00019	0.00025	0.00031	0.00037	0.00050	0.00074	0.00100	< .05x Dia	.5x - 3x Dia
			Finishing (12x Reach)	0.00006	0.00012	0.00018	0.00023	0.00029	0.00035	0.00047	0.00071	0.00095	< .05x Dia	.5x - 3x Dia
	400 - 540	200	Finishing (5x Reach)	0.00006	0.00013	0.00019	0.00025	0.00032	0.00038	0.00051	0.00077	0.00102	< .10x Dia	.5x - 3x Dia
			Finishing (6x Reach)	0.00006	0.00012	0.00018	0.00024	0.00030	0.00036	0.00048	0.00072	0.00096	< .07x Dia	.5x - 3x Dia
			Finishing (8x Reach)	0.00005	0.00011	0.00016	0.00021	0.00027	0.00032	0.00042	0.00064	0.00085	< .07x Dia	.5x - 3x Dia
			Finishing (10x Reach)	0.00005	0.00010	0.00015	0.00020	0.00025	0.00030	0.00040	0.00060	0.00081	< .05x Dia	.5x - 3x Dia
			Finishing (12x Reach)	0.00005	0.00010	0.00014	0.00019	0.00024	0.00029	0.00038	0.00057	0.00077	< .05x Dia	.5x - 3x Dia
Titanium: All alloys	275 - 300 300 - 350	300 200	Finishing (5x Reach)	0.00004	0.00009	0.00013	0.00017	0.00022	0.00026	0.00035	0.00052	0.00070	< .10x Dia	.5x - 3x Dia
			Finishing (6x Reach)	0.00004	0.00008	0.00012	0.00016	0.00020	0.00024	0.00033	0.00049	0.00066	< .07x Dia	.5x - 3x Dia
			Finishing (8x Reach)	0.00003	0.00007	0.00011	0.00014	0.00018	0.00022	0.00029	0.00043	0.00058	< .07x Dia	.5x - 3x Dia
			Finishing (10x Reach)	0.00003	0.00007	0.00010	0.00014	0.00017	0.00020	0.00028	0.00041	0.00055	< .05x Dia	.5x - 3x Dia
			Finishing (12x Reach)	0.00003	0.00006	0.00010	0.00013	0.00016	0.00019	0.00026	0.00039	0.00052	< .05x Dia	.5x - 3x Dia
	350 - 400 400 - 425	150 100	Finishing (5x Reach)	0.00003	0.00007	0.00010	0.00014	0.00017	0.00021	0.00028	0.00042	0.00056	< .10x Dia	.5x - 3x Dia
			Finishing (6x Reach)	0.00003	0.00007	0.00010	0.00013	0.00016	0.00020	0.00026	0.00039	0.00052	< .07x Dia	.5x - 3x Dia
			Finishing (8x Reach)	0.00003	0.00006	0.00009	0.00011	0.00014	0.00017	0.00023	0.00035	0.00046	< .07x Dia	.5x - 3x Dia
			Finishing (10x Reach)	0.00003	0.00005	0.00008	0.00011	0.00014	0.00016	0.00022	0.00033	0.00044	< .05x Dia	.5x - 3x Dia
			Finishing (12x Reach)	0.00003	0.00005	0.00008	0.00010	0.00013	0.00016	0.00021	0.00031	0.00042	< .05x Dia	.5x - 3x Dia
Nickel Alloys: Inconel, Hastelloy, Waspalloy, Monel, Nimonic, Haynes, Discoloy, Incoloy	275 - 300 300 - 350	150 100	Finishing (5x Reach)	0.00002	0.00004	0.00005	0.00007	0.00009	0.00011	0.00015	0.00022	0.00029	< .10x Dia	.5x - 3x Dia
			Finishing (6x Reach)	0.00001	0.00002	0.00004	0.00005	0.00006	0.00007	0.00010	0.00014	0.00019	< .05x Dia	.5x - 3x Dia
			Finishing (8x Reach)	0.00001	0.00002	0.00003	0.00004	0.00005	0.00007	0.00009	0.00013	0.00018	< .05x Dia	.5x - 3x Dia
			Finishing (10x Reach)	0.00001	0.00002	0.00003	0.00004	0.00005	0.00006	0.00008	0.00012	0.00016	< .03x Dia	.5x - 3x Dia
			Finishing (12x Reach)	0.00001	0.00002	0.00003	0.00003	0.00004	0.00005	0.00007	0.00010	0.00014	< .03x Dia	.5x - 3x Dia
	350 - 400 400 - 425	80 60	Finishing (5x Reach)	0.00001	0.00003	0.00004	0.00006	0.00007	0.00009	0.00012	0.00018	0.00023	< .10x Dia	.5x - 3x Dia
			Finishing (6x Reach)	0.00001	0.00002	0.00003	0.00004	0.00005	0.00006	0.00008	0.00012	0.00015	< .05x Dia	.5x - 3x Dia
			Finishing (8x Reach)	0.00001	0.00002	0.00003	0.00003	0.00004	0.00005	0.00007	0.00011	0.00014	< .05x Dia	.5x - 3x Dia
			Finishing (10x Reach)	0.00001	0.00002	0.00002	0.00003	0.00004	0.00005	0.00006	0.00010	0.00013	< .03x Dia	.5x - 3x Dia
			Finishing (12x Reach)	0.00001	0.00001	0.00002	0.00003	0.00003	0.00004	0.00005	0.00008	0.00011	< .03x Dia	.5x - 3x Dia

NEW SIZES!

VARIABLE HELIX END MILLS FOR HIGH TEMP ALLOYS

Finishers – Corner Radius



- Optimized for titanium alloys, inconel, nickel alloys, and other high-temperature materials with outstanding performance in difficult-to-machine steels, stainless steels, and tool steels
- Variable helix design (approx. 41°) reduces chatter and harmonics improving finish
- Latest generation AlTiN Nano coating offers superior hardness and heat resistance
- h6 shank tolerance for high precision tool holders
- End cutting (not center cutting)
- Solid carbide
- CNC ground in the USA

CUTTER DIAMETER	CORNER RADIUS	LENGTH OF CUT	FLUTES	SHANK DIAMETER	OVERALL LENGTH	AlTiN NANO COATED	
D_1 $^{+.0005''}_{-.0005''}$	R $^{+.001''}_{-.001''}$	L_2 $^{+.010''}_{-.000''}$		D_2 (h6)	L_1	TOOL #	PRICE
.015 (1/64)	**.003**	.045 (3x)	4	1/8	1-1/2	775615-C6	41.10
.015 (1/64)	**.003**	.078 (5x)	4	1/8	2-1/2	774715-C6	55.30
.020	**.003**	.060 (3x)	4	1/8	1-1/2	775620-C6	41.10
.020	**.003**	.100 (5x)	4	1/8	2-1/2	774720-C6	55.30
.020	**.005**	.060 (3x)	4	1/8	1-1/2	873020-C6	41.10
.020	**.005**	.100 (5x)	4	1/8	1-1/2	874620-C6	55.30
.031 (1/32)	**.005**	.093 (3x)	6	1/8	1-1/2	873031-C6	39.10
.031 (1/32)	**.005**	.156 (5x)	6	1/8	2-1/2	874631-C6	53.30
.047 (3/64)	**.005**	.141 (3x)	6	1/8	1-1/2	873047-C6	39.10
.047 (3/64)	**.005**	.250 (5x)	6	1/8	2-1/2	874647-C6	53.30
.047 (3/64)	**.010**	.141 (3x)	6	1/8	1-1/2	882647-C6	39.10
.047 (3/64)	**.010**	.250 (5x)	6	1/8	2-1/2	885447-C6	53.30
.062 (1/16)	**.005**	.186 (3x)	7	1/8	1-1/2	873062-C6	38.90
.062 (1/16)	**.005**	.312 (5x)	7	1/8	2-1/2	874662-C6	51.00
.062 (1/16)	**.010**	.186 (3x)	7	1/8	1-1/2	882662-C6	38.90
.062 (1/16)	**.010**	.312 (5x)	7	1/8	2-1/2	885462-C6	51.00
.078 (5/64)	**.005**	.234 (3x)	7	1/8	1-1/2	873078-C6	37.10
.078 (5/64)	**.005**	.406 (5x)	7	1/8	2-1/2	874678-C6	51.00
.078 (5/64)	**.010**	.234 (3x)	7	1/8	1-1/2	882678-C6	37.10
.078 (5/64)	**.010**	.406 (5x)	7	1/8	2-1/2	885478-C6	51.00
.093 (3/32)	**.005**	.279 (3x)	7	1/8	1-1/2	873093-C6	37.10
.093 (3/32)	**.005**	.500 (5x)	7	1/8	2-1/2	874693-C6	51.00
.093 (3/32)	**.010**	.279 (3x)	7	1/8	1-1/2	882693-C6	37.10
.093 (3/32)	**.010**	.500 (5x)	7	1/8	2-1/2	885493-C6	51.00
.093 (3/32)	**.020**	.279 (3x)	7	1/8	1-1/2	774093-C6	37.10

D_1 $^{+.000''}_{-.002''}$	R $^{+.001''}_{-.001''}$	L_2 $^{+.030''}_{-.000''}$		D_2 (h6)	L_1	TOOL #	PRICE	
.125 (1/8)	**.005**	.187 (1.5x)	7	1/8	1-1/2	872308-C6	33.50	
.125 (1/8)	**.005**	.375 (3x)	7	1/8	1-1/2	873108-C6	33.20	
.125 (1/8)	**.005**	.625 (5x)	7	1/8	2-1/2	874708-C6	35.90	NEW
.125 (1/8)	**.010**	.187 (1.5x)	7	1/8	1-1/2	880108-C6	33.50	
.125 (1/8)	**.010**	.375 (3x)	7	1/8	1-1/2	882708-C6	33.20	
.125 (1/8)	**.010**	.625 (5x)	7	1/8	2-1/2	885508-C6	35.90	NEW
.125 (1/8)	**.015**	.375 (3x)	7	1/8	1-1/2	813808-C6	33.20	
.125 (1/8)	**.020**	.375 (3x)	7	1/8	1-1/2	774108-C6	33.20	
.125 (1/8)	**.030**	.187 (1.5x)	7	1/8	1-1/2	890508-C6	33.50	
.125 (1/8)	**.030**	.375 (3x)	7	1/8	1-1/2	892708-C6	33.20	

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NEW SIZES!

VARIABLE HELIX END MILLS FOR HIGH TEMP ALLOYS

Finishers – Corner Radius (cont.)

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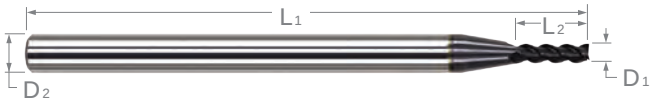
	CUTTER DIAMETER	CORNER RADIUS	LENGTH OF CUT	FLUTES	SHANK DIAMETER	OVERALL LENGTH	AlTiN NANO COATED	
	D_1 $^{+.000''}_{-.002''}$	R $^{+.001''}_{-.001''}$	L_2 $^{+.030''}_{-.000''}$		D_2 (h6)	L_1	TOOL #	PRICE
NEW	.156 (5/32)	**.005**	.470 (3x)	7	3/16	2	873110-C6	37.20
NEW	.156 (5/32)	**.010**	.470 (3x)	7	3/16	2	882710-C6	37.20
	.187 (3/16)	**.005**	.285 (1.5x)	7	3/16	2	872312-C6	37.70
	.187 (3/16)	**.005**	.570 (3x)	7	3/16	2	873112-C6	37.20
	.187 (3/16)	**.010**	.285 (1.5x)	7	3/16	2	880112-C6	37.70
	.187 (3/16)	**.010**	.570 (3x)	7	3/16	2	882712-C6	37.20
	.187 (3/16)	**.015**	.570 (3x)	7	3/16	2	813812-C6	37.20
	.187 (3/16)	**.020**	.570 (3x)	7	3/16	2	774112-C6	37.20
	.187 (3/16)	**.030**	.285 (1.5x)	7	3/16	2	890512-C6	37.70
	.187 (3/16)	**.030**	.570 (3x)	7	3/16	2	892712-C6	37.20
	.250 (1/4)	**.005**	.375 (1.5x)	7	1/4	2-1/2	872316-C6	48.60
	.250 (1/4)	**.005**	.750 (3x)	7	1/4	2-1/2	873116-C6	47.80
	.250 (1/4)	**.010**	.375 (1.5x)	7	1/4	2-1/2	880116-C6	48.60
	.250 (1/4)	**.010**	.750 (3x)	7	1/4	2-1/2	882716-C6	47.80
	.250 (1/4)	**.010**	1.250 (5x)	7	1/4	4	885516-C6	51.20
	.250 (1/4)	**.015**	.750 (3x)	7	1/4	2-1/2	813816-C6	47.80
	.250 (1/4)	**.020**	.750 (3x)	7	1/4	2-1/2	774116-C6	47.80
	.250 (1/4)	**.030**	.375 (1.5x)	7	1/4	2-1/2	890516-C6	48.60
	.250 (1/4)	**.030**	.750 (3x)	7	1/4	2-1/2	892716-C6	47.80

PLEASE SEE SPEEDS & FEEDS ON PAGE 141

NEW SIZES!

VARIABLE HELIX END MILLS FOR MEDIUM ALLOY STEELS

Square



- Optimized for readily machinable medium alloy steels, stainless steels, and tool steels
- Variable helix design (approx. 37°) reduces chatter and harmonics and increases material removal rates
- AlTiN coated for improved lubricity and heat resistance
- h6 shank tolerance for high precision tool holders
- Center cutting
- Solid carbide
- CNC ground in the USA

mm & in

CUTTER DIAMETER D1 +.0005″ −.0005″	+.00mm −.02mm	decimal equivalent	LENGTH OF CUT L2 +.010″ −.000″ +.25mm −.00mm	FLUTES	SHANK DIAMETER D2 (h6)	OVERALL LENGTH L1	AlTiN COATED TOOL #	PRICE	
.010		.0100	**.015** (1.5x)	3	1/8	1-1/2	964910-C3	53.70	
.010		.0100	**.030** (3x)	3	1/8	1-1/2	958510-C3	53.70	
.015 (1/64)		.0150	**.023** (1.5x)	3	1/8	1-1/2	964915-C3	43.70	
.015 (1/64)		.0150	**.045** (3x)	3	1/8	1-1/2	958515-C3	43.70	
.015 (1/64)		.0150	**.078** (5x)	3	1/8	2-1/2	952615-C3	53.70	
	.5 mm	.0196	**1.50 mm** (3x)	3	4 mm	50 mm	945911-C3	42.10	
.020		.0200	**.030** (1.5x)	3	1/8	1-1/2	964920-C3	38.40	
.020		.0200	**.060** (3x)	3	1/8	1-1/2	958520-C3	38.40	
.020		.0200	**.100** (5x)	3	1/8	2-1/2	952620-C3	47.30	
.025		.0250	**.038** (1.5x)	3	1/8	1-1/2	964925-C3	36.90	
.025		.0250	**.075** (3x)	3	1/8	1-1/2	958525-C3	36.90	
.025		.0250	**.125** (5x)	3	1/8	2-1/2	952625-C3	45.80	
.030		.0300	**.090** (3x)	3	1/8	1-1/2	958530-C3	36.70	
.031 (1/32)		.0310	**.047** (1.5x)	3	1/8	1-1/2	964931-C3	31.10	
.031 (1/32)		.0310	**.093** (3x)	3	1/8	1-1/2	958531-C3	31.10	
.031 (1/32)		.0310	**.125** (4x)	3	1/8	2-1/2	814831-C3	40.10	NEW
.031 (1/32)		.0310	**.156** (5x)	3	1/8	2-1/2	952631-C3	40.10	
.035		.0350	**.053** (1.5x)	3	1/8	1-1/2	964935-C3	31.10	
.035		.0350	**.105** (3x)	3	1/8	1-1/2	958535-C3	31.10	
	1.0 mm	.0393	**3.00 mm** (3x)	3	4 mm	50 mm	945922-C3	34.90	
.040		.0400	**.060** (1.5x)	3	1/8	1-1/2	964940-C3	31.30	
.040		.0400	**.120** (3x)	3	1/8	1-1/2	958540-C3	31.30	
.040		.0400	**.203** (5x)	3	1/8	2-1/2	952640-C3	40.30	
.045		.0450	**.068** (1.5x)	3	1/8	1-1/2	964945-C3	31.30	
.045		.0450	**.135** (3x)	3	1/8	1-1/2	958545-C3	31.30	
.045		.0450	**.225** (5x)	3	1/8	2-1/2	952645-C3	40.30	
.047 (3/64)		.0470	**.071** (1.5x)	3	1/8	1-1/2	964947-C3	31.10	
.047 (3/64)		.0470	**.141** (3x)	3	1/8	1-1/2	958547-C3	31.10	
.047 (3/64)		.0470	**.250** (5x)	3	1/8	2-1/2	952647-C3	40.10	
.050		.0500	**.075** (1.5x)	3	1/8	1-1/2	964950-C3	31.30	
.050		.0500	**.150** (3x)	3	1/8	1-1/2	958550-C3	31.30	
.055		.0550	**.083** (1.5x)	3	1/8	1-1/2	964955-C3	31.10	NEW
.055		.0550	**.165** (3x)	3	1/8	1-1/2	958555-C3	31.10	
.055		.0550	**.275** (5x)	3	1/8	2-1/2	952655-C3	40.10	NEW
	1.5 mm	.0590	**4.50 mm** (3x)	3	4 mm	50 mm	945933-C3	33.00	
.060		.0600	**.180** (3x)	3	1/8	1-1/2	958560-C3	32.30	
.062 (1/16)		.0620	**.050** (0.8x)	3	1/8	1-1/2	835762-C3	32.20	
.062 (1/16)		.0620	**.093** (1.5x)	3	1/8	1-1/2	964962-C3	29.10	

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VARIABLE HELIX END MILLS FOR MEDIUM ALLOY STEELS

Square (cont.)

mm & in

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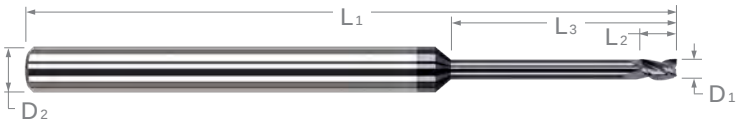
CUTTER DIAMETER D_1 +.0005″ −.0005″	+.00mm −.02mm	decimal equivalent	LENGTH OF CUT L_2 +.010″ −.000″ +.25mm −.00mm	FLUTES	SHANK DIAMETER D_2 (h6)	OVERALL LENGTH L_1	AlTiN COATED TOOL #	PRICE
.062 (1/16)		.0620	**.186** (3x)	3	1/8	1-1/2	958562-C3	29.10
.062 (1/16)		.0620	**.250** (4x)	3	1/8	2-1/2	814862-C3	33.70
.062 (1/16)		.0620	**.312** (5x)	3	1/8	2-1/2	952662-C3	38.30
.070		.0700	**.105** (1.5x)	3	1/8	1-1/2	964970-C3	29.10
.070		.0700	**.210** (3x)	3	1/8	1-1/2	958570-C3	29.10
.078 (5/64)		.0780	**.118** (1.5x)	3	1/8	1-1/2	964978-C3	29.10
.078 (5/64)		.0780	**.234** (3x)	3	1/8	1-1/2	958578-C3	29.10
.078 (5/64)		.0780	**.406** (5x)	3	1/8	2-1/2	952678-C3	38.30
	2.0 mm	.0787	**6.00 mm** (3x)	3	4 mm	50 mm	945945-C3	33.00
.080		.0800	**.240** (3x)	3	1/8	1-1/2	958580-C3	29.10
.090		.0900	**.270** (3x)	3	1/8	1-1/2	958590-C3	29.10
.093 (3/32)		.0930	**.074** (0.8x)	3	1/8	1-1/2	835793-C3	32.20
.093 (3/32)		.0930	**.140** (1.5x)	3	1/8	1-1/2	964993-C3	29.10
.093 (3/32)		.0930	**.279** (3x)	3	1/8	1-1/2	958593-C3	29.10
.093 (3/32)		.0930	**.375** (4x)	3	1/8	2-1/2	814893-C3	33.70
.093 (3/32)		.0930	**.500** (5x)	3	1/8	2-1/2	952693-C3	38.30
.100		.1000	**.150** (1.5x)	3	1/8	1-1/2	965000-C3	29.10
.100		.1000	**.300** (3x)	3	1/8	1-1/2	958600-C3	29.10
.109 (7/64)		.1090	**.164** (1.5x)	3	1/8	1-1/2	965002-C3	29.10
.109 (7/64)		.1090	**.327** (3x)	3	1/8	1-1/2	958602-C3	29.10
	3.0 mm	.1181	**9.00 mm** (3x)	3	4 mm	50 mm	945957-C3	33.00

D_1 +.000″ −.002″	+.00mm −.04mm	decimal equivalent	L_2 +.030″ −.000″ +.75mm −.00mm	FLUTES	D_2 (h6)	L_1	TOOL #	PRICE
.125 (1/8)		.1250	**.100** (0.8x)	4	1/8	1-1/2	835808-C3	30.60
.125 (1/8)		.1250	**.187** (1.5x)	4	1/8	1-1/2	965008-C3	27.60
.125 (1/8)		.1250	**.375** (3x)	4	1/8	1-1/2	958608-C3	27.60
.125 (1/8)		.1250	**.500** (4x)	4	1/8	2-1/2	814908-C3	35.10
.125 (1/8)		.1250	**.625** (5x)	4	1/8	2-1/2	952708-C3	38.10
.140 (9/64)		.1406	**.220** (1.5x)	4	3/16	2	965009-C3	39.70
.140 (9/64)		.1406	**.425** (3x)	4	3/16	2	958609-C3	39.70
.156 (5/32)		.1562	**.235** (1.5x)	4	3/16	2	965010-C3	29.80
.156 (5/32)		.1562	**.470** (3x)	4	3/16	2	958610-C3	29.80
.156 (5/32)		.1562	**.750** (5x)	4	3/16	3	952710-C3	40.70
.187 (3/16)		.1875	**.150** (0.8x)	4	3/16	2	835812-C3	32.70
.187 (3/16)		.1875	**.285** (1.5x)	4	3/16	2	965012-C3	29.80
.187 (3/16)		.1875	**.562** (3x)	4	3/16	2	958612-C3	29.80
.187 (3/16)		.1875	**1.000** (5x)	4	3/16	3	952712-C3	40.70
	6.0 mm	.2362	**18.00 mm** (3x)	4	6 mm	63 mm	945972-C3	33.00
.250 (1/4)		.2500	**.375** (1.5x)	4	1/4	2-1/2	965016-C3	37.70
.250 (1/4)		.2500	**.750** (3x)	4	1/4	2-1/2	958616-C3	37.70
.250 (1/4)		.2500	**1.250** (5x)	4	1/4	4	952716-C3	44.30
.375 (3/8)		.3750	**1.125** (3x)	4	3/8	2-1/2	958624-C3	47.10

PLEASE SEE SPEEDS & FEEDS ON PAGE 153

VARIABLE HELIX END MILLS FOR MEDIUM ALLOY STEELS

Square – Long Reach, Stub Flute



- Optimized for readily machinable medium alloy steels, stainless steels, and tool steels
- Long reach design for deep cavities
- Reduced neck diameter to avoid heeling
- Variable helix design (approx. 37°) reduces chatter and harmonics and increases material removal rates
- AlTiN coated for improved lubricity and heat resistance
- h6 shank tolerance for high precision tool holders
- Center cutting
- Solid carbide
- CNC ground in the USA

mm & in

CUTTER DIAMETER			LENGTH OF CUT	OVERALL REACH	FLUTES	SHANK DIAMETER	OVERALL LENGTH	AlTiN COATED	
D_1 +.0005″ −.0005″	+.00mm −.02mm	decimal equivalent	L_2 +.010″ −.000″ +.25mm −.00mm	L_3 +.010″ −.000″ +.25mm −.00mm		D_2 (h6)	L_1	TOOL #	PRICE
.015 (1/64)		.0150	.023	**.078** (5x)	3	1/8	2-1/2	936115-C3	57.10
.015 (1/64)		.0150	.023	**.125** (8x)	3	1/8	2-1/2	933815-C3	58.50
.020		.0200	.030	**.100** (5x)	3	1/8	2-1/2	936120-C3	55.00
.020		.0200	.030	**.160** (8x)	3	1/8	2-1/2	933820-C3	56.20
.025		.0250	.038	**.125** (5x)	3	1/8	2-1/2	936125-C3	53.50
.025		.0250	.038	**.203** (8x)	3	1/8	2-1/2	933825-C3	55.00
.030		.0300	.045	**.156** (5x)	3	1/8	2-1/2	936130-C3	50.40
.030		.0300	.045	**.250** (8x)	3	1/8	2-1/2	933830-C3	51.50
.031 (1/32)		.0310	.047	**.093** (3x)	3	1/8	1-1/2	945331-C3	48.80
.031 (1/32)		.0310	.047	**.156** (5x)	3	1/8	2-1/2	936131-C3	50.40
.031 (1/32)		.0310	.047	**.250** (8x)	3	1/8	2-1/2	933831-C3	51.50
.031 (1/32)		.0310	.047	**.312** (10x)	3	1/8	2-1/2	931131-C3	54.00
	1.0 mm	.0393	1.50 mm	**5.0 mm** (5x)	3	4 mm	50 mm	886422-C3	53.30
	1.0 mm	.0393	1.50 mm	**8.0 mm** (8x)	3	4 mm	50 mm	887122-C3	54.80
.040		.0400	.060	**.203** (5x)	3	1/8	2-1/2	936140-C3	53.30
.040		.0400	.060	**.325** (8x)	3	1/8	2-1/2	933840-C3	54.80
.047 (3/64)		.0470	.071	**.250** (5x)	3	1/8	2-1/2	936147-C3	50.40
.047 (3/64)		.0470	.071	**.375** (8x)	3	1/8	2-1/2	933847-C3	51.50
.062 (1/16)		.0620	.093	**.186** (3x)	3	1/8	1-1/2	945362-C3	49.10
.062 (1/16)		.0620	.093	**.312** (5x)	3	1/8	2-1/2	936162-C3	50.10
.062 (1/16)		.0620	.093	**.500** (8x)	3	1/8	2-1/2	933862-C3	51.50
.062 (1/16)		.0620	.093	**.625** (10x)	3	1/8	2-1/2	931162-C3	54.00
.078 (5/64)		.0780	.118	**.406** (5x)	3	1/8	2-1/2	936178-C3	50.10
.078 (5/64)		.0780	.118	**.625** (8x)	3	1/8	2-1/2	933878-C3	51.50
	2.0 mm	.0787	3.00 mm	**10.0 mm** (5x)	3	4 mm	50 mm	886445-C3	53.30
	2.0 mm	.0787	3.00 mm	**16.0 mm** (8x)	3	4 mm	50 mm	887145-C3	54.80
.093 (3/32)		.0930	.140	**.279** (3x)	3	1/8	1-1/2	945393-C3	49.10
.093 (3/32)		.0930	.140	**.500** (5x)	3	1/8	2-1/2	936193-C3	50.10
.093 (3/32)		.0930	.140	**.750** (8x)	3	1/8	2-1/2	933893-C3	51.50
.093 (3/32)		.0930	.140	**.950** (10x)	3	1/8	2-1/2	931193-C3	54.00

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VARIABLE HELIX END MILLS FOR MEDIUM ALLOY STEELS

Square – Long Reach, Stub Flute (cont.)

continued from previous page

CUTTER DIAMETER			LENGTH OF CUT	OVERALL REACH	FLUTES	SHANK DIAMETER	OVERALL LENGTH	AlTiN COATED	
D_1 +.0005″ −.0005″	+.00mm −.02mm	decimal equivalent	L_2 +.010″ −.000″ +.25mm −.00mm	L_3 +.010″ −.000″ +.25mm −.00mm		D_2 (h6)	L_1	TOOL #	PRICE
.100		.1000	.150	**.500** (5x)	3	1/8	2-1/2	936200-C3	53.30
.100		.1000	.150	**.800** (8x)	3	1/8	2-1/2	933900-C3	54.80
.109 (7/64)		.1090	.164	**.570** (5x)	3	1/8	2-1/2	936202-C3	53.30
.109 (7/64)		.1090	.164	**.900** (8x)	3	1/8	2-1/2	933902-C3	54.80
	3.0 mm	.1181	4.50 mm	**15.0 mm** (5x)	3	4 mm	50 mm	886457-C3	54.60
	3.0 mm	.1181	4.50 mm	**24.0 mm** (8x)	3	4 mm	50 mm	887157-C3	55.80

D_1 +.000″ −.002″	decimal equivalent	L_2 +.030″ −.000″	L_3 +.030″ −.000″		D_2 (h6)	L_1	TOOL #	PRICE
.125 (1/8)	.1250	.187	**.375** (3x)	4	1/8	1-1/2	945408-C3	49.10
.125 (1/8)	.1250	.187	**.625** (5x)	4	1/8	2-1/2	936208-C3	49.50
.125 (1/8)	.1250	.187	**1.000** (8x)	4	1/8	2-1/2	933908-C3	51.00
.125 (1/8)	.1250	.187	**1.250** (10x)	4	1/8	2-1/2	931208-C3	51.80
.156 (5/32)	.1562	.235	**.750** (5x)	4	3/16	3	936210-C3	55.00
.187 (3/16)	.1875	.285	**1.000** (5x)	4	3/16	3	936212-C3	55.00
.250 (1/4)	.2500	.375	**1.250** (5x)	4	1/4	4	936216-C3	61.40

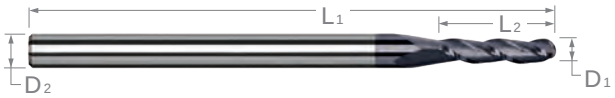
PLEASE SEE SPEEDS & FEEDS ON PAGE 155

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VARIABLE HELIX END MILLS FOR MEDIUM ALLOY STEELS

Ball



- Optimized for readily machinable medium alloy steels, stainless steels, and tool steels
- Variable helix design (approx. 37°) reduces chatter and harmonics and increases material removal rates
- AlTiN coated for improved lubricity and heat resistance
- h6 shank tolerance for high precision tool holders
- Center cutting
- Solid carbide
- CNC ground in the USA

mm & in

CUTTER DIAMETER			LENGTH OF CUT	FLUTES	SHANK DIAMETER	OVERALL LENGTH	AlTiN COATED	
D_1 +.0005″ −.0005″	+.00mm −.02mm	decimal equivalent	L_2 +.010″ −.000″ +.25mm −.00mm		D_2 (h6)	L_1	TOOL #	PRICE
	.2 mm	.0078	**.60 mm** (3x)	3	4 mm	50 mm	974804-C3	62.20
.010		.0100	**.030** (3x)	3	1/8	1-1/2	971810-C3	60.70
.015 (1/64)		.0150	**.023** (1.5x)	3	1/8	1-1/2	963015-C3	51.30
.015 (1/64)		.0150	**.045** (3x)	3	1/8	1-1/2	971815-C3	51.30
	.4 mm	.0157	**1.20 mm** (3x)	3	4 mm	50 mm	974809-C3	53.90
	.5 mm	.0196	**1.50 mm** (3x)	3	4 mm	50 mm	974811-C3	46.50
.020		.0200	**.030** (1.5x)	3	1/8	1-1/2	963020-C3	46.50
.020		.0200	**.060** (3x)	3	1/8	1-1/2	971820-C3	46.00
	.6 mm	.0236	**1.80 mm** (3x)	3	4 mm	50 mm	974813-C3	45.00
.025		.0250	**.075** (3x)	3	1/8	1-1/2	971825-C3	44.60
.031 (1/32)		.0310	**.025** (0.8x)	3	1/8	1-1/2	883931-C3	41.40
.031 (1/32)		.0310	**.047** (1.5x)	3	1/8	1-1/2	963031-C3	38.60
.031 (1/32)		.0310	**.093** (3x)	3	1/8	1-1/2	971831-C3	38.60
.031 (1/32)		.0310	**.156** (5x)	3	1/8	2-1/2	888631-C3	48.40
	.8 mm	.0314	**2.40 mm** (3x)	3	4 mm	50 mm	974818-C3	39.10
	1.0 mm	.0393	**1.50 mm** (1.5x)	3	4 mm	50 mm	929222-C3	39.10
	1.0 mm	.0393	**3.00 mm** (3x)	3	4 mm	50 mm	974822-C3	39.10
.040		.0400	**.120** (3x)	3	1/8	1-1/2	971840-C3	38.60
.047 (3/64)		.0470	**.038** (0.8x)	3	1/8	1-1/2	883947-C3	42.30
.047 (3/64)		.0470	**.071** (1.5x)	3	1/8	1-1/2	963047-C3	38.60
.047 (3/64)		.0470	**.141** (3x)	3	1/8	1-1/2	971847-C3	38.60
	1.2 mm	.0472	**3.50 mm** (3x)	3	4 mm	50 mm	974827-C3	39.10
.050		.0500	**.150** (3x)	3	1/8	1-1/2	971850-C3	38.60
	1.4 mm	.0551	**4.00 mm** (3x)	3	4 mm	50 mm	974831-C3	39.10
	1.5 mm	.0590	**4.50 mm** (3x)	3	4 mm	50 mm	974833-C3	36.90
.060		.0600	**.180** (3x)	3	1/8	1-1/2	971860-C3	38.60
.062 (1/16)		.0620	**.050** (0.8x)	3	1/8	1-1/2	883962-C3	39.10
.062 (1/16)		.0620	**.093** (1.5x)	3	1/8	1-1/2	963062-C3	36.50
.062 (1/16)		.0620	**.186** (3x)	3	1/8	1-1/2	971862-C3	36.50
.062 (1/16)		.0620	**.312** (5x)	3	1/8	2-1/2	888662-C3	46.00
	1.6 mm	.0629	**5.00 mm** (3x)	3	4 mm	50 mm	974836-C3	36.90
.070		.0700	**.210** (3x)	3	1/8	1-1/2	971870-C3	36.50
	1.8 mm	.0708	**5.50 mm** (3x)	3	4 mm	50 mm	974840-C3	36.90
.078 (5/64)		.0780	**.062** (0.8x)	3	1/8	1-1/2	883978-C3	41.20
.078 (5/64)		.0780	**.118** (1.5x)	3	1/8	1-1/2	963078-C3	36.50
.078 (5/64)		.0780	**.234** (3x)	3	1/8	1-1/2	971878-C3	36.50

continued on next page

VARIABLE HELIX END MILLS FOR MEDIUM ALLOY STEELS

Ball (cont.)

continued from previous page

CUTTER DIAMETER D_1 +.0005″ −.0005″	D_1 +.00mm −.02mm	D_1 decimal equivalent	LENGTH OF CUT L_2 +.010″ −.000″ / +.25mm −.00mm	FLUTES	SHANK DIAMETER D_2 (h6)	OVERALL LENGTH L_1	AlTiN COATED TOOL #	PRICE
	2.0 mm	.0787	**6.00 mm** (3x)	3	4 mm	50 mm	974845-C3	36.90
.080		.0800	**.240** (3x)	3	1/8	1-1/2	971880-C3	36.50
.090		.0900	**.270** (3x)	3	1/8	1-1/2	971890-C3	36.50
.093 (3/32)		.0930	**.074** (0.8x)	3	1/8	1-1/2	883993-C3	39.10
.093 (3/32)		.0930	**.140** (1.5x)	3	1/8	1-1/2	963093-C3	36.50
.093 (3/32)		.0930	**.279** (3x)	3	1/8	1-1/2	971893-C3	36.50
.093 (3/32)		.0930	**.500** (5x)	3	1/8	2-1/2	888693-C3	46.00
.100		.1000	**.300** (3x)	3	1/8	1-1/2	971900-C3	36.50
.109 (7/64)		.1090	**.327** (3x)	3	1/8	1-1/2	971902-C3	36.50
	3.0 mm	.1181	**4.50 mm** (1.5x)	3	4 mm	50 mm	929257-C3	37.10
	3.0 mm	.1181	**9.00 mm** (3x)	3	4 mm	50 mm	974857-C3	37.10

D_1 +.000″ −.002″	D_1 decimal equivalent	L_2 +.030″ −.000″	FLUTES	D_2 (h6)	L_1	TOOL #	PRICE
.125 (1/8)	.1250	**.100** (0.8x)	4	1/8	1-1/2	884008-C3	39.10
.125 (1/8)	.1250	**.187** (1.5x)	4	1/8	1-1/2	963108-C3	34.40
.125 (1/8)	.1250	**.375** (3x)	4	1/8	1-1/2	971908-C3	34.40
.125 (1/8)	.1250	**.625** (5x)	4	1/8	2-1/2	888708-C3	46.00
.140 (9/64)	.1406	**.425** (3x)	4	3/16	2	971909-C3	48.40
.156 (5/32)	.1562	**.235** (1.5x)	4	3/16	2	963110-C3	38.90
.156 (5/32)	.1562	**.470** (3x)	4	3/16	2	971910-C3	38.90
.187 (3/16)	.1875	**.150** (0.8x)	4	3/16	2	884012-C3	41.70
.187 (3/16)	.1875	**.285** (1.5x)	4	3/16	2	963112-C3	36.70
.187 (3/16)	.1875	**.562** (3x)	4	3/16	2	971912-C3	36.70
.250 (1/4)	.2500	**.375** (1.5x)	4	1/4	2-1/2	963116-C3	44.90
.250 (1/4)	.2500	**.750** (3x)	4	1/4	2-1/2	971916-C3	44.90

SPEEDS & FEEDS (Variable Helix for Medium Alloy Steels)

Important Note: Values in table are in inches and are based on standard (3x Dia) length of cut end mills. For shorter lengths of cuts, table values of IPT must be increased (for 0.8x, increase to 125%; for 1.5x, increase to 112%). For longer lengths of cut, table values of IPT and DOC must be reduced (for 4x, reduce to 85%; for 5x, reduce to 70%). For complete speeds and feeds charts, please see www.harveytool.com.

Material	Hardness (HBn)	SFM
Carbon Steels: 1030 - 1095, 1140 - 1151, 13xx, 15xx, 2xxx, 3xxx, 4xxx & 4xLxx, 5xxx & 5xLxx, 50xxx & 50Lxxx, 51xxx & 51Lxxx, 52xxx 52Lxxx, 6xxx, 8xxx, 9xxx	225 - 250	250
Stainless Steels: 201, 202, 203, 205, 301, 302, 304, 304L, 308, 309, 310, 314, 316, 316L, 317, 321, 329, 330, 347, 348, 385, 403, 405, 409, 410, 413, 414, 42x, 43x, 44x, 501, 502	250 - 275	220
Tool Steels: A, L, O, P, W series	275 - 300	180

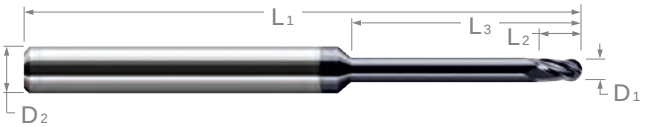
Chip Load Per Tooth (IPT) By Cutter Diameter	.015	.031	.047	.062	.078	.093	.125	.187	.250	.312	.375	.500
Slotting	.00008	.00017	.00026	.00035	.00043	.00052	.00066	.00099	.00133	.00174	.00209	.00278
Roughing	.00010	.00021	.00032	.00042	.00052	.00062	.00080	.00120	.00160	.00210	.00252	.00336
Finishing	.00012	.00025	.00038	.00050	.00063	.00075	.00096	.00144	.00193	.00252	.00303	.00404
Max	.00016	.00032	.00049	.00064	.00081	.00097	.00124	.00185	.00248	.00324	.00390	.00520

Radial Depth of Cut*:	Axial Depth of Cut*:
Slotting: 1x Dia	Slotting: .5x Dia
Roughing: .5x Dia	Roughing: .5x - 1x Dia
Finishing: .1x Dia	Finishing: .5x - 1x Dia

* If less than minimum Axial or Radial DOC values are used, increased feed rates are possible. If greater than maximum Axial and Radial DOC values are used, decreased feed rates may be needed.

VARIABLE HELIX END MILLS FOR MEDIUM ALLOY STEELS

Ball – Long Reach, Stub Flute



- Optimized for readily machinable medium alloy steels, stainless steels, and tool steels
- Long reach design for deep cavities
- Reduced neck diameter to avoid heeling
- Variable helix design (approx. 37°) reduces chatter and harmonics and increases material removal rates
- AlTiN coated for improved lubricity and heat resistance
- h6 shank tolerance for high precision tool holders
- Center cutting
- Solid carbide
- CNC ground in the USA

IMPROVES PERFORMANCE

Contour Profiling



Tipped Multi-Axis Machining



mm & in

CUTTER DIAMETER			LENGTH OF CUT	OVERALL REACH	FLUTES	SHANK DIAMETER	OVERALL LENGTH	AlTiN COATED	
D_1 +.0005″ −.0005″	+.00mm −.02mm	decimal equivalent	L_2 +.010″ −.000″ +.25mm −.00mm	L_3 +.010″ −.000″ +.25mm −.00mm		D_2 (h6)	L_1	4 FL	PRICE
.015 (1/64)		.0150	.022	**.078** (5x)	4	1/8	2-1/2	64215-C3	64.50
.015 (1/64)		.0150	.022	**.125** (8x)	4	1/8	2-1/2	56615-C3	65.80
.015 (1/64)		.0150	.022	**.187** (12x)	4	1/8	2-1/2	65415-C3	69.80
	.4 mm	.0157	.60 mm	**2.0 mm** (5x)	4	4 mm	50 mm	984709-C3	70.40
	.4 mm	.0157	.60 mm	**3.2 mm** (8x)	4	4 mm	50 mm	971009-C3	71.70
	.4 mm	.0157	.60 mm	**4.8 mm** (12x)	4	4 mm	50 mm	988309-C3	77.40
	.5 mm	.0196	.75 mm	**2.5 mm** (5x)	4	4 mm	50 mm	984711-C3	67.80
	.5 mm	.0196	.75 mm	**4.0 mm** (8x)	4	4 mm	50 mm	971011-C3	69.40
	.5 mm	.0196	.75 mm	**6.0 mm** (12x)	4	4 mm	50 mm	988311-C3	74.90
	.5 mm	.0196	.75 mm	**8.0 mm** (16x)	4	4 mm	50 mm	979511-C3	78.10
.020		.0200	.030	**.100** (5x)	4	1/8	2-1/2	64220-C3	61.60
.020		.0200	.030	**.160** (8x)	4	1/8	2-1/2	56620-C3	62.80
.020		.0200	.030	**.250** (12x)	4	1/8	2-1/2	65420-C3	67.50
	.6 mm	.0236	.90 mm	**3.0 mm** (5x)	4	4 mm	50 mm	984713-C3	66.30
	.6 mm	.0236	.90 mm	**4.8 mm** (8x)	4	4 mm	50 mm	971013-C3	67.60
	.6 mm	.0236	.90 mm	**7.2 mm** (12x)	4	4 mm	50 mm	988313-C3	72.00
.025		.0250	.037	**.125** (5x)	4	1/8	2-1/2	64225-C3	60.10
.025		.0250	.037	**.203** (8x)	4	1/8	2-1/2	56625-C3	61.20
.025		.0250	.037	**.312** (12x)	4	1/8	2-1/2	65425-C3	66.20
.031 (1/32)		.0310	.046	**.156** (5x)	4	1/8	2-1/2	64231-C3	56.20
.031 (1/32)		.0310	.046	**.250** (8x)	4	1/8	2-1/2	56631-C3	57.50
.031 (1/32)		.0310	.046	**.375** (12x)	4	1/8	2-1/2	65431-C3	59.60
	.8 mm	.0314	1.20 mm	**4.0 mm** (5x)	4	4 mm	50 mm	984718-C3	62.00
	.8 mm	.0314	1.20 mm	**6.5 mm** (8x)	4	4 mm	50 mm	971018-C3	63.10
	.8 mm	.0314	1.20 mm	**9.5 mm** (12x)	4	4 mm	50 mm	988318-C3	65.20
	1.0 mm	.0393	1.50 mm	**5.0 mm** (5x)	4	4 mm	50 mm	984722-C3	62.00
	1.0 mm	.0393	1.50 mm	**8.0 mm** (8x)	4	4 mm	50 mm	971022-C3	63.10
	1.0 mm	.0393	1.50 mm	**12.0 mm** (12x)	4	4 mm	50 mm	988322-C3	65.20
	1.0 mm	.0393	1.50 mm	**16.0 mm** (16x)	4	4 mm	50 mm	979522-C3	68.20
.047 (3/64)		.0470	.070	**.250** (5x)	4	1/8	2-1/2	64247-C3	56.20
.047 (3/64)		.0470	.070	**.375** (8x)	4	1/8	2-1/2	56647-C3	57.50
.047 (3/64)		.0470	.070	**.570** (12x)	4	1/8	2-1/2	65447-C3	59.60

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VARIABLE HELIX END MILLS FOR MEDIUM ALLOY STEELS

Ball – Long Reach, Stub Flute (cont.)

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CUTTER DIAMETER			LENGTH OF CUT	OVERALL REACH	FLUTES	SHANK DIAMETER	OVERALL LENGTH	AlTiN COATED	
D_1 +.0005″ −.0005″	+.00mm −.02mm	decimal equivalent	L_2 +.010″ −.000″ +.25mm −.00mm	L_3 +.010″ −.000″ +.25mm −.00mm		D_2 (h6)	L_1	4 FL	PRICE
	1.5 mm	.0590	2.20 mm	**7.5 mm** (5x)	4	4 mm	50 mm	984733-C3	62.00
	1.5 mm	.0590	2.20 mm	**12.0 mm** (8x)	4	4 mm	50 mm	971033-C3	63.10
	1.5 mm	.0590	2.20 mm	**18.0 mm** (12x)	4	4 mm	50 mm	988333-C3	65.20
	1.5 mm	.0590	2.20 mm	**24.0 mm** (16x)	4	4 mm	63 mm	979533-C3	68.20
.062 (1/16)		.0620	.093	**.312** (5x)	4	1/8	2-1/2	64262-C3	56.20
.062 (1/16)		.0620	.093	**.500** (8x)	4	1/8	2-1/2	56662-C3	57.50
.062 (1/16)		.0620	.093	**.750** (12x)	4	1/8	2-1/2	65462-C3	59.60
.078 (5/64)		.0780	.117	**.406** (5x)	4	1/8	2-1/2	64278-C3	56.20
.078 (5/64)		.0780	.117	**.625** (8x)	4	1/8	2-1/2	56678-C3	57.50
.078 (5/64)		.0780	.117	**.940** (12x)	4	1/8	2-1/2	65478-C3	59.60
	2.0 mm	.0787	3.00 mm	**10.0 mm** (5x)	4	4 mm	50 mm	984745-C3	62.00
	2.0 mm	.0787	3.00 mm	**16.0 mm** (8x)	4	4 mm	50 mm	971045-C3	63.10
	2.0 mm	.0787	3.00 mm	**24.0 mm** (12x)	4	4 mm	63 mm	988345-C3	65.20
	2.0 mm	.0787	3.00 mm	**32.0 mm** (16x)	4	4 mm	63 mm	979545-C3	68.20
.093 (3/32)		.0930	.139	**.500** (5x)	4	1/8	2-1/2	64293-C3	56.20
.093 (3/32)		.0930	.139	**.750** (8x)	4	1/8	2-1/2	56693-C3	57.50
.093 (3/32)		.0930	.139	**1.125** (12x)	4	1/8	2-1/2	65493-C3	59.60
	3.0 mm	.1181	4.50 mm	**15.0 mm** (5x)	4	4 mm	50 mm	984757-C3	59.10

D_1 +.000″ −.002″	decimal equivalent	L_2 +.030″ −.000″	L_3 +.030″ −.000″		D_2 (h6)	L_1	4 FL	PRICE
.125 (1/8)	.1250	.187	**.625** (5x)	4	1/8	2-1/2	64308-C3	55.60
.125 (1/8)	.1250	.187	**1.000** (8x)	4	1/8	2-1/2	56708-C3	56.90
.125 (1/8)	.1250	.187	**1.500** (12x)	4	1/8	3	65508-C3	59.60
.156 (5/32)	.1562	.234	**.750** (5x)	4	3/16	3	64310-C3	61.20
.156 (5/32)	.1562	.234	**1.250** (8x)	4	3/16	3	56710-C3	62.50
.187 (3/16)	.1875	.281	**1.000** (5x)	4	3/16	3	64312-C3	61.90
.187 (3/16)	.1875	.281	**1.500** (8x)	4	3/16	3	56712-C3	63.10
.250 (1/4)	.2500	.375	**1.250** (5x)	4	1/4	4	64316-C3	68.20
.250 (1/4)	.2500	.375	**2.000** (8x)	4	1/4	4	56716-C3	69.60

SPEEDS & FEEDS (Variable Helix – Long Reach, Stub Flute for Medium Alloy Steels)

Important Note: Values in table are in inches and are based on reached (8x Dia) end mills. For shorter reaches, table values of IPT must be increased (for 3x, increase to 135%; for 5x, increase to 125%). For longer reaches, table values of IPT and DOC must be reduced (for 10x, reduce to 90%; for 12x, reduce to 80%; for 16x, reduce to 75%) For complete speeds and feeds charts, please see www.harveytool.com.

Material	Hardness (HBn)	SFM
Carbon Steels: 1030 - 1095, 1140 - 1151, 13xx, 15xx, 2xxx, 3xxx, 4xxx & 4xLxx, 5xxx & 5xLxx, 50xxx & 50Lxxx, 51xxx & 51Lxxx, 52xxx 52Lxxx, 6xxx, 8xxx, 9xxx	225 - 250	250
Stainless Steels: 201, 202, 203, 205, 301, 302, 304, 304L, 308, 309, 310, 314, 316, 316L, 317, 321, 329, 330, 347, 348, 385, 403, 405, 409, 410, 413, 414, 42x, 43x, 44x, 501, 502	250 - 275	220
Tool Steels: A, L, O, P, W series	275 - 300	180

	Chip Load Per Tooth (IPT) By Cutter Diameter								
	.015	.031	.047	.062	.078	.093	.125	.187	.250
Slotting	.00007	.00014	.00021	.00028	.00035	.00041	.00053	.00079	.00106
Roughing	.00008	.00017	.00025	.00033	.00042	.00050	.00064	.00096	.00128
Finishing	.00010	.00020	.00030	.00040	.00050	.00060	.00077	.00115	.00154
Max	.00012	.00026	.00039	.00052	.00065	.00077	.00099	.00148	.00198

Radial Depth of Cut*:	Axial Depth of Cut*:
Slotting: 1x Dia	Slotting: .35x Dia
Roughing: .35x Dia	Roughing: .5x - 1x Dia
Finishing: .1x Dia	Finishing: .5x - 1x Dia

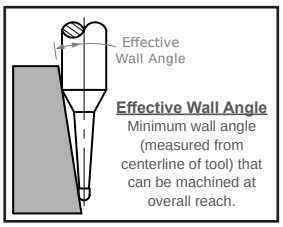
* If less than minimum Axial or Radial DOC values are used, increased feed rates are possible. If greater than maximum Axial and Radial DOC values are used, decreased feed rates may be needed.

HIGH HELIX END MILLS FOR MEDIUM ALLOY STEELS

Ball – Tapered Reach (Mold Cutters)



Excellent in Readily Machinable Mold Steels, Stainless Steels, & Tool Steels



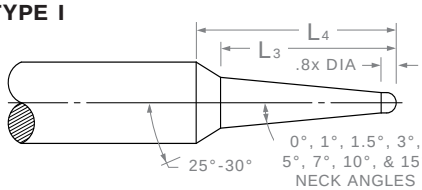
Effective Wall Angle
Minimum wall angle (measured from centerline of tool) that can be machined at overall reach.

- Very short length of cut and solid tapered neck for maximum rigidity
- Ideal for contour machining of mold and die cavities
- 35° helix for increased cutting performance
- h6 shank tolerance for high precision tool holders
- Latest generation AlTiN Nano coating offers superior hardness and heat resistance
- 2 flutes to center
- Solid carbide
- CNC ground in the USA

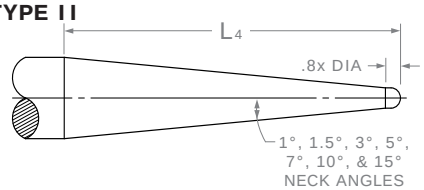
NECK ANGLE	CUTTER DIAMETER	LENGTH OF CUT	TYPE	TAPERED REACH	OVERALL REACH	EFFECTIVE WALL ANGLE	SHANK DIAMETER	OVERALL LENGTH	AlTiN NANO COATED	
A_1 +0°00′ −0°30′	D_1 +.000″ −.001″	L_2 +.010″ −.000″		L_3	L_4		D_2 (h6)	L_1	2 FL	PRICE
0° (straight neck)	.062 (1/16)	.050	I	.500	**.610**	6.2°	3/16	2	882843-C6	57.50
	.062 (1/16)	.050	I	1.000	**1.110**	3.3°	3/16	2-1/2	882850-C6	62.80
	.093 (3/32)	.074	I	.750	**.833**	3.4°	3/16	2	882864-C6	57.50
	.093 (3/32)	.074	I	1.125	**1.208**	2.3°	3/16	2-1/2	882871-C6	62.80
	.125 (1/8)	.100	I	1.000	**1.058**	1.8°	3/16	2-1/2	882877-C6	62.80
	.125 (1/8)	.100	I	1.750	**1.808**	1.0°	3/16	3	882885-C6	64.70
1°	.062 (1/16)	.050	I	.500	**.595**	6.4°	3/16	2	927543-C6	57.10
	.062 (1/16)	.050	I	1.000	**1.080**	3.5°	3/16	2-1/2	927550-C6	62.30
	.093 (3/32)	.074	I	.750	**.811**	3.6°	3/16	2	927564-C6	57.10
	.093 (3/32)	.074	I	1.125	**1.175**	2.4°	3/16	2-1/2	927571-C6	62.30
	.125 (1/8)	.100	I	1.000	**1.027**	1.9°	3/16	2	927577-C6	59.40
	.125 (1/8)	.100	II	1.890	**1.890**	1.0°	3/16	3	927585-C6	64.40
	.187 (3/16)	.150	II	1.940	**1.940**	1.0°	1/4	4	927587-C6	75.70
	.250 (1/4)	.200	II	1.990	**1.990**	1.0°	5/16	4	927592-C6	80.80
1.5°	.015 (1/64)	.012	I	.125	**.269**	18.2°	3/16	2	19001-C6	64.20
	.015 (1/64)	.012	I	.250	**.389**	12.8°	3/16	2	19008-C6	64.20
	.031 (1/32)	.025	I	.250	**.375**	12.3°	3/16	2	19015-C6	63.40
	.031 (1/32)	.025	I	.500	**.614**	7.5°	3/16	2	19022-C6	63.40
	.039 (1 mm)	.031	I	.375	**.488**	9.0°	3/16	2	19025-C6	60.00
	.047 (3/64)	.038	I	.375	**.481**	8.7°	3/16	2	19029-C6	60.00
	.047 (3/64)	.038	I	.750	**.839**	5.0°	3/16	2	19036-C6	60.00
	.062 (1/16)	.050	I	.500	**.588**	6.4°	3/16	2	19043-C6	57.10
	.062 (1/16)	.050	I	1.000	**1.066**	3.5°	3/16	2-1/2	19050-C6	62.30
	.062 (1/16)	.050	I	1.500	**1.543**	2.4°	3/16	3	19053-C6	64.70
	.078 (5/64)	.062	I	.625	**.694**	4.8°	3/16	2	19057-C6	57.10
	.093 (3/32)	.074	I	.750	**.801**	3.6°	3/16	2	19064-C6	57.10
	.093 (3/32)	.074	I	1.500	**1.517**	1.9°	3/16	2-1/2	19066-C6	62.30
	.093 (3/32)	.074	II	1.878	**1.878**	1.5°	3/16	3	19068-C6	64.70
	.125 (1/8)	.100	II	1.293	**1.293**	1.5°	3/16	2-1/2	19071-C6	59.40
	.125 (1/8)	.100	II	2.487	**2.487**	1.5°	1/4	4	19078-C6	69.80
	.187 (3/16)	.150	II	1.343	**1.343**	1.5°	1/4	2-1/2	19085-C6	63.90
	.250 (1/4)	.200	II	1.393	**1.393**	1.5°	5/16	2-1/2	19092-C6	82.30

continued on next page

TYPE I



TYPE II



HIGH HELIX END MILLS FOR MEDIUM ALLOY STEELS

Ball – Tapered Reach (Mold Cutters) (cont.)

continued from previous page

NECK ANGLE	CUTTER DIAMETER	LENGTH OF CUT	TYPE	TAPERED REACH	OVERALL REACH	EFFECTIVE WALL ANGLE	SHANK DIAMETER	OVERALL LENGTH	AlTiN NANO COATED	
A_1 $^{+0°00'}_{-0°30'}$	D_1 $^{+.000"}_{-.001"}$	L_2 $^{+.010"}_{-.000"}$		L_3	L_4		D_2 (h6)	L_1	2 FL	PRICE
	.015 (1/64)	.012	I	.156	**.292**	16.8°	3/16	2-1/2	36901-C6	69.00
	.015 (1/64)	.012	I	.375	**.491**	10.1°	3/16	2-1/2	66643-C6	64.70
	.015 (1/64)	.012	I	.875	**.946**	5.3°	3/16	2-1/2	66648-C6	64.70
	.020	.016	I	.250	**.374**	13.0°	3/16	2-1/2	36904-C6	69.00
	.020	.016	I	.500	**.601**	8.1°	3/16	2-1/2	36907-C6	69.00
	.025	.020	I	.250	**.370**	12.8°	3/16	2-1/2	36910-C6	68.70
	.025	.020	I	.500	**.597**	7.9°	3/16	2-1/2	36913-C6	68.70
	.031 (1/32)	.025	I	.312	**.421**	10.9°	3/16	2-1/2	36916-C6	68.70
	.031 (1/32)	.025	I	.750	**.820**	5.6°	3/16	2-1/2	67046-C6	56.90
	.031 (1/32)	.025	II	1.518	**1.518**	3.0°	3/16	2-1/2	36931-C6	56.90
	.039 (1 mm)	.031	I	.375	**.472**	9.3°	3/16	2-1/2	36917-C6	68.70
	.039 (1 mm)	.031	I	.750	**.813**	5.4°	3/16	2-1/2	36919-C6	68.70
	.039 (1 mm)	.031	II	1.448	**1.448**	3.0°	3/16	2-1/2	36921-C6	68.70
	.047 (3/64)	.038	I	.375	**.466**	9.0°	3/16	2-1/2	36922-C6	65.80
	.047 (3/64)	.038	I	.875	**.921**	4.5°	3/16	2-1/2	67348-C6	53.70
	.047 (3/64)	.038	II	1.378	**1.378**	3.0°	3/16	2-1/2	36947-C6	53.70
	.050	.040	I	.500	**.577**	7.1°	3/16	2-1/2	36925-C6	65.80
	.060	.048	I	.625	**.683**	5.6°	3/16	2-1/2	36928-C6	65.80
	.062 (1/16)	.050	I	.375	**.454**	8.4°	3/16	2-1/2	36934-C6	62.00
3°	.062 (1/16)	.050	I	.625	**.681**	5.5°	3/16	2-1/2	66946-C6	53.70
	.062 (1/16)	.050	I	.875	**.909**	4.1°	3/16	2-1/2	36937-C6	62.00
	.062 (1/16)	.050	II	1.247	**1.247**	3.0°	3/16	2-1/2	36962-C6	53.70
	.062 (1/16)	.050	II	1.843	**1.843**	3.0°	1/4	3	37362-C6	70.90
	.078 (5/64)	.062	I	.500	**.555**	6.1°	3/16	2-1/2	36940-C6	62.00
	.078 (5/64)	.062	II	1.107	**1.107**	3.0°	3/16	2-1/2	36978-C6	52.20
	.093 (3/32)	.074	I	.625	**.657**	4.5°	3/16	2	36943-C6	57.10
	.093 (3/32)	.074	II	.976	**.976**	3.0°	3/16	2	36993-C6	47.60
	.093 (3/32)	.074	II	1.572	**1.572**	3.0°	1/4	3	37393-C6	69.00
	.100	.080	II	1.511	**1.511**	3.0°	1/4	3	37400-C6	71.40
	.109 (7/64)	.087	II	1.432	**1.432**	3.0°	1/4	3	37402-C6	71.40
	.118 (3 mm)	.094	II	1.354	**1.354**	2.9°	1/4	2-1/2	37405-C6	71.40
	.125 (1/8)	.100	I	.875	**.913**	4.2°	1/4	2-1/2	36946-C6	68.20
	.125 (1/8)	.100	II	1.293	**1.293**	2.9°	1/4	2-1/2	37408-C6	64.90
	.125 (1/8)	.100	II	2.485	**2.485**	3.0°	3/8	4	37708-C6	101.70
	.156 (5/32)	.125	II	1.020	**1.020**	2.8°	1/4	2-1/2	37410-C6	70.90
	.187 (3/16)	.150	II	.746	**.746**	2.8°	1/4	2-1/2	37412-C6	70.20
	.187 (3/16)	.150	II	1.343	**1.343**	2.9°	5/16	2-1/2	36949-C6	82.30
	.187 (3/16)	.150	II	1.939	**1.939**	2.9°	3/8	4	37712-C6	101.70
	.250 (1/4)	.200	II	1.393	**1.393**	2.9°	3/8	2-1/2	37716-C6	84.80
	.015 (1/64)	.012	I	.375	**.469**	10.6°	3/16	2	66664-C6	58.60
	.015 (1/64)	.012	II	.998	**.998**	5.0°	3/16	2	38515-C6	58.30
	.020	.016	I	.562	**.624**	7.8°	3/16	2	38907-C6	63.70
	.020	.016	II	.973	**.973**	5.0°	3/16	2	38520-C6	63.40
5°	.025	.020	I	.562	**.621**	7.6°	3/16	2	38914-C6	63.70
	.025	.020	II	.949	**.949**	5.0°	3/16	2	38525-C6	63.40
	.031 (1/32)	.025	I	.375	**.457**	10.1°	3/16	2	67065-C6	52.10
	.031 (1/32)	.025	II	.919	**.919**	5.0°	3/16	2	38531-C6	52.10
	.039 (1 mm)	.031	I	.625	**.664**	6.6°	3/16	2	38921-C6	63.40

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HIGH HELIX END MILLS FOR MEDIUM ALLOY STEELS

Ball – Tapered Reach (Mold Cutters) (cont.)

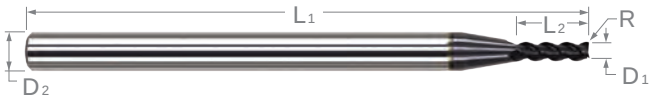
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NECK ANGLE	CUTTER DIAMETER	LENGTH OF CUT	TYPE	TAPERED REACH	OVERALL REACH	EFFECTIVE WALL ANGLE	SHANK DIAMETER	OVERALL LENGTH	AlTiN NANO COATED	
A_1 $^{+0°00'}_{-0°30'}$	D_1 $^{+.000"}_{-.001"}$	L_2 $^{+.010"}_{-.000"}$		L_3	L_4		D_2 (h6)	L_1	2 FL	PRICE
5°	.047 (3/64)	.038	II	.841	**.841**	5.0°	3/16	2	38547-C6	52.10
	.047 (3/64)	.038	II	1.198	**1.198**	5.0°	1/4	2-1/2	38947-C6	70.20
	.050	.040	II	.826	**.826**	4.9°	3/16	2	38928-C6	52.50
	.060	.048	II	.777	**.777**	4.9°	3/16	2	38935-C6	52.50
	.060	.048	II	1.134	**1.134**	5.0°	1/4	2-1/2	38960-C6	70.20
	.062 (1/16)	.050	I	.375	**.434**	8.8°	3/16	2	66963-C6	49.10
	.062 (1/16)	.050	II	.767	**.767**	4.9°	3/16	2	38562-C6	49.10
	.062 (1/16)	.050	II	1.124	**1.124**	5.0°	1/4	2-1/2	38962-C6	70.20
	.078 (5/64)	.062	II	1.045	**1.045**	4.9°	1/4	2-1/2	38978-C6	67.00
	.093 (3/32)	.074	II	.972	**.972**	4.9°	1/4	2-1/2	38993-C6	67.00
	.093 (3/32)	.074	II	1.686	**1.686**	5.0°	3/8	3	39293-C6	88.90
	.100	.080	II	.937	**.937**	4.9°	1/4	2-1/2	39000-C6	67.50
	.109 (7/64)	.087	II	.893	**.893**	4.8°	1/4	2-1/2	39002-C6	67.50
	.118 (3 mm)	.094	II	.849	**.849**	4.7°	1/4	2-1/2	39005-C6	67.50
	.125 (1/8)	.100	I	.500	**.548**	7.3°	1/4	2-1/2	38942-C6	64.20
	.125 (1/8)	.100	II	.814	**.814**	4.8°	1/4	2-1/2	39008-C6	63.90
	.125 (1/8)	.100	II	1.529	**1.529**	4.9°	3/8	3	39308-C6	85.80
	.156 (5/32)	.125	II	.661	**.661**	4.6°	1/4	2-1/2	39010-C6	67.00
	.187 (3/16)	.150	II	1.222	**1.222**	4.8°	3/8	2-1/2	39312-C6	82.30
	.187 (3/16)	.150	II	1.222	**1.222**	4.8°	3/8	4	922312-C6	91.80
	.250 (1/4)	.200	II	.914	**.914**	4.5°	3/8	2-1/2	39316-C6	82.30
	.250 (1/4)	.200	II	.914	**.914**	4.5°	3/8	4	922316-C6	91.80
7°	.015 (1/64)	.012	I	.187	**.299**	16.5°	3/16	2	66678-C6	58.60
	.015 (1/64)	.012	II	.714	**.714**	7.0°	3/16	2	40015-C6	58.60
	.020	.016	II	.698	**.698**	7.0°	3/16	2	40020-C6	58.60
	.031 (1/32)	.025	I	.250	**.338**	13.6°	3/16	2	67078-C6	52.50
	.031 (1/32)	.025	II	.662	**.662**	6.9°	3/16	2	40031-C6	52.50
	.031 (1/32)	.025	II	.917	**.917**	7.0°	1/4	2-1/2	40431-C6	67.00
	.039 (1 mm)	.031	II	.636	**.636**	6.9°	3/16	2	40007-C6	52.50
	.047 (3/64)	.038	I	.375	**.425**	9.9°	3/16	2	40014-C6	52.50
	.047 (3/64)	.038	II	.610	**.610**	6.9°	3/16	2	40047-C6	52.50
	.047 (3/64)	.038	II	.864	**.864**	6.9°	1/4	2-1/2	40447-C6	67.00
	.060	.048	II	.822	**.822**	6.9°	1/4	2-1/2	40460-C6	67.00
	.062 (1/16)	.050	I	.500	**.567**	9.9°	1/4	2-1/2	66980-C6	67.00
	.062 (1/16)	.050	II	.815	**.815**	6.9°	1/4	2-1/2	40462-C6	67.00
	.062 (1/16)	.050	II	1.324	**1.324**	6.9°	3/8	2-1/2	40862-C6	85.10
	.078 (5/64)	.062	II	1.272	**1.272**	6.9°	3/8	2-1/2	40878-C6	85.10
	.093 (3/32)	.074	II	.714	**.714**	6.7°	1/4	2-1/2	40493-C6	63.90
	.093 (3/32)	.074	II	1.223	**1.223**	6.9°	3/8	2-1/2	40893-C6	85.10
	.125 (1/8)	.100	II	.609	**.609**	6.5°	1/4	2-1/2	40508-C6	60.90
	.125 (1/8)	.100	II	1.118	**1.118**	6.8°	3/8	2-1/2	40908-C6	82.30
	.187 (3/16)	.150	II	.914	**.914**	6.5°	3/8	2-1/2	40912-C6	82.30
	.187 (3/16)	.150	II	.914	**.914**	6.5°	3/8	4	917212-C6	91.80
10°	.031 (1/32)	.025	I	.250	**.317**	14.5°	3/16	2	774631-C6	52.50
	.062 (1/16)	.050	I	.500	**.525**	10.7°	1/4	2	774662-C6	67.00
	.125 (1/8)	.100	II	.632	**.632**	9.0°	5/16	2-1/2	774608-C6	82.30
15°	.031 (1/32)	.025	I	.250	**.281**	16.3°	3/16	2	773931-C6	52.50
	.062 (1/16)	.050	II	.401	**.401**	14.1°	1/4	2	773962-C6	67.00
	.125 (1/8)	.100	II	.567	**.567**	13.7°	3/8	2-1/2	773908-C6	82.30

NEW SIZES!

VARIABLE HELIX END MILLS FOR MEDIUM ALLOY STEELS

Corner Radius



- Optimized for readily machinable medium alloy steels, stainless steels, and tool steels
- Variable helix design (approx. 37°) reduces chatter and harmonics and increases material removal rates
- AlTiN coated for improved lubricity and heat resistance
- h6 shank tolerance for high precision tool holders
- Center cutting
- Solid carbide
- CNC ground in the USA

mm & in

CUTTER DIAMETER			CORNER RADIUS	LENGTH OF CUT	FLUTES	SHANK DIAMETER	OVERALL LENGTH	AlTiN COATED	
D_1 +.0005″ −.0005″	+.00mm −.02mm	decimal equivalent	R +.001″ −.001″ +.025mm −.025mm	L_2 +.010″ −.000″ +.25mm −.00mm		D_2 (h6)	L_1	TOOL #	PRICE
	.2 mm	.0078	**.05 mm**	.30 mm (1.5x)	3	4 mm	50 mm	985604-C3	57.10
	.2 mm	.0078	**.05 mm**	.60 mm (3x)	3	4 mm	50 mm	976804-C3	57.10
.010		.0100	**.003**	.015 (1.5x)	3	1/8	1-1/2	52610-C3	53.90
.010		.0100	**.003**	.030 (3x)	3	1/8	1-1/2	45610-C3	53.90
	.3 mm	.0118	**.08 mm**	.90 mm (3x)	3	4 mm	50 mm	976806-C3	56.00
.015 (1/64)		.0150	**.003**	.022 (1.5x)	3	1/8	1-1/2	52615-C3	44.60
.015 (1/64)		.0150	**.003**	.045 (3x)	3	1/8	1-1/2	45615-C3	44.60
.015 (1/64)		.0150	**.003**	.078 (5x)	3	1/8	2-1/2	53815-C3	54.00
	.4 mm	.0157	**.08 mm**	.60 mm (1.5x)	3	4 mm	50 mm	985609-C3	47.70
	.4 mm	.0157	**.08 mm**	1.20 mm (3x)	3	4 mm	50 mm	976809-C3	47.70
	.5 mm	.0196	**.10 mm**	.75 mm (1.5x)	3	4 mm	50 mm	985611-C3	42.70
	.5 mm	.0196	**.10 mm**	1.50 mm (3x)	3	4 mm	50 mm	976811-C3	42.70
.020		.0200	**.004**	.030 (1.5x)	3	1/8	1-1/2	52620-C3	39.10
.020		.0200	**.004**	.060 (3x)	3	1/8	1-1/2	45620-C3	39.10
.020		.0200	**.004**	.100 (5x)	3	1/8	2-1/2	53820-C3	47.90
	.6 mm	.0236	**.10 mm**	.90 mm (1.5x)	3	4 mm	50 mm	985613-C3	41.40
	.6 mm	.0236	**.10 mm**	1.80 mm (3x)	3	4 mm	50 mm	976813-C3	41.40
.025		.0250	**.004**	.038 (1.5x)	3	1/8	1-1/2	52625-C3	37.80
.025		.0250	**.004**	.075 (3x)	3	1/8	1-1/2	45625-C3	37.80
.025		.0250	**.004**	.125 (5x)	3	1/8	2-1/2	53825-C3	46.50
	.7 mm	.0275	**.10 mm**	2.10 mm (3x)	3	4 mm	50 mm	976815-C3	41.40
.031 (1/32)		.0310	**.005**	.047 (1.5x)	3	1/8	1-1/2	52631-C3	31.90
.031 (1/32)		.0310	**.005**	.093 (3x)	3	1/8	1-1/2	45631-C3	31.90
.031 (1/32)		.0310	**.005**	.156 (5x)	3	1/8	2-1/2	53831-C3	40.10
.031 (1/32)		.0310	**.010**	.093 (3x)	3	1/8	1-1/2	907231-C3	31.80
	.8 mm	.0314	**.10 mm**	1.20 mm (1.5x)	3	4 mm	50 mm	985618-C3	35.70
	.8 mm	.0314	**.10 mm**	2.40 mm (3x)	3	4 mm	50 mm	976818-C3	35.70
.035		.0350	**.005**	.053 (1.5x)	3	1/8	1-1/2	52635-C3	32.00
.035		.0350	**.005**	.105 (3x)	3	1/8	1-1/2	45635-C3	32.00
.035		.0350	**.005**	.187 (5x)	3	1/8	2-1/2	53835-C3	40.10
	.9 mm	.0354	**.10 mm**	2.70 mm (3x)	3	4 mm	50 mm	976820-C3	35.70

continued on next page

NEW SIZES!

VARIABLE HELIX END MILLS FOR MEDIUM ALLOY STEELS

Corner Radius (cont.)

mm & in

continued from previous page

CUTTER DIAMETER			CORNER RADIUS	LENGTH OF CUT	FLUTES	SHANK DIAMETER	OVERALL LENGTH	AlTiN COATED	
D_1 +.0005″ −.0005″	+.00mm −.02mm	decimal equivalent	R +.001″ −.001″ +.025mm −.025mm	L_2 +.010″ −.000″ +.25mm −.00mm		D_2 (h6)	L_1	TOOL #	PRICE
	1.0 mm	.0393	**.10 mm**	1.50 mm (1.5x)	3	4 mm	50 mm	985622-C3	35.70
	1.0 mm	.0393	**.10 mm**	3.00 mm (3x)	3	4 mm	50 mm	976822-C3	35.70
.040		.0400	**.005**	.060 (1.5x)	3	1/8	1-1/2	52640-C3	32.00
.040		.0400	**.005**	.120 (3x)	3	1/8	1-1/2	45640-C3	32.00
.040		.0400	**.005**	.203 (5x)	3	1/8	2-1/2	53840-C3	40.10
	1.1 mm	.0433	**.10 mm**	3.00 mm (3x)	3	4 mm	50 mm	976824-C3	35.70
.045		.0450	**.005**	.068 (1.5x)	3	1/8	1-1/2	52645-C3	32.00
.045		.0450	**.005**	.135 (3x)	3	1/8	1-1/2	45645-C3	32.00
.045		.0450	**.005**	.225 (5x)	3	1/8	2-1/2	53845-C3	40.10
.047 (3/64)		.0470	**.005**	.071 (1.5x)	3	1/8	1-1/2	52647-C3	31.90
.047 (3/64)		.0470	**.005**	.141 (3x)	3	1/8	1-1/2	45647-C3	31.90
.047 (3/64)		.0470	**.005**	.250 (5x)	3	1/8	2-1/2	53847-C3	40.10
.047 (3/64)		.0470	**.010**	.141 (3x)	3	1/8	1-1/2	907247-C3	31.90
.047 (3/64)		.0470	**.015**	.141 (3x)	3	1/8	1-1/2	903447-C3	31.90
	1.2 mm	.0472	**.10 mm**	1.80 mm (1.5x)	3	4 mm	50 mm	985627-C3	35.70
	1.2 mm	.0472	**.10 mm**	3.50 mm (3x)	3	4 mm	50 mm	976827-C3	35.70
.050		.0500	**.005**	.075 (1.5x)	3	1/8	1-1/2	52650-C3	32.00
.050		.0500	**.005**	.150 (3x)	3	1/8	1-1/2	45650-C3	32.00
.050		.0500	**.005**	.250 (5x)	3	1/8	2-1/2	53850-C3	40.10
	1.3 mm	.0511	**.10 mm**	4.00 mm (3x)	3	4 mm	50 mm	976829-C3	35.70
.055		.0550	**.005**	.083 (1.5x)	3	1/8	1-1/2	52655-C3	32.00
.055		.0550	**.005**	.165 (3x)	3	1/8	1-1/2	45655-C3	32.00
.055		.0550	**.005**	.275 (5x)	3	1/8	2-1/2	53855-C3	40.10
	1.4 mm	.0551	**.10 mm**	2.10 mm (1.5x)	3	4 mm	50 mm	985631-C3	35.70
	1.4 mm	.0551	**.10 mm**	4.00 mm (3x)	3	4 mm	50 mm	976831-C3	35.70
	1.5 mm	.0590	**.20 mm**	2.20 mm (1.5x)	3	4 mm	50 mm	985633-C3	33.60
	1.5 mm	.0590	**.20 mm**	4.50 mm (3x)	3	4 mm	50 mm	976833-C3	33.60
.060		.0600	**.010**	.090 (1.5x)	3	1/8	1-1/2	52660-C3	32.00
.060		.0600	**.010**	.180 (3x)	3	1/8	1-1/2	45660-C3	32.00
.060		.0600	**.010**	.312 (5x)	3	1/8	2-1/2	53860-C3	40.10
.062 (1/16)		.0620	**.005**	.093 (1.5x)	3	1/8	1-1/2	881862-C3	29.60
.062 (1/16)		.0620	**.005**	.186 (3x)	3	1/8	1-1/2	913862-C3	29.60
.062 (1/16)		.0620	**.005**	.312 (5x)	3	1/8	2-1/2	759662-C3	38.60 NEW
.062 (1/16)		.0620	**.010**	.093 (1.5x)	3	1/8	1-1/2	52662-C3	29.60
.062 (1/16)		.0620	**.010**	.186 (3x)	3	1/8	1-1/2	45662-C3	29.60
.062 (1/16)		.0620	**.010**	.312 (5x)	3	1/8	2-1/2	53862-C3	38.60
.062 (1/16)		.0620	**.015**	.186 (3x)	3	1/8	1-1/2	903462-C3	29.60
.062 (1/16)		.0620	**.020**	.186 (3x)	3	1/8	1-1/2	931362-C3	29.60
	1.6 mm	.0629	**.20 mm**	2.40 mm (1.5x)	3	4 mm	50 mm	985636-C3	33.60
	1.6 mm	.0629	**.20 mm**	5.00 mm (3x)	3	4 mm	50 mm	976836-C3	33.60
	1.7 mm	.0669	**.20 mm**	5.00 mm (3x)	3	4 mm	50 mm	976838-C3	33.60
.070		.0700	**.010**	.105 (1.5x)	3	1/8	1-1/2	52670-C3	29.70
.070		.0700	**.010**	.210 (3x)	3	1/8	1-1/2	45670-C3	29.70
	1.8 mm	.0708	**.20 mm**	2.70 mm (1.5x)	3	4 mm	50 mm	985640-C3	33.60
	1.8 mm	.0708	**.20 mm**	5.50 mm (3x)	3	4 mm	50 mm	976840-C3	33.60

continued on next page

VARIABLE HELIX END MILLS FOR MEDIUM ALLOY STEELS

Corner Radius (cont.)

continued from previous page

CUTTER DIAMETER D_1 +.0005″ −.0005″	D_1 +.00mm −.02mm	D_1 decimal equivalent	CORNER RADIUS R +.001″ −.001″ / +.025mm −.025mm	LENGTH OF CUT L_2 +.010″ −.000″ / +.25mm −.00mm	FLUTES	SHANK DIAMETER D_2 (h6)	OVERALL LENGTH L_1	AlTiN COATED TOOL #	PRICE
	1.9 mm	.0748	**.20 mm**	5.50 mm (3x)	3	4 mm	50 mm	976842-C3	33.60
.078 (5/64)		.0780	**.005**	.118 (1.5x)	3	1/8	1-1/2	881878-C3	29.70
.078 (5/64)		.0780	**.005**	.234 (3x)	3	1/8	1-1/2	913878-C3	29.70
.078 (5/64)		.0780	**.010**	.118 (1.5x)	3	1/8	1-1/2	52678-C3	29.70
.078 (5/64)		.0780	**.010**	.234 (3x)	3	1/8	1-1/2	45678-C3	29.70
.078 (5/64)		.0780	**.010**	.406 (5x)	3	1/8	2-1/2	53878-C3	38.60
.078 (5/64)		.0780	**.015**	.234 (3x)	3	1/8	1-1/2	903478-C3	29.70
.078 (5/64)		.0780	**.020**	.234 (3x)	3	1/8	1-1/2	931378-C3	29.70
	2.0 mm	.0787	**.20 mm**	3.00 mm (1.5x)	3	4 mm	50 mm	985645-C3	33.60
	2.0 mm	.0787	**.20 mm**	6.00 mm (3x)	3	4 mm	50 mm	976845-C3	33.60
.080		.0800	**.010**	.120 (1.5x)	3	1/8	1-1/2	52680-C3	29.70
.080		.0800	**.010**	.240 (3x)	3	1/8	1-1/2	45680-C3	29.70
.090		.0900	**.010**	.270 (3x)	3	1/8	1-1/2	45690-C3	29.70
.093 (3/32)		.0930	**.005**	.140 (1.5x)	3	1/8	1-1/2	881893-C3	29.60
.093 (3/32)		.0930	**.005**	.279 (3x)	3	1/8	1-1/2	913893-C3	29.60
.093 (3/32)		.0930	**.010**	.140 (1.5x)	3	1/8	1-1/2	52693-C3	29.60
.093 (3/32)		.0930	**.010**	.279 (3x)	3	1/8	1-1/2	45693-C3	29.60
.093 (3/32)		.0930	**.010**	.500 (5x)	3	1/8	2-1/2	53893-C3	38.60
.093 (3/32)		.0930	**.015**	.140 (1.5x)	3	1/8	1-1/2	792393-C3	29.60
.093 (3/32)		.0930	**.015**	.279 (3x)	3	1/8	1-1/2	903493-C3	29.60
.093 (3/32)		.0930	**.020**	.279 (3x)	3	1/8	1-1/2	931393-C3	29.60
.093 (3/32)		.0930	**.030**	.279 (3x)	3	1/8	1-1/2	927893-C3	34.70
	2.5 mm	.0984	**.20 mm**	3.70 mm (1.5x)	3	4 mm	50 mm	985651-C3	33.60
	2.5 mm	.0984	**.20 mm**	7.50 mm (3x)	3	4 mm	50 mm	976851-C3	33.60
.100		.1000	**.010**	.150 (1.5x)	3	1/8	1-1/2	52700-C3	29.70
.100		.1000	**.010**	.300 (3x)	3	1/8	1-1/2	45700-C3	29.70
.100		.1000	**.010**	.500 (5x)	3	1/8	2-1/2	53900-C3	38.30
.109 (7/64)		.1090	**.010**	.164 (1.5x)	3	1/8	1-1/2	52702-C3	29.70
.109 (7/64)		.1090	**.010**	.327 (3x)	3	1/8	1-1/2	45702-C3	29.70
	3.0 mm	.1181	**.20 mm**	4.50 mm (1.5x)	3	4 mm	50 mm	985657-C3	33.60
	3.0 mm	.1181	**.20 mm**	9.00 mm (3x)	3	4 mm	50 mm	976857-C3	33.60

D_1 +.000″ −.002″	D_1 decimal equivalent	R +.001″ −.001″	L_2 +.030″ −.000″	FLUTES	D_2 (h6)	L_1	TOOL #	PRICE
.125 (1/8)	.1250	**.005**	.375 (3x)	4	1/8	1-1/2	913908-C3	29.70
.125 (1/8)	.1250	**.010**	.375 (3x)	4	1/8	1-1/2	907308-C3	28.00
.125 (1/8)	.1250	**.015**	.187 (1.5x)	4	1/8	1-1/2	52708-C3	28.00
.125 (1/8)	.1250	**.015**	.375 (3x)	4	1/8	1-1/2	45708-C3	28.00
.125 (1/8)	.1250	**.015**	.625 (5x)	4	1/8	2-1/2	53908-C3	38.60
.125 (1/8)	.1250	**.020**	.187 (1.5x)	4	1/8	1-1/2	778708-C3	28.00
.125 (1/8)	.1250	**.020**	.375 (3x)	4	1/8	1-1/2	931408-C3	28.00
NEW .125 (1/8)	.1250	**.020**	.625 (5x)	4	1/8	2-1/2	767308-C3	38.00
.125 (1/8)	.1250	**.030**	.375 (3x)	4	1/8	1-1/2	927908-C3	33.20
.140 (9/64)	.1406	**.015**	.220 (1.5x)	4	3/16	2	52709-C3	35.80
.140 (9/64)	.1406	**.015**	.425 (3x)	4	3/16	2	45709-C3	35.80

continued on next page

NEW SIZES!

VARIABLE HELIX END MILLS FOR MEDIUM ALLOY STEELS

Corner Radius (cont.)

mm & in

continued from previous page

CUTTER DIAMETER		CORNER RADIUS	LENGTH OF CUT	FLUTES	SHANK DIAMETER	OVERALL LENGTH	AlTiN COATED		
D_1 +.000″ −.002″	decimal equivalent	R +.001″ −.001″	L_2 +.030″ −.000″		D_2 (h6)	L_1	TOOL #	PRICE	
.156 (5/32)	.1562	**.015**	.235 (1.5x)	4	3/16	2	52710-C3	32.20	
.156 (5/32)	.1562	**.015**	.470 (3x)	4	3/16	2	45710-C3	32.20	
.156 (5/32)	.1562	**.015**	.750 (5x)	4	3/16	3	53910-C3	41.70	
.156 (5/32)	.1562	**.030**	.470 (3x)	4	3/16	2	927910-C3	37.30	
.187 (3/16)	.1875	**.005**	.562 (3x)	4	3/16	2	913912-C3	32.10	
.187 (3/16)	.1875	**.010**	.562 (3x)	4	3/16	2	907312-C3	32.10	NEW
.187 (3/16)	.1875	**.015**	.285 (1.5x)	4	3/16	2	52712-C3	30.40	
.187 (3/16)	.1875	**.015**	.562 (3x)	4	3/16	2	45712-C3	30.40	
.187 (3/16)	.1875	**.015**	1.000 (5x)	4	3/16	3	53912-C3	41.70	
.187 (3/16)	.1875	**.020**	.562 (3x)	4	3/16	2	931412-C3	36.00	NEW
.187 (3/16)	.1875	**.030**	.562 (3x)	4	3/16	2	927912-C3	36.00	
.187 (3/16)	.1875	**.060**	.562 (3x)	4	3/16	2	816812-C3	36.00	
.250 (1/4)	.2500	**.015**	.375 (1.5x)	4	1/4	2-1/2	52716-C3	38.30	
.250 (1/4)	.2500	**.015**	.750 (3x)	4	1/4	2-1/2	45716-C3	38.30	
.250 (1/4)	.2500	**.015**	1.250 (5x)	4	1/4	4	53916-C3	51.80	
.250 (1/4)	.2500	**.020**	.750 (3x)	4	1/4	2-1/2	931416-C3	38.30	NEW
.250 (1/4)	.2500	**.060**	.750 (3x)	4	1/4	2-1/2	816816-C3	38.30	NEW
.312 (5/16)	.3125	**.015**	.470 (1.5x)	4	5/16	2-1/2	52720-C3	56.30	
.312 (5/16)	.3125	**.015**	1.000 (3x)	4	5/16	2-1/2	45720-C3	56.30	
.375 (3/8)	.3750	**.015**	.570 (1.5x)	4	3/8	2-1/2	52724-C3	65.40	
.375 (3/8)	.3750	**.015**	1.125 (3x)	4	3/8	2-1/2	45724-C3	65.40	
.500 (1/2)	.5000	**.030**	.750 (1.5x)	4	1/2	3	52732-C3	84.60	

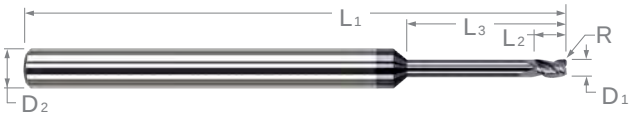
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VARIABLE HELIX END MILLS FOR MEDIUM ALLOY STEELS

Corner Radius – Long Reach, Stub Flute



- Optimized for readily machinable medium alloy steels, stainless steels, and tool steels
- Long reach design for deep cavities
- Reduced neck diameter to avoid heeling
- Variable helix design (approx. 37°) reduces chatter and harmonics and increases material removal rates
- Corner radius for improved strength
- AlTiN coated for improved lubricity and heat resistance
- h6 shank tolerance for high precision tool holders
- Center cutting
- Solid carbide
- CNC ground in the USA

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CUTTER DIAMETER			CORNER RADIUS	LENGTH OF CUT	OVERALL REACH	FLUTES	SHANK DIAMETER	OVERALL LENGTH	AlTiN COATED	
D_1 +.0005″ −.0005″	D_1 +.00mm −.02mm	D_1 decimal equivalent	R +.001″ −.001″ / +.025mm −.025mm	L_2 +.010″ −.000″ / +.25mm −.00mm	L_3 +.010″ −.000″ / +.25mm −.00mm		D_2 (h6)	L_1	TOOL #	PRICE
.015 (1/64)		.0150	**.003**	.022	.078 (5x)	3	1/8	2-1/2	62415-C3	57.70
.015 (1/64)		.0150	**.003**	.022	.125 (8x)	3	1/8	2-1/2	55015-C3	58.90
.015 (1/64)		.0150	**.003**	.022	.187 (12x)	3	1/8	2-1/2	63815-C3	64.50
	.4 mm	.0157	**.08 mm**	.60 mm	2.0 mm (5x)	3	4 mm	50 mm	986709-C3	64.50
	.4 mm	.0157	**.08 mm**	.60 mm	3.2 mm (8x)	3	4 mm	50 mm	978009-C3	65.80
	.4 mm	.0157	**.08 mm**	.60 mm	4.8 mm (12x)	3	4 mm	50 mm	982309-C3	71.40
	.5 mm	.0196	**.10 mm**	.75 mm	2.5 mm (5x)	3	4 mm	50 mm	986711-C3	62.00
	.5 mm	.0196	**.10 mm**	.75 mm	4.0 mm (8x)	3	4 mm	50 mm	978011-C3	63.10
	.5 mm	.0196	**.10 mm**	.75 mm	6.0 mm (12x)	3	4 mm	50 mm	982311-C3	69.10
	.5 mm	.0196	**.10 mm**	.75 mm	8.0 mm (16x)	3	4 mm	50 mm	975511-C3	72.20
.020		.0200	**.004**	.030	.100 (5x)	3	1/8	2-1/2	62420-C3	55.00
.020		.0200	**.004**	.030	.160 (8x)	3	1/8	2-1/2	55020-C3	56.20
.020		.0200	**.004**	.030	.250 (12x)	3	1/8	2-1/2	63820-C3	62.20
	.6 mm	.0236	**.10 mm**	.90 mm	3.0 mm (5x)	3	4 mm	50 mm	986713-C3	60.60
	.6 mm	.0236	**.10 mm**	.90 mm	4.8 mm (8x)	3	4 mm	50 mm	978013-C3	62.00
	.6 mm	.0236	**.10 mm**	.90 mm	7.2 mm (12x)	3	4 mm	50 mm	982313-C3	66.10
.025		.0250	**.004**	.038	.125 (5x)	3	1/8	2-1/2	62425-C3	53.50
.025		.0250	**.004**	.038	.203 (8x)	3	1/8	2-1/2	55025-C3	55.00
.025		.0250	**.004**	.038	.312 (12x)	3	1/8	2-1/2	63825-C3	60.50
.031 (1/32)		.0310	**.005**	.047	.156 (5x)	3	1/8	2-1/2	62431-C3	50.70
.031 (1/32)		.0310	**.005**	.047	.250 (8x)	3	1/8	2-1/2	55031-C3	51.80
.031 (1/32)		.0310	**.005**	.047	.375 (12x)	3	1/8	2-1/2	63831-C3	54.00
	.8 mm	.0314	**.10 mm**	1.20 mm	4.0 mm (5x)	3	4 mm	50 mm	986718-C3	55.90
	.8 mm	.0314	**.10 mm**	1.20 mm	6.5 mm (8x)	3	4 mm	50 mm	978018-C3	57.00
	.8 mm	.0314	**.10 mm**	1.20 mm	9.5 mm (12x)	3	4 mm	50 mm	982318-C3	59.10
.035		.0350	**.005**	.053	.187 (5x)	3	1/8	2-1/2	62435-C3	51.00
	1.0 mm	.0393	**.10 mm**	1.50 mm	5.0 mm (5x)	3	4 mm	50 mm	986722-C3	55.90
	1.0 mm	.0393	**.10 mm**	1.50 mm	8.0 mm (8x)	3	4 mm	50 mm	978022-C3	57.00
	1.0 mm	.0393	**.10 mm**	1.50 mm	12.0 mm (12x)	3	4 mm	50 mm	982322-C3	59.10
	1.0 mm	.0393	**.10 mm**	1.50 mm	16.0 mm (16x)	3	4 mm	50 mm	975522-C3	62.50
.040		.0400	**.005**	.060	.203 (5x)	3	1/8	2-1/2	62440-C3	51.00
.045		.0450	**.005**	.068	.225 (5x)	3	1/8	2-1/2	62445-C3	51.00
.047 (3/64)		.0470	**.005**	.070	.250 (5x)	3	1/8	2-1/2	62447-C3	51.00
.047 (3/64)		.0470	**.005**	.070	.375 (8x)	3	1/8	2-1/2	55047-C3	51.80
.047 (3/64)		.0470	**.005**	.070	.570 (12x)	3	1/8	2-1/2	63847-C3	54.00

continued on next page

VARIABLE HELIX END MILLS FOR MEDIUM ALLOY STEELS

Corner Radius – Long Reach, Stub Flute (cont.)

mm & in continued from previous page

CUTTER DIAMETER			CORNER RADIUS	LENGTH OF CUT	OVERALL REACH	FLUTES	SHANK DIAMETER	OVERALL LENGTH	AlTiN COATED	
D_1 +.0005″ −.0005″	+.00mm −.02mm	decimal equivalent	R +.001″ −.001″ +.025mm −.025mm	L_2 +.010″ −.000″ +.25mm −.00mm	L_3 +.010″ −.000″ +.25mm −.00mm		D_2 (h6)	L_1	TOOL #	PRICE
.050		.0500	**.005**	.075	.250 (5x)	3	1/8	2-1/2	62450-C3	50.40
.055		.0550	**.005**	.083	.275 (5x)	3	1/8	2-1/2	62455-C3	50.40
	1.5 mm	.0590	**.20 mm**	2.20 mm	7.5 mm (5x)	3	4 mm	50 mm	986733-C3	55.90
	1.5 mm	.0590	**.20 mm**	2.20 mm	12.0 mm (8x)	3	4 mm	50 mm	978033-C3	57.00
	1.5 mm	.0590	**.20 mm**	2.20 mm	18.0 mm (12x)	3	4 mm	50 mm	982333-C3	59.10
	1.5 mm	.0590	**.20 mm**	2.20 mm	24.0 mm (16x)	3	4 mm	63 mm	975533-C3	62.50
.060		.0600	**.010**	.090	.312 (5x)	3	1/8	2-1/2	62460-C3	51.00
.062 (1/16)		.0620	**.005**	.093	.312 (5x)	3	1/8	2-1/2	815662-C3	52.90
.062 (1/16)		.0620	**.005**	.093	.500 (8x)	3	1/8	2-1/2	816562-C3	54.00
.062 (1/16)		.0620	**.010**	.093	.312 (5x)	3	1/8	2-1/2	62462-C3	50.70
.062 (1/16)		.0620	**.010**	.093	.500 (8x)	3	1/8	2-1/2	55062-C3	51.80
.062 (1/16)		.0620	**.010**	.093	.750 (12x)	3	1/8	2-1/2	63862-C3	54.00
.078 (5/64)		.0780	**.010**	.117	.406 (5x)	3	1/8	2-1/2	62478-C3	50.70
.078 (5/64)		.0780	**.010**	.117	.625 (8x)	3	1/8	2-1/2	55078-C3	51.80
.078 (5/64)		.0780	**.010**	.117	.940 (12x)	3	1/8	2-1/2	63878-C3	54.00
	2.0 mm	.0787	**.20 mm**	3.00 mm	10.0 mm (5x)	3	4 mm	50 mm	986745-C3	55.90
	2.0 mm	.0787	**.20 mm**	3.00 mm	16.0 mm (8x)	3	4 mm	50 mm	978045-C3	57.00
	2.0 mm	.0787	**.20 mm**	3.00 mm	24.0 mm (12x)	3	4 mm	63 mm	982345-C3	59.10
	2.0 mm	.0787	**.20 mm**	3.00 mm	32.0 mm (16x)	3	4 mm	63 mm	975545-C3	62.50
.093 (3/32)		.0930	**.005**	.139	.500 (5x)	3	1/8	2-1/2	815693-C3	52.90
.093 (3/32)		.0930	**.005**	.139	.750 (8x)	3	1/8	2-1/2	816593-C3	54.00
.093 (3/32)		.0930	**.010**	.139	.500 (5x)	3	1/8	2-1/2	62493-C3	50.70
.093 (3/32)		.0930	**.010**	.139	.750 (8x)	3	1/8	2-1/2	55093-C3	51.80
.093 (3/32)		.0930	**.010**	.139	1.125 (12x)	3	1/8	2-1/2	63893-C3	54.00
.100		.1000	**.010**	.150	.500 (5x)	3	1/8	2-1/2	62500-C3	52.30
	3.0 mm	.1181	**.20 mm**	4.50 mm	15.0 mm (5x)	3	4 mm	50 mm	986757-C3	53.00

D_1 +.000″ −.002″	decimal equivalent	R +.001″ −.001″	L_2 +.030″ −.000″	L_3 +.030″ −.000″		D_2 (h6)	L_1	TOOL #	PRICE
.125 (1/8)	.1250	**.010**	.187	.625 (5x)	4	1/8	2-1/2	815708-C3	50.40
.125 (1/8)	.1250	**.010**	.187	1.000 (8x)	4	1/8	2-1/2	816608-C3	51.50
.125 (1/8)	.1250	**.015**	.187	.625 (5x)	4	1/8	2-1/2	62508-C3	50.40
.125 (1/8)	.1250	**.015**	.187	1.000 (8x)	4	1/8	2-1/2	55108-C3	51.50
.125 (1/8)	.1250	**.015**	.187	1.500 (12x)	4	1/8	3	63908-C3	54.00
.156 (5/32)	.1562	**.015**	.235	.750 (5x)	4	3/16	3	62510-C3	55.60
.156 (5/32)	.1562	**.015**	.235	1.250 (8x)	4	3/16	3	55110-C3	56.90
.156 (5/32)	.1562	**.015**	.235	1.875 (12x)	4	3/16	4	63910-C3	69.60
.156 (5/32)	.1562	**.030**	.235	1.250 (8x)	4	3/16	3	817310-C3	62.10
.187 (3/16)	.1875	**.015**	.281	1.000 (5x)	4	3 /16	3	62512-C3	55.60
.187 (3/16)	.1875	**.015**	.281	1.500 (8x)	4	3/16	3	55112-C3	56.90
.187 (3/16)	.1875	**.015**	.281	2.250 (12x)	4	3/16	4	63912-C3	69.60
.187 (3/16)	.1875	**.030**	.281	1.500 (8x)	4	3/16	3	817312-C3	62.10
.250 (1/4)	.2500	**.015**	.375	1.250 (5x)	4	1/4	4	62516-C3	61.90
.250 (1/4)	.2500	**.015**	.375	2.000 (8x)	4	1/4	4	55116-C3	63.10
.250 (1/4)	.2500	**.015**	.375	3.000 (12x)	4	1/4	6	63916-C3	76.90

PLEASE SEE SPEEDS & FEEDS ON PAGE 155

NEW SIZES!

VARIABLE HELIX END MILLS FOR MEDIUM ALLOY STEELS

Finishers – Square



Down to .2 mm!

- Optimized for readily machinable medium alloy steels, stainless steels, and tool steels
- Multi-flute, high helix (approx. 44°), coated design improves finishing in carbon steels, 300 and 400 stainless steels, and machinable tool steels
- Can be used in light duty roughing and profiling applications
- AlTiN Nano coating offers superior hardness and heat resistance
- h6 shank tolerance for high precision tool holders
- End cutting (not center cutting)
- Solid carbide
- CNC ground in the USA

mm & in

	CUTTER DIAMETER			LENGTH OF CUT	FLUTES	SHANK DIAMETER	OVERALL LENGTH	AlTiN NANO COATED	
	D_1 +.0005″ −.0005″	+.00mm −.02mm	decimal equivalent	L_2 +.010″ −.000″ +.25mm −.00mm		D_2 (h6)	L_1	TOOL #	PRICE
		.2 mm	.0078	**.60 mm** (3x)	4	4 mm	50 mm	977704-C6	53.50
		.2 mm	.0078	**1.00 mm** (5x)	4	4 mm	50 mm	980104-C6	61.90
		.2 mm	.0078	**1.60 mm** (8x)	4	4 mm	50 mm	981704-C6	63.40
		.3 mm	.0118	**.90 mm** (3x)	4	4 mm	50 mm	977706-C6	49.50
	.015 (1/64)		.0150	**.045** (3x)	4	1/8	1-1/2	24315-C6	43.40
	.015 (1/64)		.0150	**.078** (5x)	4	1/8	2-1/2	53315-C6	53.90
	.015 (1/64)		.0150	**.125** (8x)	4	1/8	2-1/2	62815-C6	55.60
		.4 mm	.0157	**1.20 mm** (3x)	4	4 mm	50 mm	977709-C6	47.10
		.4 mm	.0157	**2.00 mm** (5x)	4	4 mm	50 mm	980109-C6	55.60
		.4 mm	.0157	**3.20 mm** (8x)	4	4 mm	50 mm	981709-C6	56.90
		.5 mm	.0196	**1.50 mm** (3x)	4	4 mm	50 mm	977711-C6	46.50
		.5 mm	.0196	**2.50 mm** (5x)	4	4 mm	50 mm	980111-C6	54.00
		.5 mm	.0196	**4.00 mm** (8x)	4	4 mm	50 mm	981711-C6	56.00
	.020		.0200	**.030** (1.5x)	4	1/8	1-1/2	935920-C6	42.70
	.020		.0200	**.060** (3x)	4	1/8	1-1/2	24320-C6	42.70
NEW	.020		.0200	**.080** (4x)	4	1/8	1-1/2	835320-C6	44.60
	.020		.0200	**.100** (5x)	4	1/8	2-1/2	53320-C6	53.50
	.020		.0200	**.160** (8x)	4	1/8	2-1/2	62820-C6	54.60
		.6 mm	.0236	**1.80 mm** (3x)	4	4 mm	50 mm	977713-C6	46.50
		.6 mm	.0236	**3.00 mm** (5x)	4	4 mm	50 mm	980113-C6	54.00
		.6 mm	.0236	**4.80 mm** (8x)	4	4 mm	50 mm	981713-C6	56.00
	.025		.0250	**.038** (1.5x)	4	1/8	1-1/2	935925-C6	40.10
	.025		.0250	**.075** (3x)	4	1/8	1-1/2	24325-C6	40.10
	.025		.0250	**.125** (5x)	4	1/8	2-1/2	53325-C6	51.80
	.025		.0250	**.203** (8x)	4	1/8	2-1/2	62825-C6	52.90
		.7 mm	.0275	**2.10 mm** (3x)	4	4 mm	50 mm	977715-C6	46.50
	.031 (1/32)		.0310	**.047** (1.5x)	5	1/8	1-1/2	935931-C6	35.70
	.031 (1/32)		.0310	**.093** (3x)	5	1/8	1-1/2	24331-C6	35.70
	.031 (1/32)		.0310	**.125** (4x)	5	1/8	2-1/2	835331-C6	49.30
	.031 (1/32)		.0310	**.156** (5x)	5	1/8	2-1/2	53331-C6	49.80
	.031 (1/32)		.0310	**.250** (8x)	5	1/8	2-1/2	62831-C6	50.70
	.031 (1/32)		.0310	**.312** (10x)	5	1/8	2-1/2	882431-C6	58.10
	.031 (1/32)		.0310	**.375** (12x)	5	1/8	2-1/2	68531-C6	62.50
		.8 mm	.0314	**2.40 mm** (3x)	5	4 mm	50 mm	977718-C6	40.90
		.8 mm	.0314	**4.00 mm** (5x)	5	4 mm	50 mm	980118-C6	51.00
		.8 mm	.0314	**6.50 mm** (8x)	5	4 mm	50 mm	981718-C6	52.50
		.9 mm	.0354	**2.70 mm** (3x)	5	4 mm	50 mm	977720-C6	40.90

continued on next page

NEW SIZES!

VARIABLE HELIX END MILLS FOR MEDIUM ALLOY STEELS

Finishers – Square (cont.)

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continued from previous page

CUTTER DIAMETER			LENGTH OF CUT	FLUTES	SHANK DIAMETER	OVERALL LENGTH	AlTiN NANO COATED	
D_1 +.0005″ −.0005″	+.00mm −.02mm	decimal equivalent	L_2 +.010″ −.000″ +.25mm −.00mm		D_2 (h6)	L_1	TOOL #	PRICE
	1.0 mm	.0393	**1.50 mm** (1.5x)	5	4 mm	50 mm	778522-C6	40.90
	1.0 mm	.0393	**3.00 mm** (3x)	5	4 mm	50 mm	977722-C6	40.90
	1.0 mm	.0393	**5.00 mm** (5x)	5	4 mm	50 mm	980122-C6	51.00
	1.0 mm	.0393	**8.00 mm** (8x)	5	4 mm	50 mm	981722-C6	52.50
.040		.0400	**.060** (1.5x)	5	1/8	1-1/2	935940-C6	35.70
.040		.0400	**.120** (3x)	5	1/8	1-1/2	24340-C6	35.70
.040		.0400	**.160** (4x)	5	1/8	2-1/2	835340-C6	49.80
.040		.0400	**.203** (5x)	5	1/8	2-1/2	53340-C6	49.80
.040		.0400	**.325** (8x)	5	1/8	2-1/2	62840-C6	50.70
	1.1 mm	.0433	**3.00 mm** (3x)	5	4 mm	50 mm	977724-C6	40.90
.047 (3/64)		.0470	**.071** (1.5x)	5	1/8	1-1/2	935947-C6	35.70
.047 (3/64)		.0470	**.141** (3x)	5	1/8	1-1/2	24347-C6	35.70
.047 (3/64)		.0470	**.187** (4x)	5	1/8	2-1/2	835347-C6	45.70
.047 (3/64)		.0470	**.250** (5x)	5	1/8	2-1/2	53347-C6	49.80
.047 (3/64)		.0470	**.375** (8x)	5	1/8	2-1/2	62847-C6	50.70
.047 (3/64)		.0470	**.480** (10x)	5	1/8	2-1/2	882447-C6	58.10
.047 (3/64)		.0470	**.570** (12x)	5	1/8	2-1/2	68547-C6	62.50
	1.2 mm	.0472	**3.50 mm** (3x)	5	4 mm	50 mm	977727-C6	40.90
	1.2 mm	.0472	**6.00 mm** (5x)	5	4 mm	50 mm	980127-C6	51.00
	1.2 mm	.0472	**9.50 mm** (8x)	5	4 mm	50 mm	981727-C6	52.50
.050		.0500	**.075** (1.5x)	5	1/8	1-1/2	935950-C6	35.70
.050		.0500	**.150** (3x)	5	1/8	1-1/2	24350-C6	35.70
.050		.0500	**.250** (5x)	5	1/8	2-1/2	53350-C6	49.80
.050		.0500	**.400** (8x)	5	1/8	2-1/2	62850-C6	50.70
	1.3 mm	.0511	**4.00 mm** (3x)	5	4 mm	50 mm	977729-C6	40.90
	1.4 mm	.0551	**4.00 mm** (3x)	5	4 mm	50 mm	977731-C6	40.90
	1.4 mm	.0551	**7.00 mm** (5x)	5	4 mm	50 mm	980131-C6	51.00
	1.4 mm	.0551	**11.00 mm** (8x)	5	4 mm	50 mm	981731-C6	52.50
	1.5 mm	.0590	**4.50 mm** (3x)	5	4 mm	50 mm	977733-C6	39.50
	1.5 mm	.0590	**7.50 mm** (5x)	5	4 mm	50 mm	980133-C6	49.50
	1.5 mm	.0590	**12.00 mm** (8x)	5	4 mm	50 mm	981733-C6	51.30
.060		.0600	**.090** (1.5x)	5	1/8	1-1/2	935960-C6	35.70
.060		.0600	**.180** (3x)	5	1/8	1-1/2	24360-C6	35.70
.060		.0600	**.312** (5x)	5	1/8	2-1/2	53360-C6	49.80
.060		.0600	**.500** (8x)	5	1/8	2-1/2	62860-C6	50.70
.062 (1/16)		.0620	**.093** (1.5x)	5	1/8	1-1/2	935962-C6	33.60
.062 (1/16)		.0620	**.186** (3x)	5	1/8	1-1/2	24362-C6	33.60
.062 (1/16)		.0620	**.250** (4x)	5	1/8	2-1/2	835362-C6	46.40
.062 (1/16)		.0620	**.312** (5x)	5	1/8	2-1/2	53362-C6	46.90
.062 (1/16)		.0620	**.375** (6x)	5	1/8	2-1/2	778362-C6	46.90
.062 (1/16)		.0620	**.500** (8x)	5	1/8	2-1/2	62862-C6	47.60
.062 (1/16)		.0620	**.625** (10x)	5	1/8	2-1/2	882462-C6	59.20
.062 (1/16)		.0620	**.750** (12x)	5	1/8	2-1/2	68562-C6	66.70
.062 (1/16)		.0620	**.950** (15x)	5	1/8	2-1/2	68962-C6	84.10
	1.6 mm	.0629	**5.00 mm** (3x)	5	4 mm	50 mm	977736-C6	39.50
	1.6 mm	.0629	**8.00 mm** (5x)	5	4 mm	50 mm	980136-C6	49.80
	1.6 mm	.0629	**13.00 mm** (8x)	5	4 mm	50 mm	981736-C6	50.70
	1.7 mm	.0669	**5.00 mm** (3x)	5	4 mm	50 mm	977738-C6	39.50

continued on next page

VARIABLE HELIX END MILLS FOR MEDIUM ALLOY STEELS

Finishers – Square (cont.)

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continued from previous page

CUTTER DIAMETER			LENGTH OF CUT	FLUTES	SHANK DIAMETER	OVERALL LENGTH	AlTiN NANO COATED	
D_1			L_2		D_2 (h6)	L_1	TOOL #	PRICE
+.0005″ −.0005″	+.00mm −.02mm	decimal equivalent	+.010″ −.000″ +.25mm −.00mm					
.070		.0700	**.210** (3x)	5	1/8	1-1/2	24370-C6	33.60
.070		.0700	**.375** (5x)	5	1/8	2-1/2	53370-C6	46.90
.070		.0700	**.570** (8x)	5	1/8	2-1/2	62870-C6	47.60
	1.8 mm	.0708	**5.50 mm** (3x)	5	4 mm	50 mm	977740-C6	39.50
	1.8 mm	.0708	**9.00 mm** (5x)	5	4 mm	50 mm	980140-C6	49.50
	1.8 mm	.0708	**14.00 mm** (8x)	5	4 mm	50 mm	981740-C6	51.30
	1.9 mm	.0748	**5.50 mm** (3x)	5	4 mm	50 mm	977742-C6	39.50
.078 (5/64)		.0780	**.117** (1.5x)	5	1/8	1-1/2	935978-C6	33.60
.078 (5/64)		.0780	**.234** (3x)	5	1/8	1-1/2	24378-C6	33.60
.078 (5/64)		.0780	**.312** (4x)	5	1/8	2-1/2	835378-C6	42.80
.078 (5/64)		.0780	**.406** (5x)	5	1/8	2-1/2	53378-C6	46.90
.078 (5/64)		.0780	**.475** (6x)	5	1/8	2-1/2	778378-C6	46.90
.078 (5/64)		.0780	**.625** (8x)	5	1/8	2-1/2	62878-C6	47.60
.078 (5/64)		.0780	**.800** (10x)	5	1/8	2-1/2	882478-C6	59.20
.078 (5/64)		.0780	**.940** (12x)	5	1/8	2-1/2	68578-C6	66.70
.078 (5/64)		.0780	**1.187** (15x)	5	1/8	2-1/2	68978-C6	84.10
	2.0 mm	.0787	**6.00 mm** (3x)	5	4 mm	50 mm	977745-C6	39.50
	2.0 mm	.0787	**10.00 mm** (5x)	5	4 mm	50 mm	980145-C6	49.50
	2.0 mm	.0787	**16.00 mm** (8x)	5	4 mm	50 mm	981745-C6	51.30
.080		.0800	**.120** (1.5x)	5	1/8	1-1/2	935980-C6	33.60
.080		.0800	**.240** (3x)	5	1/8	1-1/2	24380-C6	33.60
.080		.0800	**.406** (5x)	5	1/8	2-1/2	53380-C6	46.90
.080		.0800	**.650** (8x)	5	1/8	2-1/2	62880-C6	47.60
.090		.0900	**.270** (3x)	5	1/8	1-1/2	24390-C6	33.60
.090		.0900	**.450** (5x)	5	1/8	2-1/2	53390-C6	46.90
.090		.0900	**.750** (8x)	5	1/8	2-1/2	62890-C6	47.60
.093 (3/32)		.0930	**.140** (1.5x)	5	1/8	1-1/2	935993-C6	33.60
.093 (3/32)		.0930	**.279** (3x)	5	1/8	1-1/2	24393-C6	33.60
.093 (3/32)		.0930	**.375** (4x)	5	1/8	2-1/2	835393-C6	46.40
.093 (3/32)		.0930	**.500** (5x)	5	1/8	2-1/2	53393-C6	46.90
.093 (3/32)		.0930	**.585** (6x)	5	1/8	2-1/2	778393-C6	46.90
.093 (3/32)		.0930	**.750** (8x)	5	1/8	2-1/2	62893-C6	47.60
.093 (3/32)		.0930	**.950** (10x)	5	1/8	2-1/2	882493-C6	59.20
.093 (3/32)		.0930	**1.125** (12x)	5	1/8	2-1/2	68593-C6	66.70
.093 (3/32)		.0930	**1.400** (15x)	5	1/8	3	68993-C6	84.80
	2.5 mm	.0984	**7.50 mm** (3x)	5	4 mm	50 mm	977751-C6	39.50
NEW	2.5 mm	.0984	**12.00 mm** (5x)	5	4 mm	50 mm	980151-C6	49.10
.100		.1000	**.150** (1.5x)	5	1/8	1-1/2	936000-C6	33.60
.100		.1000	**.300** (3x)	5	1/8	1-1/2	24399-C6	33.60
.100		.1000	**.500** (5x)	5	1/8	2-1/2	53399-C6	46.90
.100		.1000	**.800** (8x)	5	1/8	2-1/2	53400-C6	47.60
.109 (7/64)		.1090	**.327** (3x)	5	1/8	1-1/2	24402-C6	33.80
.109 (7/64)		.1090	**.570** (5x)	5	1/8	2-1/2	63502-C6	46.90
	3.0 mm	.1181	**9.00 mm** (3x)	5	4 mm	50 mm	977757-C6	39.50
	3.0 mm	.1181	**15.00 mm** (5x)	5	4 mm	50 mm	980157-C6	49.10
	3.0 mm	.1181	**24.00 mm** (8x)	5	4 mm	50 mm	981757-C6	51.50

continued on next page

NEW SIZES!

VARIABLE HELIX END MILLS FOR MEDIUM ALLOY STEELS

Finishers – Square (cont.)

mm & in

continued from previous page

CUTTER DIAMETER		LENGTH OF CUT	FLUTES	SHANK DIAMETER	OVERALL LENGTH	AlTiN NANO COATED	
D_1 $^{+.000″}_{-.002″}$		L_2 $^{+.030″}_{-.000″}$		D_2 (h6)	L_1	TOOL #	PRICE
.125 (1/8)	.1250	**.187** (1.5x)	5	1/8	1-1/2	936008-C6	30.10
.125 (1/8)	.1250	**.375** (3x)	5	1/8	1-1/2	795408-C6	30.10
.125 (1/8)	.1250	**.500** (4x)	5	1/8	1-1/2	24408-C6	30.10
.125 (1/8)	.1250	**.625** (5x)	5	1/8	2-1/2	776908-C6	45.80
.125 (1/8)	.1250	**.750** (6x)	5	1/8	2-1/2	63508-C6	45.80
.125 (1/8)	.1250	**1.000** (8x)	5	1/8	2-1/2	53408-C6	46.90
.125 (1/8)	.1250	**1.125** (10x)	5	1/8	2-1/2	882508-C6	57.70
.125 (1/8)	.1250	**1.500** (12x)	5	1/8	3	68608-C6	65.80
.125 (1/8)	.1250	**1.875** (15x)	5	1/8	3	69008-C6	83.80
.140 (9/64)	.1406	**.500** (3x)	5	3/16	2	24409-C6	44.30
.140 (9/64)	.1406	**.750** (5x)	5	3/16	3	63509-C6	45.80
.156 (5/32)	.1562	**.235** (1.5x)	5	3/16	2	936010-C6	36.40
.156 (5/32)	.1562	**.562** (3x)	5	3/16	2	24410-C6	36.40
.156 (5/32)	.1562	**.625** (4x)	5	3/16	3	835410-C6	48.80
.156 (5/32)	.1562	**.875** (5x)	5	3/16	3	63510-C6	48.80
.156 (5/32)	.1562	**1.250** (8x)	5	3/16	3	53410-C6	49.60
.187 (3/16)	.1875	**.285** (1.5x)	5	3/16	2	936012-C6	34.30
.187 (3/16)	.1875	**.625** (3x)	5	3/16	2	24412-C6	34.30
.187 (3/16)	.1875	**.750** (4x)	5	3/16	3	835412-C6	43.60
.187 (3/16)	.1875	**1.000** (5x)	5	3/16	3	63512-C6	48.80
.187 (3/16)	.1875	**1.500** (8x)	5	3/16	3	53412-C6	49.60
.250 (1/4)	.2500	**.375** (1.5x)	5	1/4	2-1/2	936016-C6	43.60
.250 (1/4)	.2500	**.750** (3x)	5	1/4	2-1/2	24416-C6	43.60
.250 (1/4)	.2500	**1.250** (5x)	5	1/4	4	63516-C6	59.60
.250 (1/4)	.2500	**2.000** (8x)	5	1/4	4	53416-C6	60.70
.375 (3/8)	.3750	**1.125** (3x)	5	3/8	2-1/2	24424-C6	69.40
.500 (1/2)	.5000	**.750** (1.5x)	5	1/2	3	936032-C6	91.50 NEW
.500 (1/2)	.5000	**1.500** (3x)	5	1/2	3	24432-C6	90.20
.500 (1/2)	.5000	**2.625** (5x)	5	1/2	4	63532-C6	98.50 NEW

PLEASE SEE SPEEDS & FEEDS ON PAGE 169

VARIABLE HELIX END MILLS FOR MEDIUM ALLOY STEELS

Finishers

SPEEDS & FEEDS (High-Helix Finishers for Medium Alloy Steels)

Material	Hardness (HBn)	SFM		Chip Load Per Tooth (IPT) By Cutter Diameter									Depth of Cut	
				.015	.031	.047	.062	.078	.093	.125	.187	.250	Radial	Axial
Carbon Steels: 1030 - 1095, 1140 - 1151, 13xx, 15xx, 2xxx, 3xxx, 4xxx & 4xLxx, 5xxx & 5xLxx, 50xxx & 50Lxxx, 51xxx & 51Lxxx, 52xxx & 52Lxxx, 6xxx, 8xxx, 9xxx	225 - 250	600	Finishing (1.5x LOC)	0.00020	0.00041	0.00062	0.00082	0.00103	0.00123	0.00165	0.00247	0.00330	< .10x Dia	.5x - 1.5x Dia
	250 - 275	550	Finishing (3x LOC)	0.00018	0.00037	0.00056	0.00074	0.00094	0.00112	0.00150	0.00224	0.00300	< .10x Dia	.5x - 3x Dia
			Finishing (4x LOC)	0.00016	0.00032	0.00049	0.00065	0.00081	0.00097	0.00131	0.00195	0.00261	< .09x Dia	.5x - 4x Dia
			Finishing (5x LOC)	0.00014	0.00028	0.00042	0.00056	0.00070	0.00084	0.00113	0.00168	0.00225	< .07x Dia	.5x - 5x Dia
			Finishing (6x LOC)	0.00011	0.00023	0.00035	0.00047	0.00059	0.00070	0.00094	0.00140	0.00188	< .07x Dia	.5x - 5x Dia
			Finishing (8x LOC)	0.00010	0.00020	0.00031	0.00041	0.00051	0.00061	0.00083	0.00123	0.00165	< .05x Dia	.5x - 8x Dia
			Finishing (10x LOC)	-	0.00019	0.00029	0.00039	0.00049	0.00058	0.00078	0.00117	0.00156	< .04x Dia	.5x - 10x Dia
			Finishing (12x LOC)	-	0.00019	0.00028	0.00037	0.00047	0.00056	0.00075	0.00112	0.00150	< .04x Dia	.5x - 12x Dia
			Finishing (15x LOC)	-	-	-	0.00033	0.00042	0.00050	0.00068	0.00101	0.00135	< .02x Dia	.5x - 15x Dia
	275 - 300	500	Finishing (1.5x LOC)	0.00018	0.00038	0.00057	0.00075	0.00094	0.00113	0.00151	0.00226	0.00303	< .10x Dia	.5x - 1.5x Dia
			Finishing (3x LOC)	0.00017	0.00034	0.00052	0.00068	0.00086	0.00102	0.00138	0.00206	0.00275	< .10x Dia	.5x - 3x Dia
			Finishing (4x LOC)	0.00014	0.00030	0.00045	0.00059	0.00075	0.00089	0.00120	0.00179	0.00239	< .09x Dia	.5x - 4x Dia
			Finishing (5x LOC)	0.00012	0.00026	0.00039	0.00051	0.00064	0.00077	0.00103	0.00154	0.00206	< .07x Dia	.5x - 5x Dia
			Finishing (6x LOC)	0.00010	0.00021	0.00032	0.00043	0.00054	0.00064	0.00086	0.00129	0.00172	< .07x Dia	.5x - 5x Dia
			Finishing (8x LOC)	0.00009	0.00019	0.00028	0.00038	0.00047	0.00056	0.00076	0.00113	0.00151	< .05x Dia	.5x - 8x Dia
			Finishing (10x LOC)	-	0.00018	0.00027	0.00035	0.00045	0.00053	0.00072	0.00107	0.00143	< .04x Dia	.5x - 10x Dia
			Finishing (12x LOC)	-	0.00017	0.00026	0.00034	0.00043	0.00051	0.00069	0.00103	0.00138	< .04x Dia	.5x - 12x Dia
			Finishing (15x LOC)	-	-	-	0.00031	0.00039	0.00046	0.00062	0.00093	0.00124	< .02x Dia	.5x - 15x Dia
Stainless Steels: 201, 202, 203, 205, 301, 302, 304, 304L, 308, 309, 310, 314, 316, 316L, 317, 321, 329, 330, 347, 348, 385, 403, 405, 409, 410, 413, 414, 42x, 43x, 44x, 501, 502 **Tool Steels:** A, L, O, P, W series	225 - 250	500	Finishing (1.5x LOC)	0.00017	0.00034	0.00052	0.00068	0.00086	0.00102	0.00138	0.00206	0.00275	< .10x Dia	.5x - 1.5x Dia
	250 - 275	500	Finishing (3x LOC)	0.00015	0.00031	0.00047	0.00062	0.00078	0.00093	0.00125	0.00187	0.00250	< .10x Dia	.5x - 3x Dia
			Finishing (4x LOC)	0.00013	0.00027	0.00041	0.00054	0.00068	0.00081	0.00109	0.00163	0.00218	< .09x Dia	.5x - 4x Dia
			Finishing (5x LOC)	0.00011	0.00023	0.00035	0.00047	0.00059	0.00070	0.00094	0.00140	0.00188	< .07x Dia	.5x - 5x Dia
			Finishing (6x LOC)	0.00009	0.00019	0.00029	0.00039	0.00049	0.00058	0.00078	0.00117	0.00156	< .07x Dia	.5x - 5x Dia
			Finishing (8x LOC)	0.00008	0.00017	0.00026	0.00034	0.00043	0.00051	0.00069	0.00103	0.00138	< .05x Dia	.5x - 8x Dia
			Finishing (10x LOC)	-	0.00016	0.00024	0.00032	0.00041	0.00048	0.00065	0.00097	0.00130	< .04x Dia	.5x - 10x Dia
			Finishing (12x LOC)	-	0.00014	0.00021	0.00028	0.00035	0.00042	0.00056	0.00084	0.00113	< .04x Dia	.5x - 12x Dia
			Finishing (15x LOC)	-	-	-	0.00028	0.00035	0.00042	0.00056	0.00084	0.00113	< .02x Dia	.5x - 15x Dia
	275 - 300	500	Finishing (1.5x LOC)	0.00015	0.00031	0.00047	0.00061	0.00077	0.00092	0.00124	0.00185	0.00248	< .10x Dia	.5x - 1.5x Dia
	300 - 350	500	Finishing (3x LOC)	0.00014	0.00028	0.00042	0.00056	0.00070	0.00084	0.00113	0.00168	0.00225	< .10x Dia	.5x - 3x Dia
			Finishing (4x LOC)	0.00012	0.00024	0.00037	0.00049	0.00061	0.00073	0.00098	0.00146	0.00196	< .09x Dia	.5x - 4x Dia
			Finishing (5x LOC)	0.00010	0.00021	0.00032	0.00042	0.00053	0.00063	0.00084	0.00126	0.00169	< .07x Dia	.5x - 5x Dia
			Finishing (6x LOC)	0.00008	0.00017	0.00026	0.00035	0.00044	0.00052	0.00070	0.00105	0.00141	< .07x Dia	.5x - 5x Dia
			Finishing (8x LOC)	0.00007	0.00015	0.00023	0.00031	0.00039	0.00046	0.00062	0.00093	0.00124	< .05x Dia	.5x - 8x Dia
			Finishing (10x LOC)	-	0.00015	0.00022	0.00029	0.00037	0.00044	0.00059	0.00088	0.00117	< .04x Dia	.5x - 10x Dia
			Finishing (12x LOC)	-	0.00014	0.00021	0.00028	0.00035	0.00042	0.00056	0.00084	0.00113	< .04x Dia	.5x - 12x Dia
			Finishing (15x LOC)	-	-	-	0.00025	0.00032	0.00038	0.00051	0.00076	0.00101	< .02x Dia	.5x - 15x Dia

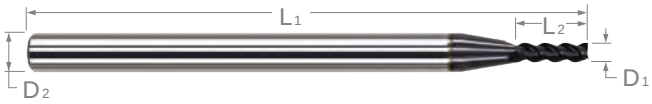


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VARIABLE HELIX END MILLS FOR FREE MACHINING STEELS

Square



- Optimized for free machining varieties of carbon steels and stainless steels
- Variable helix design (approx. 38°) reduces chatter and harmonics and increases material removal rates
- AlTiN coated for improved lubricity and heat resistance
- h6 shank tolerance for high precision tool holders
- Center cutting
- Solid carbide
- CNC ground in the USA

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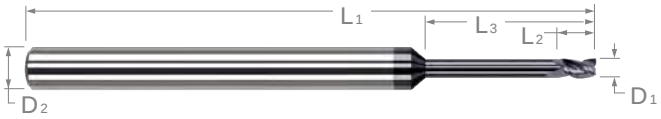
CUTTER DIAMETER			LENGTH OF CUT	FLUTES	SHANK DIAMETER	OVERALL LENGTH	AlTiN COATED	
D_1 +.0005″ −.0005″	+.00mm −.02mm	decimal equivalent	L_2 +.010″ −.000″ +.25mm −.00mm		D_2 (h6)	L_1	TOOL #	PRICE
.015 (1/64)		.0150	**.023** (1.5x)	3	1/8	1-1/2	939815-C3	43.10
.015 (1/64)		.0150	**.045** (3x)	3	1/8	1-1/2	945715-C3	43.10
	.5 mm	.0196	**1.50 mm** (3x)	3	4 mm	50 mm	952411-C3	42.10
.020		.0200	**.060** (3x)	3	1/8	1-1/2	945720-C3	38.90
.025		.0250	**.075** (3x)	3	1/8	1-1/2	945725-C3	37.50
.031 (1/32)		.0310	**.047** (1.5x)	3	1/8	1-1/2	939831-C3	31.20
.031 (1/32)		.0310	**.093** (3x)	3	1/8	1-1/2	945731-C3	31.20
.031 (1/32)		.0310	**.156** (5x)	3	1/8	2-1/2	900531-C3	40.10
	1.0 mm	.0393	**1.50 mm** (1.5x)	3	4 mm	50 mm	926022-C3	34.90
	1.0 mm	.0393	**3.00 mm** (3x)	3	4 mm	50 mm	952422-C3	34.90
.040		.0400	**.120** (3x)	3	1/8	1-1/2	945740-C3	32.20
.047 (3/64)		.0470	**.071** (1.5x)	3	1/8	1-1/2	939847-C3	31.20
.047 (3/64)		.0470	**.141** (3x)	3	1/8	1-1/2	945747-C3	31.20
	1.5 mm	.0590	**4.50 mm** (3x)	3	4 mm	50 mm	952433-C3	33.00
.062 (1/16)		.0620	**.093** (1.5x)	3	1/8	1-1/2	939862-C3	29.20
.062 (1/16)		.0620	**.186** (3x)	3	1/8	1-1/2	945762-C3	29.20
.062 (1/16)		.0620	**.312** (5x)	3	1/8	2-1/2	900562-C3	38.30
.078 (5/64)		.0780	**.118** (1.5x)	3	1/8	1-1/2	939878-C3	29.20
.078 (5/64)		.0780	**.234** (3x)	3	1/8	1-1/2	945778-C3	29.20
	2.0 mm	.0787	**6.00 mm** (3x)	3	4 mm	50 mm	952445-C3	33.00
.093 (3/32)		.0930	**.140** (1.5x)	3	1/8	1-1/2	939893-C3	29.20
.093 (3/32)		.0930	**.279** (3x)	3	1/8	1-1/2	945793-C3	29.20
.093 (3/32)		.0930	**.500** (5x)	3	1/8	2-1/2	900593-C3	38.30
	3.0 mm	.1181	**4.50 mm** (1.5x)	3	4 mm	50 mm	926057-C3	33.00
	3.0 mm	.1181	**9.00 mm** (3x)	3	4 mm	50 mm	952457-C3	33.00

D_1 +.000″ −.002″	decimal equivalent	L_2 +.030″ −.000″		D_2 (h6)	L_1	TOOL #	PRICE
.125 (1/8)	.1250	**.187** (1.5x)	4	1/8	1-1/2	939908-C3	27.60
.125 (1/8)	.1250	**.375** (3x)	4	1/8	1-1/2	945808-C3	27.60
.125 (1/8)	.1250	**.625** (5x)	4	1/8	2-1/2	900608-C3	38.10
.156 (5/32)	.1562	**.235** (1.5x)	4	3/16	2	939910-C3	31.30
.156 (5/32)	.1562	**.470** (3x)	4	3/16	2	945810-C3	31.30
.187 (3/16)	.1875	**.285** (1.5x)	4	3/16	2	939912-C3	29.80
.187 (3/16)	.1875	**.562** (3x)	4	3/16	2	945812-C3	29.80
.250 (1/4)	.2500	**.375** (1.5x)	4	1/4	2-1/2	939916-C3	37.70
.250 (1/4)	.2500	**.750** (3x)	4	1/4	2-1/2	945816-C3	37.70

PLEASE SEE SPEEDS & FEEDS ON PAGE 173

VARIABLE HELIX END MILLS FOR FREE MACHINING STEELS

Square – Long Reach, Stub Flute



- Optimized for free machining varieties of carbon steels and stainless steels
- Long reach design for deep cavities
- Reduced neck diameter to avoid heeling
- Variable helix design (approx. 38°) reduces chatter and harmonics and increases material removal rates
- AlTiN coated for improved lubricity and heat resistance
- h6 shank tolerance for high precision tool holders
- Center cutting
- Solid carbide
- CNC ground in the USA

CUTTER DIAMETER	LENGTH OF CUT	OVERALL REACH	FLUTES	SHANK DIAMETER	OVERALL LENGTH	AlTiN COATED	
D_1 +.0005″ −.0005″	L_2 +.010″ −.000″	L_3 +.010″ −.000″		D_2 (h6)	L_1	TOOL #	PRICE
.015 (1/64)	.023	**.078** (5x)	3	1/8	2-1/2	915015-C3	56.00
.015 (1/64)	.023	**.125** (8x)	3	1/8	2-1/2	920215-C3	57.10
.020	.030	**.100** (5x)	3	1/8	2-1/2	915020-C3	53.90
.020	.030	**.160** (8x)	3	1/8	2-1/2	920220-C3	55.20
.025	.038	**.125** (5x)	3	1/8	2-1/2	915025-C3	52.50
.025	.038	**.203** (8x)	3	1/8	2-1/2	920225-C3	53.70
.031 (1/32)	.047	**.093** (3x)	3	1/8	1-1/2	927331-C3	49.10
.031 (1/32)	.047	**.156** (5x)	3	1/8	2-1/2	915031-C3	49.50
.031 (1/32)	.047	**.250** (8x)	3	1/8	2-1/2	920231-C3	50.70
.031 (1/32)	.047	**.312** (10x)	3	1/8	2-1/2	909531-C3	52.50
.047 (3/64)	.071	**.250** (5x)	3	1/8	2-1/2	915047-C3	49.50
.047 (3/64)	.071	**.375** (8x)	3	1/8	2-1/2	920247-C3	50.70
.062 (1/16)	.093	**.186** (3x)	3	1/8	1-1/2	927362-C3	49.10
.062 (1/16)	.093	**.312** (5x)	3	1/8	2-1/2	915062-C3	49.50
.062 (1/16)	.093	**.500** (8x)	3	1/8	2-1/2	920262-C3	50.40
.062 (1/16)	.093	**.625** (10x)	3	1/8	2-1/2	909562-C3	52.50
.078 (5/64)	.118	**.406** (5x)	3	1/8	2-1/2	915078-C3	49.50
.078 (5/64)	.118	**.625** (8x)	3	1/8	2-1/2	920278-C3	50.40
.093 (3/32)	.140	**.279** (3x)	3	1/8	1-1/2	927393-C3	49.10
.093 (3/32)	.140	**.500** (5x)	3	1/8	2-1/2	915093-C3	49.50
.093 (3/32)	.140	**.750** (8x)	3	1/8	2-1/2	920293-C3	50.40
.093 (3/32)	.140	**.950** (10x)	3	1/8	2-1/2	909593-C3	52.50

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VARIABLE HELIX END MILLS FOR FREE MACHINING STEELS

Square – Long Reach, Stub Flute (cont.)

continued from previous page

CUTTER DIAMETER	LENGTH OF CUT	OVERALL REACH	FLUTES	SHANK DIAMETER	OVERALL LENGTH	AlTiN COATED	
D_1 $^{+.000''}_{-.002''}$	L_2 $^{+.030''}_{-.000''}$	L_3 $^{+.030''}_{-.000''}$		D_2 (h6)	L_1	TOOL #	PRICE
.125 (1/8)	.187	**.375** (3x)	4	1/8	1-1/2	927408-C3	49.10
.125 (1/8)	.187	**.625** (5x)	4	1/8	2-1/2	915108-C3	49.50
.125 (1/8)	.187	**1.000** (8x)	4	1/8	2-1/2	920308-C3	50.40
.125 (1/8)	.187	**1.250** (10x)	4	1/8	2-1/2	909608-C3	52.50
.156 (5/32)	.235	**.750** (5x)	4	3/16	3	915110-C3	53.50
.187 (3/16)	.285	**1.000** (5x)	4	3/16	3	915112-C3	53.50
.250 (1/4)	.375	**1.250** (5x)	4	1/4	4	915116-C3	60.10

SPEEDS & FEEDS (Variable Helix – Long Reach, Stub Flute for Free Machining Steels)

Important Note: Values in table are in inches and are based on reached (8x Dia) end mills. For shorter reaches, table values of IPT must be increased (for 3x, increase to 135%; for 5x, increase to 125%). For longer reaches, table values of IPT and DOC must be reduced (for 10x, reduce to 90%). For complete speeds and feeds charts, please see www.harveytool.com.

Material	Hardness (HBn)	SFM
Carbon Steels: 10xx - 1030, 10Lxx, 11xx - 1140, 11Lxx, 12xx - 1215, 12Lxx **Stainless Steels**: 203 EZ, 303 (all types), 416, 416 Se, 416 Plus X,, 420 F, 420 F Se	100-125	500
	125-150	425
	150-175	400
	175-200	375
	200-225	350

	Chip Load Per Tooth (IPT) By Cutter Diameter											
	.015	.031	.047	.062	.078	.093	.125	.187	.250	.312	.375	.500
Slotting	.00010	.00021	.00031	.00041	.00052	.00062	.00079	.00118	.00158	.00207	.00249	.00332
Roughing	.00012	.00025	.00038	.00050	.00063	.00075	.00096	.00144	.00192	.00252	.00302	.00403
Finishing	.00014	.00030	.00045	.00060	.00075	.00090	.00115	.00172	.00230	.00301	.00362	.00483
Max	.00019	.00039	.00058	.00077	.00097	.00116	.00148	.00221	.00296	.00388	.00466	.00622

Radial Depth of Cut*:

Slotting: 1x Dia

Roughing: .35x Dia

Finishing: .1x Dia

Axial Depth of Cut*:

Slotting: .35x Dia

Roughing: .5x - 1x Dia

Finishing: .5x - 1x Dia

* If less than minimum Axial or Radial DOC values are used, increased feed rates are possible. If greater than maximum Axial and Radial DOC values are used, decreased feed rates may be needed.



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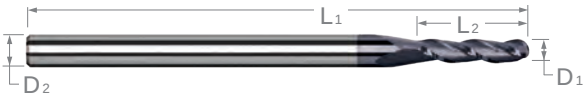
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VARIABLE HELIX END MILLS FOR FREE MACHINING STEELS

Ball



- Optimized for free machining varieties of carbon steels and stainless steels
- Variable helix design (approx. 38°) reduces chatter and harmonics and increases material removal rates
- AlTiN coated for improved lubricity and heat resistance
- h6 shank tolerance for high precision tool holders
- Center cutting
- Solid carbide
- CNC ground in the USA

CUTTER DIAMETER	LENGTH OF CUT	FLUTES	SHANK DIAMETER	OVERALL LENGTH	AlTiN COATED	
D_1 $^{+.0005''}_{-.0005''}$	L_2 $^{+.010''}_{-.000''}$		D_2 (h6)	L_1	TOOL #	PRICE
.015 (1/64)	**.045** (3x)	3	1/8	1-1/2	950015-C3	51.30
.031 (1/32)	**.047** (1.5x)	3	1/8	1-1/2	911531-C3	38.60
.031 (1/32)	**.093** (3x)	3	1/8	1-1/2	950031-C3	38.60
.047 (3/64)	**.141** (3x)	3	1/8	1-1/2	950047-C3	38.60
.062 (1/16)	**.093** (1.5x)	3	1/8	1-1/2	911562-C3	38.60
.062 (1/16)	**.186** (3x)	3	1/8	1-1/2	950062-C3	37.50
.078 (5/64)	**.234** (3x)	3	1/8	1-1/2	950078-C3	36.50
.093 (3/32)	**.140** (1.5x)	3	1/8	1-1/2	911593-C3	36.50
.093 (3/32)	**.279** (3x)	3	1/8	1-1/2	950093-C3	36.50
D_1 $^{+.000''}_{-.002''}$	L_2 $^{+.030''}_{-.000''}$		D_2 (h6)	L_1	TOOL #	PRICE
.125 (1/8)	**.187** (1.5x)	4	1/8	1-1/2	911608-C3	34.40
.125 (1/8)	**.375** (3x)	4	1/8	1-1/2	950108-C3	34.40
.156 (5/32)	**.470** (3x)	4	3/16	2	950110-C3	38.90
.187 (3/16)	**.562** (3x)	4	3/16	2	950112-C3	36.70
.250 (1/4)	**.750** (3x)	4	1/4	2-1/2	950116-C3	44.90

SPEEDS & FEEDS (Variable Helix for Free Machining Steels)

Important Note: Values in table are in inches and are based on standard (3x Dia) length of cut end mills. For shorter lengths of cuts, table values of IPT must be increased (for 1.5x, increase to 112%). For longer lengths of cut, table values of IPT and DOC must be reduced (for 5x, reduce to 70%). For complete speeds and feeds charts, please see www.harveytool.com.

Material	Hardness (HBn)	SFM
Carbon Steels: 10xx - 1030, 10Lxx, 11xx - 1140, 11Lxx, 12xx - 1215, 12Lxx	100-125	500
	125-150	425
Stainless Steels: 203 EZ, 303 (all types), 416, 416 Se, 416 Plus X, 420 F, 420 F Se	150-175	400
	175-200	375
	200-225	350

Chip Load Per Tooth (IPT) By Cutter Diameter	.015	.031	.047	.062	.078	.093	.125	.187	.250	.312	.375	.500
Slotting	.00013	.00026	.00040	.00053	.00067	.00079	.00099	.00148	.00198	.00259	.00311	.00415
Roughing	.00016	.00032	.00049	.00064	.00081	.00096	.00120	.00180	.00240	.00314	.00378	.00504
Finishing	.00019	.00039	.00058	.00077	.00097	.00116	.00144	.00215	.00288	.00377	.00453	.00604
Max	.00024	.00050	.00075	.00099	.00125	.00149	.00185	.00277	.00370	.00485	.00583	.00777

Radial Depth of Cut*:

Slotting: 1x Dia

Roughing: .5x Dia

Finishing: .1x Dia

Axial Depth of Cut*:

Slotting: .5x Dia

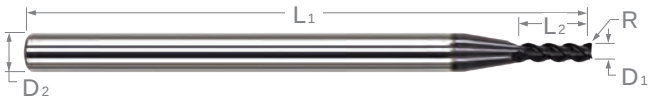
Roughing: .5x - 1x Dia

Finishing: .5x - 1x Dia

* If less than minimum Axial or Radial DOC values are used, increased feed rates are possible. If greater than maximum Axial and Radial DOC values are used, decreased feed rates may be needed.

VARIABLE HELIX END MILLS FOR FREE MACHINING STEELS

Corner Radius



- Optimized for free machining varieties of carbon steels and stainless steels
- Variable helix design (approx. 38°) reduces chatter and harmonics and increases material removal rates
- AlTiN coated for improved lubricity and heat resistance
- h6 shank tolerance for high precision tool holders
- Center cutting
- Solid carbide
- CNC ground in the USA

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CUTTER DIAMETER			CORNER RADIUS	LENGTH OF CUT	FLUTES	SHANK DIAMETER	OVERALL LENGTH	AlTiN COATED	
D_1 +.0005″ −.0005″	+.00mm −.02mm	decimal equivalent	R +.001″ −.001″ +.25mm −.25mm	L_2 +.010″ −.000″ +.25mm −.00mm		D_2 (h6)	L_1	TOOL #	PRICE
.015 (1/64)		.0150	**.002**	.023 (1.5x)	3	1/8	1-1/2	969415-C3	44.60
.015 (1/64)		.0150	**.002**	.045 (3x)	3	1/8	1-1/2	971215-C3	44.60
.015 (1/64)		.0150	**.002**	.078 (5x)	3	1/8	2-1/2	980315-C3	54.00
.015 (1/64)		.0150	**.005**	.045 (3x)	3	1/8	1-1/2	859815-C3	44.60
.020		.0200	**.002**	.060 (3x)	3	1/8	1-1/2	971220-C3	39.20
.020		.0200	**.005**	.060 (3x)	3	1/8	1-1/2	859820-C3	39.10
.025		.0250	**.002**	.075 (3x)	3	1/8	1-1/2	971225-C3	37.80
.025		.0250	**.005**	.075 (3x)	3	1/8	1-1/2	859825-C3	37.80
.031 (1/32)		.0310	**.003**	.047 (1.5x)	3	1/8	1-1/2	969431-C3	32.00
.031 (1/32)		.0310	**.003**	.093 (3x)	3	1/8	1-1/2	971231-C3	32.00
.031 (1/32)		.0310	**.003**	.156 (5x)	3	1/8	2-1/2	980331-C3	40.10
.031 (1/32)		.0310	**.005**	.093 (3x)	3	1/8	1-1/2	859831-C3	31.90
.031 (1/32)		.0310	**.010**	.093 (3x)	3	1/8	1-1/2	856631-C3	34.20
	1.0 mm	.0393	**.08 mm**	3.00 mm (3x)	3	4 mm	50 mm	901822-C3	35.20
.040		.0400	**.003**	.120 (3x)	3	1/8	1-1/2	971240-C3	32.00
.040		.0400	**.005**	.120 (3x)	3	1/8	1-1/2	859840-C3	31.90
.047 (3/64)		.0470	**.003**	.071 (1.5x)	3	1/8	1-1/2	969447-C3	32.00
.047 (3/64)		.0470	**.003**	.141 (3x)	3	1/8	1-1/2	971247-C3	32.00
.047 (3/64)		.0470	**.003**	.250 (5x)	3	1/8	2-1/2	980347-C3	40.10
.047 (3/64)		.0470	**.005**	.141 (3x)	3	1/8	1-1/2	859847-C3	31.90
.047 (3/64)		.0470	**.010**	.141 (3x)	3	1/8	1-1/2	856647-C3	31.90
.047 (3/64)		.0470	**.015**	.141 (3x)	3	1/8	1-1/2	857447-C3	34.20
.050		.0500	**.003**	.150 (3x)	3	1/8	1-1/2	971250-C3	31.90
.050		.0500	**.005**	.150 (3x)	3	1/8	1-1/2	859850-C3	31.90
.060		.0600	**.005**	.180 (3x)	3	1/8	1-1/2	971260-C3	31.90
.060		.0600	**.010**	.180 (3x)	3	1/8	1-1/2	856660-C3	31.90
.062 (1/16)		.0620	**.005**	.093 (1.5x)	3	1/8	1-1/2	969462-C3	29.70
.062 (1/16)		.0620	**.005**	.186 (3x)	3	1/8	1-1/2	971262-C3	29.70
.062 (1/16)		.0620	**.005**	.312 (5x)	3	1/8	2-1/2	980362-C3	38.60
.062 (1/16)		.0620	**.010**	.186 (3x)	3	1/8	1-1/2	856662-C3	29.70
.062 (1/16)		.0620	**.020**	.186 (3x)	3	1/8	1-1/2	858262-C3	32.00
.078 (5/64)		.0780	**.005**	.118 (1.5x)	3	1/8	1-1/2	969478-C3	29.70
.078 (5/64)		.0780	**.005**	.234 (3x)	3	1/8	1-1/2	971278-C3	29.70
.078 (5/64)		.0780	**.005**	.406 (5x)	3	1/8	2-1/2	980378-C3	38.60
.078 (5/64)		.0780	**.010**	.234 (3x)	3	1/8	1-1/2	856678-C3	29.70
.078 (5/64)		.0780	**.020**	.234 (3x)	3	1/8	1-1/2	858278-C3	32.00

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VARIABLE HELIX END MILLS FOR FREE MACHINING STEELS

Corner Radius (cont.)

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CUTTER DIAMETER D_1 +.0005″ −.0005″ / +.00mm −.02mm	decimal equivalent	CORNER RADIUS R +.001″ −.001″ / +.25mm −.25mm	LENGTH OF CUT L_2 +.010″ −.000″ / +.25mm −.00mm	FLUTES	SHANK DIAMETER D_2 (h6)	OVERALL LENGTH L_1	AlTiN COATED TOOL #	PRICE
2.0 mm	.0787	**.10 mm**	6.00 mm (3x)	3	4 mm	50 mm	901845-C3	33.30
.093 (3/32)	.0930	**.005**	.140 (1.5x)	3	1/8	1-1/2	969493-C3	29.70
.093 (3/32)	.0930	**.005**	.279 (3x)	3	1/8	1-1/2	971293-C3	29.70
.093 (3/32)	.0930	**.005**	.500 (5x)	3	1/8	2-1/2	980393-C3	38.60
.093 (3/32)	.0930	**.010**	.279 (3x)	3	1/8	1-1/2	856693-C3	29.70
.093 (3/32)	.0930	**.030**	.279 (3x)	3	1/8	1-1/2	859093-C3	32.00
.100	.1000	**.005**	.300 (3x)	3	1/8	1-1/2	971300-C3	29.70
3.0 mm	.1181	**.10 mm**	9.00 mm (3x)	3	4 mm	50 mm	901857-C3	33.30

D_1 +.000″ −.002″	decimal equivalent	R +.001″ −.001″	L_2 +.030″ −.000″	FLUTES	D_2 (h6)	L_1	TOOL #	PRICE
.125 (1/8)	.1250	**.005**	.187 (1.5x)	4	1/8	1-1/2	969508-C3	28.00
.125 (1/8)	.1250	**.005**	.375 (3x)	4	1/8	1-1/2	971308-C3	28.00
.125 (1/8)	.1250	**.005**	.625 (5x)	4	1/8	2-1/2	980408-C3	38.60
.125 (1/8)	.1250	**.010**	.375 (3x)	4	1/8	1-1/2	856708-C3	29.70
.125 (1/8)	.1250	**.030**	.375 (3x)	4	1/8	1-1/2	859108-C3	32.00
.156 (5/32)	.1562	**.010**	.235 (1.5x)	4	3/16	2	969510-C3	32.20
.156 (5/32)	.1562	**.010**	.470 (3x)	4	3/16	2	971310-C3	32.20
.156 (5/32)	.1562	**.010**	.750 (5x)	4	3/16	3	980410-C3	41.70
.187 (3/16)	.1875	**.010**	.285 (1.5x)	4	3/16	2	969512-C3	30.40
.187 (3/16)	.1875	**.010**	.562 (3x)	4	3/16	2	971312-C3	30.40
.187 (3/16)	.1875	**.010**	1.000 (5x)	4	3/16	3	980412-C3	41.70
.250 (1/4)	.2500	**.010**	.375 (1.5x)	4	1/4	2-1/2	969516-C3	38.30
.250 (1/4)	.2500	**.010**	.750 (3x)	4	1/4	2-1/2	971316-C3	38.30
.250 (1/4)	.2500	**.010**	1.250 (5x)	4	1/4	4	980416-C3	51.80
.312 (5/16)	.3125	**.010**	.470 (1.5x)	4	5/16	2-1/2	969520-C3	56.30
.312 (5/16)	.3125	**.010**	1.000 (3x)	4	5/16	2-1/2	971320-C3	56.30
.375 (3/8)	.3750	**.010**	.570 (1.5x)	4	3/8	2-1/2	969524-C3	65.40
.375 (3/8)	.3750	**.010**	1.125 (3x)	4	3/8	2-1/2	971324-C3	65.40
.500 (1/2)	.5000	**.015**	.750 (1.5x)	4	1/2	3	969532-C3	84.60

PLEASE SEE SPEEDS & FEEDS ON PAGE 173

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VARIABLE HELIX END MILLS FOR FREE MACHINING STEELS

Finishers – Square



- Optimized for free machining varieties of carbon steels and stainless steels
- Variable helix design (approx. 47°) reduces chatter and harmonics, improving finish
- High helix for effective chip evacuation
- h6 shank tolerance for high precision tool holders
- End cutting (not center cutting)
- Solid carbide
- CNC ground in the USA

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CUTTER DIAMETER			LENGTH OF CUT	FLUTES	SHANK DIAMETER	OVERALL LENGTH	AlTiN COATED	
D_1 +.0005″ −.0005″	+.00mm −.02mm	decimal equivalent	L_2 +.010″ −.000″ +.25mm −.00mm		D_2 (h6)	L_1	TOOL #	PRICE
.015 (1/64)		.0150	**.045** (3x)	4	1/8	1-1/2	967815-C3	43.40
.015 (1/64)		.0150	**.078** (5x)	4	1/8	2-1/2	972415-C3	53.90
.015 (1/64)		.0150	**.125** (8x)	4	1/8	2-1/2	983615-C3	54.60
.020		.0200	**.060** (3x)	4	1/8	1-1/2	967820-C3	42.70
.020		.0200	**.100** (5x)	4	1/8	2-1/2	972420-C3	53.50
.025		.0250	**.075** (3x)	4	1/8	1-1/2	967825-C3	40.10
.025		.0250	**.125** (5x)	4	1/8	2-1/2	972425-C3	51.80
.031 (1/32)		.0310	**.047** (1.5x)	5	1/8	1-1/2	935131-C3	35.70
.031 (1/32)		.0310	**.093** (3x)	5	1/8	1-1/2	967831-C3	35.70
.031 (1/32)		.0310	**.156** (5x)	5	1/8	2-1/2	972431-C3	49.80
.031 (1/32)		.0310	**.250** (8x)	5	1/8	2-1/2	983631-C3	50.70
	1.0 mm	.0393	**3.00 mm** (3x)	5	4 mm	50 mm	921922-C3	40.90
	1.0 mm	.0393	**5.00 mm** (5x)	5	4 mm	50 mm	916422-C3	51.00
.040		.0400	**.120** (3x)	5	1/8	1-1/2	967840-C3	36.40
.040		.0400	**.203** (5x)	5	1/8	2-1/2	972440-C3	50.40
.047 (3/64)		.0470	**.141** (3x)	5	1/8	1-1/2	967847-C3	35.70
.047 (3/64)		.0470	**.250** (5x)	5	1/8	2-1/2	972447-C3	49.80
.047 (3/64)		.0470	**.375** (8x)	5	1/8	2-1/2	983647-C3	50.70
.050		.0500	**.150** (3x)	5	1/8	1-1/2	967850-C3	36.40
.050		.0500	**.250** (5x)	5	1/8	2-1/2	972450-C3	50.40
.060		.0600	**.180** (3x)	5	1/8	1-1/2	967860-C3	36.40
.060		.0600	**.312** (5x)	5	1/8	2-1/2	972460-C3	50.40
.062 (1/16)		.0620	**.093** (1.5x)	5	1/8	1-1/2	935162-C3	33.60
.062 (1/16)		.0620	**.186** (3x)	5	1/8	1-1/2	967862-C3	33.60
.062 (1/16)		.0620	**.312** (5x)	5	1/8	2-1/2	972462-C3	46.90
.062 (1/16)		.0620	**.500** (8x)	5	1/8	2-1/2	983662-C3	47.60
.078 (5/64)		.0780	**.234** (3x)	5	1/8	1-1/2	967878-C3	33.60
.078 (5/64)		.0780	**.406** (5x)	5	1/8	2-1/2	972478-C3	46.90
.078 (5/64)		.0780	**.625** (8x)	5	1/8	2-1/2	983678-C3	47.60
	2.0 mm	.0787	**6.00 mm** (3x)	5	4 mm	50 mm	921945-C3	39.50
	2.0 mm	.0787	**10.00 mm** (5x)	5	4 mm	50 mm	916445-C3	49.50

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VARIABLE HELIX END MILLS FOR FREE MACHINING STEELS

Finishers – Square (cont.)

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CUTTER DIAMETER D_1 +.0005″ −.0005″	+.00mm −.02mm	decimal equivalent	LENGTH OF CUT L_2 +.010″ −.000″ +.25mm −.00mm	FLUTES	SHANK DIAMETER D_2 (h6)	OVERALL LENGTH L_1	AlTiN COATED TOOL #	PRICE
.093 (3/32)		.0930	**.140** (1.5x)	5	1/8	1-1/2	935193-C3	33.60
.093 (3/32)		.0930	**.279** (3x)	5	1/8	1-1/2	967893-C3	33.60
.093 (3/32)		.0930	**.500** (5x)	5	1/8	2-1/2	972493-C3	46.90
.093 (3/32)		.0930	**.750** (8x)	5	1/8	2-1/2	983693-C3	47.60
.100		.1000	**.300** (3x)	5	1/8	1-1/2	967900-C3	34.10
.100		.1000	**.500** (5x)	5	1/8	2-1/2	972500-C3	46.90
	3.0 mm	.1181	**9.00 mm** (3x)	5	4 mm	50 mm	921957-C3	39.50
	3.0 mm	.1181	**15.00 mm** (5x)	5	4 mm	50 mm	916457-C3	49.50

D_1 +.000″ −.002″	decimal equivalent	L_2 +.030″ −.000″	FLUTES	D_2 (h6)	L_1	TOOL #	PRICE
.125 (1/8)	.1250	**.187** (1.5x)	5	1/8	1-1/2	935208-C3	31.90
.125 (1/8)	.1250	**.375** (3x)	5	1/8	1-1/2	967908-C3	31.90
.125 (1/8)	.1250	**.625** (5x)	5	1/8	2-1/2	972508-C3	45.80
.125 (1/8)	.1250	**1.000** (8x)	5	1/8	2-1/2	983708-C3	46.90
.156 (5/32)	.1562	**.470** (3x)	5	3/16	2	967910-C3	36.40
.156 (5/32)	.1562	**.750** (5x)	5	3/16	3	972510-C3	48.80
.187 (3/16)	.1875	**.570** (3x)	5	3/16	2	967912-C3	36.40
.187 (3/16)	.1875	**1.000** (5x)	5	3/16	3	972512-C3	48.80
.187 (3/16)	.1875	**1.500** (8x)	5	3/16	3	983712-C3	49.60
.250 (1/4)	.2500	**.750** (3x)	5	1/4	2-1/2	967916-C3	46.20
.250 (1/4)	.2500	**1.250** (5x)	5	1/4	4	972516-C3	59.60
.250 (1/4)	.2500	**2.000** (8x)	5	1/4	4	983716-C3	60.70

SPEEDS & FEEDS (High-Helix Finishers for Free Machining Steels)

Material	Hardness (HBn)	SFM		Chip Load Per Tooth (IPT) By Cutter Diameter .015	.031	.047	.062	.078	.093	.125	.187	.250	Depth of Cut Radial	Axial
Carbon Steels: 10xx - 1030 & all 10Lxx, 11xx - 1140 & all 11Lxx, 12xx - 1215 & all 12Lxx	100 - 125	500	Finishing (1.5x LOC)	.00025	.00051	.00078	.00102	.00129	.00153	.00206	.00309	.00413	< .10x Dia	.5x - 1.5x Dia
	125 - 150	425	Finishing (3x LOC)	.00023	.00047	.00071	.00093	.00117	.00140	.00188	.00281	.00375	< .10x Dia	.5x - 3x Dia
	150 - 175	400	Finishing (5x LOC)	.00017	.00035	.00053	.00070	.00088	.00105	.00141	.00210	.00281	< .07x Dia	.5x - 5x Dia
Stainless Steels: 203 EZ, 303 (all types), 416, 416 Se, 416 Plus X, 420 F, 420 F Se, 440 F, 440 F Se	175 - 200	375												
	200 - 225	350	Finishing (8x LOC)	.00012	.00026	.00039	.00051	.00064	.00077	.00103	.00154	.00206	< .05x Dia	.5x - 8x Dia

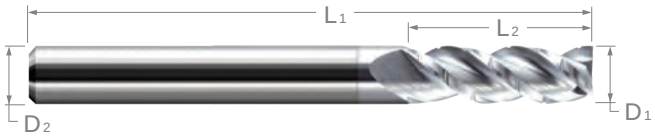
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NEW!

VARIABLE HELIX END MILLS FOR ALUMINUM ALLOYS

Chipbreaker Roughers – Square



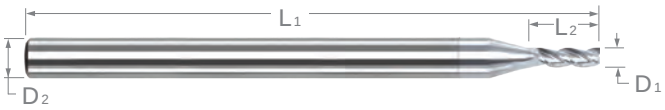
- Optimized for aluminum and aluminum alloys with excellent performance in copper, brass, and bronze alloys
- Chipbreaker geometry to improve chip management
- Variable helix design (approx. 42°) reduces chatter and harmonics and increases material removal rates
- h6 shank tolerance for high precision tool holders
- 3 flutes
- Center cutting
- Solid carbide
- CNC ground in the USA

CUTTER DIAMETER	LENGTH OF CUT	FLUTES	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		TiB2 COATED		
D_1 +.0005″ −.0005″	L_2 +.010″ −.000″		D_2 (h6)	L_1	3 FL	PRICE	3 FL	PRICE	
.062 (1/16)	.186 (3x)	3	1/8	1-1/2	769062	27.70	769062-C8	34.90	NEW
.078 (5/64)	.234 (3x)	3	1/8	1-1/2	769078	27.70	769078-C8	34.90	NEW
.093 (3/32)	.279 (3x)	3	1/8	1-1/2	769093	27.70	769093-C8	34.90	NEW
D_1 +.000″ −.002″	L_2 +.030″ −.000″		D_2 (h6)	L_1	3 FL	PRICE	3 FL	PRICE	
.125 (1/8)	.375 (3x)	3	1/8	1-1/2	769108	26.60	769108-C8	33.80	NEW
.187 (3/16)	.562 (3x)	3	3/16	2	769112	29.60	769112-C8	36.80	NEW
.250 (1/4)	.750 (3x)	3	1/4	2-1/2	769116	36.90	769116-C8	44.60	NEW

NEW SIZES!

VARIABLE HELIX END MILLS FOR ALUMINUM ALLOYS

Square



- Optimized for aluminum and aluminum alloys with excellent performance in copper, brass, and bronze alloys
- Variable helix design (approx. 42°) reduces chatter and harmonics, and increases material removal rates
- h6 shank tolerance for high precision tool holders
- Center cutting
- Solid carbide
- CNC ground in the USA

mm & in

	CUTTER DIAMETER D_1			LENGTH OF CUT L_2	FLUTES	SHANK DIA. D_2 (h6)	OAL L_1	UNCOATED		TiB_2 COATED		AMORPHOUS DIAMOND	
	+.0005″ −.0005″	+.00mm −.02mm	decimal equivalent	+.010″ −.000″ +.25mm −.00mm				TOOL #	PRICE	TOOL #	PRICE	TOOL #	PRICE
	.010		.0100	**.015** (1.5x)	3	1/8	1-1/2	968710	48.70	968710-C8	55.90		
	.010		.0100	**.030** (3x)	3	1/8	1-1/2	942210	48.70	942210-C8	55.90		
	.015 (1/64)		.0150	**.023** (1.5x)	3	1/8	1-1/2	968715	39.20	968715-C8	46.40		
	.015 (1/64)		.0150	**.045** (3x)	3	1/8	1-1/2	942215	39.20	942215-C8	46.40	942215-C4	51.60
	.015 (1/64)		.0150	**.078** (5x)	3	1/8	2-1/2	923015	49.60	923015-C8	56.80		
		0.5 mm	.0196	**1.50 mm** (3x)	3	4 mm	50 mm	900411	39.10	900411-C8	46.60		
	.020		.0200	**.030** (1.5x)	3	1/8	1-1/2	968720	34.60	968720-C8	41.10		
	.020		.0200	**.060** (3x)	3	1/8	1-1/2	942220	34.60	942220-C8	41.10	942220-C4	47.00
	.020		.0200	**.100** (5x)	3	1/8	2-1/2	923020	44.80	923020-C8	51.30		
	.025		.0250	**.038** (1.5x)	3	1/8	1-1/2	968725	34.60	968725-C8	41.10		
	.025		.0250	**.075** (3x)	3	1/8	1-1/2	942225	34.60	942225-C8	41.10	942225-C4	47.00
	.025		.0250	**.125** (5x)	3	1/8	2-1/2	923025	44.80	923025-C8	51.30		
	.030		.0300	**.045** (1.5x)	3	1/8	1-1/2	968730	34.60	968730-C8	41.10		
	.030		.0300	**.090** (3x)	3	1/8	1-1/2	942230	34.60	942230-C8	41.10	942230-C4	47.00
	.030		.0300	**156** (5x)	3	1/8	2-1/2	923030	44.80	923030-C8	51.30		
	.031 (1/32)		.0310	**.025** (.8x)	3	1/8	1-1/2	873531	30.40	873531-C8	37.60		
	.031 (1/32)		.0310	**.047** (1.5x)	3	1/8	1-1/2	968731	27.50	968731-C8	33.90	968731-C4	39.90
	.031 (1/32)		.0310	**.093** (3x)	2	1/8	1-1/2	792131	27.50	792131-C8	34.70		
	.031 (1/32)		.0310	**.093** (3x)	3	1/8	1-1/2	942231	27.50	942231-C8	33.90	942231-C4	39.90
	.031 (1/32)		.0310	**.125** (4x)	3	1/8	2-1/2	857231	37.80	857231-C8	45.00		
	.031 (1/32)		.0310	**.156** (5x)	3	1/8	2-1/2	923031	37.80	923031-C8	44.30	923031-C4	50.20
	.035		.0350	**.105** (3x)	3	1/8	1-1/2	942235	32.10	942235-C8	39.30		
NEW		1.0 mm	.0393	**1.50 mm** (1.5x)	3	4 mm	50 mm	858422	30.20	858422-C8	37.70		
		1.0 mm	.0393	**3.00 mm** (3x)	3	4 mm	50 mm	900422	30.20	900422-C8	36.40	900422-C4	47.30
NEW		1.0 mm	.0393	**5.00 mm** (5x)	3	4 mm	50 mm	845922	32.00	845922-C8	39.50		
	.040		.0400	**.060** (1.5x)	3	1/8	1-1/2	968740	27.70	968740-C8	33.90		
	.040		.0400	**.120** (3x)	3	1/8	1-1/2	942240	27.70	942240-C8	33.90	942240-C4	39.50
NEW	.040		.0400	**.160** (4x)	3	1/8	2-1/2	857240	37.80	857240-C8	45.00		
	.040		.0400	**.203** (5x)	3	1/8	2-1/2	923040	37.80	923040-C8	44.30	923040-C4	50.20
	.045		.0450	**.135** (3x)	3	1/8	1-1/2	942245	27.70	942245-C8	34.90		
	.047 (3/64)		.0470	**.071** (1.5x)	3	1/8	1-1/2	968747	27.50	968747-C8	33.90	968747-C4	39.90
	.047 (3/64)		.0470	**.141** (3x)	2	1/8	1-1/2	792147	27.50	792147-C8	34.70		
	.047 (3/64)		.0470	**.141** (3x)	3	1/8	1-1/2	942247	27.50	942247-C8	33.90	942247-C4	39.90
	.047 (3/64)		.0470	**.187** (4x)	3	1/8	2-1/2	857247	37.80	857247-C8	45.00		
	.047 (3/64)		.0470	**.250** (5x)	3	1/8	2-1/2	923047	37.80	923047-C8	44.30	923047-C4	50.20
	.050		.0500	**.075** (1.5x)	3	1/8	1-1/2	968750	27.70	968750-C8	33.90		
	.050		.0500	**.150** (3x)	3	1/8	1-1/2	942250	27.70	942250-C8	33.90	942250-C4	39.50
	.050		.0500	**.250** (5x)	3	1/8	2-1/2	923050	37.80	923050-C8	44.30		

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NEW SIZES!

VARIABLE HELIX END MILLS FOR ALUMINUM ALLOYS

Square (cont.)

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CUTTER DIAMETER			LENGTH OF CUT	FLUTES	SHANK DIA.	OAL	UNCOATED		TiB_2 COATED		AMORPHOUS DIAMOND		
D_1 +.0005″ −.0005″	+.00mm −.02mm	decimal equivalent	L_2 +.010″ −.000″ +.25mm −.00mm		D_2 (h6)	L_1	TOOL #	PRICE	TOOL #	PRICE	TOOL #	PRICE	
.055		.0550	**.083** (1.5x)	3	1/8	1-1/2	968755	27.70	968755-C8	34.90			
.055		.0550	**.165** (3x)	3	1/8	1-1/2	942255	27.70	942255-C8	34.90			
.055		.0550	**.275** (5x)	3	1/8	2-1/2	923055	37.80	923055-C8	45.00			NEW
	1.5 mm	.0590	**4.50 mm** (3x)	3	4 mm	50 mm	900433	32.00	900433-C8	39.50			
.060		.0600	**.090** (1.5x)	3	1/8	1-1/2	968760	25.70	968760-C8	32.90			
.060		.0600	**.180** (3x)	3	1/8	1-1/2	942260	27.70	942260-C8	33.90	942260-C4	39.50	
.060		.0600	**.250** (4x)	3	1/8	2-1/2	857260	37.80	857260-C8	45.00			NEW
.060		.0600	**.312** (5x)	3	1/8	2-1/2	923060	37.80	923060-C8	44.30			
.062 (1/16)		.0620	**.050** (.8x)	3	1/8	1-1/2	873562	27.50	873562-C8	34.70			
.062 (1/16)		.0620	**.093** (1.5x)	3	1/8	1-1/2	968762	25.60	968762-C8	31.70	968762-C4	37.30	
.062 (1/16)		.0620	**.186** (3x)	2	1/8	1-1/2	792162	25.60	792162-C8	32.80			
.062 (1/16)		.0620	**.186** (3x)	3	1/8	1-1/2	942262	25.60	942262-C8	31.70	942262-C4	37.30	
.062 (1/16)		.0620	**.250** (4x)	3	1/8	2-1/2	857262	35.70	857262-C8	42.90	857262-C4	48.10	
.062 (1/16)		.0620	**.312** (5x)	3	1/8	2-1/2	923062	35.70	923062-C8	42.00	923062-C4	48.10	
.070		.0700	**.105** (1.5x)	3	1/8	1-1/2	968770	25.70	968770-C8	32.90			
.070		.0700	**.210** (3x)	3	1/8	1-1/2	942270	25.70	942270-C8	31.70	942270-C4	37.30	
.070		.0700	**.375** (5x)	3	1/8	2-1/2	923070	35.70	923070-C8	42.00			
.075		.0750	**.225** (3x)	3	1/8	1-1/2	942275	25.70	942275-C8	32.90			
.078 (5/64)		.0780	**.117** (1.5x)	3	1/8	1-1/2	968778	25.60	968778-C8	31.70	968778-C4	37.30	
.078 (5/64)		.0780	**.234** (3x)	2	1/8	1-1/2	792178	25.60	792178-C8	32.80			
.078 (5/64)		.0780	**.234** (3x)	3	1/8	1-1/2	942278	25.60	942278-C8	31.70	942278-C4	37.30	
.078 (5/64)		.0780	**.312** (4x)	3	1/8	2-1/2	857278	35.70	857278-C8	42.90			
.078 (5/64)		.0780	**.406** (5x)	3	1/8	2-1/2	923078	35.70	923078-C8	42.00	923078-C4	48.10	
	2.0 mm	.0787	**3.00 mm** (1.5x)	3	4 mm	50 mm	858445	28.20	858445-C8	35.70			NEW
	2.0 mm	.0787	**6.00 mm** (3x)	3	4 mm	50 mm	900445	28.20	900445-C8	34.30	900445-C4	45.30	
	2.0 mm	.0787	**10.00 mm** (5x)	3	4 mm	50 mm	845945	30.00	845945-C8	37.50			NEW
.080		.0800	**.120** (1.5x)	3	1/8	1-1/2	968780	25.70	968780-C8	32.90			
.080		.0800	**.240** (3x)	3	1/8	1-1/2	942280	25.70	942280-C8	31.70	942280-C4	37.30	
.080		.0800	**.406** (5x)	3	1/8	2-1/2	923080	35.70	923080-C8	42.00			
.090		.0900	**.135** (1.5x)	3	1/8	1-1/2	968790	25.70	968790-C8	32.90			
.090		.0900	**.270** (3x)	3	1/8	1-1/2	942290	25.70	942290-C8	31.70	942290-C4	37.30	
.090		.0900	**.450** (5x)	3	1/8	2-1/2	923090	35.70	923090-C8	42.00			
.093 (3/32)		.0930	**.074** (.8x)	3	1/8	1-1/2	873593	27.50	873593-C8	34.70			
.093 (3/32)		.0930	**.140** (1.5x)	3	1/8	1-1/2	968793	25.60	968793-C8	31.70	968793-C4	37.30	
.093 (3/32)		.0930	**.279** (3x)	2	1/8	1-1/2	792193	25.60	792193-C8	32.80			
.093 (3/32)		.0930	**.279** (3x)	3	1/8	1-1/2	942293	25.60	942293-C8	31.70	942293-C4	37.30	
.093 (3/32)		.0930	**.375** (4x)	3	1/8	2-1/2	857293	35.70	857293-C8	42.90	857293-C4	48.10	
.093 (3/32)		.0930	**.500** (5x)	3	1/8	2-1/2	923093	35.70	923093-C8	42.00	923093-C4	48.10	
	2.5 mm	.0984	**7.50 mm** (3x)	3	4 mm	50 mm	900451	30.00	900451-C8	37.50			
.100		.1000	**.150** (1.5x)	3	1/8	1-1/2	968800	25.70	968800-C8	31.70			
.100		.1000	**.300** (3x)	3	1/8	1-1/2	942300	25.70	942300-C8	31.70	942300-C4	37.30	
.100		.1000	**.500** (5x)	3	1/8	2-1/2	923100	35.70	923100-C8	42.00			

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VARIABLE HELIX END MILLS FOR ALUMINUM ALLOYS

Square (cont.)

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CUTTER DIAMETER D_1 +.0005″ −.0005″	+.00mm −.02mm	decimal equivalent	LENGTH OF CUT L_2 +.010″ −.000″ +.25mm −.00mm	FLUTES	SHANK DIA. D_2 (h6)	OAL L_1	UNCOATED TOOL #	UNCOATED PRICE	TiB_2 COATED TOOL #	TiB_2 COATED PRICE	AMORPHOUS DIAMOND TOOL #	AMORPHOUS DIAMOND PRICE
.109 (7/64)		.1090	**.164** (1.5x)	3	1/8	1-1/2	968802	25.70	968802-C8	31.70		
.109 (7/64)		.1090	**.327** (3x)	3	1/8	1-1/2	942302	25.70	942302-C8	31.70	942302-C4	37.30
.109 (7/64)		.1090	**.570** (5x)	3	1/8	2-1/2	923102	35.70	923102-C8	42.00		
	3.0 mm	.1181	**4.50 mm** (1.5x)	3	4 mm	50mm	858457	28.50	858457-C8	36.00		
	3.0 mm	.1181	**9.00 mm** (3x)	3	4 mm	50 mm	900457	28.20	900457-C8	34.30	900457-C4	45.30
NEW	3.0 mm	.1181	**12.00 mm** (4x)	3	4 mm	50 mm	770057	30.00	770057-C8	37.50		
	3.0 mm	.1181	**15.00 mm** (5x)	3	4 mm	50 mm	845957	31.70	845957-C8	39.20		

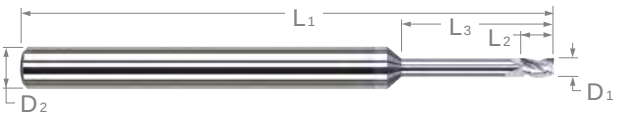
D_1 +.000″ −.002″	+.00mm −.04mm	decimal equivalent	L_2 +.030″ −.000″ +.75mm −.00mm	FLUTES	D_2 (h6)	L_1	TOOL #	PRICE	TOOL #	PRICE	TOOL #	PRICE
.125 (1/8)		.1250	**.100** (.8x)	3	1/8	1-1/2	873608	28.30	873608-C8	35.50		
.125 (1/8)		.1250	**.187** (1.5x)	3	1/8	1-1/2	968808	24.20	968808-C8	31.40	968808-C4	36.60
.125 (1/8)		.1250	**.375** (3x)	2	1/8	1-1/2	792208	24.20	792208-C8	31.40		
.125 (1/8)		.1250	**.375** (3x)	3	1/8	1-1/2	942308	24.20	942308-C8	31.40	942308-C4	36.60
.125 (1/8)		.1250	**.500** (4x)	3	1/8	2-1/2	857308	35.40	857308-C8	42.60	857308-C4	47.80
.125 (1/8)		.1250	**.625** (5x)	3	1/8	2-1/2	923108	35.40	923108-C8	42.00	923108-C4	47.80
.140 (9/64)		.1406	**.425** (3x)	3	3/16	2	942309	26.40	942309-C8	33.60		
NEW .140 (9/64)		.1406	**.750** (5x)	3	3/16	3	923109	36.70	923109-C8	43.90		
.156 (5/32)		.1562	**.235** (1.5x)	3	3/16	2	968810	26.60	968810-C8	33.80	968810-C4	43.70
.156 (5/32)		.1562	**.469** (3x)	3	3/16	2	942310	26.60	942310-C8	33.80	942310-C4	43.70
.156 (5/32)		.1562	**.750** (5x)	3	3/16	3	923110	36.70	923110-C8	43.90	923110-C4	53.80
.187 (3/16)		.1875	**.150** (.8x)	3	3/16	2	873612	29.50	873612-C8	36.70		
.187 (3/16)		.1875	**.285** (1.5x)	3	3/16	2	968812	26.00	968812-C8	33.20	968812-C4	43.10
.187 (3/16)		.1875	**.562** (3x)	2	3/16	2	792212	26.00	792212-C8	33.20		
.187 (3/16)		.1875	**.562** (3x)	3	3/16	2	942312	26.00	942312-C8	33.20	942312-C4	43.10
.187 (3/16)		.1875	**.750** (4x)	3	3/16	3	857312	29.70	857312-C8	36.90		
.187 (3/16)		.1875	**1.000** (5x)	3	3/16	3	923112	36.70	923112-C8	43.90	923112-C4	53.80
.218 (7/32)		.2187	**.625** (3x)	3	1/4	2-1/2	942314	38.00	942314-C8	45.70		
	6.0 mm	.2362	**18.00 mm** (3x)	3	6 mm	63 mm	900466	38.90	900466-C8	46.60		
.250 (1/4)		.2500	**.200** (.8x)	3	1/4	2-1/2	873616	36.70	873616-C8	44.40		
.250 (1/4)		.2500	**.375** (1.5x)	3	1/4	2-1/2	968816	31.40	968816-C8	39.10	968816-C4	50.80
.250 (1/4)		.2500	**.750** (3x)	3	1/4	2-1/2	942316	31.40	942316-C8	39.10	942316-C4	50.80
.250 (1/4)		.2500	**1.000** (4x)	3	1/4	4	857316	35.10	857316-C8	43.80		
.250 (1/4)		.2500	**1.250** (5x)	3	1/4	4	923116	43.50	923116-C8	52.20	923116-C4	62.90
.312 (5/16)		.3125	**1.000** (3x)	3	5/16	2-1/2	942320	39.40	942320-C8	55.80		
.375 (3/8)		.3750	**.570** (1.5x)	3	3/8	2-1/2	968824	42.80	968824-C8	62.70		
.375 (3/8)		.3750	**1.125** (3x)	3	3/8	2-1/2	942324	42.80	942324-C8	62.70	942324-C4	66.20
.500 (1/2)		.5000	**.750** (1.5x)	3	1/2	3	968832	45.30	968832-C8	68.70		
.500 (1/2)		.5000	**1.500** (3x)	3	1/2	3	942332	45.30	942332-C8	68.70		

PLEASE SEE SPEEDS & FEEDS ON PAGE 193

NEW SIZES!

VARIABLE HELIX END MILLS FOR ALUMINUM ALLOYS

Square – Long Reach, Stub Flute



- Optimized for aluminum and aluminum alloys with excellent performance in copper, brass, and bronze alloys
- Long reach design for deep cavities
- Reduced neck diameter to avoid heeling
- Variable helix design (approx. 42°) reduces chatter and harmonics and increases material removal rates
- h6 shank tolerance for high precision tool holders
- 3 flutes
- Center cutting
- Solid carbide
- CNC ground in the USA

mm & in

CUTTER DIAMETER			LENGTH OF CUT	OVERALL REACH	FLUTES	SHANK DIA.	OAL	UNCOATED		TiB2 COATED		AMORPHOUS DIAMOND		
D1 +.0005″ −.0005″	+.00mm −.02mm	decimal equivalent	L2 +.010″ −.000″	L3 +.010″ −.000″		D2 (h6)	L1	3 FL	PRICE	3 FL	PRICE	3 FL	PRICE	
.015 (1/64)		.0150	.023	**.078** (5x)	3	1/8	2-1/2	930815	51.00	930815-C8	58.20			
.015 (1/64)		.0150	.023	**.125** (8x)	3	1/8	2-1/2	927115	52.20	927115-C8	59.40			
.020		.0200	.030	**.100** (5x)	3	1/8	2-1/2	930820	48.80	930820-C8	56.00			
.020		.0200	.030	**.160** (8x)	3	1/8	2-1/2	927120	50.10	927120-C8	57.30			
.020		.0200	.030	**.200** (10x)	3	1/8	2-1/2	919320	52.10	919320-C8	59.30			
.025		.0250	.038	**.125** (5x)	3	1/8	2-1/2	930825	47.60	930825-C8	54.80			
.025		.0250	.038	**.203** (8x)	3	1/8	2-1/2	927125	48.80	927125-C8	56.00			
.030		.0300	.045	**.250** (8x)	3	1/8	2-1/2	927130	48.80	927130-C8	56.00			
.031 (1/32)		.0310	.047	**.093** (3x)	3	1/8	1-1/2	924531	44.10	924531-C8	51.30			
.031 (1/32)		.0310	.047	**.125** (4x)	3	1/8	2-1/2	814331	44.60	814331-C8	51.80			
.031 (1/32)		.0310	.047	**.156** (5x)	3	1/8	2-1/2	930831	44.60	930831-C8	51.80	930831-C4	57.00	
.031 (1/32)		.0310	.047	**.186** (6x)	3	1/8	2-1/2	814131	44.60	814131-C8	51.80			NEW
.031 (1/32)		.0310	.047	**.218** (7x)	3	1/8	2-1/2	813931	45.60	813931-C8	52.80			NEW
.031 (1/32)		.0310	.047	**.250** (8x)	3	1/8	2-1/2	927131	45.60	927131-C8	52.80	927131-C4	58.00	
.031 (1/32)		.0310	.047	**.312** (10x)	3	1/8	2-1/2	919331	47.60	919331-C8	54.80			
.031 (1/32)		.0310	.047	**.375** (12x)	3	1/8	2-1/2	879231	49.30	879231-C8	56.50			
	1.0 mm	.0393	1.5 mm	**8 mm** (8x)	3	4 mm	50 mm	795322	49.50	795322-C8	57.00			
.040		.0400	.060	**.325** (8x)	3	1/8	2-1/2	927140	47.90	927140-C8	55.10			
.047 (3/64)		.0470	.071	**.250** (5x)	3	1/8	2-1/2	930847	44.60	930847-C8	51.80			
.047 (3/64)		.0470	.071	**.375** (8x)	3	1/8	2-1/2	927147	45.60	927147-C8	52.80			
.047 (3/64)		.0470	.071	**.480** (10x)	3	1/8	2-1/2	919347	47.90	919347-C8	55.10			
.050		.0500	.075	**.400** (8x)	3	1/8	2-1/2	927150	49.60	927150-C8	56.80			
.055		.0550	.083	**.450** (8x)	3	1/8	2-1/2	927155	49.60	927155-C8	56.80			
.060		.0600	.090	**.500** (8x)	3	1/8	2-1/2	927160	49.60	927160-C8	56.80			
.062 (1/16)		.0620	.093	**.186** (3x)	3	1/8	1-1/2	924562	44.10	924562-C8	51.30			
.062 (1/16)		.0620	.093	**.250** (4x)	3	1/8	2-1/2	814362	44.60	814362-C8	51.80			
.062 (1/16)		.0620	.093	**.312** (5x)	3	1/8	2-1/2	930862	44.60	930862-C8	51.80	930862-C4	57.00	
.062 (1/16)		.0620	.093	**.375** (6x)	3	1/8	2-1/2	814162	45.30	814162-C8	52.50			
.062 (1/16)		.0620	.093	**.437** (7x)	3	1/8	2-1/2	813962	45.30	813962-C8	52.50			
.062 (1/16)		.0620	.093	**.500** (8x)	3	1/8	2-1/2	927162	45.30	927162-C8	52.50	927162-C4	57.70	
.062 (1/16)		.0620	.093	**.625** (10x)	3	1/8	2-1/2	919362	47.60	919362-C8	54.80			
.062 (1/16)		.0620	.093	**.750** (12x)	3	1/8	2-1/2	879262	49.30	879262-C8	56.50			
.070		.0700	.105	**.570** (8x)	3	1/8	2-1/2	927170	46.40	927170-C8	53.60			

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VARIABLE HELIX END MILLS FOR ALUMINUM ALLOYS

Square – Long Reach, Stub Flute (cont.)

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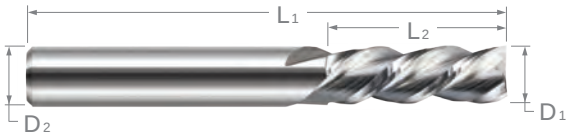
CUTTER DIAMETER			LENGTH OF CUT	OVERALL REACH	FLUTES	SHANK DIA.	OAL	UNCOATED		TiB$_2$ COATED		AMORPHOUS DIAMOND	
D_1 +.0005″ −.0005″	+.00mm −.02mm	decimal equivalent	L_2 +.010″ −.000″	L_3 +.010″ −.000″		D_2 (h6)	L_1	3 FL	PRICE	3 FL	PRICE	3 FL	PRICE
.078 (5/64)		.0780	.118	**.406** (5x)	3	1/8	2-1/2	930878	44.60	930878-C8	51.80		
.078 (5/64)		.0780	.118	**.625** (8x)	3	1/8	2-1/2	927178	45.30	927178-C8	52.50		
.078 (5/64)		.0780	.118	**.800** (10x)	3	1/8	2-1/2	919378	47.90	919378-C8	55.10		
	2.0 mm	.0787	3 mm	**16 mm** (8x)	3	4 mm	50 mm	795345	49.50	795345-C8	57.00		
.080		.0800	.120	**.650** (8x)	3	1/8	2-1/2	927180	46.40	927180-C8	53.60		
.090		.0900	.135	**.750** (8x)	3	1/8	2-1/2	927190	46.40	927190-C8	53.60		
.093 (3/32)		.0930	.140	**.279** (3x)	3	1/8	1-1/2	924593	44.10	924593-C8	51.30		
.093 (3/32)		.0930	.140	**.375** (4x)	3	1/8	2-1/2	814393	44.60	814393-C8	51.80		
.093 (3/32)		.0930	.140	**.500** (5x)	3	1/8	2-1/2	930893	44.60	930893-C8	51.80	930893-C4	57.00
.093 (3/32)		.0930	.140	**.585** (6x)	3	1/8	2-1/2	814193	45.30	814193-C8	52.50		
.093 (3/32)		.0930	.140	**.670** (7x)	3	1/8	2-1/2	813993	45.30	813993-C8	52.50		
.093 (3/32)		.0930	.140	**.750** (8x)	3	1/8	2-1/2	927193	45.30	927193-C8	52.50	927193-C4	57.70
.093 (3/32)		.0930	.140	**.950** (10x)	3	1/8	2-1/2	919393	47.60	919393-C8	54.80		
.093 (3/32)		.0930	.140	**1.125** (12x)	3	1/8	2-1/2	879293	49.30	879293-C8	56.50		
.100		.1000	.150	**.800** (8x)	3	1/8	2-1/2	927200	49.60	927200-C8	56.80		
.109 (7/64)		.1090	.164	**.900** (8x)	3	1/8	2-1/2	927202	49.60	927202-C8	56.80		
	3.0 mm	.1181	4.50 mm	**24.0 mm** (8x)	3	4 mm	50 mm	795357	51.60	795357-C8	59.10		

D_1 +.000″ −.002″	decimal equivalent	L_2 +.030″ −.000″	L_3 +.030″ −.000″		D_2 (h6)	L_1	3 FL	PRICE	3 FL	PRICE	3 FL	PRICE
.125 (1/8)	.1250	.187	**.375** (3x)	3	1/8	1-1/2	924608	44.10	924608-C8	51.30		
.125 (1/8)	.1250	.187	**.500** (4x)	3	1/8	2-1/2	814408	44.60	814408-C8	51.80		
.125 (1/8)	.1250	.187	**.625** (5x)	3	1/8	2-1/2	930908	44.60	930908-C8	51.80	930908-C4	57.00
.125 (1/8)	.1250	.187	**.750** (6x)	3	1/8	2-1/2	814208	45.30	814208-C8	52.50		
.125 (1/8)	.1250	.187	**.875** (7x)	3	1/8	2-1/2	814008	45.30	814008-C8	52.50		
.125 (1/8)	.1250	.187	**1.000** (8x)	3	1/8	2-1/2	927208	45.30	927208-C8	52.50	927208-C4	57.70
.125 (1/8)	.1250	.187	**1.250** (10x)	3	1/8	2-1/2	919408	47.60	919408-C8	54.80		
.125 (1/8)	.1250	.187	**1.500** (12x)	3	1/8	3	879308	49.30	879308-C8	56.50		
.140 (9/64)	.1406	.220	**1.125** (8x)	3	3/16	3	927209	52.50	927209-C8	59.70		
.156 (5/32)	.1562	.235	**.750** (5x)	3	3/16	3	930910	48.80	930910-C8	56.00		
.156 (5/32)	.1562	.235	**1.250** (8x)	3	3/16	3	927210	50.10	927210-C8	57.30		
.156 (5/32)	.1562	.235	**1.570** (10x)	3	3/16	3	919410	51.90	919410-C8	59.10		
.187 (3/16)	.1875	.285	**1.000** (5x)	3	3/16	3	930912	48.80	930912-C8	56.00	930912-C4	65.90
NEW .187 (3/16)	.1875	.285	**1.156** (6x)	3	3/16	3	814212	48.80	814212-C8	56.00		
NEW .187 (3/16)	.1875	.285	**1.312** (7x)	3	3/16	3	814012	50.10	814012-C8	57.30		
.187 (3/16)	.1875	.285	**1.500** (8x)	3	3/16	3	927212	50.10	927212-C8	57.30		
.187 (3/16)	.1875	.285	**1.875** (10x)	3	3/16	4	919412	51.90	919412-C8	59.60		
.250 (1/4)	.2500	.375	**1.250** (5x)	3	1/4	4	930916	52.10	930916-C8	60.80		
.250 (1/4)	.2500	.375	**2.000** (8x)	3	1/4	4	927216	53.20	927216-C8	61.90		
.250 (1/4)	.2500	.375	**2.500** (10x)	3	1/4	4	919416	55.00	919416-C8	63.70		
.375 (3/8)	.3750	.570	**2.000** (5x)	3	3/8	4	930924	62.20	930924-C8	85.60		
.500 (1/2)	.5000	.750	**2.500** (5x)	3	1/2	4	930932	75.30	930932-C8	96.70		

PLEASE SEE SPEEDS & FEEDS ON PAGE 195

VARIABLE HELIX END MILLS FOR ALUMINUM ALLOYS

Square – Downcut



- Optimized for aluminum and aluminum alloys with excellent performance in copper, brass, and bronze alloys
- Variable helix design (approx. 42°) reduces chatter and harmonics and increases material removal rates
- Prevents lifting of workpiece
- h6 shank tolerance for high precision tool holders
- 3 left hand spiral, right hand cut flutes
- Center cutting
- Solid carbide
- CNC ground in the USA

CUTTER DIAMETER	LENGTH OF CUT	FLUTES	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		TiB_2 COATED	
D_1 $^{+.0005''}_{-.0005''}$	L_2 $^{+.010''}_{-.000''}$		D_2 (h6)	L_1	3 FL	PRICE	3 FL	PRICE
.015 (1/64)	.045 (3x)	3	1/8	1-1/2	896215	44.30	896215-C8	51.50
.031 (1/32)	.047 (1.5x)	3	1/8	1-1/2	858531	31.20	858531-C8	38.40
.031 (1/32)	.093 (3x)	3	1/8	1-1/2	896231	31.00	896231-C8	38.20
.047 (3/64)	.141 (3x)	3	1/8	1-1/2	896247	31.00	896247-C8	38.20
.062 (1/16)	.093 (1.5x)	3	1/8	1-1/2	858562	29.00	858562-C8	36.20
.062 (1/16)	.186 (3x)	3	1/8	1-1/2	896262	28.80	896262-C8	36.00
.078 (5/64)	.234 (3x)	3	1/8	1-1/2	896278	28.80	896278-C8	36.00
.093 (3/32)	.140 (1.5x)	3	1/8	1-1/2	858593	29.00	858593-C8	36.20
.093 (3/32)	.279 (3x)	3	1/8	1-1/2	896293	28.80	896293-C8	36.00
D_1 $^{+.000''}_{-.002''}$	L_2 $^{+.030''}_{-.000''}$		D_2 (h6)	L_1	3 FL	PRICE	3 FL	PRICE
.125 (1/8)	.187 (1.5x)	3	1/8	1-1/2	858608	29.00	858608-C8	36.20
.125 (1/8)	.375 (3x)	3	1/8	1-1/2	896308	28.80	896308-C8	36.00
.187 (3/16)	.285 (1.5x)	3	3/16	2	858612	30.30	858612-C8	37.50
.187 (3/16)	.562 (3x)	3	3/16	2	896312	30.10	896312-C8	37.30
.250 (1/4)	.375 (1.5x)	3	1/4	2-1/2	858616	37.60	858616-C8	45.30
.250 (1/4)	.750 (3x)	3	1/4	2-1/2	896316	37.20	896316-C8	44.90
.375 (3/8)	.570 (1.5x)	3	3/8	2-1/2	858624	50.20	858624-C8	70.10
.375 (3/8)	1.125 (3x)	3	3/8	2-1/2	896324	49.80	896324-C8	69.70

PLEASE SEE SPEEDS & FEEDS ON PAGE 193

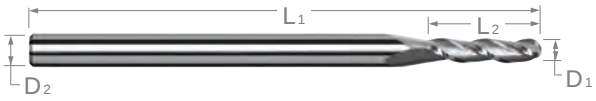
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NEW SIZES!

VARIABLE HELIX END MILLS FOR ALUMINUM ALLOYS

Ball



- Optimized for aluminum and aluminum alloys with excellent performance in copper, brass, and bronze alloys
- Variable helix design (approx. 42°) reduces chatter and harmonics and increases material removal rates
- h6 shank tolerance for high precision tool holders
- 3 flutes
- Center cutting
- Solid carbide
- CNC ground in the USA

mm & in

	CUTTER DIAMETER			LENGTH OF CUT	FLUTES	SHANK DIA.	OAL	UNCOATED		TiB2 COATED		AMORPHOUS DIAMOND	
	D1 +.0005″ −.0005″	+.00mm −.02mm	decimal equivalent	L2 +.010″ −.000″ +.25mm −.00mm		D2 (h6)	L1	3 FL	PRICE	3 FL	PRICE	3 FL	PRICE
		.2 mm	.0078	**.60 mm** (3x)	3	4 mm	50 mm	977504	56.90	977504-C8	64.40		
NEW	.010		.0100	**.015** (1.5x)	3	1/8	1-1/2	958110	58.00	958110-C8	65.20		
	.010		.0100	**.030** (3x)	3	1/8	1-1/2	989710	58.00	989710-C8	65.20		
	.015 (1/64)		.0150	**.023** (1.5x)	3	1/8	1-1/2	958115	46.90	958115-C8	54.10		
	.015 (1/64)		.0150	**.045** (3x)	3	1/8	1-1/2	989715	46.90	989715-C8	54.10		
		.4 mm	.0157	**1.20 mm** (3x)	3	4 mm	50 mm	977509	46.00	977509-C8	53.50		
		.5 mm	.0196	**1.50 mm** (3x)	3	4 mm	50 mm	977511	41.20	977511-C8	48.70		
	.020		.0200	**.030** (1.5x)	3	1/8	1-1/2	958120	41.00	958120-C8	48.20		
	.020		.0200	**.060** (3x)	3	1/8	1-1/2	989720	41.00	989720-C8	48.20		
NEW	.020		.0200	**.100** (5x)	3	1/8	2-1/2	850020	41.60	850020-C8	48.80		
		.6 mm	.0236	**1.80 mm** (3x)	3	4 mm	50 mm	977513	39.10	977513-C8	46.60		
	.025		.0250	**.075** (3x)	3	1/8	1-1/2	989725	39.50	989725-C8	46.70		
	.030		.0300	**.090** (3x)	3	1/8	1-1/2	989730	34.70	989730-C8	41.90		
	.031 (1/32)		.0310	**.047** (1.5x)	3	1/8	1-1/2	958131	34.30	958131-C8	41.50		
	.031 (1/32)		.0310	**.093** (3x)	3	1/8	1-1/2	989731	33.90	989731-C8	41.10	989731-C4	46.30
	.031 (1/32)		.0310	**.156** (5x)	3	1/8	2-1/2	850031	42.10	850031-C8	49.30		
		.8 mm	.0314	**2.40 mm** (3x)	3	4 mm	50 mm	977518	33.60	977518-C8	41.10		
		1.0 mm	.0393	**1.50 mm** (1.5x)	3	4 mm	50 mm	908322	33.60	908322-C8	41.10		
		1.0 mm	.0393	**3.00 mm** (3x)	3	4 mm	50 mm	977522	33.60	977522-C8	41.10		
NEW	.040		.0400	**.060** (1.5x)	3	1/8	1-1/2	958140	36.60	958140-C8	43.80		
	.040		.0400	**.120** (3x)	3	1/8	1-1/2	989740	36.20	989740-C8	43.40		
	.047 (3/64)		.0470	**.071** (1.5x)	3	1/8	1-1/2	958147	34.30	958147-C8	41.50		
	.047 (3/64)		.0470	**.141** (3x)	3	1/8	1-1/2	989747	33.90	989747-C8	41.10		
	.047 (3/64)		.0470	**.250** (5x)	3	1/8	2-1/2	850047	42.10	850047-C8	49.30		
		1.2 mm	.0472	**3.50 mm** (3x)	3	4 mm	50 mm	977527	33.60	977527-C8	41.10		
	.050		.0500	**.150** (3x)	3	1/8	1-1/2	989750	34.90	989750-C8	42.10		
		1.4 mm	.0551	**4.00 mm** (3x)	3	4 mm	50 mm	977531	33.60	977531-C8	41.10		
		1.5 mm	.0590	**4.50 mm** (3x)	3	4 mm	50 mm	977533	31.50	977533-C8	39.00		
	.060		.0600	**.180** (3x)	3	1/8	1-1/2	989760	34.10	989760-C8	41.30		
	.062 (1/16)		.0620	**.093** (1.5x)	3	1/8	1-1/2	958162	32.10	958162-C8	39.30		
	.062 (1/16)		.0620	**.186** (3x)	3	1/8	1-1/2	989762	32.10	989762-C8	39.30	989762-C4	44.50
	.062 (1/16)		.0620	**.250** (4x)	3	1/8	2-1/2	791162	40.10	791162-C8	47.30		
	.062 (1/16)		.0620	**.312** (5x)	3	1/8	2-1/2	850062	40.10	850062-C8	47.30		
		1.6 mm	.0629	**5.00 mm** (3x)	3	4 mm	50 mm	977536	31.50	977536-C8	39.00		
		1.8 mm	.0708	**5.50 mm** (3x)	3	4 mm	50 mm	977540	31.50	977540-C8	39.00		

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NEW SIZES!

VARIABLE HELIX END MILLS FOR ALUMINUM ALLOYS

Ball (cont.)

mm & in continued from previous page

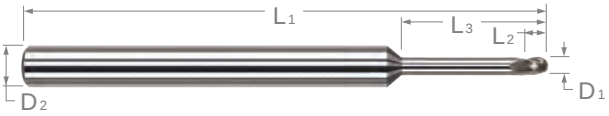
CUTTER DIAMETER D_1 +.0005″ −.0005″	D_1 +.00mm −.02mm	decimal equivalent	LENGTH OF CUT L_2 +.010″ −.000″ / +.25mm −.00mm	FLUTES	SHANK DIA. D_2 (h6)	OAL L_1	UNCOATED 3 FL	UNCOATED PRICE	TiB_2 COATED 3 FL	TiB_2 COATED PRICE	AMORPHOUS DIAMOND 3 FL	AMORPHOUS DIAMOND PRICE
.078 (5/64)		.0780	**.118** (1.5x)	3	1/8	1-1/2	958178	32.10	958178-C8	39.30		
.078 (5/64)		.0780	**.234** (3x)	3	1/8	1-1/2	989778	32.10	989778-C8	39.30		
.078 (5/64)		.0780	**.406** (5x)	3	1/8	2-1/2	850078	40.10	850078-C8	47.30		
	2.0 mm	.0787	**3.00 mm** (1.5x)	3	4 mm	50 mm	908345	31.50	908345-C8	39.00		
	2.0 mm	.0787	**6.00 mm** (3x)	3	4 mm	50 mm	977545	31.50	977545-C8	39.00		
.093 (3/32)		.0930	**.140** (1.5x)	3	1/8	1-1/2	958193	32.10	958193-C8	39.30		
.093 (3/32)		.0930	**.279** (3x)	3	1/8	1-1/2	989793	32.10	989793-C8	39.30	989793-C4	44.50
.093 (3/32)		.0930	**.500** (5x)	3	1/8	2-1/2	850093	40.10	850093-C8	47.30		
.100		.1000	**.300** (3x)	3	1/8	1-1/2	989800	32.20	989800-C8	39.40		
.109 (7/64)		.1094	**.327** (3x)	3	1/8	1-1/2	989802	33.00	989802-C8	39.50		
	3.0 mm	.1181	**9.00 mm** (3x)	3	4 mm	50 mm	977557	32.40	977557-C8	39.90		

D_1 +.000″ −.002″	decimal equivalent	L_2 +.030″ −.000″	FLUTES	D_2 (h6)	L_1	3 FL	PRICE	3 FL	PRICE	3 FL	PRICE	
.125 (1/8)	.1250	**.187** (1.5x)	3	1/8	1-1/2	958208	30.40	958208-C8	37.60			
.125 (1/8)	.1250	**.375** (3x)	3	1/8	1-1/2	989808	30.40	989808-C8	37.60	989808-C4	42.80	
.125 (1/8)	.1250	**.500** (4x)	3	1/8	2-1/2	791208	40.10	791208-C8	47.30			
.125 (1/8)	.1250	**.625** (5x)	3	1/8	2-1/2	850108	40.10	850108-C8	47.30			
.156 (5/32)	.1562	**.235** (1.5x)	3	3/16	2	958210	33.10	958210-C8	40.30			
.156 (5/32)	.1562	**.470** (3x)	3	3/16	2	989810	33.10	989810-C8	40.30			
.187 (3/16)	.1875	**.285** (1.5x)	3	3/16	2	958212	31.40	958212-C8	38.60			
.187 (3/16)	.1875	**.562** (3x)	3	3/16	2	989812	31.40	989812-C8	38.60	989812-C4	48.50	
.187 (3/16)	.1875	**1.000** (5x)	3	3/16	3	850112	32.30	850112-C8	39.50			NEW
.250 (1/4)	.2500	**.375** (1.5x)	3	1/4	2-1/2	958216	37.40	958216-C8	45.10			
.250 (1/4)	.2500	**.750** (3x)	3	1/4	2-1/2	989816	37.40	989816-C8	45.10	989816-C4	56.80	
.250 (1/4)	.2500	**1.250** (5x)	3	1/4	4	850116	48.90	850116-C8	57.60			NEW
.375 (3/8)	.3750	**.570** (1.5x)	3	3/8	2-1/2	958224	49.10	958224-C8	69.00			NEW
.375 (3/8)	.3750	**1.125** (3x)	3	3/8	2-1/2	989824	49.10	989824-C8	69.00			NEW
.500 (1/2)	.5000	**.750** (1.5x)	3	1/2	3	958232	51.60	958232-C8	75.00			NEW
.500 (1/2)	.5000	**1.500** (3x)	3	1/2	3	989832	51.60	989832-C8	75.00			NEW

PLEASE SEE SPEEDS & FEEDS ON PAGE 193

VARIABLE HELIX END MILLS FOR ALUMINUM ALLOYS

Ball – Long Reach, Stub Flute



- Optimized for aluminum and aluminum alloys with excellent performance in copper, brass, and bronze alloys
- Variable helix design (approx. 42°) improves performance in off-center contour milling applications
- Reduced neck diameter to avoid heeling
- Ball end for profiling
- h6 shank tolerance for high precision tool holders
- 3 flutes
- Center cutting
- Solid carbide
- CNC ground in the USA

mm & in

CUTTER DIA.			LENGTH OF CUT	OVERALL REACH		SHANK DIA	OAL	UNCOATED		TiB2 COATED		AMORPHOUS DIAMOND	
D1 +.0005″ −.0005″	+.00mm −.02mm	decimal equivalent	L2 +.010″ −.000″ +.25mm −.00mm	L3 +.010″ −.000″ +.25mm −.00mm	FLUTES	D2 (h6)	L1	3 FL	PRICE	3 FL	PRICE	3 FL	PRICE
.015 (1/64)		.0150	.022	**.078** (5x)	3	1/8	2-1/2	947015	51.30	947015-C8	58.50		
.015 (1/64)		.0150	.022	**.125** (8x)	3	1/8	2-1/2	54415	59.60	54415-C8	66.80		
.020		.0200	.030	**.100** (5x)	3	1/8	2-1/2	947020	55.20	947020-C8	62.40		
.020		.0200	.030	**.160** (8x)	3	1/8	2-1/2	54420	56.20	54420-C8	63.40		
.025		.0250	.037	**.125** (5x)	3	1/8	2-1/2	947025	53.70	947025-C8	60.90		
.025		.0250	.037	**.203** (8x)	3	1/8	2-1/2	54425	55.00	54425-C8	62.20		
.031 (1/32)		.0310	.046	**.156** (5x)	3	1/8	2-1/2	947031	50.70	947031-C8	57.90		
.031 (1/32)		.0310	.046	**.250** (8x)	3	1/8	2-1/2	54431	53.40	54431-C8	60.60	54431-C4	65.80
.031 (1/32)		.0310	.046	**.312** (10x)	3	1/8	2-1/2	925131	56.60	925131-C8	63.80		
.031 (1/32)		.0310	.046	**.375** (12x)	3	1/8	2-1/2	879431	58.50	879431-C8	65.70		
	1.0 mm	.0393	1.50 mm	**5.0 mm** (5x)	3	4 mm	50 mm	851322	56.90	851322-C8	64.40		
.047 (3/64)		.0470	.070	**.250** (5x)	3	1/8	2-1/2	947047	50.70	947047-C8	57.90		
.047 (3/64)		.0470	.070	**.375** (8x)	3	1/8	2-1/2	54447	51.30	54447-C8	58.50	54447-C4	63.70
.062 (1/16)		.0620	.093	**.312** (5x)	3	1/8	2-1/2	947062	50.70	947062-C8	57.90		
.062 (1/16)		.0620	.093	**.500** (8x)	3	1/8	2-1/2	54462	51.30	54462-C8	58.50	54462-C4	63.70
.062 (1/16)		.0620	.093	**.625** (10x)	3	1/8	2-1/2	925162	56.60	925162-C8	63.80		
.062 (1/16)		.0620	.093	**.750** (12x)	3	1/8	2-1/2	879462	59.60	879462-C8	66.80		
.078 (5/64)		.0780	.117	**.406** (5x)	3	1/8	2-1/2	947078	50.70	947078-C8	57.90		
.078 (5/64)		.0780	.117	**.625** (8x)	3	1/8	2-1/2	54478	51.30	54478-C8	58.50	54478-C4	63.70
	2.0 mm	.0787	3.00 mm	**10.0 mm** (5x)	3	4 mm	50 mm	851345	52.90	851345-C8	60.40		
.093 (3/32)		.0930	.139	**.500** (5x)	3	1/8	2-1/2	947093	50.70	947093-C8	57.90		
.093 (3/32)		.0930	.139	**.750** (8x)	3	1/8	2-1/2	54493	51.30	54493-C8	58.50	54493-C4	63.70
.093 (3/32)		.0930	.139	**.950** (10x)	3	1/8	2-1/2	925193	56.60	925193-C8	63.80		
.093 (3/32)		.0930	.139	**1.125** (12x)	3	1/8	2-1/2	879493	59.60	879493-C8	66.80		
	3.0 mm	.1181	4.50 mm	**15.0 mm** (5x)	3	4 mm	50 mm	851357	56.90	851357-C8	64.40		

D1 +.000″ −.002″	decimal equivalent	L2 +.030″ −.000″	L3 +.030″ −.000″	FLUTES	D2 (h6)	L1	3 FL	PRICE	3 FL	PRICE	3 FL	PRICE
.125 (1/8)	.1250	.187	**.625** (5x)	3	1/8	2-1/2	947108	49.60	947108-C8	56.80		
.125 (1/8)	.1250	.187	**1.000** (8x)	3	1/8	2-1/2	54508	50.70	54508-C8	57.90	54508-C4	63.10
.125 (1/8)	.1250	.187	**1.250** (10x)	3	1/8	2-1/2	925208	56.60	925208-C8	63.80		
.125 (1/8)	.1250	.187	**1.500** (12x)	3	1/8	3	879508	59.60	879508-C8	66.80		
.156 (5/32)	.1562	.234	**.750** (5x)	3	3/16	3	947110	56.00	947110-C8	63.20		
.156 (5/32)	.1562	.234	**1.250** (8x)	3	3/16	3	54510	56.20	54510-C8	63.40		
.187 (3/16)	.1875	.281	**1.000** (5x)	3	3/16	3	947112	56.00	947112-C8	63.20		
.187 (3/16)	.1875	.281	**1.500** (8x)	3	3/16	3	54512	56.50	54512-C8	63.70	54512-C4	73.60
.250 (1/4)	.2500	.375	**1.250** (5x)	3	1/4	4	947116	58.10	947116-C8	66.80		
.250 (1/4)	.2500	.375	**2.000** (8x)	3	1/4	4	54516	59.20	54516-C8	67.90	54516-C4	78.60

PLEASE SEE SPEEDS & FEEDS ON PAGE 195

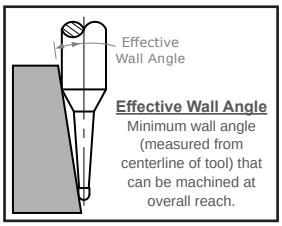
HIGH HELIX END MILLS FOR ALUMINUM ALLOYS

Ball – Tapered Reach (Mold Cutters)



Excellent in Aluminum & Other Non-Ferrous Materials

- Very short length of cut and solid tapered neck for maximum rigidity
- 1°, 1.5°, 3°, 5°, and 7° neck angles to address common draft angles for molds
- 45° helix, large flute valley, and sharper cutting edge for faster chip removal and better finish
- Offered with TiB_2 coating to minimize galling and enhance performance
- 2 flutes to center
- Solid carbide
- CNC ground in the USA



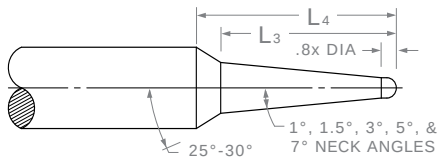
Effective Wall Angle
Minimum wall angle (measured from centerline of tool) that can be machined at overall reach.

ALUMINUM ALLOYS

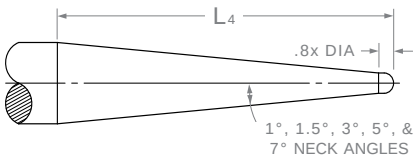
NECK ANGLE	CUTTER DIA.	LENGTH OF CUT	TYPE	TAPERED REACH	OVERALL REACH	EFFECTIVE WALL ANGLE	SHANK DIA.	OAL	UNCOATED		TiB_2 COATED	
A_1 +0°00′ −0°30′	D_1 +.000″ −.001″	L_2 +.010″ −.000″		L_3	L_4		D_2 (h6)	L_1	2 FL	PRICE	2 FL	PRICE
1°	.062 (1/16)	.050	I	.500	**.595**	6.4°	3/16	2	925049	51.50	925049-C8	58.70
	.062 (1/16)	.050	I	1.000	**1.080**	3.5°	3/16	2-1/2	925056	51.50	925056-C8	58.70
	.093 (3/32)	.074	I	.750	**.811**	3.6°	3/16	2	925070	48.80	925070-C8	56.00
	.093 (3/32)	.074	I	1.125	**1.175**	2.4°	3/16	2-1/2	925072	51.00	925072-C8	58.20
	.125 (1/8)	.100	I	1.000	**1.027**	1.9°	3/16	2	925091	62.30	925091-C8	69.50
	.125 (1/8)	.100	II	1.890	**1.890**	1.0°	3/16	3	925077	64.40	925077-C8	71.60
	.187 (3/16)	.150	II	1.940	**1.940**	1.0°	1/4	4	925087	64.90	925087-C8	73.60
	.250 (1/4)	.200	II	1.990	**1.990**	1.0°	5/16	4	925092	69.60	925092-C8	89.50
1.5°	.015 (1/64)	.012	I	.125	**.269**	18.2°	3/16	2	997807	57.70	997807-C8	64.90
	.015 (1/64)	.012	I	.250	**.389**	12.8°	3/16	2	997814	57.70	997814-C8	64.90
	.031 (1/32)	.025	I	.250	**.375**	12.3°	3/16	2	997821	53.00	997821-C8	60.20
	.031 (1/32)	.025	I	.500	**.614**	7.5°	3/16	2	997828	53.00	997828-C8	60.20
	.047 (3/64)	.038	I	.375	**.481**	8.7°	3/16	2	997835	52.20	997835-C8	59.40
	.047 (3/64)	.038	I	.750	**.839**	5.0°	3/16	2	997842	52.20	997842-C8	59.40
	.062 (1/16)	.050	I	.500	**.588**	6.4°	3/16	2	997849	51.50	997849-C8	58.70
	.062 (1/16)	.050	I	1.000	**1.066**	3.5°	3/16	2-1/2	997856	51.50	997856-C8	58.70
	.078 (5/64)	.062	I	.625	**.694**	4.8°	3/16	2	997863	49.80	997863-C8	57.00
	.093 (3/32)	.074	I	.750	**.801**	3.6°	3/16	2	997870	48.80	997870-C8	56.00
	.125 (1/8)	.100	II	1.293	**1.293**	1.5°	3/16	2-1/2	997877	62.30	997877-C8	69.50
	.187 (3/16)	.150	II	1.343	**1.343**	1.5°	1/4	2-1/2	997887	63.10	997887-C8	70.80
	.250 (1/4)	.200	II	1.393	**1.393**	1.5°	5/16	2-1/2	997892	67.50	997892-C8	83.90

continued on next page

TYPE I



TYPE II



HIGH HELIX END MILLS FOR ALUMINUM ALLOYS

Ball – Tapered Reach (Mold Cutters) (cont.)

continued from previous page

NECK ANGLE	CUTTER DIA.	LENGTH OF CUT	TYPE	TAPERED REACH	OVERALL REACH	EFFECTIVE WALL ANGLE	SHANK DIA.	OAL	UNCOATED		TiB$_2$ COATED	
A_1 $^{+0°00'}_{-0°30'}$	D_1 $^{+.000"}_{-.001"}$	L_2 $^{+.010"}_{-.000"}$		L_3	L_4		D_2 (h6)	L_1	2 FL	PRICE	2 FL	PRICE
3°	.031 (1/32)	.025	I	.750	**.820**	5.6°	3/16	2-1/2	996607	54.30	996607-C8	61.50
	.031 (1/32)	.025	II	1.518	**1.518**	3.0°	3/16	2-1/2	996614	54.30	996614-C8	61.50
	.047 (3/64)	.038	I	.875	**.921**	4.5°	3/16	2-1/2	996621	51.30	996621-C8	58.50
	.047 (3/64)	.038	II	1.378	**1.378**	3.0°	3/16	2-1/2	996628	51.30	996628-C8	58.50
	.062 (1/16)	.050	I	.625	**.681**	5.5°	3/16	2-1/2	996635	51.30	996635-C8	58.50
	.062 (1/16)	.050	II	1.247	**1.247**	3.0°	3/16	2-1/2	996642	51.30	996642-C8	58.50
	.078 (5/64)	.062	II	1.107	**1.107**	3.0°	3/16	2-1/2	996649	49.80	996649-C8	57.00
	.093 (3/32)	.074	II	.976	**.976**	3.0°	3/16	2	996656	45.00	996656-C8	52.20
	.125 (1/8)	.100	II	1.293	**1.293**	2.9°	1/4	2-1/2	996663	62.30	996663-C8	70.00
	.187 (3/16)	.150	II	.746	**.746**	2.8°	1/4	2-1/2	996670	67.50	996670-C8	75.20
	.187 (3/16)	.150	II	1.939	**1.939**	2.9°	3/8	4	996674	70.20	996674-C8	93.60
	.250 (1/4)	.200	II	1.393	**1.393**	2.9°	3/8	2-1/2	996692	68.70	996692-C8	88.60
5°	.031 (1/32)	.025	II	.919	**.919**	5.0°	3/16	2	996007	49.50	996007-C8	56.70
	.047 (3/64)	.038	II	.841	**.841**	5.0°	3/16	2	996014	49.50	996014-C8	56.70
	.062 (1/16)	.050	II	.767	**.767**	4.9°	3/16	2	996021	46.50	996021-C8	53.70
	.078 (5/64)	.062	II	1.045	**1.045**	4.9°	1/4	2-1/2	996028	64.40	996028-C8	72.10
	.093 (3/32)	.074	II	.971	**.971**	4.9°	1/4	2-1/2	996035	64.40	996035-C8	72.10
	.125 (1/8)	.100	II	.814	**.814**	4.8°	1/4	2-1/2	996042	67.00	996042-C8	74.70
	.187 (3/16)	.150	II	1.222	**1.222**	4.8°	3/8	2-1/2	996087	68.70	996087-C8	88.60
	.250 (1/4)	.200	II	.914	**.914**	4.5°	3/8	2-1/2	996092	68.70	996092-C8	88.60
7°	.031 (1/32)	.025	II	.662	**.662**	6.9°	3/16	2	995607	49.50	995607-C8	56.70
	.047 (3/64)	.038	II	.610	**.610**	6.9°	3/16	2	995614	49.50	995614-C8	56.70
	.062 (1/16)	.050	II	.816	**.816**	6.9°	1/4	2-1/2	995621	64.40	995621-C8	72.10
	.078 (5/64)	.062	II	.762	**.762**	6.8°	1/4	2-1/2	995628	64.40	995628-C8	72.10
	.093 (3/32)	.074	II	.713	**.713**	6.7°	1/4	2-1/2	995635	61.20	995635-C8	68.90
	.125 (1/8)	.100	II	.609	**.609**	6.5°	1/4	2-1/2	995642	58.30	995642-C8	66.00
	.187 (3/16)	.150	II	.914	**.914**	6.5°	3/8	2-1/2	995687	68.70	995687-C8	88.60



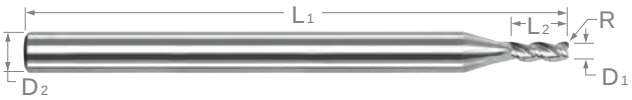
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Corner Radius



- Optimized for aluminum and aluminum alloys with excellent performance in copper, brass, and bronze alloys
- Variable helix design (approx. 42°) reduces chatter and harmonics, and increases material removal rates
- h6 shank tolerance for high precision tool holders
- 3 flutes
- Center cutting
- Solid carbide
- CNC ground in the USA

TiB_2 Titanium Diboride	Best used in Non-Abrasive Aluminum Alloys and Magnesium Alloys! Extremely low affinity to aluminum. Prevents build-up on cutting edge and chip packing, extending tool life.
Amorphous Diamond	Outstanding performance in Copper, Brass, Bronze and High Silicon Aluminum! Improves wear resistance and lubricity. Thin film coating maintains sharp edge, improving performance and finish.

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CUTTER DIAMETER			CORNER RADIUS	LENGTH OF CUT		FLUTES	SHANK DIA.	OAL	UNCOATED		TiB_2 COATED		AMORPHOUS DIAMOND	
D_1 +.0005″ −.0005″	D_1 +.00mm −.02mm	decimal equivalent	R +.001″ −.001″ +.025mm −.025mm	L_2 +.010″ −.000″ +.25mm −.00mm			D_2 (h6)	L_1	3 FL	PRICE	3 FL	PRICE	3 FL	PRICE
	.2 mm	.0078	**.03 mm**	.30 mm	(1.5x)	3	4 mm	50 mm	986204	52.10	986204-C8	59.60		
	.2 mm	.0078	**.03 mm**	.60 mm	(3x)	3	4 mm	50 mm	973504	52.10	973504-C8	59.60		
.010		.0100	**.002**	.030	(3x)	3	1/8	1-1/2	50010	43.10	50010-C8	50.30		
	.3 mm	.0118	**.05 mm**	.90 mm	(3x)	3	4 mm	50 mm	973506	50.70	973506-C8	58.20		
.015 (1/64)		.0150	**.002**	.022	(1.5x)	3	1/8	1-1/2	61715	40.30	61715-C8	47.50		
.015 (1/64)		.0150	**.002**	.045	(3x)	3	1/8	1-1/2	50015	40.30	50015-C8	47.50	50015-C4	52.70
.015 (1/64)		.0150	**.002**	.078	(5x)	3	1/8	2-1/2	53015	47.90	53015-C8	55.10	53015-C4	60.30
	.4 mm	.0157	**.05 mm**	.60 mm	(1.5x)	3	4 mm	50 mm	986209	42.50	986209-C8	50.00		
	.4 mm	.0157	**.05 mm**	1.20 mm	(3x)	3	4 mm	50 mm	973509	42.50	973509-C8	50.00		
	.5 mm	.0196	**.05 mm**	.75 mm	(1.5x)	3	4 mm	50 mm	986211	37.50	986211-C8	45.00		
	.5 mm	.0196	**.05 mm**	1.50 mm	(3x)	3	4 mm	50 mm	973511	37.50	973511-C8	45.00		
.020		.0200	**.002**	.030	(1.5x)	3	1/8	1-1/2	61720	34.60	61720-C8	41.80		
.020		.0200	**.002**	.060	(3x)	3	1/8	1-1/2	50020	34.60	50020-C8	41.80	50020-C4	47.00
.020		.0200	**.002**	.100	(5x)	3	1/8	2-1/2	53020	42.30	53020-C8	49.50	53020-C4	54.70
	.6 mm	.0236	**.05 mm**	.90 mm	(1.5x)	3	4 mm	50 mm	986213	36.10	986213-C8	43.60		
	.6 mm	.0236	**.05 mm**	1.80 mm	(3x)	3	4 mm	50 mm	973513	36.10	973513-C8	43.60		
.025		.0250	**.002**	.038	(1.5x)	3	1/8	1-1/2	61725	33.30	61725-C8	40.50		
.025		.0250	**.002**	.075	(3x)	3	1/8	1-1/2	50025	33.30	50025-C8	40.50	50025-C4	45.70
.025		.0250	**.002**	.125	(5x)	3	1/8	2-1/2	53025	41.00	53025-C8	48.20	53025-C4	53.40
	.7 mm	.0275	**.08 mm**	2.10 mm	(3x)	3	4 mm	50 mm	973515	36.10	973515-C8	43.60		
.031 (1/32)		.0310	**.003**	.047	(1.5x)	3	1/8	1-1/2	61731	27.70	61731-C8	34.90		
.031 (1/32)		.0310	**.003**	.093	(3x)	3	1/8	1-1/2	50031	27.70	50031-C8	34.90	50031-C4	40.10
.031 (1/32)		.0310	**.003**	.156	(5x)	3	1/8	2-1/2	53031	34.90	53031-C8	42.10	53031-C4	47.30
.031 (1/32)		.0310	**.005**	.093	(3x)	3	1/8	1-1/2	901531	27.30	901531-C8	34.50		
.031 (1/32)		.0310	**.010**	.093	(3x)	3	1/8	1-1/2	904631	27.30	904631-C8	34.50		
	.8 mm	.0314	**.08 mm**	1.20 mm	(1.5x)	3	4 mm	50 mm	986218	30.40	986218-C8	37.90		
	.8 mm	.0314	**.08 mm**	2.40 mm	(3x)	3	4 mm	50 mm	973518	30.40	973518-C8	37.90		
.035		.0350	**.003**	.053	(1.5x)	3	1/8	1-1/2	61735	27.70	61735-C8	34.90		
.035		.0350	**.003**	.105	(3x)	3	1/8	1-1/2	50035	27.50	50035-C8	34.70		
	.9 mm	.0354	**.08 mm**	2.7 mm	(3x)	3	4 mm	50 mm	973520	30.40	973520-C8	37.90		
	1.0 mm	.0393	**.08 mm**	1.50 mm	(1.5x)	3	4 mm	50 mm	986222	30.40	986222-C8	37.90		
	1.0 mm	.0393	**.08 mm**	3.00 mm	(3x)	3	4 mm	50 mm	973522	30.40	973522-C8	37.90		
.040		.0400	**.003**	.060	(1.5x)	3	1/8	1-1/2	61740	27.70	61740-C8	34.90		
.040		.0400	**.003**	.120	(3x)	3	1/8	1-1/2	50040	27.70	50040-C8	34.90		
.040		.0400	**.003**	.203	(5x)	3	1/8	2-1/2	53040	34.90	53040-C8	42.10		

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VARIABLE HELIX END MILLS FOR ALUMINUM ALLOYS

Corner Radius (cont.)

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continued from previous page

	CUTTER DIAMETER			CORNER RADIUS	LENGTH OF CUT		FLUTES	SHANK DIA.	OAL	UNCOATED		TiB$_2$ COATED		AMORPHOUS DIAMOND	
	D_1 +.0005″ −.0005″	D_1 +.00mm −.02mm	decimal equivalent	R +.001″ −.001″ +.025mm −.025mm	L_2 +.010″ −.000″ +.25mm −.00mm			D_2 (h6)	L_1	3 FL	PRICE	3 FL	PRICE	3 FL	PRICE
		1.1 mm	.0433	**.08 mm**	3.00 mm	(3x)	3	4 mm	50 mm	973524	30.40	973524-C8	37.90		
	.045		.0450	**.003**	.135	(3x)	3	1/8	1-1/2	50045	27.70	50045-C8	34.90		
	.047 (3/64)		.0470	**.003**	.070	(1.5x)	3	1/8	1-1/2	61747	27.70	61747-C8	34.90		
	.047 (3/64)		.0470	**.003**	.141	(3x)	3	1/8	1-1/2	50047	27.50	50047-C8	34.70	50047-C4	39.90
	.047 (3/64)		.0470	**.003**	.250	(5x)	3	1/8	2-1/2	53047	34.90	53047-C8	42.10	53047-C4	47.30
	.047 (3/64)		.0470	**.005**	.141	(3x)	3	1/8	1-1/2	901547	27.30	901547-C8	34.50		
NEW	.047 (3/64)		.0470	**.010**	.141	(3x)	3	1/8	1-1/2	904647	27.30	904647-C8	34.50	904647-C4	39.70
	.047 (3/64)		.0470	**.015**	.141	(3x)	3	1/8	1-1/2	912347	27.30	912347-C8	34.50		
		1.2 mm	.0472	**.08 mm**	1.80 mm	(1.5x)	3	4 mm	50 mm	986227	30.40	986227-C8	37.90		
		1.2 mm	.0472	**.08 mm**	3.50 mm	(3x)	3	4 mm	50 mm	973527	30.40	973527-C8	37.90		
	.050		.0500	**.003**	.075	(1.5x)	3	1/8	1-1/2	61750	27.50	61750-C8	34.70		
	.050		.0500	**.003**	.150	(3x)	3	1/8	1-1/2	50050	27.50	50050-C8	34.70		
	.050		.0500	**.003**	.250	(5x)	3	1/8	2-1/2	53050	34.90	53050-C8	42.10		
		1.3 mm	.0511	**.08 mm**	4.00 mm	(3x)	3	4 mm	50 mm	973529	30.40	973529-C8	37.90		
	.055		.0550	**.003**	.083	(1.5x)	3	1/8	1-1/2	61755	27.50	61755-C8	34.70		
	.055		.0550	**.003**	.165	(3x)	3	1/8	1-1/2	50055	27.50	50055-C8	34.70		
	.055		.0550	**.003**	.275	(5x)	3	1/8	2-1/2	53055	34.90	53055-C8	42.10		
		1.4 mm	.0551	**.08 mm**	2.10 mm	(1.5x)	3	4 mm	50 mm	986231	30.40	986231-C8	37.90		
		1.4 mm	.0551	**.08 mm**	4.00 mm	(3x)	3	4 mm	50 mm	973531	30.40	973531-C8	37.90		
		1.5 mm	.0590	**.10 mm**	2.20 mm	(1.5x)	3	4 mm	50 mm	986233	28.20	986233-C8	35.70		
		1.5 mm	.0590	**.10 mm**	4.50 mm	(3x)	3	4 mm	50 mm	973533	28.20	973533-C8	35.70		
	.060		.0600	**.005**	.090	(1.5x)	3	1/8	1-1/2	61760	27.50	61760-C8	34.70		
	.060		.0600	**.005**	.180	(3x)	3	1/8	1-1/2	50060	27.50	50060-C8	34.70		
	.060		.0600	**.005**	.312	(5x)	3	1/8	2-1/2	53060	34.90	53060-C8	42.10		
	.060		.0600	**.010**	.180	(3x)	3	1/8	1-1/2	904660	34.90	904660-C8	42.10		
	.062 (1/16)		.0620	**.005**	.093	(1.5x)	3	1/8	1-1/2	61762	25.50	61762-C8	32.70	61762-C4	37.90
	.062 (1/16)		.0620	**.005**	.186	(3x)	3	1/8	1-1/2	50062	25.40	50062-C8	32.60	50062-C4	37.80
	.062 (1/16)		.0620	**.005**	.312	(5x)	3	1/8	2-1/2	53062	33.10	53062-C8	40.30	53062-C4	45.50
	.062 (1/16)		.0620	**.010**	.093	(1.5x)	3	1/8	1-1/2	878562	25.50	878562-C8	32.70		
	.062 (1/16)		.0620	**.010**	.186	(3x)	3	1/8	1-1/2	904662	25.40	904662-C8	32.60		
	.062 (1/16)		.0620	**.010**	.312	(5x)	3	1/8	2-1/2	840762	33.10	840762-C8	40.30		
	.062 (1/16)		.0620	**.015**	.186	(3x)	3	1/8	1-1/2	912362	25.40	912362-C8	32.60		
	.062 (1/16)		.0620	**.020**	.186	(3x)	3	1/8	1-1/2	925862	25.40	925862-C8	32.60		
		1.6 mm	.0629	**.10 mm**	2.40 mm	(1.5x)	3	4 mm	50 mm	986236	28.20	986236-C8	35.70		
		1.6 mm	.0629	**.10 mm**	5.00 mm	(3x)	3	4 mm	50 mm	973536	28.20	973536-C8	35.70		
		1.7 mm	.0669	**.10 mm**	5.00 mm	(3x)	3	4 mm	50 mm	973538	28.20	973538-C8	35.70		
	.070		.0700	**.005**	.210	(3x)	3	1/8	1-1/2	50070	26.00	50070-C8	33.20		
		1.8 mm	.0708	**.10 mm**	2.70 mm	(1.5x)	3	4 mm	50 mm	986240	28.20	986240-C8	35.70		
		1.8 mm	.0708	**.10 mm**	5.50 mm	(3x)	3	4 mm	50 mm	973540	28.20	973540-C8	35.70		
		1.9 mm	.0748	**.10 mm**	5.50 mm	(3x)	3	4 mm	50 mm	973542	28.20	973542-C8	35.70		
	.078 (5/64)		.0780	**.005**	.117	(1.5x)	3	1/8	1-1/2	61778	25.50	61778-C8	32.70	61778-C4	37.90
	.078 (5/64)		.0780	**.005**	.234	(3x)	3	1/8	1-1/2	50078	25.40	50078-C8	32.60	50078-C4	37.80
	.078 (5/64)		.0780	**.005**	.406	(5x)	3	1/8	2-1/2	53078	33.10	53078-C8	40.30	53078-C4	45.50
	.078 (5/64)		.0780	**.010**	.117	(1.5x)	3	1/8	1-1/2	878578	25.50	878578-C8	32.70		
	.078 (5/64)		.0780	**.010**	.234	(3x)	3	1/8	1-1/2	904678	25.40	904678-C8	32.60		
	.078 (5/64)		.0780	**.015**	.234	(3x)	3	1/8	1-1/2	912378	25.40	912378-C8	32.60		
	.078 (5/64)		.0780	**.020**	.234	(3x)	3	1/8	1-1/2	925878	25.40	925878-C8	32.60		

continued on next page

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VARIABLE HELIX END MILLS FOR ALUMINUM ALLOYS

Corner Radius (cont.)

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continued from previous page

CUTTER DIAMETER			CORNER RADIUS	LENGTH OF CUT		FLUTES	SHANK DIA.	OAL	UNCOATED		TiB$_2$ COATED		AMORPHOUS DIAMOND		
D_1 +.0005″ −.0005″	D_1 +.00mm −.02mm	decimal equivalent	R +.001″ −.001″ +.025mm −.025mm	L_2 +.010″ −.000″ +.25mm −.00mm			D_2 (h6)	L_1	3 FL	PRICE	3 FL	PRICE	3 FL	PRICE	
	2.0 mm	.0787	**.10 mm**	3.00 mm	(1.5x)	3	4 mm	50 mm	986245	28.20	986245-C8	35.70			
	2.0 mm	.0787	**.10 mm**	6.00 mm	(3x)	3	4 mm	50 mm	973545	28.20	973545-C8	35.70			
.080		.0800	**.005**	.240	(3x)	3	1/8	1-1/2	50080	26.00	50080-C8	33.20			
.090		.0900	**.005**	.270	(3x)	3	1/8	1-1/2	50090	26.00	50090-C8	33.20			
.093 (3/32)		.0930	**.005**	.139	(1.5x)	3	1/8	1-1/2	61793	25.50	61793-C8	32.70	61793-C4	37.90	
.093 (3/32)		.0930	**.005**	.279	(3x)	3	1/8	1-1/2	50093	25.40	50093-C8	32.60	50093-C4	37.80	
.093 (3/32)		.0930	**.005**	.500	(5x)	3	1/8	2-1/2	53093	33.10	53093-C8	40.30	53093-C4	45.50	
.093 (3/32)		.0930	**.010**	.139	(1.5x)	3	1/8	1-1/2	878593	25.50	878593-C8	32.70			
.093 (3/32)		.0930	**.010**	.279	(3x)	3	1/8	1-1/2	904693	25.40	904693-C8	32.60	904693-C4	37.80	NEW
.093 (3/32)		.0930	**.010**	.500	(5x)	3	1/8	2-1/2	840793	33.10	840793-C8	40.30			
.093 (3/32)		.0930	**.015**	.279	(3x)	3	1/8	1-1/2	912393	25.40	912393-C8	32.60			
.093 (3/32)		.0930	**.020**	.139	(1.5x)	3	1/8	1-1/2	889493	25.50	889493-C8	32.70			
.093 (3/32)		.0930	**.020**	.279	(3x)	3	1/8	1-1/2	925893	25.40	925893-C8	32.60			
.093 (3/32)		.0930	**.030**	.139	(1.5x)	3	1/8	1-1/2	893893	25.50	893893-C8	32.70			
.093 (3/32)		.0930	**.030**	.279	(3x)	3	1/8	1-1/2	904193	25.40	904193-C8	32.60			
	2.5 mm	.0984	**.10 mm**	7.50 mm	(3x)	3	4 mm	50 mm	973551	28.20	973551-C8	35.70			
.100		.1000	**.005**	.150	(1.5x)	3	1/8	1-1/2	61800	25.50	61800-C8	32.70			
.100		.1000	**.005**	.300	(3x)	3	1/8	1-1/2	50100	25.50	50100-C8	32.70			
	3.0 mm	.1181	**.10 mm**	9.00 mm	(3x)	3	4 mm	50 mm	973557	28.20	973557-C8	35.70			

D_1 +.000″ −.002″	decimal equivalent	R +.001″ −.001″	L_2 +.030″ −.000″			D_2 (h6)	L_1	3 FL	PRICE	3 FL	PRICE	3 FL	PRICE	
.125 (1/8)	.1250	**.005**	.187	(1.5x)	3	1/8	1-1/2	61808	25.40	61808-C8	32.60	61808-C4	37.80	
.125 (1/8)	.1250	**.005**	.375	(3x)	3	1/8	1-1/2	50108	25.40	50108-C8	32.60	50108-C4	37.80	
.125 (1/8)	.1250	**.005**	.625	(5x)	3	1/8	2-1/2	53108	33.10	53108-C8	40.30	53108-C4	45.50	
.125 (1/8)	.1250	**.010**	.187	(1.5x)	3	1/8	1-1/2	878608	24.70	878608-C8	31.90			
.125 (1/8)	.1250	**.010**	.375	(3x)	3	1/8	1-1/2	904708	24.00	904708-C8	31.20	904708-C4	36.40	
.125 (1/8)	.1250	**.010**	.625	(5x)	3	1/8	2-1/2	840808	32.30	840808-C8	39.50			
.125 (1/8)	.1250	**.015**	.187	(1.5x)	3	1/8	1-1/2	831208	24.00	831208-C8	31.20			
.125 (1/8)	.1250	**.015**	.375	(3x)	3	1/8	1-1/2	912408	24.00	912408-C8	31.20	912408-C4	36.40	
.125 (1/8)	.1250	**.015**	.625	(5x)	3	1/8	2-1/2	852408	32.30	852408-C8	39.50			
.125 (1/8)	.1250	**.020**	.187	(1.5x)	3	1/8	1-1/2	889508	27.20	889508-C8	34.40			
.125 (1/8)	.1250	**.020**	.375	(3x)	3	1/8	1-1/2	925908	24.00	925908-C8	31.20	925908-C4	36.40	
.125 (1/8)	.1250	**.020**	.625	(5x)	3	1/8	2-1/2	838308	32.30	838308-C8	39.50			
.125 (1/8)	.1250	**.030**	.187	(1.5x)	3	1/8	1-1/2	893908	27.20	893908-C8	34.40			
.125 (1/8)	.1250	**.030**	.375	(3x)	3	1/8	1-1/2	904208	24.00	904208-C8	31.20	904208-C4	36.40	
.125 (1/8)	.1250	**.030**	.625	(5x)	3	1/8	2-1/2	829708	32.30	829708-C8	39.50			
.125 (1/8)	.1250	**.040**	.375	(3x)	3	1/8	1-1/2	892808	28.70	892808-C8	35.90			
.140 (9/64)	.1406	**.015**	.425	(3x)	3	3/16	2	912409	26.40	912409-C8	33.60			NEW
.156 (5/32)	.1562	**.005**	.235	(1.5x)	3	3/16	2	61810	26.40	61810-C8	33.60			
.156 (5/32)	.1562	**.005**	.470	(3x)	3	3/16	2	50110	26.40	50110-C8	33.60	50110-C4	43.50	
.156 (5/32)	.1562	**.005**	.750	(5x)	3	3/16	3	53110	36.50	53110-C8	43.70			
.156 (5/32)	.1562	**.020**	.470	(3x)	3	3/16	2	925910	26.40	925910-C8	33.60			
.156 (5/32)	.1562	**.030**	.470	(3x)	3	3/16	2	904210	26.40	904210-C8	33.60			
.187 (3/16)	.1875	**.005**	.285	(1.5x)	3	3/16	2	61812	26.40	61812-C8	33.60	61812-C4	43.50	
.187 (3/16)	.1875	**.005**	.562	(3x)	3	3/16	2	50112	26.40	50112-C8	33.60	50112-C4	43.50	
.187 (3/16)	.1875	**.005**	1.000	(5x)	3	3/16	3	53112	36.50	53112-C8	43.70	53112-C4	51.00	
.187 (3/16)	.1875	**.010**	.562	(3x)	3	3/16	2	904712	37.20	904712-C8	44.40			
.187 (3/16)	.1875	**.015**	.285	(1.5x)	3	3/16	2	831212	37.20	831212-C8	44.40			NEW

continued on next page

NEW SIZES!

VARIABLE HELIX END MILLS FOR ALUMINUM ALLOYS

Corner Radius (cont.)

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continued from previous page

	CUTTER DIAMETER		CORNER RADIUS	LENGTH OF CUT	FLUTES	SHANK DIA.	OAL	UNCOATED		TiB$_2$ COATED		AMORPHOUS DIAMOND	
	D_1 +.000″ −.002″	decimal equivalent	R +.001″ −.001″	L_2 +.030″ −.000″		D_2 (h6)	L_1	3 FL	PRICE	3 FL	PRICE	3 FL	PRICE
	.187 (3/16)	.1875	**.015**	.562 (3x)	3	3/16	2	912412	37.20	912412-C8	44.40		
	.187 (3/16)	.1875	**.020**	.285 (1.5x)	3	3/16	2	889512	37.20	889512-C8	44.40		
	.187 (3/16)	.1875	**.020**	.562 (3x)	3	3/16	2	925912	37.20	925912-C8	44.40		
	.187 (3/16)	.1875	**.030**	.285 (1.5x)	3	3/16	2	893912	37.20	893912-C8	44.40		
NEW	.187 (3/16)	.1875	**.030**	.562 (3x)	3	3/16	2	904212	37.20	904212-C8	44.40	904212-C4	54.30
NEW	.187 (3/16)	.1875	**.030**	1.000 (5x)	3	3/16	3	829712	39.20	829712-C8	46.40		
	.187 (3/16)	.1875	**.060**	.562 (3x)	3	3/16	2	834812	37.20	834812-C8	44.40		
	.250 (1/4)	.2500	**.005**	.750 (3x)	3	1/4	2-1/2	901616	34.80	901616-C8	42.50		
	.250 (1/4)	.2500	**.010**	.375 (1.5x)	3	1/4	2-1/2	61816	31.10	61816-C8	38.80	61816-C4	50.50
	.250 (1/4)	.2500	**.010**	.750 (3x)	3	1/4	2-1/2	50116	31.10	50116-C8	38.80	50116-C4	50.50
	.250 (1/4)	.2500	**.010**	1.250 (5x)	3	1/4	4	53116	44.60	53116-C8	53.30	53116-C4	64.00
	.250 (1/4)	.2500	**.015**	.750 (3x)	3	1/4	2-1/2	912416	33.00	912416-C8	40.70		
NEW	.250 (1/4)	.2500	**.020**	.375 (1.5x)	3	1/4	2-1/2	889516	33.00	889516-C8	40.70		
NEW	.250 (1/4)	.2500	**.020**	.750 (3x)	3	1/4	2-1/2	925916	33.00	925916-C8	40.70	925916-C4	52.40
	.250 (1/4)	.2500	**.030**	.375 (1.5x)	3	1/4	2-1/2	893916	33.00	893916-C8	40.70		
	.250 (1/4)	.2500	**.030**	.750 (3x)	3	1/4	2-1/2	904216	33.00	904216-C8	40.70		
	.250 (1/4)	.2500	**.060**	.750 (3x)	3	1/4	2-1/2	834816	33.00	834816-C8	40.70		
	.375 (3/8)	.3750	**.015**	1.125 (3x)	3	3/8	2-1/2	912424	54.30	912424-C8	74.20		
	.375 (3/8)	.3750	**.030**	1.125 (3x)	3	3/8	2-1/2	904224	54.30	904224-C8	74.20		

SPEEDS & FEEDS (Variable Helix for Aluminum & Non-Ferrous Alloys)

Important Note: Values in table are in inches and are based on standard (3x Dia) length of cut end mills. For 2 flutes, table values of IPT must be increased to 110% before adjustments for different lengths of cut. For shorter lengths of cut, table values of IPT must be increased (for 0.8x, increase to 125%; for 1.5x, increase to 115%). For longer lengths of cut, table values of IPT must be reduced (for 4x, reduce to 85%; for 5x, reduce to 70%). For complete speeds and feeds charts, please see www.harveytool.com

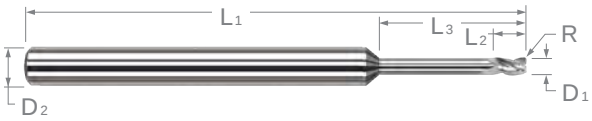
Cutter Series	Material	SFM	Chip Load Per Tooth (IPT) By Cutter Diameter	.015	.031	.047	.062	.078	.093	.125	.187	.250
Uncoated	**Aluminum Alloys:** Casting (2xx, 5xx, 7xx, 8xx)	750	Slotting	.00020	.00041	.00062	.00082	.00103	.00123	.00165	.00247	.00330
	Wrought (1xxx, 2xxx, 3xxx, 5xxx, 6xxx, 7xxx, 8xxx)	1000	Roughing	.00023	.00048	.00072	.00095	.00120	.00143	.00193	.00288	.00385
	Magnesium Alloys: All alloys	1500	Finishing	.00025	.00051	.00078	.00102	.00129	.00153	.00206	.00309	.00413
	Zinc Alloys: All alloys	800	Max	.00026	.00055	.00083	.00109	.00137	.00164	.00220	.00329	.00440
	Copper Alloys: High Coppers - 90%+ (C1xxxx)	225	Slotting	.00016	.00033	.00050	.00065	.00082	.00098	.00132	.00197	.00264
	Brass (Copper Zinc alloys, C2xxxx, C3xxxx, C4xxxx)	500	Roughing	.00018	.00038	.00058	.00076	.00096	.00115	.00154	.00230	.00308
	Phosphor Bronzes (Copper Tin alloys, C5xxxx)	225	Finishing	.00020	.00041	.00062	.00082	.00103	.00123	.00165	.00247	.00330
	Aluminum Bronzes (Copper Aluminum alloys, C60600-C64200)	500	Max	.00021	.00044	.00066	.00087	.00110	.00131	.00176	.00263	.00352
	Silicon Bronzes (Copper Silicon alloys, C64700-C66100)	500			**Radial Depth of Cut*:** Slotting: 1x Dia; Roughing: .5x Dia; Finishing: .1x Dia				**Axial Depth of Cut*:** Slotting: .5x Dia; Roughing: .5x - 1x Dia; Finishing: .5x - 1x Dia			
	Copper Nickels, Nickel Silvers (Copper Nickel alloys, C7xxxx)	225										
	Cast Copper Alloys (C83300-C86200, C86400-C87900, C92200-C95800, C97300-C97800, C99400-C99700)	550										
TiB$_2$	**Aluminum:** Casting (2xx, 5xx, 7xx, 8xx)	1000	Slotting	.00026	.00053	.00081	.00106	.00134	.00160	.00215	.00321	.00429
	Wrought (1xxx, 2xxx, 3xxx, 5xxx, 6xxx, 7xxx, 8xxx)	1400	Roughing	.00030	.00062	.00094	.00124	.00156	.00186	.00250	.00374	.00501
	Magnesium Alloys: All alloys	2000	Finishing	.00032	.00066	.00101	.00133	.00167	.00199	.00268	.00401	.00536
	Zinc Alloys: All alloys	1100	Max	.00034	.00071	.00108	.00142	.00178	.00213	.00286	.00428	.00572
					Radial Depth of Cut*: Slotting: 1x Dia; Roughing: .5x Dia; Finishing: .1x Dia				**Axial Depth of Cut*:** Slotting: .5x Dia; Roughing: .5x - 1x Dia; Finishing: .5x - 1x Dia			
Amorphous Diamond	**Aluminum (High Silicon):** Casting - 3% - 5% Si (3xx, A3xx, C3xx, 4xx, A4xx, B4xx)	2500	Slotting	.00022	.00045	.00068	.00090	.00113	.00135	.00182	.00272	.00363
	Casting - 5% - 8% Si (3xx, A3xx, C3xx, 4xx, A4xx, B4xx)	2000	Roughing	.00025	.00053	.00080	.00105	.00132	.00158	.00212	.00317	.00424
	Casting - 8% - 12% Si (3xx, A3xx, C3xx, 4xx, A4xx, B4xx)	1500	Finishing	.00027	.00056	.00085	.00113	.00142	.00169	.00227	.00339	.00454
	Casting - 12% - 16% Si (3xx, A3xx, C3xx, 4xx, A4xx, B4xx)	1000	Max	.00029	.00060	.00091	.00120	.00151	.00180	.00242	.00362	.00484
	Wrought - 5% - 8% Si (4xxx)	2200										
	Wrought - 8% - 12% Si (4xxx)	1700										
	Copper Alloys: High Coppers - 90%+ (C1xxxx)	800	Slotting	.00017	.00036	.00055	.00072	.00091	.00108	.00145	.00217	.00290
	Brass (Copper Zinc alloys, C2xxxx, C3xxxx, C4xxxx)	1500	Roughing	.00020	.00042	.00064	.00084	.00106	.00126	.00169	.00253	.00339
	Phosphor Bronzes (Copper Tin alloys, C5xxxx)	800	Finishing	.00022	.00045	.00068	.00090	.00113	.00135	.00182	.00272	.00363
	Aluminum Bronzes (Copper Aluminum alloys, C60600-C64200)	1000	Max	.00023	.00048	.00073	.00096	.00121	.00144	.00194	.00290	.00387
	Silicon Bronzes (Copper Silicon alloys, C64700-C66100)	1000			**Radial Depth of Cut*:** Slotting: 1x Dia; Roughing: .4x Dia; Finishing: .1x Dia				**Axial Depth of Cut*:** Slotting: .4x Dia; Roughing: .3x - .8x Dia; Finishing: .5x - 1x Dia			
	Copper Nickels, Nickel Silvers (Copper Nickel alloys, C7xxxx)	800										
	Cast Copper Alloys (C80100-C82800, C86300, C90200-C91700, C96200-C96600, C99300)	150										
	Cast Copper Alloys (C83300-C86200, C86400-C87900, C92200-C95800, C97300-C97800, C99400-C99700)	750										

* If less than minimum Axial or Radial DOC values are used, increased feed rates are possible. If greater than maximum Axial and Radial DOC values are used, decreased feed rates may be needed.

NEW SIZES!

VARIABLE HELIX END MILLS FOR ALUMINUM ALLOYS

Corner Radius – Long Reach, Stub Flute



- Optimized for aluminum and aluminum alloys with excellent performance in copper, brass, and bronze alloys
- Long reach design for deep cavities
- Reduced neck diameter to avoid heeling
- Variable helix design (approx. 42°) reduces chatter and harmonics and increases material removal rates
- Small corner radius for improved strength
- 3 flutes
- h6 shank tolerance for high precision tool holders
- Center cutting
- Solid carbide
- CNC ground in the USA

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CUTTER DIAMETER			CORNER RADIUS	LENGTH OF CUT	OVERALL REACH	FLUTES	SHANK DIA.	OAL	UNCOATED		TiB2 COATED	
D1 +.0005″ −.0005″	+.00mm −.02mm	decimal equivalent	R +.001″ −.001″ +.025mm −.025mm	L2 +.010″ −.000″ +.25mm −.00mm	L3 +.010″ −.000″ +.25mm −.00mm		D2 (h6)	L1	3 FL	PRICE	3 FL	PRICE
.015 (1/64)		.0150	**.002**	.023	.078 (5x)	3	1/8	2-1/2	956515	52.50	956515-C8	59.70
.015 (1/64)		.0150	**.002**	.023	.125 (8x)	3	1/8	2-1/2	961315	53.70	961315-C8	60.90
.020		.0200	**.002**	.030	.100 (5x)	3	1/8	2-1/2	956520	49.80	956520-C8	57.00
.025		.0250	**.002**	.038	.125 (5x)	3	1/8	2-1/2	956525	48.50	956525-C8	55.70
.031 (1/32)		.0310	**.003**	.047	.156 (5x)	3	1/8	2-1/2	956531	45.30	956531-C8	52.50
.031 (1/32)		.0310	**.003**	.047	.250 (8x)	3	1/8	2-1/2	961331	46.50	961331-C8	53.70
.031 (1/32)		.0310	**.003**	.047	.312 (10x)	3	1/8	2-1/2	861031	50.00	861031-C8	57.20
.031 (1/32)		.0310	**.003**	.047	.375 (12x)	3	1/8	2-1/2	949631	51.30	949631-C8	58.50
.031 (1/32)		.0310	**.010**	.047	.250 (8x)	3	1/8	2-1/2	876231	46.50	876231-C8	53.70
	1.0 mm	.0393	**.08 mm**	1.50 mm	5.0 mm (5x)	3	4 mm	50 mm	907622	50.00	907622-C8	57.50
.040		.0400	**.003**	.060	.203 (5x)	3	1/8	2-1/2	956540	45.60	956540-C8	52.80
.040		.0400	**.003**	.060	.325 (8x)	3	1/8	2-1/2	961340	46.50	961340-C8	53.70
.047 (3/64)		.0470	**.003**	.071	.250 (5x)	3	1/8	2-1/2	956547	45.30	956547-C8	52.50
.047 (3/64)		.0470	**.003**	.071	.375 (8x)	3	1/8	2-1/2	961347	46.50	961347-C8	53.70
.047 (3/64)		.0470	**.003**	.071	.570 (12x)	3	1/8	2-1/2	949647	51.30	949647-C8	58.50
.047 (3/64)		.0470	**.010**	.071	.375 (8x)	3	1/8	2-1/2	876247	46.50	876247-C8	53.70
.062 (1/16)		.0620	**.005**	.093	.312 (5x)	3	1/8	2-1/2	956562	45.30	956562-C8	52.50
.062 (1/16)		.0620	**.005**	.093	.500 (8x)	3	1/8	2-1/2	961362	46.50	961362-C8	53.70
.062 (1/16)		.0620	**.005**	.093	.625 (10x)	3	1/8	2-1/2	861062	50.00	861062-C8	57.20
.062 (1/16)		.0620	**.005**	.093	.750 (12x)	3	1/8	2-1/2	949662	51.30	949662-C8	58.50
.062 (1/16)		.0620	**.005**	.093	.950 (15x)	3	1/8	2-1/2	886862	51.30	886862-C8	58.50
.062 (1/16)		.0620	**.010**	.093	.500 (8x)	3	1/8	2-1/2	876262	46.50	876262-C8	53.70
.078 (5/64)		.0780	**.005**	.118	.406 (5x)	3	1/8	2-1/2	956578	45.30	956578-C8	52.50
.078 (5/64)		.0780	**.005**	.118	.625 (8x)	3	1/8	2-1/2	961378	46.50	961378-C8	53.70
.078 (5/64)		.0780	**.005**	.118	.940 (12x)	3	1/8	2-1/2	949678	51.30	949678-C8	58.50
.078 (5/64)		.0780	**.010**	.118	.625 (8x)	3	1/8	2-1/2	876278	46.50	876278-C8	53.70
	2.0 mm	.0787	**.10 mm**	3.00 mm	10.0 mm (5x)	3	4 mm	50 mm	907645	50.00	907645-C8	57.50
.093 (3/32)		.0930	**.005**	.140	.500 (5x)	3	1/8	2-1/2	956593	45.30	956593-C8	52.50
.093 (3/32)		.0930	**.005**	.140	.750 (8x)	3	1/8	2-1/2	961393	46.50	961393-C8	53.70
.093 (3/32)		.0930	**.005**	.140	.950 (10x)	3	1/8	2-1/2	861093	50.00	861093-C8	57.20
.093 (3/32)		.0930	**.005**	.140	1.125 (12x)	3	1/8	2-1/2	949693	51.30	949693-C8	58.50
.093 (3/32)		.0930	**.005**	.140	1.400 (15x)	3	1/8	3	886893	53.90	886893-C8	61.10
.093 (3/32)		.0930	**.010**	.140	.750 (8x)	3	1/8	2-1/2	876293	46.50	876293-C8	53.70
.093 (3/32)		.0930	**.030**	.140	.500 (5x)	3	1/8	2-1/2	761093	45.30	761093-C8	52.50 NEW
.093 (3/32)		.0930	**.030**	.140	.750 (8x)	3	1/8	2-1/2	891893	46.50	891893-C8	53.70
	3.0 mm	.1181	**.10 mm**	4.50 mm	15.0 mm (5x)	3	4 mm	50 mm	907657	47.10	907657-C8	54.60

D1 +.000″ −.002″	decimal equivalent	R +.001″ −.001″	L2 +.030″ −.000″	L3 +.030″ −.000″		D2 (h6)	L1	3 FL	PRICE	3 FL	PRICE
.125 (1/8)	.1250	**.005**	.187	.625 (5x)	3	1/8	2-1/2	956608	44.60	956608-C8	51.80
.125 (1/8)	.1250	**.005**	.187	1.000 (8x)	3	1/8	2-1/2	961408	45.60	961408-C8	52.80

continued on next page

NEW SIZES!

VARIABLE HELIX END MILLS FOR ALUMINUM ALLOYS

Corner Radius – Long Reach, Stub Flute (cont.)

mm & in

continued from previous page

	CUTTER DIAMETER		CORNER RADIUS	LENGTH OF CUT	OVERALL REACH	FLUTES	SHANK DIA.	OAL	UNCOATED		TiB2 COATED	
	D_1 +.000″ −.002″	decimal equivalent	R +.001″ −.001″	L_2 +.030″ −.000″	L_3 +.030″ −.000″		D_2 (h6)	L_1	3 FL	PRICE	3 FL	PRICE
	.125 (1/8)	.1250	**.005**	.187	1.250 (10x)	3	1/8	2-1/2	861108	48.10	861108-C8	55.30
	.125 (1/8)	.1250	**.005**	.187	1.500 (12x)	3	1/8	3	949708	49.30	949708-C8	56.50
	.125 (1/8)	.1250	**.005**	.187	1.875 (15x)	3	1/8	3	886908	51.90	886908-C8	59.10
	.125 (1/8)	.1250	**.010**	.187	1.000 (8x)	3	1/8	2-1/2	876308	45.60	876308-C8	52.80
	.125 (1/8)	.1250	**.030**	.187	1.000 (8x)	3	1/8	2-1/2	891908	45.60	891908-C8	52.80
	.156 (5/32)	.1562	**.005**	.235	.750 (5x)	3	3/16	3	956610	50.10	956610-C8	57.30
	.156 (5/32)	.1562	**.005**	.235	1.250 (8x)	3	3/16	3	961410	51.50	961410-C8	58.70
	.187 (3/16)	.1875	**.005**	.285	1.000 (5x)	3	3/16	3	956612	50.10	956612-C8	57.30
	.187 (3/16)	.1875	**.005**	.285	1.500 (8x)	3	3/16	3	961412	51.50	961412-C8	58.70
	.187 (3/16)	.1875	**.005**	.285	2.250 (12x)	3	3/16	4	949712	64.20	949712-C8	71.90
NEW	.187 (3/16)	.1875	**.030**	.285	1.000 (5x)	3	3/16	3	761112	50.10	761112-C8	57.30
NEW	.187 (3/16)	.1875	**.030**	.285	1.500 (8x)	3	3/16	3	891912	51.50	891912-C8	58.70
	.250 (1/4)	.2500	**.010**	.375	1.250 (5x)	3	1/4	4	956616	52.50	956616-C8	61.20
	.250 (1/4)	.2500	**.010**	.375	2.000 (8x)	3	1/4	4	961416	53.50	961416-C8	62.20
	.250 (1/4)	.2500	**.010**	.375	3.000 (12x)	3	1/4	6	949716	67.50	949716-C8	79.90
NEW	.250 (1/4)	.2500	**.030**	.375	1.250 (5x)	3	1/4	4	761116	52.50	761116-C8	61.20
NEW	.250 (1/4)	.2500	**.030**	.375	2.000 (8x)	3	1/4	4	891916	53.50	891916-C8	62.20

SPEEDS & FEEDS (Variable Helix – Long Reach, Stub Flute for Aluminum Alloys)

Important Note: Values in table are in inches and are based on reached (8x Dia) end mills. For shorter reaches, table values of IPT must be increased (for 3x, increase to 135%; for 5x, increase to 125%). For longer reaches, table values of IPT and DOC must be reduced (for 10x, reduce to 90%; for 12x, reduce to 80%). For complete speeds and feeds charts, please see www.harveytool.com.

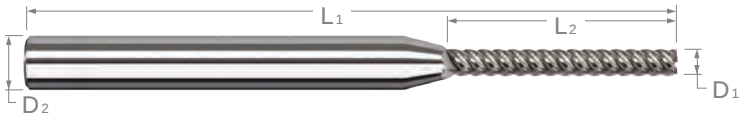
Cutter Series	Material	SFM		Chip Load Per Tooth (IPT) By Cutter Diameter								
				.015	.031	.047	.062	.078	.093	.125	.187	.250
Uncoated	**Aluminum Alloys:** Casting (2xx, 5xx, 7xx, 8xx)	750	Slotting	.00016	.00033	.00050	.00065	.00082	.00098	.00132	.00197	.00264
	Wrought (1xxx, 2xxx, 3xxx, 5xxx, 6xxx, 7xxx, 8xxx)	1000	Roughing	.00018	.00038	.00058	.00076	.00096	.00115	.00154	.00230	.00308
	Magnesium Alloys: All alloys	1500	Finishing	.00020	.00041	.00062	.00082	.00103	.00123	.00165	.00247	.00330
	Zinc Alloys: All alloys	800	Max	.00021	.00044	.00066	.00087	.00110	.00131	.00176	.00263	.00352
	Copper Alloys: High Coppers - 90%+ (C1xxxx)	225	Slotting	.00013	.00026	.00040	.00052	.00066	.00079	.00106	.00158	.00211
	Brass (Copper Zinc alloys, C2xxxx, C3xxxx, C4xxxx, C66400-C69800)	500	Roughing	.00015	.00031	.00046	.00061	.00077	.00092	.00123	.00184	.00246
			Finishing	.00016	.00033	.00050	.00065	.00082	.00098	.00132	.00197	.00264
	Phosphor Bronzes (Copper Tin alloys, C5xxxx)	225	Max	.00017	.00035	.00053	.00070	.00088	.00105	.00141	.00211	.00282
	Aluminum Bronzes (Copper Aluminum alloys, C60600-C64200)	500	**Radial Depth of Cut*:** Slotting: 1x Dia; Roughing: .4x Dia; Finishing: .1x Dia — **Axial Depth of Cut*:** Slotting: .4x Dia; Roughing: .5x - 1x Dia; Finishing: .5x - 1x Dia									
	Silicon Bronzes (Copper Silicon alloys, C64700-C66100)	500										
	Copper Nickels, Nickel Silvers (Copper Nickel alloys, C7xxxx)	225										
	Cast Copper Alloys (C83300-C86200, C86400-C87900, C92200-C95800, C97300-C97800, C99400-C99700)	550										
TiB2	**Aluminum:** Casting (2xx, 5xx, 7xx, 8xx)	1000	Slotting	.00021	.00043	.00065	.00085	.00107	.00128	.00172	.00257	.00343
	Wrought (1xxx, 2xxx, 3xxx, 5xxx, 6xxx, 7xxx, 8xxx)	1400	Roughing	.00024	.00050	.00075	.00099	.00125	.00149	.00200	.00299	.00400
	Magnesium Alloys: All alloys	2000	Finishing	.00026	.00053	.00081	.00106	.00134	.00160	.00215	.00321	.00429
	Zinc Alloys: All alloys	1100	Max	.00027	.00057	.00086	.00113	.00143	.00170	.00229	.00342	.00458
			Radial Depth of Cut*: Slotting: 1x Dia; Roughing: .4x Dia; Finishing: .1x Dia — **Axial Depth of Cut*:** Slotting: .4x Dia; Roughing: .5x - 1x Dia; Finishing: .5x - 1x Dia									
Amorphous Diamond	**Aluminum (High Silicon):** Casting - 3% - 5% Si (3xx, A3xx, C3xx, 4xx, A4xx, B4xx)	2500	Slotting	.00017	.00036	.00055	.00072	.00091	.00108	.00145	.00217	.00290
	Casting - 5% - 8% Si (3xx, A3xx, C3xx, 4xx, A4xx, B4xx)	2000	Roughing	.00020	.00042	.00064	.00084	.00106	.00126	.00169	.00253	.00339
	Casting - 8% - 12% Si (3xx, A3xx, C3xx, 4xx, A4xx, B4xx)	1500	Finishing	.00022	.00045	.00068	.00090	.00113	.00135	.00182	.00272	.00363
	Casting - 12% - 16% Si (3xx, A3xx, C3xx, 4xx, A4xx, B4xx)	1000	Max	.00023	.00048	.00073	.00096	.00121	.00144	.00194	.00290	.00387
	Wrought - 5% - 8% Si (4xxx)	2200										
	Wrought - 8% - 12% Si (4xxx)	1700										
	Copper Alloys: High Coppers - 90%+ (C1xxxx)	800	Slotting	.00014	.00029	.00044	.00058	.00072	.00086	.00116	.00174	.00232
	Brass (Copper Zinc alloys, C2xxxx, C3xxxx, C4xxxx, C66400-C69800)	1500	Roughing	.00016	.00034	.00051	.00067	.00085	.00101	.00136	.00203	.00271
			Finishing	.00017	.00036	.00055	.00072	.00091	.00108	.00145	.00217	.00290
	Phosphor Bronzes (Copper Tin alloys, C5xxxx)	800	Max	.00019	.00038	.00058	.00077	.00097	.00115	.00155	.00232	.00310
	Aluminum Bronzes (Copper Aluminum alloys, C60600-C64200)	1000	**Radial Depth of Cut*:** Slotting: 1x Dia; Roughing: .3x Dia; Finishing: .1x Dia — **Axial Depth of Cut*:** Slotting: .3x Dia; Roughing: .3x - .8x Dia; Finishing: .5x - 1x Dia									
	Silicon Bronzes (Copper Silicon alloys, C64700-C66100)	1000										
	Copper Nickels, Nickel Silvers (Copper Nickel alloys, C7xxxx)	800										
	Cast Copper Alloys (C80100-C82800, C86300, C90200-C91700, C96200-C96600, C99300)	150										
	Cast Copper Alloys (C83300-C86200, C86400-C87900, C92200-C95800, C97300-C97800, C99400-C99700)	750										

* If less than minimum Axial or Radial DOC values are used, increased feed rates are possible. If greater than maximum Axial and Radial DOC values are used, decreased feed rates may be needed.

NEW SIZES!

VARIABLE HELIX END MILLS FOR ALUMINUM ALLOYS

Finishers – Square



- Optimized for aluminum and aluminum alloys with excellent performance in copper, brass, and bronze alloys
- Variable helix design (approx. 50°) reduces chatter and harmonics, improving finish
- High helix for effective chip evacuation
- h6 shank tolerance for high precision tool holders
- End cutting (not center cutting)
- Solid carbide
- CNC ground in the USA

mm & in

CUTTER DIAMETER			LENGTH OF CUT	FLUTES	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		TiB2 COATED	
D1 +.0005″ −.0005″	+.00mm −.02mm	decimal equivalent	L2 +.010″ −.000″ +.25mm −.00mm		D2 (h6)	L1	TOOL #	PRICE	TOOL #	PRICE
.015 (1/64)		.0150	**.078** (5x)	4	1/8	2-1/2	66715	47.30	66715-C8	54.50
.015 (1/64)		.0150	**.125** (8x)	4	1/8	2-1/2	67115	47.90	67115-C8	55.10
.020		.0200	**.100** (5x)	4	1/8	2-1/2	66720	46.00	66720-C8	53.20
.020		.0200	**.160** (8x)	4	1/8	2-1/2	67120	47.60	67120-C8	54.80
.025		.0250	**.125** (5x)	4	1/8	2-1/2	66725	44.80	66725-C8	52.00
.025		.0250	**.203** (8x)	4	1/8	2-1/2	67125	45.80	67125-C8	53.00
.031 (1/32)		.0310	**.093** (3x)	5	1/8	1-1/2	948831	30.50	948831-C8	37.70
.031 (1/32)		.0310	**.156** (5x)	5	1/8	2-1/2	66731	42.70	66731-C8	49.90
.031 (1/32)		.0310	**.250** (8x)	5	1/8	2-1/2	67131	43.90	67131-C8	51.10
.031 (1/32)		.0310	**.312** (10x)	5	1/8	2-1/2	917631	56.00	917631-C8	63.20
	1.0 mm	.0393	**5.00 mm** (5x)	5	4 mm	50 mm	915522	43.90	915522-C8	51.40
	1.0 mm	.0393	**8.00 mm** (8x)	5	4 mm	50 mm	907122	45.30	907122-C8	52.80
.040		.0400	**.203** (5x)	5	1/8	2-1/2	66740	42.70	66740-C8	49.90
.040		.0400	**.325** (8x)	5	1/8	2-1/2	67140	43.90	67140-C8	51.10
.047 (3/64)		.0470	**.141** (3x)	5	1/8	1-1/2	948847	30.50	948847-C8	37.70
.047 (3/64)		.0470	**.250** (5x)	5	1/8	2-1/2	66747	42.70	66747-C8	49.90
.047 (3/64)		.0470	**.375** (8x)	5	1/8	2-1/2	67147	43.90	67147-C8	51.10
.050		.0500	**.250** (5x)	5	1/8	2-1/2	66750	42.70	66750-C8	49.90
.050		.0500	**.400** (8x)	5	1/8	2-1/2	67150	43.90	67150-C8	51.10
.060		.0600	**.312** (5x)	5	1/8	2-1/2	66760	39.70	66760-C8	46.90
.060		.0600	**.500** (8x)	5	1/8	2-1/2	67160	40.90	67160-C8	48.10
.062 (1/16)		.0620	**.186** (3x)	5	1/8	1-1/2	948862	28.50	948862-C8	35.70
.062 (1/16)		.0620	**.312** (5x)	5	1/8	2-1/2	66762	39.70	66762-C8	46.90
.062 (1/16)		.0620	**.500** (8x)	5	1/8	2-1/2	67162	40.90	67162-C8	48.10
.062 (1/16)		.0620	**.625** (10x)	5	1/8	2-1/2	917662	60.10	917662-C8	67.30
.078 (5/64)		.0780	**.234** (3x)	5	1/8	1-1/2	948878	28.50	948878-C8	35.70
.078 (5/64)		.0780	**.406** (5x)	5	1/8	2-1/2	66778	39.70	66778-C8	46.90
.078 (5/64)		.0780	**.625** (8x)	5	1/8	2-1/2	67178	40.90	67178-C8	48.10
	2.0 mm	.0787	**10.00 mm** (5x)	5	4 mm	50 mm	915545	42.50	915545-C8	50.00
	2.0 mm	.0787	**16.00 mm** (8x)	5	4 mm	50 mm	907145	43.90	907145-C8	51.40
.093 (3/32)		.0930	**.279** (3x)	5	1/8	1-1/2	948893	28.50	948893-C8	35.70
.093 (3/32)		.0930	**.375** (4x)	5	1/8	2-1/2	829493	39.20	829493-C8	46.40
.093 (3/32)		.0930	**.500** (5x)	5	1/8	2-1/2	66793	39.70	66793-C8	46.90
.093 (3/32)		.0930	**.750** (8x)	5	1/8	2-1/2	67193	40.90	67193-C8	48.10
.093 (3/32)		.0930	**.950** (10x)	5	1/8	2-1/2	917693	60.10	917693-C8	67.30

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VARIABLE HELIX END MILLS FOR ALUMINUM ALLOYS

Finishers – Square (cont.)

mm & in

continued from previous page

CUTTER DIAMETER D_1 +.0005″ −.0005″	+.00mm −.02mm	decimal equivalent	LENGTH OF CUT L_2 +.010″ −.000″ +.25mm −.00mm	FLUTES	SHANK DIAMETER D_2 (h6)	OVERALL LENGTH L_1	UNCOATED TOOL #	UNCOATED PRICE	TiB_2 COATED TOOL #	TiB_2 COATED PRICE
.100		.1000	**.500** (5x)	5	1/8	2-1/2	66800	39.70	66800-C8	46.90
.100		.1000	**.800** (8x)	5	1/8	2-1/2	67200	40.90	67200-C8	48.10
.109 (7/64)		.1090	**.570** (5x)	5	1/8	2-1/2	66802	39.70	66802-C8	46.90
.109 (7/64)		.1090	**.900** (8x)	5	1/8	2-1/2	67202	40.90	67202-C8	48.10
	3.0 mm	.1181	**15.00 mm** (5x)	5	4 mm	50 mm	915557	42.50	915557-C8	50.00
	3.0 mm	.1181	**24.00 mm** (8x)	5	4 mm	50 mm	907157	43.90	907157-C8	51.40

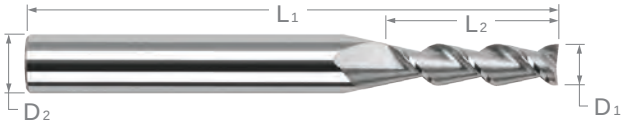
	D_1 +.000″ −.002″	decimal equivalent	L_2 +.030″ −.000″	FLUTES	D_2 (h6)	L_1	TOOL #	PRICE	TOOL #	PRICE
	.125 (1/8)	.1250	**.187** (1.5x)	5	1/8	1-1/2	856908	26.40	856908-C8	33.60
	.125 (1/8)	.1250	**.375** (3x)	5	1/8	1-1/2	948908	26.40	948908-C8	33.60
	.125 (1/8)	.1250	**.500** (4x)	5	1/8	2-1/2	829508	38.20	829508-C8	45.40
	.125 (1/8)	.1250	**.625** (5x)	5	1/8	2-1/2	66808	38.70	66808-C8	45.90
	.125 (1/8)	.1250	**1.000** (8x)	5	1/8	2-1/2	67208	40.10	67208-C8	47.30
	.125 (1/8)	.1250	**1.125** (10x)	5	1/8	2-1/2	917708	59.40	917708-C8	66.60
	.156 (5/32)	.1562	**.750** (5x)	5	3/16	3	66810	41.40	66810-C8	48.60
	.156 (5/32)	.1562	**1.250** (8x)	5	3/16	3	67210	43.10	67210-C8	50.30
	.187 (3/16)	.1875	**.285** (1.5x)	5	3/16	2	856912	31.10	856912-C8	38.30
	.187 (3/16)	.1875	**.570** (3x)	5	3/16	2	948912	31.10	948912-C8	38.30
	.187 (3/16)	.1875	**1.000** (5x)	5	3/16	3	66812	41.40	66812-C8	48.60
	.187 (3/16)	.1875	**1.500** (8x)	5	3/16	3	67212	43.10	67212-C8	50.30
	.187 (3/16)	.1875	**1.875** (10x)	5	3/16	4	917712	60.30	917712-C8	68.00
	.250 (1/4)	.2500	**.375** (1.5x)	5	1/4	2-1/2	856916	41.00	856916-C8	48.70
	.250 (1/4)	.2500	**.750** (3x)	5	1/4	2-1/2	948916	41.00	948916-C8	48.70
	.250 (1/4)	.2500	**1.250** (5x)	5	1/4	4	66816	50.50	66816-C8	59.20
	.250 (1/4)	.2500	**2.000** (8x)	5	1/4	4	67216	51.80	67216-C8	60.50
NEW	.375 (3/8)	.3750	**1.125** (3x)	5	3/8	2-1/2	948924	57.30	948924-C8	77.20
NEW	.500 (1/2)	.5000	**1.500** (3x)	5	1/2	3	948932	77.10	948932-C8	100.50

SPEEDS & FEEDS (High Helix Finishers for Aluminum & Non-Ferrous Alloys)

Cutter Series	Material	SFM		Chip Load Per Tooth (IPT) .015	.031	.047	.062	.078	.093	.125	.187	.250	Depth of Cut Radial	Axial
Uncoated	**Aluminum Alloys:** Casting (2xx, 5xx, 7xx, 8xx)	750	Finishing (3x LOC)	.00027	.00056	.00085	.00112	.00140	.00167	.00225	.00337	.00450	.12x Dia	.5x - 3x Dia
	Wrought (1xxx, 2xxx, 3xxx, 5xxx, 6xxx, 7xxx, 8xxx)	1000												
	Magnesium Alloys: All alloys	1500												
	Zinc Alloys: All alloys	800												
	Copper Alloys: High Coppers - 90%+ (C1xxxx)	225	Finishing (4x LOC)	.00024	.00049	.00074	.00098	.00123	.00146	.00197	.00295	.00394	.10x Dia	.5x - 4x Dia
	Brass (Copper Zinc alloys, C2xxxx, C3xxxx, C4xxxx, C66400-C69800)	500												
	Phosphor Bronzes (Copper Tin alloys, C5xxxx)	225	Finishing (5x LOC)	.00020	.00042	.00063	.00084	.00105	.00126	.00169	.00252	.00338	.09x Dia	.5x - 5x Dia
	Aluminum Bronzes (Copper Aluminum alloys, C60600-C64200)	500												
	Silicon Bronzes (Copper Silicon alloys, C64700-C66100)	500	Finishing (8x LOC)	.00015	.00031	.00047	.00061	.00077	.00092	.00124	.00185	.00248	.07x Dia	.5x - 8x Dia
	Copper Nickels, Nickel Silvers (Copper Nickel alloys, C7xxxx)	225												
	Cast Copper Alloys (C83300-C86200, C86400-C87900, C92200-C95800, C97300-C97800, C99400-C99700)	550	Finishing (10x LOC)	.00014	.00029	.00044	.00058	.00073	.00087	.00117	.00175	.00234	.05x Dia	.5x - 10x Dia
TiB_2	**Aluminum:** Casting (2xx, 5xx, 7xx, 8xx)	1000	Finishing (3x LOC)	.00035	.00073	.00110	.00145	.00183	.00218	.00293	.00438	.00585	.12x Dia	.5x - 3x Dia
			Finishing (4x LOC)	.00031	.00063	.00096	.00127	.00160	.00190	.00256	.00383	.00512	.10x Dia	.5x - 4x Dia
	Wrought (1xxx, 2xxx, 3xxx, 5xxx, 6xxx, 7xxx, 8xxx)	1400	Finishing (5x LOC)	.00026	.00054	.00082	.00109	.00137	.00163	.00219	.00328	.00439	.09x Dia	.5x - 5x Dia
	Magnesium Alloys: All alloys	2000	Finishing (8x LOC)	.00019	.00040	.00060	.00080	.00100	.00120	.00161	.00241	.00322	.07x Dia	.5x - 8x Dia
	Zinc Alloys: All alloys	1100	Finishing (10x LOC)	.00018	.00038	.00057	.00075	.00095	.00113	.00152	.00228	.00304	.05x Dia	.5x - 10x Dia

HIGH HELIX END MILLS FOR ALUMINUM ALLOYS

45° Helix – Square



◄ *Down to .010"!*

- 2 flute, high helix design improves results in aluminum and other non-ferrous applications
- 45° helix for faster chip removal and better finish
- h6 shank tolerance for high precision tool holders
- Center cutting
- Solid carbide
- CNC ground in the USA

OUTSTANDING IN ALUMINUM!

CUTTER DIAMETER	LENGTH OF CUT	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		ZrN COATED		TiB_2 COATED	
D_1 +.0005" −.0005"	L_2 +.010" −.000"	D_2 (h6)	L_1	2 FL	PRICE	2 FL	PRICE	2 FL	PRICE
.010	**.030** (3x)	1/8	1-1/2	24110	30.80			24110-C8	38.00
.015 (1/64)	**.045** (3x)	1/8	1-1/2	24115	30.00			24115-C8	37.20
.020	**.060** (3x)	1/8	1-1/2	24120	28.20			24120-C8	35.40
.025	**.075** (3x)	1/8	1-1/2	24125	26.20			24125-C8	33.40
.030	**.090** (3x)	1/8	1-1/2	24130	22.70			24130-C8	29.90
.031 (1/32)	**.047** (1.5x)	1/8	1-1/2	935531	22.70			935531-C8	29.90
.031 (1/32)	**.093** (3x)	1/8	1-1/2	24131	22.70	24131-C7	28.30	24131-C8	29.90
.031 (1/32)	**.156** (5x)	1/8	2-1/2	932031	29.20			932031-C8	36.40
.039 (1 mm)	**.117** (3x)	1/8	1-1/2	24139	22.70			24139-C8	29.90
.040	**.120** (3x)	1/8	1-1/2	24140	22.70	24140-C7	28.30	24140-C8	29.90
.040	**.203** (5x)	1/8	2-1/2	932040	29.20			932040-C8	36.40
.047 (3/64)	**.071** (1.5x)	1/8	1-1/2	935547	22.70			935547-C8	29.90
.047 (3/64)	**.141** (3x)	1/8	1-1/2	24147	22.70	24147-C7	28.30	24147-C8	29.90
.047 (3/64)	**.250** (5x)	1/8	2-1/2	932047	29.20			932047-C8	36.40
.050	**.150** (3x)	1/8	1-1/2	24150	22.70	24150-C7	28.30	24150-C8	29.90
.050	**.250** (5x)	1/8	2-1/2	932050	29.20			932050-C8	36.40
.060	**.180** (3x)	1/8	1-1/2	24160	22.70	24160-C7	28.30	24160-C8	29.90
.060	**.312** (5x)	1/8	2-1/2	932060	30.20			932060-C8	37.40
.062 (1/16)	**.093** (1.5x)	1/8	1-1/2	935562	19.90			935562-C8	27.10
.062 (1/16)	**.186** (3x)	1/8	1-1/2	24162	19.90	24162-C7	25.50	24162-C8	27.10
.062 (1/16)	**.250** (4x)	1/8	2-1/2	789662	30.20			789662-C8	37.40
.062 (1/16)	**.312** (5x)	1/8	2-1/2	932062	30.20			932062-C8	37.40
.070	**.210** (3x)	1/8	1-1/2	24170	19.90	24170-C7	25.50	24170-C8	27.10
.078 (5/64)	**.117** (1.5x)	1/8	1-1/2	935578	19.90			935578-C8	27.10
.078 (5/64)	**.234** (3x)	1/8	1-1/2	24178	19.90	24178-C7	25.50	24178-C8	27.10
.078 (5/64)	**.406** (5x)	1/8	2-1/2	932078	30.20			932078-C8	37.40
.080	**.240** (3x)	1/8	1-1/2	24180	19.90	24180-C7	25.50	24180-C8	27.10
.090	**.270** (3x)	1/8	1-1/2	24190	19.90	24190-C7	25.50	24190-C8	27.10
.093 (3/32)	**.140** (1.5x)	1/8	1-1/2	935593	19.90			935593-C8	27.10
.093 (3/32)	**.279** (3x)	1/8	1-1/2	24193	19.90	24193-C7	25.50	24193-C8	27.10
.093 (3/32)	**.375** (4x)	1/8	2-1/2	789693	30.20			789693-C8	37.40
.093 (3/32)	**.500** (5x)	1/8	2-1/2	932093	30.20			932093-C8	37.40
.100	**.300** (3x)	1/8	1-1/2	24199	19.90	24199-C7	25.50	24199-C8	27.10
.109 (7/64)	**.327** (3x)	1/8	1-1/2	24202	30.00			24202-C8	37.20
.118 (3 mm)	**.354** (3x)	1/8	1-1/2	24205	29.80			24205-C8	37.00

continued on next page

HIGH HELIX END MILLS FOR ALUMINUM ALLOYS

45° Helix – Square (cont.)

continued from previous page

CUTTER DIAMETER	LENGTH OF CUT	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		ZrN COATED		TiB_2 COATED	
D_1 $^{+.000''}_{-.002''}$	L_2 $^{+.030''}_{-.000''}$	D_2 (h6)	L_1	2 FL	PRICE	2 FL	PRICE	2 FL	PRICE
.125 (1/8)	**.187** (1.5x)	1/8	1-1/2	935608	18.10			935608-C8	25.30
.125 (1/8)	**.500** (4x)	1/8	1-1/2	24208	18.10	24208-C7	23.70	24208-C8	25.30
.125 (1/8)	**.625** (5x)	1/8	2-1/2	932108	24.80			932108-C8	32.00
.140 (9/64)	**.500** (3x)	3/16	2	24209	24.20			24209-C8	31.40
.156 (5/32)	**.235** (1.5x)	3/16	2	935610	20.40			935610-C8	27.60
.156 (5/32)	**.562** (3x)	3/16	2	24210	20.40			24210-C8	27.60
.156 (5/32)	**.750** (5x)	3/16	3	932110	24.30			932110-C8	31.50
.187 (3/16)	**.285** (1.5x)	3/16	2	935612	20.40			935612-C8	27.60
.187 (3/16)	**.625** (3x)	3/16	2	24212	20.40	24212-C7	26.40	24212-C8	27.60
.187 (3/16)	**1.000** (5x)	3/16	3	932112	24.30			932112-C8	31.50
.250 (1/4)	**.375** (1.5x)	1/4	2-1/2	935616	25.20			935616-C8	32.90
.250 (1/4)	**.750** (3x)	1/4	2-1/2	24216	25.20	24216-C7	33.80	24216-C8	32.90
.250 (1/4)	**1.250** (5x)	1/4	4	932116	30.40			932116-C8	39.10

SPEEDS & FEEDS (45° Helix – 2 Flutes)

Important Note: ValmportantNote: Values in table are in inches and are based on standard (3c Dia) length of cut end mills. for shorter lengths of cuts, table values of IPT must be increased (for 1.5x, increase to 110%). For longer lengths of cut, table values of IPT must be reduced (for 4x, reduce to 90%; for 5x, reduce to 80%), For complete speeds and feeds charts, please see www.harveytool.com

SERIES	MATERIAL	SFM
Uncoated	**Aluminum Alloys:**	
	Casting (2xx, 5xx, 7xx, 8xx)	750
	Wrought (1xxx, 2xxx, 3xxx, 5xxx, 6xxx, 7xxx, 8xxx)	1000
	Copper Alloys:	
	High Coppers - 90%+ (C1xxxx)	225
	Brass (Copper Zinc alloys, C2xxxx, C3xxxx, C4xxxx, C66400-C69800)	500
	Phosphor Bronzes (Copper Tin alloys, C5xxxx)	225
	Aluminum Bronzes (Copper Aluminum alloys, C60600-C64200)	500
	Silicon Bronzes (Copper Silicon alloys, C64700-C66100)	500
	Copper Nickels, Nickel Silvers (Copper Nickel alloys, C7xxxx)	225
	Cast Copper Alloys (C83300-C86200, C86400-C87900, C92200-C95800, C97300-C97800, C99400-C99700)	550
	Magnesium Alloys	1500
	Zinc Alloys	800
ZrN	**Aluminum Alloys (High Silicon):**	
	Casting - 3% - 5% Si (3xx, A3xx, C3xx, 4xx, A4xx, B4xx)	2500
	Casting - 5% - 8% Si (3xx, A3xx, C3xx, 4xx, A4xx, B4xx)	2000
	Casting - 8% - 12% Si (3xx, A3xx, C3xx, 4xx, A4xx, B4xx)	1500
	Casting - 12% - 16% Si (3xx, A3xx, C3xx, 4xx, A4xx, B4xx)	1000
	Wrought - 5% - 8% Si (4xxx)	2200
	Wrought - 8% - 12% Si (4xxx)	1700
	Copper Alloys:	
	High Coppers - 90%+ (C1xxxx)	800
	Brass (Copper Zinc alloys, C2xxxx, C3xxxx, C4xxxx, C66400-C69800)	1500
	Phosphor Bronzes (Copper Tin alloys, C5xxxx)	800
	Aluminum Bronzes (Copper Aluminum alloys, C60600-C64200)	1000
	Silicon Bronzes (Copper Silicon alloys, C64700-C66100)	1000
	Copper Nickels, Nickel Silvers (Copper Nickel alloys, C7xxxx)	800
	Cast Copper Alloys (C80100-C82800, C86300, C90200-C91700, C96200-C96600, C99300)	150
	Cast Copper Alloys (C83300-C86200, C86400-C87900, C92200-C95800, C97300-C97800, C99400-C99700)	750
	Magnesium Alloys	2000
	Zinc Alloys	1100
TiB_2	**Aluminum Alloys:**	
	Casting (2xx, 5xx, 7xx, 8xx)	1000
	Wrought (1xxx, 2xxx, 3xxx, 5xxx, 6xxx, 7xxx, 8xxx)	1400
	Magnesium Alloys	2000
	Zinc Alloys	1100

CHIP LOAD PER TOOTH (IPT) BY CUTTER DIAMETER

	.031	.047	.062	.078	.093	.125	.187	.250
Slotting	.00031	.00047	.00062	.00078	.00093	.00125	.00187	.00250
Roughing	.00037	.00056	.00074	.00094	.00112	.00150	.00224	.00300
Finishing	.00025	.00038	.00050	.00062	.00074	.00100	.00150	.00200

Radial Depth of Cut*:
Slotting: 1x Dia
Roughing: .5x Dia
Finishing: .1x Dia

Axial Depth of Cut*:
Slotting: .5x Dia
Roughing: .5x - 1x Dia
Finishing: 1x - 3x Dia

CHIP LOAD PER TOOTH (IPT) BY CUTTER DIAMETER

	.031	.047	.062	.078	.093	.125	.187	.250
Slotting	.00039	.00059	.00078	.00098	.00116	.00156	.00234	.00313
Roughing	.00042	.00063	.00084	.00105	.00126	.00169	.00252	.00338
Finishing	.00031	.00047	.00062	.00078	.00093	.00125	.00187	.00250

Radial Depth of Cut*:
Slotting: 1x Dia
Roughing: .5x Dia
Finishing: .1x Dia

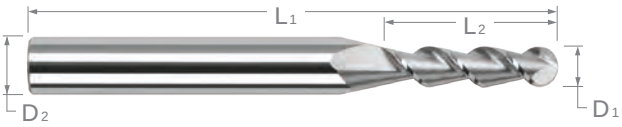
Axial Depth of Cut*:
Slotting: .5x Dia
Roughing: .5x - 1x Dia
Finishing: 1x - 3x Dia

View a comprehensive library of **Speeds & Feeds** charts for every Harvey Tool End Mill on the new Harveytool.com.

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HIGH HELIX END MILLS FOR ALUMINUM ALLOYS

45° Helix – Ball



- 2 flute, high helix design improves results in aluminum and other non-ferrous applications
- 45° helix for faster chip removal and better finish
- h6 shank tolerance for high precision tool holders
- Center cutting
- Solid carbide
- CNC ground in the USA

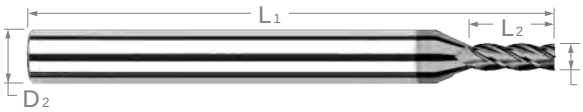
OUTSTANDING IN ALUMINUM!

CUTTER DIAMETER	LENGTH OF CUT	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		ZrN COATED		TiB_2 COATED	
D_1 $^{+.0005''}_{-.0005''}$	L_2 $^{+.010''}_{-.000''}$	D_2 (h6)	L_1	2 FL	PRICE	2 FL	PRICE	2 FL	PRICE
.015 (1/64)	**.045** (3x)	1/8	1-1/2	27815	33.90			27815-C8	41.10
.020	**.060** (3x)	1/8	1-1/2	27820	32.30			27820-C8	39.50
.031 (1/32)	**.047** (1.5x)	1/8	1-1/2	894831	26.20			894831-C8	33.40
.031 (1/32)	**.093** (3x)	1/8	1-1/2	27831	26.20	27831-C7	31.80	27831-C8	33.40
.031 (1/32)	**.156** (5x)	1/8	2-1/2	887631	32.40			887631-C8	39.60
.040	**.120** (3x)	1/8	1-1/2	27840	26.20	27840-C7	31.80	27840-C8	33.40
.047 (3/64)	**.141** (3x)	1/8	1-1/2	27847	26.20	27847-C7	31.80	27847-C8	33.40
.050	**.150** (3x)	1/8	1-1/2	27850	26.20	27850-C7	31.80	27850-C8	33.40
.060	**.180** (3x)	1/8	1-1/2	27860	26.20	27860-C7	31.80	27860-C8	33.40
.062 (1/16)	**.093** (1.5x)	1/8	1-1/2	894862	24.80			894862-C8	32.00
.062 (1/16)	**.186** (3x)	1/8	1-1/2	27862	24.80	27862-C7	30.40	27862-C8	32.00
.062 (1/16)	**.312** (5x)	1/8	2-1/2	887662	32.40			887662-C8	39.60
.070	**.210** (3x)	1/8	1-1/2	27870	24.80	27870-C7	30.40	27870-C8	32.00
.078 (5/64)	**.234** (3x)	1/8	1-1/2	27878	24.80	27878-C7	30.40	27878-C8	32.00
.080	**.240** (3x)	1/8	1-1/2	27880	24.80	27880-C7	30.40	27880-C8	32.00
.090	**.270** (3x)	1/8	1-1/2	27890	24.80	27890-C7	30.40	27890-C8	32.00
.093 (3/32)	**.140** (1.5x)	1/8	1-1/2	894893	24.80			894893-C8	32.00
.093 (3/32)	**.279** (3x)	1/8	1-1/2	27893	24.80	27893-C7	30.40	27893-C8	32.00
.093 (3/32)	**.500** (5x)	1/8	2-1/2	887693	32.40			887693-C8	39.60
.100	**.300** (3x)	1/8	1-1/2	27899	24.80	27899-C7	30.40	27899-C8	32.00
.118 (3 mm)	**.354** (3x)	1/8	1-1/2	27905	33.70			27905-C8	40.90
D_1 $^{+.000''}_{-.002''}$	L_2 $^{+.030''}_{-.000''}$	D_2 (h6)	L_1	2 FL	PRICE	2 FL	PRICE	2 FL	PRICE
.125 (1/8)	**.187** (1.5x)	1/8	1-1/2	894908	22.60			894908-C8	29.80
.125 (1/8)	**.500** (4x)	1/8	1-1/2	27908	22.60	27908-C7	28.20	27908-C8	29.80
.125 (1/8)	**.625** (5x)	1/8	2-1/2	887708	28.10			887708-C8	35.30
.156 (5/32)	**.562** (3x)	3/16	2	27910	24.50			27910-C8	31.70
.187 (3/16)	**.625** (3x)	3/16	2	27912	24.50	27912-C7	30.50	27912-C8	31.70
.250 (1/4)	**.750** (3x)	1/4	2-1/2	27916	27.70	27916-C7	36.30	27916-C8	35.40

PLEASE SEE SPEEDS & FEEDS ON PAGE 199

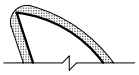
DIAMOND END MILLS FOR NON-FERROUS MATERIALS

CVD Diamond – Square

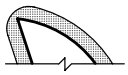


◄ *Outstanding in Graphite!*

- True crystalline CVD diamond on solid carbide substrate
- 4 µm CVD diamond coating yields a sharper cutting edge and therefore leaves a smoother finish on non-ferrous alloys and composites
- 9 µm CVD diamond coating offers increased tool life for non-ferrous alloys and composites, especially higher abrasive materials such as graphite, green carbide, and green ceramics
- Maximum abrasion resistance increases tool life
- 4 flutes
- h6 shank tolerance for high precision tool holders
- Center cutting
- CNC ground in the USA



CVD diamond (4 µm) layer for a balance between wear resistance and edge sharpness.



CVD diamond (9 µm) layer for increased tool life, especially in abrasive materials.

CUTTER DIAMETER	LENGTH OF CUT	SHANK DIAMETER	OVERALL LENGTH	CVD DIAMOND (4 µm)		CVD DIAMOND (9 µm)	
D_1 +.000″ −.001″	L_2 +.010″ −.000″	D_2 (h6)	L_1	4 FL	PRICE	4 FL	PRICE
.015 (1/64)	**.023** (1.5x)	1/8	1-1/2			962715	87.50
.015 (1/64)	**.045** (3x)	1/8	1-1/2	799715	74.40	995715	87.50
.015 (1/64)	**.078** (5x)	1/8	2-1/2			936615	99.00
.020	**.060** (3x)	1/8	1-1/2	799720	74.40	995720	87.50
.020	**.100** (5x)	1/8	2-1/2			936620	99.00
.031 (1/32)	**.047** (1.5x)	1/8	1-1/2			962731	87.50
.031 (1/32)	**.093** (3x)	1/8	1-1/2	799731	74.40	995731	87.50
.031 (1/32)	**.156** (5x)	1/8	2-1/2			936631	99.00
.039 (1 mm)	**.117** (3x)	1/8	1-1/2			995739	87.50
.040	**.120** (3x)	1/8	1-1/2			995740	87.50
.040	**.203** (5x)	1/8	2-1/2			936640	99.00
.047 (3/64)	**.071** (1.5x)	1/8	1-1/2			962747	87.50
.047 (3/64)	**.141** (3x)	1/8	1-1/2	799747	74.40	995747	87.50
.047 (3/64)	**.250** (5x)	1/8	2-1/2			936647	99.00
.050	**.150** (3x)	1/8	1-1/2			995750	87.50
.050	**.250** (5x)	1/8	2-1/2			936650	99.00
.060	**.180** (3x)	1/8	1-1/2			995760	87.50
.060	**.312** (5x)	1/8	2-1/2			936660	99.00
.062 (1/16)	**.093** (1.5x)	1/8	1-1/2			962762	86.70
.062 (1/16)	**.186** (3x)	1/8	1-1/2	799762	73.70	995762	86.70
.062 (1/16)	**.250** (4x)	1/8	2-1/2			871262	97.60
.062 (1/16)	**.312** (5x)	1/8	2-1/2			936662	98.50
.062 (1/16)	**.500** (8x)	1/8	2-1/2			891562	101.40
.078 (5/64)	**.118** (1.5x)	1/8	1-1/2			962778	86.70
.078 (5/64)	**.234** (3x)	1/8	1-1/2			995778	86.70
.078 (5/64)	**.406** (5x)	1/8	2-1/2			936678	98.50
.093 (3/32)	**.140** (1.5x)	1/8	1-1/2			962793	86.70
.093 (3/32)	**.279** (3x)	1/8	1-1/2	799793	73.70	995793	86.70
.093 (3/32)	**.375** (4x)	1/8	2-1/2			871293	97.60
.093 (3/32)	**.500** (5x)	1/8	2-1/2			936693	98.50
.093 (3/32)	**.750** (8x)	1/8	2-1/2			891593	101.40
.100	**.300** (3x)	1/8	1-1/2			995800	86.70
.109 (7/64)	**.327** (3x)	1/8	1-1/2			995802	86.70
.118 (3 mm)	**.354** (3x)	1/8	1-1/2			995805	86.70

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DIAMOND END MILLS FOR NON-FERROUS MATERIALS

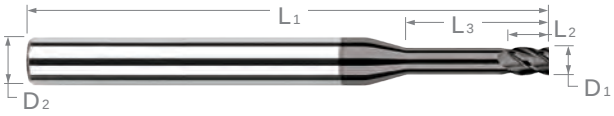
CVD Diamond – Square (cont.)

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CUTTER DIAMETER	LENGTH OF CUT	SHANK DIAMETER	OVERALL LENGTH	CVD DIAMOND (4 µm)		CVD DIAMOND (9 µm)	
D_1 $^{+.000''}_{-.002''}$	L_2 $^{+.030''}_{-.000''}$	D_2 (h6)	L_1	4 FL	PRICE	4 FL	PRICE
.125 (1/8)	**.187** (1.5x)	1/8	1-1/2			962808	88.30
.125 (1/8)	**.375** (3x)	1/8	1-1/2	799808	75.00	995808	88.30
.125 (1/8)	**.500** (4x)	1/8	2-1/2			871308	97.90
.125 (1/8)	**.625** (5x)	1/8	2-1/2			936708	99.00
.125 (1/8)	**1.000** (8x)	1/8	2-1/2			891608	101.80
.140 (9/64)	**.425** (3x)	3/16	2			995809	110.90
.156 (5/32)	**.235** (1.5x)	3/16	2			962810	110.90
.156 (5/32)	**.470** (3x)	3/16	2			995810	110.90
.187 (3/16)	**.285** (1.5x)	3/16	2			962812	110.90
.187 (3/16)	**.570** (3x)	3/16	2	799812	94.20	995812	110.90
.187 (3/16)	**1.000** (5x)	3/16	3			936712	141.10
.250 (1/4)	**.375** (1.5x)	1/4	2-1/2			962816	147.80
.250 (1/4)	**.750** (3x)	1/4	2-1/2	799816	125.60	995816	147.80
.250 (1/4)	**1.000** (4x)	1/4	4			871316	156.50
.250 (1/4)	**1.250** (5x)	1/4	4			936716	158.90
.312 (5/16)	**.470** (1.5x)	5/16	2-1/2			962820	164.30
.312 (5/16)	**1.000** (3x)	5/16	2-1/2			995820	164.30
.375 (3/8)	**.570** (1.5x)	3/8	2-1/2			962824	177.50
.375 (3/8)	**1.125** (3x)	3/8	2-1/2			995824	187.20
.375 (3/8)	**2.000** (5x)	3/8	4			936724	193.70
.500 (1/2)	**.750** (1.5x)	1/2	3			962832	286.00
.500 (1/2)	**1.500** (3x)	1/2	3			995832	294.50
.500 (1/2)	**2.625** (5x)	1/2	6			936732	304.20

DIAMOND END MILLS FOR NON-FERROUS MATERIALS

CVD Diamond – Square – Long Reach, Stub Flute



◄ *Outstanding in Graphite!*



Reduced Neck Diameter to Avoid Heeling

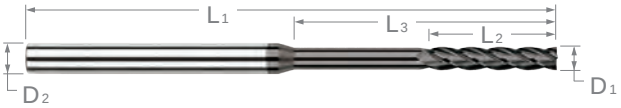
- True crystalline CVD diamond on solid carbide substrate
- Ideal for machining graphite and composites, green carbide, and green ceramics
- Maximum abrasion resistance increases tool life
- Reduced neck for clearance and maximum rigidity
- 4 flutes
- h6 shank tolerance for high precision tool holders
- Center cutting
- CNC ground in the USA

CUTTER DIAMETER	LENGTH OF CUT	OVERALL REACH	SHANK DIAMETER	OVERALL LENGTH	CVD DIAMOND (9 µm)	
D_1 $^{+.000''}_{-.001''}$	L_2 $^{+.010''}_{-.000''}$	L_3 $^{+.010''}_{-.000''}$	D_2 (h6)	L_1	4 FL	PRICE
.015 (1/64)	.023	**.078** (5x)	1/8	2-1/2	943015	129.90
.015 (1/64)	.023	**.125** (8x)	1/8	2-1/2	960215	129.90
.015 (1/64)	.023	**.187** (12x)	1/8	2-1/2	974615	133.10
.020	.030	**.100** (5x)	1/8	2-1/2	943020	129.90
.020	.030	**.160** (8x)	1/8	2-1/2	960220	129.90
.020	.030	**.250** (12x)	1/8	2-1/2	974620	133.10
.025	.038	**.125** (5x)	1/8	2-1/2	943025	129.90
.025	.038	**.203** (8x)	1/8	2-1/2	960225	129.90
.025	.038	**.312** (12x)	1/8	2-1/2	974625	133.10
.031 (1/32)	.047	**.156** (5x)	1/8	2-1/2	943031	129.90
.031 (1/32)	.047	**.250** (8x)	1/8	2-1/2	960231	129.90
.031 (1/32)	.047	**.375** (12x)	1/8	2-1/2	974631	133.10
.039 (1 mm)	.059	**.203** (5x)	1/8	2-1/2	943039	129.90
.039 (1 mm)	.059	**.325** (8x)	1/8	2-1/2	960239	129.90
.047 (3/64)	.071	**.250** (5x)	1/8	2-1/2	943047	129.90
.047 (3/64)	.071	**.375** (8x)	1/8	2-1/2	960247	129.90
.047 (3/64)	.071	**.570** (12x)	1/8	2-1/2	974647	133.10
.062 (1/16)	.093	**.312** (5x)	1/8	2-1/2	943062	118.40
.062 (1/16)	.093	**.500** (8x)	1/8	2-1/2	960262	118.40
.062 (1/16)	.093	**.750** (12x)	1/8	2-1/2	974662	121.90
.078 (5/64)	.117	**.406** (5x)	1/8	2-1/2	943078	118.40
.078 (5/64)	.117	**.625** (8x)	1/8	2-1/2	960278	118.40
.078 (5/64)	.117	**.940** (12x)	1/8	2-1/2	974678	121.90
.093 (3/32)	.140	**.500** (5x)	1/8	2-1/2	943093	118.40
.093 (3/32)	.140	**.750** (8x)	1/8	2-1/2	960293	118.40
.093 (3/32)	.140	**1.125** (12x)	1/8	2-1/2	974693	121.90
.118 (3 mm)	.177	**.625** (5x)	1/8	2-1/2	943105	118.40
.118 (3 mm)	.177	**.950** (8x)	1/8	2-1/2	960305	118.40

D_1 $^{+.000''}_{-.002''}$	L_2 $^{+.030''}_{-.000''}$	L_3 $^{+.030''}_{-.000''}$	D_2 (h6)	L_1	4 FL	PRICE
.125 (1/8)	.187	**.625** (5x)	1/8	2-1/2	943108	120.80
.125 (1/8)	.187	**1.000** (8x)	1/8	2-1/2	960308	120.80
.125 (1/8)	.187	**1.500** (12x)	1/8	3	974708	124.20
.187 (3/16)	.285	**1.000** (5x)	3/16	3	943112	165.50
.187 (3/16)	.285	**1.500** (8x)	3/16	3	960312	165.50
.250 (1/4)	.375	**1.250** (5x)	1/4	4	943116	184.10
.250 (1/4)	.375	**2.000** (8x)	1/4	4	960316	184.10
.375 (3/8)	.570	**1.250** (3x)	3/8	2-1/2	977924	226.30
.500 (1/2)	.750	**1.500** (3x)	1/2	3	977932	339.20

DIAMOND END MILLS FOR NON-FERROUS MATERIALS

CVD Diamond – Square – Long Reach, Long Flute



◀ *Outstanding in Graphite!*

- True crystalline CVD diamond on solid carbide substrate
- Ideal for machining graphite and composites, green carbide, and green ceramics
- Maximum abrasion resistance increases tool life
- Reduced neck for clearance and maximum rigidity
- h6 shank tolerance for high precision tool holders
- 4 flutes
- Center cutting
- CNC ground in the USA

CUTTER DIAMETER	LENGTH OF CUT	OVERALL REACH	SHANK DIAMETER	OVERALL LENGTH	CVD DIAMOND (9 µm)	
D_1 $^{+.000''}_{-.001''}$	L_2 $^{+.010''}_{-.000''}$	L_3 $^{+.010''}_{-.000''}$	D_2 (h6)	L_1	4 FL	PRICE
.015 (1/64)	.078	**.156** (10x)	1/8	2-1/2	36315	148.90
.020	.100	**.200** (10x)	1/8	2-1/2	36320	148.90
.025	.125	**.250** (10x)	1/8	2-1/2	36325	148.90
.031 (1/32)	.156	**.312** (10x)	1/8	2-1/2	36331	148.90
.047 (3/64)	.250	**.480** (10x)	1/8	2-1/2	36347	148.90
.062 (1/16)	.312	**.625** (10x)	1/8	2-1/2	36362	136.30
.078 (5/64)	.406	**.800** (10x)	1/8	2-1/2	36378	136.30
.093 (3/32)	.500	**.950** (10x)	1/8	2-1/2	36393	136.30
D_1 $^{+.000''}_{-.002''}$	L_2 $^{+.030''}_{-.000''}$	L_3 $^{+.030''}_{-.000''}$	D_2 (h6)	L_1	4 FL	PRICE
.125 (1/8)	.625	**1.250** (10x)	1/8	2-1/2	36408	145.50
.187 (3/16)	1.000	**1.875** (10x)	3/16	3	36412	191.90
.250 (1/4)	1.250	**2.500** (10x)	1/4	4	36416	213.20

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DIAMOND END MILLS FOR NON-FERROUS MATERIALS

CVD Diamond – Ball

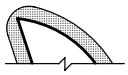


◀ *Outstanding in Graphite!*

- True crystalline CVD diamond on solid carbide substrate
- 4 µm CVD diamond coating yields a sharper cutting edge and therefore leaves a smoother finish on non-ferrous alloys and composites
- 9 µm CVD diamond coating offers increased tool life for non-ferrous alloys and composites, especially higher abrasive materials such as graphite, green carbide, and green ceramics
- Maximum abrasion resistance increases tool life
- 4 flutes
- h6 shank tolerance for high precision tool holders
- Center cutting
- CNC ground in the USA



CVD diamond (4 µm) layer for a balance between wear resistance and edge sharpness.



CVD diamond (9 µm) layer for increased tool life, especially in abrasive materials.

CUTTER DIAMETER	LENGTH OF CUT	SHANK DIAMETER	OVERALL LENGTH	CVD DIAMOND (4 µm)		CVD DIAMOND (9 µm)	
D_1 $^{+.000''}_{-.001''}$	L_2 $^{+.010''}_{-.000''}$	D_2 (h6)	L_1	4 FL	PRICE	4 FL	PRICE
.015 (1/64)	**.023** (1.5x)	1/8	1-1/2			914415	95.30
.015 (1/64)	**.045** (3x)	1/8	1-1/2	799515	81.00	999315	95.30
.015 (1/64)	**.078** (5x)	1/8	2-1/2			940915	106.60
.020	**.030** (1.5x)	1/8	1-1/2			914420	95.30
.020	**.060** (3x)	1/8	1-1/2	799520	81.00	999320	95.30
.020	**.100** (5x)	1/8	2-1/2			940920	106.60
.031 (1/32)	**.047** (1.5x)	1/8	1-1/2			914431	95.30
.031 (1/32)	**.093** (3x)	1/8	1-1/2	799531	81.00	999331	95.30
.031 (1/32)	**.125** (4x)	1/8	2-1/2			818631	105.70
.031 (1/32)	**.156** (5x)	1/8	2-1/2			940931	106.60
.039 (1 mm)	**.117** (3x)	1/8	1-1/2			999339	95.30
.040	**.120** (3x)	1/8	1-1/2			999340	95.30
.047 (3/64)	**.071** (1.5x)	1/8	1-1/2			914447	95.30
.047 (3/64)	**.141** (3x)	1/8	1-1/2	799547	81.00	999347	95.30
.047 (3/64)	**.250** (5x)	1/8	2-1/2			940947	106.60
.050	**.150** (3x)	1/8	1-1/2			999350	95.30
.060	**.180** (3x)	1/8	1-1/2			999360	95.30
.062 (1/16)	**.093** (1.5x)	1/8	1-1/2			914462	92.20
.062 (1/16)	**.186** (3x)	1/8	1-1/2	799562	78.40	999362	92.20
.062 (1/16)	**.250** (4x)	1/8	2-1/2			818662	103.00
.062 (1/16)	**.312** (5x)	1/8	2-1/2			940962	103.90
.078 (5/64)	**.118** (1.5x)	1/8	1-1/2			914478	92.20
.078 (5/64)	**.234** (3x)	1/8	1-1/2			999378	92.20
.078 (5/64)	**.406** (5x)	1/8	2-1/2			940978	103.90
.093 (3/32)	**.140** (1.5x)	1/8	1-1/2			914493	92.20
.093 (3/32)	**.279** (3x)	1/8	1-1/2	799593	78.40	999393	92.20
.093 (3/32)	**.500** (5x)	1/8	2-1/2			940993	103.90
.100	**.300** (3x)	1/8	1-1/2			999400	92.20
.118 (3 mm)	**.354** (3x)	1/8	1-1/2			999405	92.20

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DIAMOND END MILLS FOR NON-FERROUS MATERIALS

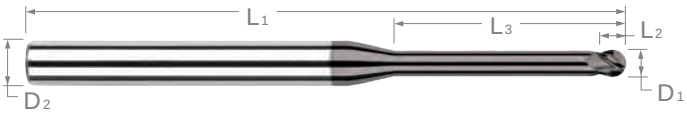
CVD Diamond – Ball (cont.)

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CUTTER DIAMETER	LENGTH OF CUT	SHANK DIAMETER	OVERALL LENGTH	CVD DIAMOND (4 µm)		CVD DIAMOND (9 µm)	
D_1 $^{+.000''}_{-.002''}$	L_2 $^{+.030''}_{-.000''}$	D_2 (h6)	L_1	4 FL	PRICE	4 FL	PRICE
.125 (1/8)	**.187** (1.5x)	1/8	1-1/2			914508	93.70
.125 (1/8)	**.375** (3x)	1/8	1-1/2	799608	79.60	999408	93.70
.125 (1/8)	**.500** (4x)	1/8	2-1/2			818708	105.40
.125 (1/8)	**.625** (5x)	1/8	2-1/2			941008	106.40
.156 (5/32)	**.235** (1.5x)	3/16	2			914510	116.20
.156 (5/32)	**.470** (3x)	3/16	2			999410	116.20
.187 (3/16)	**.285** (1.5x)	3/16	2			914512	116.20
.187 (3/16)	**.570** (3x)	3/16	2	799612	98.80	999412	116.20
.250 (1/4)	**.375** (1.5x)	1/4	2-1/2			914516	153.70
.250 (1/4)	**.750** (3x)	1/4	2-1/2	799616	130.60	999416	153.70
.250 (1/4)	**1.250** (5x)	1/4	4			941016	164.80
.375 (3/8)	**.570** (1.5x)	3/8	2-1/2			914524	189.90
.500 (1/2)	**.750** (1.5x)	1/2	3			914532	301.00
.500 (1/2)	**1.500** (3x)	1/2	3			999432	301.00

DIAMOND END MILLS FOR NON-FERROUS MATERIALS

CVD Diamond – Ball – Long Reach, Stub Flute



◄ *Outstanding in Graphite!*



Reduced Neck Diameter
to Avoid Heeling

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CUTTER DIAMETER	LENGTH OF CUT	OVERALL REACH	SHANK DIAMETER	OVERALL LENGTH	CVD DIAMOND (9 µm)	
D_1 $^{+.000''}_{-.001''}$	L_2 $^{+.010''}_{-.000''}$	L_3 $^{+.010''}_{-.000''}$	D_2 (h6)	L_1	4 FL	PRICE
.015 (1/64)	.023	**.078** (5x)	1/8	2-1/2	61015	135.80
.015 (1/64)	.023	**.125** (8x)	1/8	2-1/2	62015	135.80
.015 (1/64)	.023	**.156** (10x)	1/8	2-1/2	939515	139.30
.015 (1/64)	.023	**.187** (12x)	1/8	2-1/2	65215	139.30
.015 (1/64)	.023	**.225** (15x)	1/8	2-1/2	76015	146.40
.015 (1/64)	.023	**.270** (18x)	1/8	2-1/2	841815	153.30
.020	.030	**.100** (5x)	1/8	2-1/2	61020	135.80
.020	.030	**.160** (8x)	1/8	2-1/2	62020	135.80
.020	.030	**.200** (10x)	1/8	2-1/2	939520	139.30
.020	.030	**.250** (12x)	1/8	2-1/2	65220	139.30
.020	.030	**.300** (15x)	1/8	2-1/2	76020	146.40
.020	.030	**.360** (18x)	1/8	2-1/2	841820	153.30
.025	.038	**.125** (5x)	1/8	2-1/2	61025	135.80
.025	.038	**.203** (8x)	1/8	2-1/2	62025	135.80
.025	.038	**.312** (12x)	1/8	2-1/2	65225	139.30
.025	.038	**.375** (15x)	1/8	2-1/2	76025	146.40
.030	.045	**.250** (8x)	1/8	2-1/2	62030	135.80
.031 (1/32)	.047	**.093** (3x)	1/8	1-1/2	922231	122.20
.031 (1/32)	.047	**.156** (5x)	1/8	2-1/2	61031	135.80
.031 (1/32)	.047	**.187** (6x)	1/8	2-1/2	795131	135.80
.031 (1/32)	.047	**.218** (7x)	1/8	2-1/2	794931	135.80
.031 (1/32)	.047	**.250** (8x)	1/8	2-1/2	62031	135.80
.031 (1/32)	.047	**.312** (10x)	1/8	2-1/2	939531	139.30
.031 (1/32)	.047	**.375** (12x)	1/8	2-1/2	65231	139.30
.031 (1/32)	.047	**.470** (15x)	1/8	2-1/2	76031	146.40
.031 (1/32)	.047	**.565** (18x)	1/8	2-1/2	841831	153.30
.039 (1 mm)	.059	**.203** (5x)	1/8	2-1/2	61039	135.80
.039 (1 mm)	.059	**.325** (8x)	1/8	2-1/2	62039	135.80
.040	.060	**.203** (5x)	1/8	2-1/2	61040	135.80
.040	.060	**.325** (8x)	1/8	2-1/2	62040	135.80
.047 (3/64)	.071	**.250** (5x)	1/8	2-1/2	61047	135.80
.047 (3/64)	.071	**.375** (8x)	1/8	2-1/2	62047	135.80
.047 (3/64)	.071	**.480** (10x)	1/8	2-1/2	939547	139.30
.047 (3/64)	.071	**.570** (12x)	1/8	2-1/2	65247	139.30
.047 (3/64)	.071	**.710** (15x)	1/8	2-1/2	76047	146.40
.047 (3/64)	.071	**.850** (18x)	1/8	2-1/2	841847	153.30
.050	.075	**.250** (5x)	1/8	2-1/2	61050	135.80
.050	.075	**.400** (8x)	1/8	2-1/2	62050	135.80
.060	.090	**.312** (5x)	1/8	2-1/2	61060	135.80
.060	.090	**.500** (8x)	1/8	2-1/2	62060	135.80

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DIAMOND END MILLS FOR NON-FERROUS MATERIALS

CVD Diamond – Ball – Long Reach, Stub Flute (cont.)

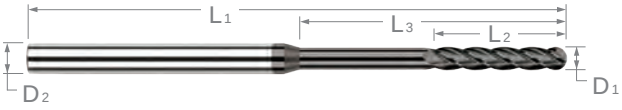
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CUTTER DIAMETER	LENGTH OF CUT	OVERALL REACH	SHANK DIAMETER	OVERALL LENGTH	CVD DIAMOND (9 µm)	
D_1 $^{+.000″}_{-.001″}$	L_2 $^{+.010″}_{-.000″}$	L_3 $^{+.010″}_{-.000″}$	D_2 (h6)	L_1	4 FL	PRICE
.062 (1/16)	.093	**.186** (3x)	1/8	1-1/2	922262	107.90
.062 (1/16)	.093	**.312** (5x)	1/8	2-1/2	61062	121.90
.062 (1/16)	.093	**.375** (6x)	1/8	2-1/2	795162	121.90
.062 (1/16)	.093	**.437** (7x)	1/8	2-1/2	794962	121.90
.062 (1/16)	.093	**.500** (8x)	1/8	2-1/2	62062	121.90
.062 (1/16)	.093	**.625** (10x)	1/8	2-1/2	939562	125.50
.062 (1/16)	.093	**.750** (12x)	1/8	2-1/2	65262	125.50
.062 (1/16)	.093	**.950** (15x)	1/8	2-1/2	76062	132.00
.062 (1/16)	.093	**1.125** (18x)	1/8	2-1/2	841862	138.50
.078 (5/64)	.117	**.406** (5x)	1/8	2-1/2	61078	121.90
.078 (5/64)	.117	**.625** (8x)	1/8	2-1/2	62078	121.90
.078 (5/64)	.117	**.800** (10x)	1/8	2-1/2	939578	125.50
.078 (5/64)	.117	**.940** (12x)	1/8	2-1/2	65278	125.50
.078 (5/64)	.117	**1.187** (15x)	1/8	2-1/2	76078	132.00
.078 (5/64)	.117	**1.400** (18x)	1/8	2-1/2	841878	138.50
.093 (3/32)	.140	**.279** (3x)	1/8	1-1/2	922293	107.90
.093 (3/32)	.140	**.500** (5x)	1/8	2-1/2	61093	121.90
.093 (3/32)	.140	**.585** (6x)	1/8	2-1/2	795193	121.90
.093 (3/32)	.140	**.670** (7x)	1/8	2-1/2	794993	121.90
.093 (3/32)	.140	**.750** (8x)	1/8	2-1/2	62093	121.90
.093 (3/32)	.140	**.950** (10x)	1/8	2-1/2	939593	125.50
.093 (3/32)	.140	**1.125** (12x)	1/8	2-1/2	65293	125.50
.093 (3/32)	.140	**1.400** (15x)	1/8	2-1/2	76093	132.00
.093 (3/32)	.140	**1.675** (18x)	1/8	3	841893	138.50
.100	.150	**.800** (8x)	1/8	2-1/2	62100	121.90
.109 (7/64)	.164	**.900** (8x)	1/8	2-1/2	62102	121.90
.118 (3 mm)	.177	**.625** (5x)	1/8	2-1/2	61105	121.90
.118 (3 mm)	.177	**.950** (8x)	1/8	2-1/2	62105	121.90

D_1 $^{+.000″}_{-.002″}$	L_2 $^{+.030″}_{-.000″}$	L_3 $^{+.030″}_{-.000″}$	D_2 (h6)	L_1	4 FL	PRICE
.125 (1/8)	.187	**.375** (3x)	1/8	1-1/2	64008	119.20
.125 (1/8)	.187	**.625** (5x)	1/8	2-1/2	61108	132.90
.125 (1/8)	.187	**.750** (6x)	1/8	2-1/2	795208	132.90
.125 (1/8)	.187	**.875** (7x)	1/8	2-1/2	795008	132.90
.125 (1/8)	.187	**1.000** (8x)	1/8	2-1/2	62108	132.90
.125 (1/8)	.187	**1.250** (10x)	1/8	2-1/2	939608	136.70
.125 (1/8)	.187	**1.500** (12x)	1/8	3	65308	136.70
.125 (1/8)	.187	**1.875** (15x)	1/8	3	944108	143.90
.125 (1/8)	.187	**2.250** (18x)	1/8	4	841908	152.50
.140 (9/64)	.220	**1.125** (8x)	3/16	3	62109	171.60
.156 (5/32)	.235	**.750** (5x)	3/16	3	61110	171.60
.156 (5/32)	.235	**1.250** (8x)	3/16	3	62110	171.60
.187 (3/16)	.285	**1.000** (5x)	3/16	3	61112	171.60
.187 (3/16)	.285	**1.500** (8x)	3/16	3	62112	171.60
.187 (3/16)	.285	**2.250** (12x)	3/16	4	65312	180.60
.250 (1/4)	.375	**1.250** (5x)	1/4	4	61116	190.50
.250 (1/4)	.375	**2.000** (8x)	1/4	4	62116	190.50
.250 (1/4)	.375	**3.000** (12x)	1/4	6	65316	198.90
.312 (5/16)	.470	**2.500** (8x)	5/16	4	62120	207.70
.375 (3/8)	.570	**1.250** (3x)	3/8	2-1/2	64024	239.40
.500 (1/2)	.750	**1.500** (3x)	1/2	3	64032	355.60

DIAMOND END MILLS FOR NON-FERROUS MATERIALS

CVD Diamond – Ball – Long Reach, Long Flute



◀ *Outstanding in Graphite!*

- True crystalline CVD diamond on solid carbide substrate
- Ideal for machining graphite and composites, green carbide, and green ceramics
- Maximum abrasion resistance increases tool life
- Reduced neck for clearance and maximum rigidity
- h6 shank tolerance for high precision tool holders
- 4 flutes
- Center cutting
- CNC ground in the USA

CUTTER DIAMETER	LENGTH OF CUT	OVERALL REACH	SHANK DIAMETER	OVERALL LENGTH	CVD DIAMOND (9 µm)	
D_1 $^{+.000''}_{-.001''}$	L_2 $^{+.010''}_{-.000''}$	L_3 $^{+.010''}_{-.000''}$	D_2 (h6)	L_1	4 FL	PRICE
.015 (1/64)	.078	**.156** (10x)	1/8	2-1/2	36515	159.20
.020	.100	**.200** (10x)	1/8	2-1/2	36520	159.20
.025	.125	**.250** (10x)	1/8	2-1/2	36525	159.20
.031 (1/32)	.156	**.312** (10x)	1/8	2-1/2	36531	159.20
.047 (3/64)	.250	**.480** (10x)	1/8	2-1/2	36547	159.20
.062 (1/16)	.312	**.625** (10x)	1/8	2-1/2	36562	142.90
.078 (5/64)	.406	**.800** (10x)	1/8	2-1/2	36578	142.90
.093 (3/32)	.500	**.950** (10x)	1/8	2-1/2	36593	142.90
D_1 $^{+.000''}_{-.002''}$	L_2 $^{+.030''}_{-.000''}$	L_3 $^{+.030''}_{-.000''}$	D_2 (h6)	L_1	4 FL	PRICE
.125 (1/8)	.625	**1.250** (10x)	1/8	2-1/2	36608	152.00
.187 (3/16)	1.000	**1.875** (10x)	3/16	3	36612	200.80
.250 (1/4)	1.250	**2.500** (10x)	1/4	4	36616	222.90

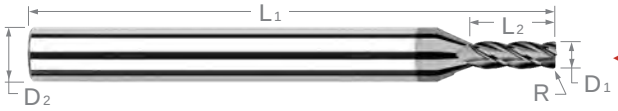
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NEW SIZES!

DIAMOND END MILLS FOR NON-FERROUS MATERIALS

CVD Diamond – Corner Radius



◀ *Outstanding in Graphite!*

- True crystalline CVD diamond on solid carbide substrate
- Ideal for machining graphite and composites, green carbide, and green ceramics
- Maximum abrasion resistance increases tool life
- Corner radius for improved strength
- 4 flutes
- h6 shank tolerance for high precision tool holders
- Center cutting
- CNC ground in the USA

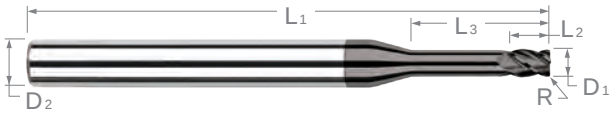
CUTTER DIAMETER	CORNER RADIUS	LENGTH OF CUT	SHANK DIAMETER	OVERALL LENGTH	CVD DIAMOND (9 µm)		
D_1 +.000″ −.001″	R +.001″ −.001″	L_2 +.010″ −.000″	D_2 (h6)	L_1	4 FL	PRICE	
.015 (1/64)	**.003**	**.045** (3x)	1/8	1-1/2	942015	95.30	
.020	**.005**	**.060** (3x)	1/8	1-1/2	955420	95.30	
.031 (1/32)	**.005**	**.093** (3x)	1/8	1-1/2	955431	95.30	
.031 (1/32)	**.005**	**.156** (5x)	1/8	2-1/2	819331	106.60	
.031 (1/32)	**.010**	**.093** (3x)	1/8	1-1/2	977131	95.30	
.047 (3/64)	**.005**	**.141** (3x)	1/8	1-1/2	955447	95.30	
.062 (1/16)	**.005**	**.186** (3x)	1/8	1-1/2	955462	92.20	
.062 (1/16)	**.010**	**.186** (3x)	1/8	1-1/2	977162	92.20	
.062 (1/16)	**.010**	**.312** (5x)	1/8	2-1/2	820462	103.90	
.062 (1/16)	**.020**	**.186** (3x)	1/8	1-1/2	768262	92.20	NEW
.078 (5/64)	**.010**	**.234** (3x)	1/8	1-1/2	977178	92.20	
.093 (3/32)	**.005**	**.279** (3x)	1/8	1-1/2	955493	92.20	
.093 (3/32)	**.010**	**.279** (3x)	1/8	1-1/2	977193	92.20	
.093 (3/32)	**.015**	**.279** (3x)	1/8	1-1/2	938593	92.20	NEW
.093 (3/32)	**.030**	**.279** (3x)	1/8	1-1/2	906293	92.20	

D_1 +.000″ −.002″	R +.001″ −.001″	L_2 +.030″ −.000″	D_2 (h6)	L_1	4 FL	PRICE	
.125 (1/8)	**.005**	**.375** (3x)	1/8	1-1/2	955508	93.70	
.125 (1/8)	**.010**	**.375** (3x)	1/8	1-1/2	977208	93.70	
.125 (1/8)	**.015**	**.375** (3x)	1/8	1-1/2	938608	93.70	
.125 (1/8)	**.015**	**.625** (5x)	1/8	2-1/2	855208	104.50	
.125 (1/8)	**.030**	**.375** (3x)	1/8	1-1/2	906308	93.70	
.187 (3/16)	**.015**	**.570** (3x)	3/16	2	938612	116.20	NEW
.187 (3/16)	**.030**	**.570** (3x)	3/16	2	906312	116.20	
.250 (1/4)	**.010**	**.750** (3x)	1/4	2-1/2	977216	153.70	
.250 (1/4)	**.030**	**.750** (3x)	1/4	2-1/2	906316	153.70	
.250 (1/4)	**.030**	**1.250** (5x)	1/4	4	862116	164.80	

NEW SIZES!

DIAMOND END MILLS FOR NON-FERROUS MATERIALS

CVD Diamond – Corner Radius – Long Reach, Stub Flute



◀ *Outstanding in Graphite!*



Reduced Neck Diameter to Avoid Heeling

- True crystalline CVD diamond on solid carbide substrate
- Ideal for machining graphite and composites, green carbide, and green ceramics
- Maximum abrasion resistance increases tool life
- Reduced neck for clearance and maximum rigidity
- Corner radius for improved strength
- 4 flutes
- h6 shank tolerance for high precision tool holders
- Center cutting
- CNC ground in the USA

	CUTTER DIAMETER	CORNER RADIUS	LENGTH OF CUT	OVERALL REACH	SHANK DIAMETER	OVERALL LENGTH	CVD DIAMOND (9 µm)	
	D_1 +.000″ −.001″	R +.001″ −.001″	L_2 +.010″ −.000″	L_3 +.010″ −.000″	D_2 (h6)	L_1	4 FL	PRICE
	.015 (1/64)	**.003**	.023	**.078** (5x)	1/8	2-1/2	61615	135.80
	.015 (1/64)	**.003**	.023	**.125** (8x)	1/8	2-1/2	61915	135.80
	.015 (1/64)	**.003**	.023	**.187** (12x)	1/8	2-1/2	62215	139.30
	.020	**.005**	.030	**.100** (5x)	1/8	2-1/2	62920	135.80
	.020	**.005**	.030	**.160** (8x)	1/8	2-1/2	63220	135.80
	.020	**.005**	.030	**.250** (12x)	1/8	2-1/2	64120	139.30
	.025	**.005**	.038	**.125** (5x)	1/8	2-1/2	62925	135.80
	.025	**.005**	.038	**.203** (8x)	1/8	2-1/2	63225	135.80
	.025	**.005**	.038	**.312** (12x)	1/8	2-1/2	64125	139.30
	.031 (1/32)	**.005**	.047	**.156** (5x)	1/8	2-1/2	62931	135.80
	.031 (1/32)	**.005**	.047	**.250** (8x)	1/8	2-1/2	63231	135.80
	.031 (1/32)	**.005**	.047	**.375** (12x)	1/8	2-1/2	64131	139.30
	.039 (1 mm)	**.005**	.059	**.203** (5x)	1/8	2-1/2	62939	135.80
	.039 (1 mm)	**.005**	.059	**.325** (8x)	1/8	2-1/2	63239	135.80
	.047 (3/64)	**.005**	.071	**.250** (5x)	1/8	2-1/2	62947	135.80
	.047 (3/64)	**.005**	.071	**.375** (8x)	1/8	2-1/2	63247	135.80
	.047 (3/64)	**.005**	.071	**.570** (12x)	1/8	2-1/2	64147	139.30
NEW	.062 (1/16)	**.005**	.093	**.312** (5x)	1/8	2-1/2	62962	121.90
NEW	.062 (1/16)	**.005**	.093	**.500** (8x)	1/8	2-1/2	63262	121.90
	.062 (1/16)	**.010**	.093	**.312** (5x)	1/8	2-1/2	65062	121.90
	.062 (1/16)	**.010**	.093	**.500** (8x)	1/8	2-1/2	66562	121.90
	.062 (1/16)	**.010**	.093	**.750** (12x)	1/8	2-1/2	65962	125.50
	.078 (5/64)	**.010**	.117	**.406** (5x)	1/8	2-1/2	65078	121.90
	.078 (5/64)	**.010**	.117	**.625** (8x)	1/8	2-1/2	66578	121.90
	.078 (5/64)	**.010**	.117	**.940** (12x)	1/8	2-1/2	65978	125.50
	.093 (3/32)	**.010**	.140	**.500** (5x)	1/8	2-1/2	65093	121.90
	.093 (3/32)	**.010**	.140	**.750** (8x)	1/8	2-1/2	66593	121.90
	.093 (3/32)	**.010**	.140	**1.125** (12x)	1/8	2-1/2	65993	125.50
	.118 (3 mm)	**.010**	.177	**.625** (5x)	1/8	2-1/2	916305	121.90
	.118 (3 mm)	**.010**	.177	**.950** (8x)	1/8	2-1/2	914705	121.90

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NEW SIZES!

DIAMOND END MILLS FOR NON-FERROUS MATERIALS

CVD Diamond – Corner Radius – Long Reach, Stub Flute (cont.)

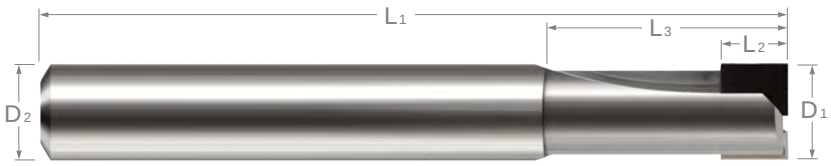
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CUTTER DIAMETER	CORNER RADIUS	LENGTH OF CUT	OVERALL REACH	SHANK DIAMETER	OVERALL LENGTH	CVD DIAMOND (9 µm)		
D_1 $^{+.000''}_{-.002''}$	R $^{+.001''}_{-.001''}$	L_2 $^{+.030''}_{-.000''}$	L_3 $^{+.030''}_{-.000''}$	D_2 (h6)	L_1	4 FL	PRICE	
.125 (1/8)	**.010**	.187	**.625** (5x)	1/8	2-1/2	916308	132.90	NEW
.125 (1/8)	**.010**	.187	**1.000** (8x)	1/8	2-1/2	914708	132.90	NEW
.125 (1/8)	**.015**	.187	**.625** (5x)	1/8	2-1/2	66208	132.90	
.125 (1/8)	**.015**	.187	**1.000** (8x)	1/8	2-1/2	64708	132.90	
.125 (1/8)	**.015**	.187	**1.500** (12x)	1/8	3	66408	136.70	
.187 (3/16)	**.030**	.285	**1.000** (5x)	3/16	3	63312	171.60	
.187 (3/16)	**.030**	.285	**1.500** (8x)	3/16	3	65612	171.60	
.250 (1/4)	**.030**	.375	**1.250** (5x)	1/4	4	63316	190.50	
.250 (1/4)	**.030**	.375	**2.000** (8x)	1/4	4	65616	190.50	

NEW SIZE!

DIAMOND END MILLS FOR NON-FERROUS MATERIALS

PCD Diamond – Square



- PCD diamond brazed on solid carbide body allows for significant tool lifeimprovement over carbide
- Recommended work piece material: aluminum, copper, brass, bronze, plastics, graphite, carbon, carbon fiber materials, green carbide, gold, silver, magnesium, zinc, green ceramics
- Center cutting for 1 and 2 flutes
- End cutting (not center cutting) for 4 flutes

	CUTTER DIAMETER	LENGTH OF CUT	OVERALL REACH	FLUTES	SHANK DIAMETER	OVERALL LENGTH	PCD DIAMOND	
	D_1 +.000″ −.002″	L_2 +.020″ −.000″	L_3 +.020″ −.000″		D_2	L_1	TOOL #	PRICE
	3/32	3/16	**3/8**	1	1/8	1-1/2	12106	252.00
	3 mm	1/4	**1/2**	1	1/8	1-1/2	1213M	252.00
NEW	1/8	1/8	**5/16**	1	1/8	1-1/2	760008	229.00
	1/8	1/4	**1/2**	1	1/8	1-1/2	12108	252.00
	5/32	1/4	**1/2**	1	3/16	2	12110	281.60
	3/16	1/4	**5/8**	2	3/16	2	12112	281.60
	1/4	1/4	**3/4**	2	1/4	2-1/2	12116	305.70
	1/4	1/2	**1**	4	1/4	2-1/2	914116	492.20
	5/16	1/4	**13/16**	2	5/16	2-1/2	12120	334.50
	5/16	1/2	**1-1/16**	4	5/16	2-1/2	914120	544.00
	3/8	1/4	**15/16**	2	3/8	2-1/2	12124	358.70
	3/8	3/4	**1-7/16**	4	3/8	3	914124	622.10
	1/2	1/4	**1**	2	1/2	3	12132	457.30
	1/2	1	**1-3/4**	4	1/2	3	914132	733.70
	5/8	3/8	**1**	2	5/8	3-1/2	12140	564.80
	5/8	1	**1-3/4**	4	5/8	3-1/2	914140	859.80
	3/4	3/8	**1-1/8**	2	3/4	4	12148	687.90
	3/4	1-1/4	**2**	4	3/4	4	914148	1004.90

* End cutting (not center cutting) for 4 flutes

Single Flute designed for smaller diameters



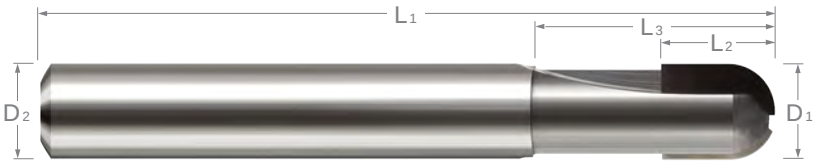
4 Flute ideal for finishing operations



For PCD High Performance Drills, see page 433.

DIAMOND END MILLS FOR NON-FERROUS MATERIALS

PCD Diamond – Ball





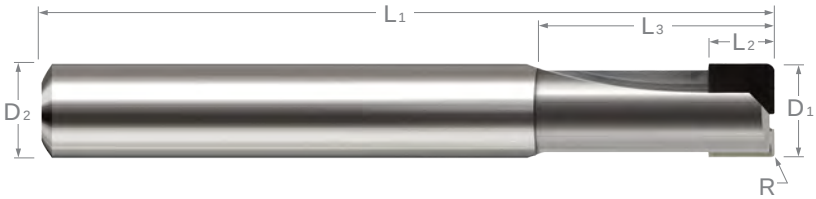
Also Stocked in Single Flute Style

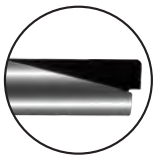
- PCD diamond brazed on solid carbide body allows for significant tool life improvement over carbide.
- Recommended work piece material: aluminum, copper, brass, bronze, plastics, graphite, carbon, carbon fiber materials, green carbide, gold, silver, magnesium, zinc, green ceramics
- Center cutting

CUTTER DIAMETER	LENGTH OF CUT	OVERALL REACH	FLUTES	SHANK DIAMETER	OVERALL LENGTH	PCD DIAMOND	
D_1 $^{+.000″}_{-.002″}$	L_2 $^{+.020″}_{-.000″}$	L_3 $^{+.020″}_{-.000″}$		D_2	L_1	TOOL #	PRICE
3/32	3/16	**3/8**	1	1/8	1-1/2	12006	305.70
1/8	1/4	**1/2**	1	1/8	1-1/2	12008	305.70
3/16	1/4	**5/8**	2	3/16	2	12012	327.30
1/4	5/16	**3/4**	2	1/4	2-1/2	12016	343.40
3/8	7/16	**15/16**	2	3/8	2-1/2	12024	424.30
1/2	1/2	**1**	2	1/2	3	12032	492.00
5/8	1/2	**1**	2	5/8	3-1/2	12040	599.10
3/4	5/8	**1-1/8**	2	3/4	4	12048	722.00

DIAMOND END MILLS FOR NON-FERROUS MATERIALS

PCD Diamond – Corner Radius





Also Stocked in Single Flute Style

- PCD diamond brazed on solid carbide body allows for significant tool life improvement over carbide.
- Recommended work piece material: aluminum, copper, brass, bronze, plastics, graphite, carbon, carbon fiber materials, green carbide, gold, silver, magnesium, zinc, green ceramics
- Center cutting

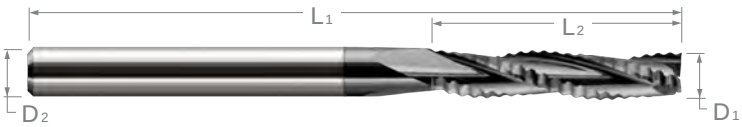
CUTTER DIAMETER	LENGTH OF CUT	OVERALL REACH	CORNER RADIUS	FLUTES	SHANK DIAMETER	OVERALL LENGTH	PCD DIAMOND	
D_1 $^{+.000″}_{-.002″}$	L_2 $^{+.020″}_{-.000″}$	L_3 $^{+.020″}_{-.000″}$	R $^{+.001″}_{-.001″}$		D_2	L_1	TOOL #	PRICE
3/32	3/16	**3/8**	**.010**	1	1/8	1-1/2	12206	305.70
1/8	1/4	**1/2**	**.015**	1	1/8	1-1/2	12208	305.70
3/16	1/4	**5/8**	**.015**	2	3/16	2	12212	327.30
1/4	1/4	**3/4**	**.010**	2	1/4	2-1/2	858916	343.40
1/4	1/4	**3/4**	**.030**	2	1/4	2-1/2	12216	343.40
1/4	1/4	**3/4**	**.060**	2	1/4	2-1/2	847316	343.40
3/8	1/4	**15/16**	**.030**	2	3/8	2-1/2	12224	424.30
1/2	1/4	**1**	**.030**	2	1/2	3	12232	492.00

For PCD High Performance Drills, see page 433.

NEW!

END MILLS FOR PLASTICS

Rougher – Square Upcut – 3 Flute (Slow Helix)



- Optimized for roughing applications in plastics
- Engineered with irregular edge geometry for chip control and minimized cutting forces
- 3 flute design strengthens rigidity of tool
- Center cutting
- Solid carbide
- CNC ground in the USA

	CUTTER DIAMETER	LENGTH OF CUT	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AMORPHOUS DIAMOND	
	D_1 +.000″ −.002″	L_2 +.030″ −.000″	D_2	L_1	3 FL	PRICE	3 FL	PRICE
NEW	1/16	**3/16** (3x)	1/8	1-1/2	798662	31.50	798662-C4	43.90
NEW	1/16	**5/16** (5x)	1/8	2	770662	36.90	770662-C4	55.10
NEW	3/32	**9/32** (3x)	1/8	1-1/2	798693	31.50	798693-C4	43.90
NEW	3/32	**1/2** (5x)	1/8	2	770693	36.90	770693-C4	55.10
NEW	1/8	**3/8** (3x)	1/8	1-1/2	798708	31.50	798708-C4	43.90
NEW	1/8	**5/8** (5x)	1/8	2	770708	36.90	770708-C4	55.10
NEW	3/16	**9/16** (3x)	3/16	2	798712	48.80	798712-C4	65.90
NEW	3/16	**1** (5x)	3/16	3	770712	51.00	770712-C4	68.10
NEW	1/4	**3/4** (3x)	1/4	2-1/2	798716	51.00	798716-C4	70.40
NEW	1/4	**1-1/4** (5x)	1/4	3	770716	57.70	770716-C4	77.10

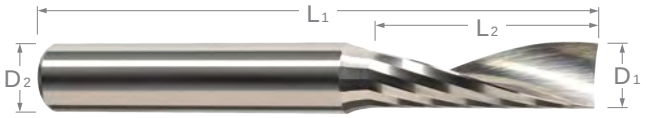
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NEW SIZES!

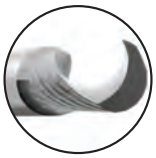
END MILLS FOR PLASTICS

Square Upcut – Single Flute



2x the Material Removal with Improved Finish Over Standard End Mills!

- Design allows for maximum stock removal while maintaining excellent finish
- High rake, high relief design produces sharper edge for improved shearing action while transferring heat into the chip
- Large flute valley creates room for the chip and aids in chip evacuation
- Slower helix reduces lifting forces, making design preferable for fiber-reinforced applications and vacuum table setups
- Select sizes available with oversized, router-style shanks
- High flute finish resists chip welding
- Will ramp or plunge if required
- Right hand spiral, right hand cut
- Solid carbide
- CNC ground in the USA



Single Spiral Upcut Flute

CUTTER DIAMETER	LENGTH OF CUT	SHANK DIAMETER	OVERALL LENGTH	SOFT PLASTICS		HARD PLASTICS		HARD PLASTICS AMORPHOUS DIAMOND		
D_1 +.000″ −.001″	L_2 +.010″ −.000″	D_2	L_1	1 FL	PRICE	1 FL	PRICE	1 FL	PRICE	
.020	**.060** (3x)	1/8	1-1/2			51420	35.00			NEW
1/32	**3/32** (3x)	1/8	1-1/2			51431	35.00	51431-C4	47.40	
1/32	**5/32** (5x)	1/8	1-1/2			52431	43.00			
3/64	**9/64** (3x)	1/8	1-1/2			51447	31.30	51447-C4	43.70	
3/64	**1/4** (5x)	1/8	1-1/2			52447	36.30			

D_1 +.000″ −.002″	L_2 +.030″ −.000″	D_2	L_1	1 FL	PRICE	1 FL	PRICE	1 FL	PRICE	
1/16	**3/16** (3x)	1/8	1-1/2	51162	25.60	51462	25.60	51462-C4	38.00	
1/16	**1/4** (4x)	1/8	1-1/2	878262	25.60	897362	25.60			NEW
1/16*	**1/4** (4x)	1/4*	2	14104-20	36.50	14204-20	36.50			
1/16	**5/16** (5x)	1/8	2	51862	30.20	52462	30.20	52462-C4	43.80	
5/64	**15/64** (3x)	1/8	1-1/2	51178	25.60	51478	25.60	51478-C4	38.00	
5/64*	**5/16** (4x)	1/4*	2	14105-20	36.50	14205-20	36.50			
5/64	**13/32** (5x)	1/8	2	51878	30.20	52478	30.20	52478-C4	43.80	
3/32	**9/32** (3x)	1/8	1-1/2	51193	25.60	51493	25.60	51493-C4	38.00	
3/32	**3/8** (4x)	1/8	1-1/2	878293	25.60	897393	25.60			NEW
3/32*	**3/8** (4x)	1/4*	2	14106-20	36.50	14206-20	36.50			
3/32	**1/2** (5x)	1/8	2	51893	30.20	52493	30.20	52493-C4	43.80	
1/8*	**1/4** (2x)	1/4*	2	14108-10	34.70	14208-10	34.70	892026-C4	49.40	
1/8	**3/8** (3x)	1/8	1-1/2	51208	25.60	51508	25.60	51508-C4	38.00	
1/8	**1/2** (4x)	1/8	2	878308	25.60	897408	25.60			NEW
1/8*	**1/2** (4x)	1/4*	2	14108-20	34.70	14208-20	34.70	892028-C4	49.40	
1/8	**5/8** (5x)	1/8	2	51908	30.20	52508	30.20	52508-C4	43.80	
5/32*	**5/8** (4x)	1/4*	2	14110-20	34.70	14210-20	34.70			
5/32	**3/4** (5x)	3/16	3			52510	40.40			
3/16*	**3/8** (2x)	1/4*	2	14112-10	34.70	14212-10	34.70			
3/16	**9/16** (3x)	3/16	2	51212	32.80	51512	32.80	51512-C4	49.90	
3/16*	**5/8** (3x)	1/4*	2	14112-20	34.70	14212-20	34.70	892012-C4	54.10	

*Cutter diameter tolerance is +.000"/-.004". Tools are ground on oversized, router-style shank.

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PLEASE SEE SPEEDS & FEEDS ON PAGE 218

END MILLS FOR PLASTICS

Square Upcut – Single Flute (cont.)

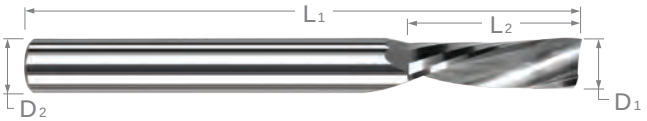
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CUTTER DIAMETER	LENGTH OF CUT	SHANK DIAMETER	OVERALL LENGTH	SOFT PLASTICS		HARD PLASTICS		HARD PLASTICS AMORPHOUS DIAMOND	
D_1 $^{+.000''}_{-.002''}$	L_2 $^{+.030''}_{-.000''}$	D_2	L_1	1 FL	PRICE	1 FL	PRICE	1 FL	PRICE
3/16	**1** (5x)	3/16	3	51912	40.40	52512	40.40	52512-C4	57.50
1/4	**3/8** (1.5x)	1/4	2-1/2	883116	34.70	883816	34.70		
1/4	**3/4** (3x)	1/4	2-1/2	51216	34.70	51516	34.70	51516-C4	54.10
1/4	**1** (4x)	1/4	3	878316	44.90	897416	44.90		
1/4	**1-1/4** (5x)	1/4	3	51916	44.90	52516	44.90	52516-C4	64.30
3/8	**9/16** (1.5x)	3/8	2-1/2	883124	70.50	883824	70.50		
3/8	**1-1/8** (3x)	3/8	2-1/2	51224	70.50	51524	70.50	51524-C4	93.90
NEW 3/8	**1-1/2** (4x)	3/8	4	878324	78.20	897424	78.20		
3/8	**2** (5x)	3/8	4	51924	78.20	52524	78.20		
1/2	**3/4** (1.5x)	1/2	3	883132	120.10	883832	120.10		
1/2	**1-1/2** (3x)	1/2	3	51232	120.10	51532	120.10	51532-C4	148.30
1/2	**2-5/8** (5x)	1/2	5	51932	198.40	52532	198.40		

*Cutter diameter tolerance is +.000"/-.004". Tools are ground on oversized, router-style shank.

END MILLS FOR PLASTICS

Square Downcut – Single Flute



Prevents Fraying, Chip-Out, and Lifting

- **Prevents fraying and chip-out of top edge of work piece**
- Prevents lifting on vacuum tables
- Left hand spiral, right hand cut
- High rake, high relief design produces sharper edge for improved shearing action while transferring heat into the chip
- Resists chip welding
- Solid carbide
- CNC ground in the USA

CUTTER DIAMETER	LENGTH OF CUT	SHANK DIAMETER	OVERALL LENGTH	SOFT PLASTICS		HARD PLASTICS		HARD PLASTICS AMORPHOUS DIAMOND	
D_1 $^{+.000''}_{-.001''}$	L_2 $^{+.010''}_{-.000''}$	D_2	L_1	1 FL	PRICE	1 FL	PRICE	1 FL	PRICE
1/32	**3/32** (3x)	1/8	1-1/2			929731	37.90		

D_1 $^{+.000''}_{-.002''}$	L_2 $^{+.030''}_{-.000''}$	D_2	L_1	1 FL	PRICE	1 FL	PRICE	1 FL	PRICE
1/16	**3/16** (3x)	1/8	1-1/2			929762	37.90		
1/16	**1/4** (4x)	1/4	2			44862	39.90		
1/16	**5/16** (5x)	1/8	2			935362	38.90		
5/64	**5/16** (4x)	1/4	2			44878	39.90		
3/32	**3/8** (4x)	1/4	2			44893	39.90	44893-C4	59.30
1/8	**3/8** (3x)	1/8	1-1/2			929808	36.30		
1/8	**1/2** (4x)	1/4	2	855908	38.10	44908	38.10	44908-C4	57.50
1/8	**5/8** (5x)	1/8	2			935408	37.40		
5/32	**5/8** (4x)	1/4	2			44910	38.10		
3/16	**9/16** (3x)	3/16	2			929812	36.30		
3/16	**5/8** (3x)	1/4	2			44912	38.10		
1/4	**3/4** (3x)	1/4	2-1/2	855916	38.10	44916	38.10	44916-C4	57.50
1/4	**1-1/4** (5x)	1/4	3			935416	69.90		
3/8	**1-1/8** (3x)	3/8	3			44924	65.40		
3/8	**2** (5x)	3/8	4			935424	112.00		
1/2	**1-1/2** (3x)	1/2	4			44932	153.80		
1/2	**2-5/8** (5x)	1/2	5			935432	236.20		

SPEEDS & FEEDS (Single Flute Plastic Cutting End Mills)

Important Note: Values in table are in inches and are based on standard (3x Dia) length of cut end mills. For shorter lengths of cuts, table values of IPT must be increased (for 1.5x, increase to 115%). For longer lengths of cut, table values of IPT must be reduced (for 4x, reduce 95%, for 5x, reduce to 90%). For complete speeds and feeds charts, please see www.harveytool.com

Material Type		SFM		Chip Load Per Tooth (IPT) By Cutter Diameter														Depth of Cut	
				.015	.031	.047	.062	.078	.093	.125	.187	.250	.312	.375	.500	.625	.750	Radial	Axial
Unfilled	Unfilled	800-1200	Slot - Rough	.0006	.0013	.0020	.0027	.0033	.0040	.0054	.0080	.0107	.0114	.0137	.0182	.0228	.0273	1 x Dia	1 x Dia
			Profile	.0007	.0015	.0023	.0031	.0038	.0046	.0062	.0092	.0123	.0131	.0157	.0210	.0262	.0315	.35 x Dia	1 x Dia
Filled Plastics	Carbon/ Glass Filled 5% < 20%	600-800	Slot - Rough	.0006	.0013	.0020	.0027	.0033	.0040	.0054	.0080	.0107	.0114	.0137	.0182	.0228	.0273	1 x Dia	1 x Dia
			Profile	.0007	.0015	.0023	.0031	.0038	.0046	.0062	.0092	.0123	.0131	.0157	.0210	.0262	.0315	.35 x Dia	1 x Dia
	Carbon/ Glass Filled 21% < 40%	500-700	Slot - Rough	.0005	.0011	.0016	.0022	.0027	.0033	.0044	.0066	.0088	.0093	.0112	.0149	.0186	.0224	1 x Dia	1 x Dia
			Profile	.0006	.0013	.0019	.0025	.0031	.0038	.0050	.0075	.0101	.0107	.0129	.0172	.0214	.0257	.35 x Dia	1 x Dia
Fiber Reinforced	Carbon/ Glass Fiber 5% < 20%	500-700	Slot - Rough	.0006	.0013	.0020	.0027	.0033	.0040	.0054	.0080	.0107	.0114	.0137	.0182	.0228	.0273	1 x Dia	1 x Dia
			Profile	.0007	.0015	.0023	.0031	.0038	.0046	.0062	.0092	.0123	.0131	.0157	.0210	.0262	.0315	.35 x Dia	1 x Dia
	Carbon/ Glass Fiber 21% < 40%	300-400	Slot - Rough	.0005	.0011	.0016	.0022	.0027	.0033	.0044	.0066	.0088	.0093	.0112	.0149	.0186	.0224	1 x Dia	1 x Dia
			Profile	.0006	.0013	.0019	.0025	.0031	.0038	.0050	.0075	.0101	.0107	.0129	.0172	.0214	.0257	.35 x Dia	1 x Dia

END MILLS FOR PLASTICS

Ball Upcut – Single Flute



- Design allows for maximum stock removal while maintaining excellent finish
- High rake, high relief design produces sharper edge for improved shearing action while transferring heat into the chip
- Large flute valley creates room for the chip and aids in chip evacuation
- Slower helix reduces lifting forces, making design preferable for fiber-reinforced applications and vacuum table setups
- High flute finish resists chip welding
- Will ramp or plunge if required
- Right hand spiral, right hand cut
- Solid carbide
- CNC ground in the USA

CUTTER DIAMETER	LENGTH OF CUT	SHANK DIAMETER	OVERALL LENGTH	UNCOATED	
D_1 $^{+.000''}_{-.002''}$	L_2 $^{+.030''}_{-.000''}$	D_2	L_1	1 FL	PRICE
1/16	**3/16** (3x)	1/8	1-1/2	869562	29.70
1/16	**5/16** (5x)	1/8	2	842262	36.20
3/32	**9/32** (3x)	1/8	1-1/2	869593	29.70
3/32	**1/2** (5x)	1/8	2	842293	36.20
1/8	**3/8** (3x)	1/8	1-1/2	869608	29.70
1/8	**5/8** (5x)	1/8	2	842308	36.20
3/16	**9/16** (3x)	3/16	2	869612	38.20
1/4	**3/4** (3x)	1/4	2-1/2	869616	41.80
3/8	**1-1/8** (3x)	3/8	2-1/2	869624	79.20

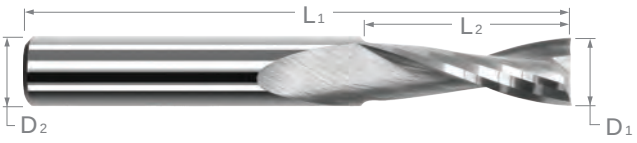
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END MILLS FOR PLASTICS

Square Upcut – 2 Flute (Slow Helix)



2 Flute Design Improves Bottom Finish and Accuracy

- High rake, high relief design with large flute valley maximizes chip removal and performance
- 2 flute design improves rigidity for better accuracy, less deflection, and longer tool life
- Slower helix reduces lifting forces, making design preferable for fiber-reinforced applications and vacuum table setups
- Center cutting design improves plunging and ramping
- Solid carbide
- CNC ground in the USA

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CUTTER DIAMETER		LENGTH OF CUT	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AMORPHOUS DIAMOND	
D_1 +.000″ −.001″	decimal equivalent	L_2 +.010″ −.000″	D_2	L_1	2 FL	PRICE	2 FL	PRICE
.008	.0080	**.024** (3x)	1/8	1-1/2	48608	62.50		
.008	.0080	**.040** (5x)	1/8	1-1/2	49808	63.10		
.010	.0010	**.030** (3x)	1/8	1-1/2	48610	59.60		
.010	.0010	**.050** (5x)	1/8	1-1/2	49810	67.80		
1/64	.0156	**.023** (1.5x)	1/8	1-1/2	957615	51.00		
1/64	.0156	**3/64** (3x)	1/8	1-1/2	48615	51.00		
1/64	.0156	**5/64** (5x)	1/8	1-1/2	49815	59.20		
1/64	.0156	**1/8** (8x)	1/8	1-1/2	60215	66.50		
.020	.0200	**.030** (1.5x)	1/8	1-1/2	957620	38.90		
.020	.0200	**.060** (3x)	1/8	1-1/2	48620	38.90	48620-C4	51.30
.020	.0200	**.100** (5x)	1/8	1-1/2	49820	47.30		
.020	.0200	**.160** (8x)	1/8	1-1/2	60220	54.60		
.020	.0200	**.200** (10x)	1/8	1-1/2	938920	54.60		
.025	.0250	**.038** (1.5x)	1/8	1-1/2	957625	38.90		
.025	.0250	**.075** (3x)	1/8	1-1/2	48625	38.90		
.025	.0250	**1/8** (5x)	1/8	1-1/2	49825	47.10	49825-C4	59.50
.025	.0250	**13/64** (8x)	1/8	1-1/2	60225	54.60		
.030	.0300	**.090** (3x)	1/8	1-1/2	48630	38.90		
.030	.0300	**.156** (5x)	1/8	1-1/2	49830	47.30		
1/32	.0312	**3/64** (1.5x)	1/8	1-1/2	957631	38.60		
1/32	.0312	**3/32** (3x)	1/8	1-1/2	48631	38.60	48631-C4	51.00
1/32	.0312	**3/32** (3x)	1/4	2	878731	47.80		
1/32	.0312	**5/32** (5x)	1/8	1-1/2	49831	47.10	49831-C4	59.50
1/32	.0312	**1/4** (8x)	1/8	1-1/2	60231	53.90	60231-C4	66.30
1/32	.0312	**5/16** (10x)	1/8	1-1/2	938931	53.90		
.035	.0350	**.105** (3x)	1/8	1-1/2	48635	38.90		
.039 (1 mm)	.0394	**.118** (3x)	1/8	1-1/2	48639	39.10		
.039 (1 mm)	.0394	**13/64** (5x)	1/8	1-1/2	49839	39.10		
.040	.0400	**.060** (1.5x)	1/8	1-1/2	957640	38.90		
.040	.0400	**.120** (3x)	1/8	1-1/2	48640	38.90		
.040	.0400	**13/64** (5x)	1/8	1-1/2	49840	47.30		
.040	.0400	**.325** (8x)	1/8	2	60240	54.60		
.045	.0450	**.135** (3x)	1/8	1-1/2	48645	38.90		
3/64	.0469	**.071** (1.5x)	1/8	1-1/2	957647	32.70		
3/64	.0469	**9/64** (3x)	1/8	1-1/2	48647	32.70	48647-C4	45.10
3/64	.0469	**1/4** (5x)	1/8	1-1/2	49847	38.00	49847-C4	50.40
3/64	.0469	**3/8** (8x)	1/8	2	60247	45.60		
.050	.0500	**.150** (3x)	1/8	1-1/2	48650	33.00		
.050	.0500	**.250** (5x)	1/8	1-1/2	49850	38.30		

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END MILLS FOR PLASTICS

Square Upcut – 2 Flute (Slow Helix) (cont.)

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CUTTER DIAMETER		LENGTH OF CUT	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AMORPHOUS DIAMOND	
D_1 +.000″ −.001″	decimal equivalent	L_2 +.010″ −.000″	D_2	L_1	2 FL	PRICE	2 FL	PRICE
.055	.0550	**.165** (3x)	1/8	1-1/2	48655	33.00		
.060	.0600	**.180** (3x)	1/8	1-1/2	48660	33.00		
.060	.0600	**5/16** (5x)	1/8	1-1/2	49860	38.30		

D_1 +.000″ −.002″ +.00mm −.05mm	decimal equivalent	L_2 +.030″ −.000″ +.75mm −.00mm	D_2	L_1	2 FL	PRICE	2 FL	PRICE
1/16	.0625	**3/32** (1.5x)	1/8	1-1/2	957662	28.70		
1/16	.0625	**3/16** (3x)	1/8	1-1/2	48662	28.70	48662-C4	41.10
1/16	.0625	**3/16** (3x)	1/4	2	878762	37.90		
1/16	.0625	**1/4** (4x)	1/8	2	874862	33.90		
1/16	.0625	**5/16** (5x)	1/8	2	49862	33.90	49862-C4	47.50
1/16	.0625	**1/2** (8x)	1/8	2	60262	41.80	60262-C4	55.80
1/16	.0625	**5/8** (10x)	1/8	2	938962	41.80		
5/64	.0781	**.117** (1.5x)	1/8	1-1/2	957678	28.70		
5/64	.0781	**15/64** (3x)	1/8	1-1/2	48678	28.70	48678-C4	41.10
5/64	.0781	**13/32** (5x)	1/8	2	49878	33.90	49878-C4	47.50
5/64	.0781	**5/8** (8x)	1/8	2	60278	41.80		
5/64	.0781	**.800** (10x)	1/8	2	938978	41.80		
3/32	.0937	**9/64** (1.5x)	1/8	1-1/2	957693	28.70	957693-C4	41.10
3/32	.0937	**9/32** (3x)	1/8	1-1/2	48693	28.70	48693-C4	41.10
3/32	.0937	**9/32** (3x)	1/4	2	878793	37.90		
3/32	.0937	**3/8** (4x)	1/8	2	874893	33.90		
3/32	.0937	**1/2** (5x)	1/8	2	49893	33.90	49893-C4	47.50
3/32	.0937	**3/4** (8x)	1/8	2	60293	41.80	60293-C4	55.80
3/32	.0937	**.950** (10x)	1/8	2	938993	41.80		
.100	.1000	**.150** (1.5x)	1/8	1-1/2	957700	28.80		
.100	.1000	**.300** (3x)	1/8	1-1/2	48700	28.80		
.100	.1000	**1/2** (5x)	1/8	2	49900	34.40		
.100	.1000	**.800** (8x)	1/8	2-1/2	60300	42.30		
7/64	.1090	**21/64** (3x)	1/8	1-1/2	48707	28.80		
.118 (3 mm)	.1181	**.177** (1.5x)	1/8	1-1/2	957706	28.80		
.118 (3 mm)	.1181	**.354** (3x)	1/8	1-1/2	48706	28.80		
.118 (3 mm)	.1181	**.625** (5x)	1/8	2	49906	34.40		
.118 (3 mm)	.1181	**.950** (8x)	1/8	2-1/2	60306	42.30		
1/8	.1250	**.100** (0.8x)	1/8	1-1/2	793208	28.70		
1/8	.1250	**3/16** (1.5x)	1/8	1-1/2	957708	28.70	957708-C4	41.10
1/8	.1250	**3/8** (3x)	1/8	1-1/2	48708	28.70	48708-C4	41.10
1/8	.1250	**3/8** (3x)	1/4	2	878808	37.90		
1/8	.1250	**1/2** (4x)	1/8	2	874908	33.90		
1/8	.1250	**5/8** (5x)	1/8	2	49908	33.90	49908-C4	47.50
1/8	.1250	**1** (8x)	1/8	2-1/2	60308	41.80	60308-C4	54.20
1/8	.1250	**1-1/4** (10x)	1/8	2-1/2	939008	41.80	939008-C4	54.20
9/64	.1406	**27/64** (3x)	3/16	2	48709	38.00		
9/64	.1406	**3/4** (5x)	3/16	3	49909	37.90		
5/32	.1562	**15/64** (1.5x)	3/16	2	957710	37.90		
5/32	.1562	**15/32** (3x)	3/16	2	48710	37.90	48710-C4	55.00
5/32	.1562	**3/4** (5x)	3/16	3	49910	46.70	49910-C4	63.80
5/32	.1562	**1-1/4** (8x)	3/16	3	60310	51.30		

continued on next page

END MILLS FOR PLASTICS

Square Upcut – 2 Flute (Slow Helix) (cont.)

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continued from previous page

CUTTER DIAMETER D_1 +.000″ −.002″	+.00mm −.05mm	decimal equivalent	LENGTH OF CUT L_2 +.030″ −.000″ +.75mm −.00mm		SHANK DIAMETER D_2	OVERALL LENGTH L_1	UNCOATED 2 FL	UNCOATED PRICE	AMORPHOUS DIAMOND 2 FL	AMORPHOUS DIAMOND PRICE
3/16		.1875	**9/32**	(1.5x)	3/16	2	957712	37.90	957712-C4	55.00
3/16		.1875	**9/16**	(3x)	3/16	2	48712	37.90	48712-C4	55.00
3/16		.1875	**9/16**	(3x)	1/4	2	878812	47.10		
3/16		.1875	**3/4**	(4x)	3/16	3	874912	46.70		
3/16		.1875	**1**	(5x)	3/16	3	49912	46.70	49912-C4	63.80
3/16		.1875	**1-1/2**	(8x)	3/16	3	60312	51.30		
3/16		.1875	**1-7/8**	(10x)	3/16	3	939012	51.30		
1/4		.2500	**.200**	(0.8x)	1/4	2-1/2	793216	46.70		
1/4		.2500	**3/8**	(1.5x)	1/4	2-1/2	957716	46.70	957716-C4	66.10
1/4		.2500	**3/4**	(3x)	1/4	2-1/2	48716	46.70	48716-C4	66.10
1/4		.2500	**1**	(4x)	1/4	3	874916	53.50		
1/4		.2500	**1-1/4**	(5x)	1/4	3	49916	53.50	49916-C4	72.90
1/4		.2500	**2**	(8x)	1/4	4	60316	66.90	60316-C4	86.30
1/4		.2500	**2-1/2**	(10x)	1/4	4	939016	66.90		
	6.0 mm	.2362	**18 mm**	(3x)	6 mm	63 mm	886566	74.60		
5/16		.3125	**15/32**	(1.5x)	5/16	2-1/2	957720	69.50		
5/16		.3125	**1**	(3x)	5/16	2-1/2	48720	69.50		
5/16		.3125	**1-5/8**	(5x)	5/16	4	49920	89.80		
	8.0 mm	.3149	**24 mm**	(3x)	8 mm	63 mm	886570	99.90		
3/8		.3750	**9/16**	(1.5x)	3/8	3	957724	80.20	957724-C4	103.60
3/8		.3750	**1-1/8**	(3x)	3/8	3	48724	80.20	48724-C4	103.60
3/8		.3750	**1-1/2**	(4x)	3/8	4	874924	92.50		
3/8		.3750	**2**	(5x)	3/8	4	49924	92.50		
3/8		.3750	**3**	(8x)	3/8	6	60324	104.40		
	10.0 mm	.3937	**30 mm**	(3x)	10 mm	75 mm	886573	89.50		
	12.0 mm	.4724	**36 mm**	(3x)	12 mm	100 mm	886576	93.00		
1/2		.5000	**3/4**	(1.5x)	1/2	4	957732	141.20	957732-C4	169.30
1/2		.5000	**1-1/2**	(3x)	1/2	4	48732	141.20	48732-C4	169.30
1/2		.5000	**2**	(4x)	1/2	4	874932	152.70		
1/2		.5000	**2-5/8**	(5x)	1/2	5	49932	168.10	49932-C4	196.60
1/2		.5000	**4**	(8x)	1/2	7	60332	193.50		
5/8		.6250	**15/16**	(1.5x)	5/8	4	957740	204.10		
3/4		.7500	**1-1/8**	(1.5x)	3/4	4	957748	265.70		
3/4		.7500	**2-1/4**	(3x)	3/4	4	48748	265.70		

SPEEDS & FEEDS (2 Flute Plastic Cutting End Mills - Slow Helix)

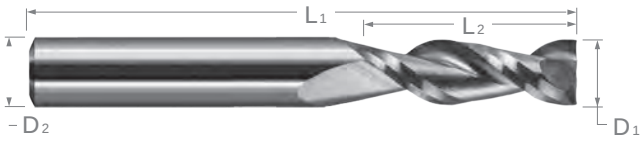
Important Note: Values are in inches and are based on standard (3x Dia) length of cut end mills. For shorter lengths of cut, table values of IPT must be increased (for 0.8x, increase 120%, for 1.5x, increase 115%). For longer lengths of cuts, table values of IPT must be reduced (for 4x, reduce to 95%; for 5x, reduce to 90%; for 8x, reduce to 54%; for 10x, reduce to 40%). For complete speeds and feeds charts, please see www.harveytool.com

Material Type		SFM		Chip Load Per Tooth (IPT) By Cutter Diameter .015	.031	.047	.062	.078	.093	.125	.187	.250	.312	.375	.500	.625	.750	Depth of Cut Radial	Axial
Unfilled	Unfilled	800-1200	Slot - Rough	.0005	.0010	.0015	.0020	.0025	.0030	.0040	.0060	.0080	.0085	.0103	.0137	.0171	.0205	1 x Dia	1 x Dia
			Profile	.0006	.0011	.0017	.0023	.0029	.0034	.0046	.0069	.0093	.0098	.0118	.0157	.0197	.0236	.35 x Dia	1 x Dia
Filled Plastics	Carbon/Glass Filled 5% < 20%	600-800	Slot - Rough	.0005	.0010	.0015	.0020	.0025	.0030	.0040	.0060	.0080	.0085	.0103	.0137	.0171	.0205	1 x Dia	1 x Dia
			Profile	.0006	.0011	.0017	.0023	.0029	.0034	.0046	.0069	.0093	.0098	.0118	.0157	.0197	.0236	.35 x Dia	1 x Dia
	Carbon/Glass Filled 21% < 40%	500-700	Slot - Rough	.0004	.0008	.0012	.0016	.0021	.0024	.0033	.0049	.0066	.0070	.0084	.0112	.0140	.0168	1 x Dia	1 x Dia
			Profile	.0005	.0009	.0014	.0019	.0024	.0028	.0038	.0057	.0076	.0080	.0096	.0129	.0161	.0193	.35 x Dia	1 x Dia
Fiber Reinforced	Carbon/Glass Fiber 5% < 20%	500-700	Slot - Rough	.0005	.0010	.0015	.0020	.0025	.0030	.0040	.0060	.0080	.0085	.0103	.0137	.0171	.0205	1 x Dia	1 x Dia
			Profile	.0006	.0011	.0017	.0023	.0029	.0034	.0046	.0069	.0093	.0098	.0118	.0157	.0197	.0236	.35 x Dia	1 x Dia
	Carbon/Glass Fiber 21% < 40%	300-400	Slot - Rough	.0004	.0008	.0012	.0016	.0021	.0024	.0033	.0049	.0066	.0070	.0084	.0112	.0140	.0168	1 x Dia	1 x Dia
			Profile	.0005	.0009	.0014	.0019	.0024	.0028	.0038	.0057	.0076	.0080	.0096	.0129	.0161	.0193	.35 x Dia	1 x Dia

NEW SIZES!

END MILLS FOR PLASTICS

Square Upcut – 2 Flute (High Helix)



2 Flute Design Improves Bottom Finish and Accuracy

- High rake, high relief design with large flute valley maximizes chip removal performance
- 2 flute design improves rigidity for better accuracy, less deflection, and longer tool life
- Higher helix (approx. 40°) for faster chip removal and better finish
- Center cutting design improves plunging and ramping
- Solid carbide
- CNC ground in the USA

	CUTTER DIAMETER	LENGTH OF CUT	SHANK DIAMETER	OVERALL LENGTH	UNCOATED	
	D_1 +.000″ −.001″	L_2 +.010″ −.000″	D_2	L_1	2 FL	PRICE
	1/32	**3/32** (3x)	1/8	1-1/2	898131	49.20
NEW	3/64	**9/64** (3x)	1/8	1-1/2	898147	36.20
	D_1 +.000″ −.002″	L_2 +.030″ −.000″	D_2	L_1	2 FL	PRICE
NEW	1/16	**3/32** (1.5x)	1/8	1-1/2	827662	36.20
	1/16	**3/16** (3x)	1/8	1-1/2	898162	36.20
	1/16	**5/16** (5x)	1/8	2	866262	38.50
NEW	5/64	**15/64** (3x)	1/8	1-1/2	898178	36.20
	3/32	**9/32** (3x)	1/8	1-1/2	898193	36.20
	1/8	**3/16** (1.5x)	1/8	1-1/2	827708	36.20
	1/8	**3/8** (3x)	1/8	1-1/2	898208	36.20
	1/8	**5/8** (5x)	1/8	2	866308	38.50
	5/32	**15/32** (3x)	3/16	2	898210	51.30
	3/16	**9/16** (3x)	3/16	2	898212	49.80
	3/16	**1** (5x)	3/16	3	866312	53.30
	1/4	**3/8** (1.5x)	1/4	2-1/2	827716	56.00
	1/4	**3/4** (3x)	1/4	2-1/2	898216	56.00
	1/4	**1-1/4** (5x)	1/4	3	866316	59.80
NEW	3/8	**9/16** (1.5x)	3/8	3	827724	84.90
	3/8	**1-1/8** (3x)	3/8	3	898224	84.90
	3/8	**2** (5x)	3/8	4	866324	90.80
NEW	1/2	**3/4** (1.5x)	1/2	4	827732	146.40
	1/2	**1-1/2** (3x)	1/2	4	898232	146.40
	1/2	**2-5/8** (5x)	1/2	5	866332	156.50

SPEEDS & FEEDS (2 Flute Plastic Cutting End Mills - High Helix)

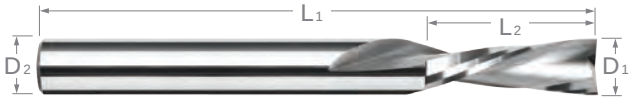
Important Note: Values are in inches and are based on standard (3x Dia) length of cut end mills. For shorter lengths of cut, table values of IPT must be increased (for 1.5x, increase 115%). For longer lengths of cuts, table values of IPT must be reduced (for 5x, reduce to 90%). For complete speeds and feeds charts, please see www.harveytool.com

Material Type		SFM		Chip Load Per Tooth (IPT) By Cutter Diameter													Depth of Cut	
				.015	.031	.047	.062	.078	.093	.125	.187	.250	.312	.375	.500	.625	.750	Radial	Axial
Unfilled	Unfilled	800-1200	Slot - Rough	.0006	.0012	.0018	.0024	.0030	.0036	.0048	.0072	.0097	.0102	.0123	.0164	.0205	.0246	1 x Dia	1 x Dia
			Profile	.0007	.0014	.0021	.0028	.0035	.0041	.0056	.0083	.0111	.0118	.0142	.0189	.0236	.0283	.35 x Dia	1 x Dia
Filled Plastics	Carbon/Glass Filled 5% < 20%	600-800	Slot - Rough	.0006	.0012	.0018	.0024	.0030	.0036	.0048	.0072	.0097	.0102	.0123	.0164	.0205	.0246	1 x Dia	1 x Dia
			Profile	.0007	.0014	.0021	.0028	.0035	.0041	.0056	.0083	.0111	.0118	.0142	.0189	.0236	.0283	.35 x Dia	1 x Dia
	Carbon/Glass Filled 21% < 40%	500-700	Slot - Rough	.0005	.0010	.0015	.0020	.0025	.0029	.0039	.0059	.0079	.0084	.0101	.0134	.0168	.0201	1 x Dia	1 x Dia
			Profile	.0005	.0011	.0017	.0023	.0028	.0034	.0045	.0068	.0091	.0096	.0116	.0154	.0193	.0232	.35 x Dia	1 x Dia
Fiber Reinforced	Carbon/Glass Fiber 5% < 20%	500-700	Slot - Rough	.0006	.0012	.0018	.0024	.0030	.0036	.0048	.0072	.0097	.0102	.0123	.0164	.0205	.0246	1 x Dia	1 x Dia
			Profile	.0007	.0014	.0021	.0028	.0035	.0041	.0056	.0083	.0111	.0118	.0142	.0189	.0236	.0283	.35 x Dia	1 x Dia
	Carbon/Glass Fiber 21% < 40%	300-400	Slot - Rough	.0005	.0010	.0015	.0020	.0025	.0029	.0039	.0059	.0079	.0084	.0101	.0134	.0168	.0201	1 x Dia	1 x Dia
			Profile	.0005	.0011	.0017	.0023	.0028	.0034	.0045	.0068	.0091	.0096	.0116	.0154	.0193	.0232	.35 x Dia	1 x Dia

NEW SIZES!

END MILLS FOR PLASTICS

Square Downcut – 2 Flute (Slow Helix)



- **Prevents fraying and chip-out on the top of the workpiece**
- Prevents lifting on vacuum tables
- 2 left hand spiral, right hand cut flutes
- High rake, high relief design with large flute valley maximizes chip removal and performance
- 2 flute design improves rigidity for better accuracy, less deflection, and longer tool life
- Solid carbide
- CNC ground in the USA

CUTTER DIAMETER	LENGTH OF CUT	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AMORPHOUS DIAMOND		
D_1 +.000″ −.001″	L_2 +.010″ −.000″	D_2	L_1	2 FL	PRICE	2 FL	PRICE	
.010	**.030** (3x)	1/8	1-1/2	998510	61.60			
1/64	**.023** (1.5x)	1/8	1-1/2	966215	56.20			
1/64	**3/64** (3x)	1/8	1-1/2	998515	56.20	998515-C4	68.60	
1/64	**5/64** (5x)	1/8	1-1/2	999815	64.50			
.020	**.030** (1.5x)	1/8	1-1/2	966220	43.90			
.020	**.060** (3x)	1/8	1-1/2	998520	43.90	998520-C4	56.30	NEW
.025	**.075** (3x)	1/8	1-1/2	998525	43.90			
1/32	**3/64** (1.5x)	1/8	1-1/2	966231	43.90			
1/32	**3/32** (3x)	1/8	1-1/2	998531	43.90	998531-C4	56.30	
1/32	**5/32** (5x)	1/8	1-1/2	999831	52.20			
.040	**.120** (3x)	1/8	1-1/2	998540	43.90	998540-C4	56.30	NEW
.040	**.203** (5x)	1/8	1-1/2	999840	52.20			
3/64	**.071** (1.5x)	1/8	1-1/2	966247	37.80			
3/64	**9/64** (3x)	1/8	1-1/2	998547	37.80			
3/64	**1/4** (5x)	1/8	1-1/2	999847	43.40			
.050	**.150** (3x)	1/8	1-1/2	998550	43.90			
.060	**.180** (3x)	1/8	1-1/2	998560	43.90			

D_1 +.000″ −.002″	L_2 +.030″ −.000″	D_2	L_1	2 FL	PRICE	2 FL	PRICE
1/16	**3/32** (1.5x)	1/8	1-1/2	966262	33.90		
1/16	**3/16** (3x)	1/8	1-1/2	998562	33.90	998562-C4	46.30
1/16	**1/4** (4x)	1/8	2	827462	45.30		
1/16	**5/16** (5x)	1/8	2	999862	45.30	999862-C4	63.50
1/16	**1/2** (8x)	1/8	2	978962	75.70		
5/64	**.117** (1.5x)	1/8	1-1/2	966278	33.90		
5/64	**15/64** (3x)	1/8	1-1/2	998578	33.90		
5/64	**13/32** (5x)	1/8	2	999878	45.30		
5/64	**5/8** (8x)	1/8	2	978978	75.70		

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Check Out All of Our Plastic Cutting Solutions!

END MILLS FOR PLASTICS

Square Downcut – 2 Flute (Slow Helix) (cont.)

continued from previous page

	CUTTER DIAMETER	LENGTH OF CUT	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AMORPHOUS DIAMOND	
	D_1 $^{+.000''}_{-.002''}$	L_2 $^{+.030''}_{-.000''}$	D_2	L_1	2 FL	PRICE	2 FL	PRICE
	3/32	**9/64** (1.5x)	1/8	1-1/2	966293	33.90		
	3/32	**9/32** (3x)	1/8	1-1/2	998593	33.90	998593-C4	46.30
	3/32	**3/8** (4x)	1/8	2	827493	45.30		
	3/32	**1/2** (5x)	1/8	2	999893	45.30		
	3/32	**3/4** (8x)	1/8	2	978993	75.70		
	.118 (3 mm)	**.354** (3x)	1/8	1-1/2	998606	33.90		
	1/8	**3/16** (1.5x)	1/8	1-1/2	966308	33.90	966308-C4	46.30
	1/8	**3/8** (3x)	1/8	1-1/2	998608	33.90	998608-C4	46.30
	1/8	**1/2** (4x)	1/8	2	827508	45.30		
	1/8	**5/8** (5x)	1/8	2	999908	45.30		
	1/8	**1** (8x)	1/8	2-1/2	979008	75.70		
	9/64	**.425** (3x)	3/16	2	998609	46.00		
	5/32	**15/64** (1.5x)	3/16	2	966310	46.00		
NEW	5/32	**15/32** (3x)	3/16	2	998610	46.00	998610-C4	63.10
	5/32	**3/4** (5x)	3/16	3	999910	54.60		
	3/16	**9/32** (1.5x)	3/16	2	966312	46.00		
	3/16	**9/16** (3x)	3/16	2	998612	46.00	998612-C4	63.10
	3/16	**1** (5x)	3/16	3	999912	54.60		
	3/16	**1-1/2** (8x)	3/16	3	979012	81.10		
	1/4	**3/8** (1.5x)	1/4	2-1/2	966316	54.60	966316-C4	74.00
	1/4	**3/4** (3x)	1/4	2-1/2	998616	54.60	998616-C4	74.00
	1/4	**1** (4x)	1/4	3	827516	59.60		
	1/4	**1-1/4** (5x)	1/4	3	999916	59.60	999916-C4	79.00
	1/4	**2** (8x)	1/4	4	979016	87.80		
	5/16	**1** (3x)	5/16	2-1/2	998620	81.60		
	3/8	**9/16** (1.5x)	3/8	3	966324	92.80		
	3/8	**1-1/8** (3x)	3/8	3	998624	92.80	998624-C4	116.20
	3/8	**2** (5x)	3/8	4	999924	108.80		
	1/2	**3/4** (1.5x)	1/2	4	966332	167.20		
	1/2	**1-1/2** (3x)	1/2	4	998632	167.20	998632-C4	195.30
	1/2	**2-5/8** (5x)	1/2	5	999932	185.30		

PLEASE SEE SPEEDS & FEEDS ON PAGE 222

Plastic Cutting End Mills vs. Metal Cutting End Mills

Improved Finish - Sharper edge provides for cleaner cut and less plowing action. Chips curl faster, transferring heat to the chip, not the part.

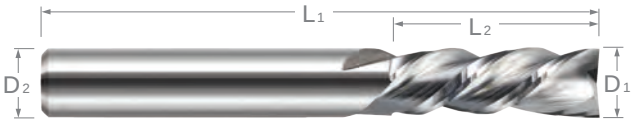
Increased Stock Removal - Large flute opening gives more chip clearance, avoids chip welding, and improves chip evacuation.

Feature	Typical Metal Working End Mills	Plastic Cutting End Mills
Flute Rake	8° – 12°	25° – 32°
Axial/End Gash Rake	2° – 4°	8° – 12°
OD Primary Relief	12° – 18°	18° – 26°
OD Secondary Relief	18° – 26°	35° – 45°
Core Diameter	56% – 60%	40% – 44%
Typical Cross Section	 2 FLUTE STANDARD	 SINGLE FLUTE 2 FLUTE 2 STRAIGHT FLUTE

Data presented is intended to be general guidelines for understanding how plastic end mill geometry compares to metal working tools. Actual values will change based on diameter, application and specific tool.

END MILLS FOR PLASTICS

Square Downcut – 2 Flute (High Helix)



- **Prevents fraying and chip-out on the top of the workpiece**
- Prevents lifing on vacuum tables
- 2 left hand spiral, right hand cut flutes
- High rake, high relief design with large flute valley maximizes chip removal and performance
- Higher helix (approx. 40°) for faster chip removal and better finish
- Solid carbide
- CNC ground in the USA

CUTTER DIAMETER	LENGTH OF CUT	SHANK DIAMETER	OVERALL LENGTH	UNCOATED	
D_1 $^{+.000''}_{-.002''}$	L_2 $^{+.030''}_{-.000''}$	D_2	L_1	2 FL	PRICE
1/16	**3/16** (3x)	1/8	1-1/2	775862	40.50
1/16	**5/16** (5x)	1/8	2	826362	45.30
3/32	**9/32** (3x)	1/8	1-1/2	775893	40.50
3/32	**1/2** (5x)	1/8	2	826393	45.30
1/8	**3/8** (3x)	1/8	1-1/2	775908	40.50
1/8	**5/8** (5x)	1/8	2	826408	45.30
3/16	**9/16** (3x)	3/16	2	775912	48.90
3/16	**1** (5x)	3/16	3	826412	54.60
1/4	**3/4** (3x)	1/4	2-1/2	775916	53.90
1/4	**1-1/4** (5x)	1/4	3	826416	59.60
3/8	**1-1/8** (3x)	3/8	3	775924	99.10
3/8	**2** (5x)	3/8	4	826424	108.80
1/2	**1-1/2** (3x)	1/2	4	775932	168.60
1/2	**2-5/8** (5x)	1/2	5	826432	185.30

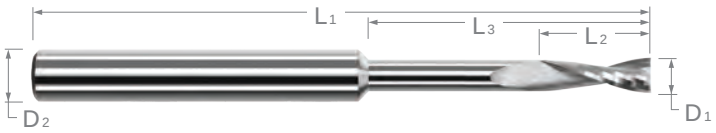
PLEASE SEE SPEEDS & FEEDS ON PAGE 223

View a comprehensive library of **Speeds & Feeds** charts for every Harvey Tool End Mill on the new Harveytool.com.

Access **Simulation Files** in DXF format for every Harvey Tool product, downloadable now from the new Harveytool.com.

END MILLS FOR PLASTICS

Square Upcut – Long Reach – 2 Flute



- High rake, high relief design with large flute valley maximizes chip removal and performance
- Center cutting design improves plunging and ramping
- Reduced neck diameter to avoid heeling
- Length of cut = 3x diameter
- Solid carbide
- CNC ground in the USA

CUTTER DIAMETER	LENGTH OF CUT	OVERALL REACH	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AMORPHOUS DIAMOND	
D_1 +.000″ −.001″	L_2 +.010″ −.000″	L_3 +.010″ −.000″	D_2	L_1	2 FL	PRICE	2 FL	PRICE
1/64	3/64	**1/8** (8x)	1/8	1-1/2	989015	65.30		
1/64	3/64	**3/16** (12x)	1/8	1-1/2	994115	68.60		
.020	.060	**.160** (8x)	1/8	1-1/2	989020	53.00		
.020	.060	**1/4** (12x)	1/8	1-1/2	994120	56.00		
1/32	3/32	**5/32** (5x)	1/8	1-1/2	961531	51.50		
1/32	3/32	**1/4** (8x)	1/8	1-1/2	989031	53.00		
1/32	3/32	**3/8** (12x)	1/8	1-1/2	994131	56.00		
1/32	3/32	**15/32** (15x)	1/8	1-1/2	979731	59.40		
.040	.120	**.325** (8x)	1/8	1-1/2	989040	53.00		
.040	.120	**.480** (12x)	1/8	1-1/2	994140	56.00		
3/64	9/64	**3/8** (8x)	1/8	1-1/2	989047	47.10		
3/64	9/64	**9/16** (12x)	1/8	1-1/2	994147	50.10		
D_1 +.000″ −.002″	L_2 +.030″ −.000″	L_3 +.030″ −.000″	D_2	L_1	2 FL	PRICE	2 FL	PRICE
1/16	3/16	**5/16** (5x)	1/8	1-1/2	961562	42.10		
1/16	3/16	**1/2** (8x)	1/8	1-1/2	989062	43.20	989062-C4	55.60
1/16	3/16	**3/4** (12x)	1/8	2	994162	46.20		
1/16	3/16	**15/16** (15x)	1/8	2	979762	49.60		
5/64	15/64	**5/8** (8x)	1/8	2	989078	43.20		
5/64	15/64	**15/16** (12x)	1/8	2	994178	46.20		
3/32	9/32	**1/2** (5x)	1/8	1-1/2	961593	42.10		
3/32	9/32	**3/4** (8x)	1/8	2	989093	43.20		
3/32	9/32	**1-1/8** (12x)	1/8	2	994193	46.20		
3/32	9/32	**1-13/32** (15x)	1/8	2-1/2	979793	49.60		
1/8	3/8	**5/8** (5x)	1/8	1-1/2	961608	42.10		
1/8	3/8	**1** (8x)	1/8	2	989108	43.20	989108-C4	61.40
1/8	3/8	**1-1/2** (12x)	1/8	2-1/2	994208	46.20		
1/8	3/8	**1-7/8** (15x)	1/8	3	979808	49.60		
5/32	15/32	**1-1/4** (8x)	3/16	2-1/2	989110	52.10		
5/32	15/32	**1-7/8** (12x)	3/16	4	994210	60.70		
3/16	9/16	**1-1/2** (8x)	3/16	2-1/2	989112	52.10		
3/16	9/16	**2-1/4** (12x)	3/16	4	994212	60.70		
1/4	3/4	**2** (8x)	1/4	4	989116	61.90	989116-C4	81.30
1/4	3/4	**3** (12x)	1/4	6	994216	73.90		
3/8	1-1/8	**3** (8x)	3/8	6	989124	112.70		
1/2	1-1/2	**4** (8x)	1/2	7	989132	205.10		

PLEASE SEE SPEEDS & FEEDS ON PAGE 229

END MILLS FOR PLASTICS

Ball Upcut – 2 Flute



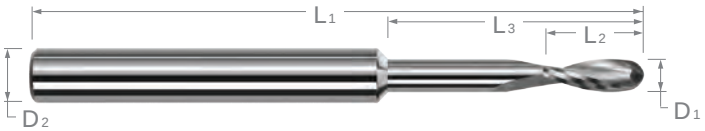
- Ball end for profiling complex shapes
- Ball end has increased rake and relief for improved cutting action at tip of ball
- Slower helix reduces lifting forces, making design preferable for fiber-reinforced applications and vacuum table setups
- Center cutting
- Solid carbide
- CNC ground in the USA

CUTTER DIAMETER	LENGTH OF CUT	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AMORPHOUS DIAMOND	
D_1 +.000″ −.001″	L_2 +.010″ −.000″	D_2	L_1	2 FL	PRICE	2 FL	PRICE
1/64	**3/64** (3x)	1/8	1-1/2	49515	56.90		
1/64	**5/64** (5x)	1/8	1-1/2	71315	67.00		
.020	**.060** (3x)	1/8	1-1/2	49520	44.60		
.020	**.100** (5x)	1/8	1-1/2	71320	54.60		
.025	**.075** (3x)	1/8	1-1/2	49525	44.60		
.025	**1/8** (5x)	1/8	1-1/2	71325	54.60		
1/32	**3/64** (1.5x)	1/8	1-1/2	962331	44.60		
1/32	**3/32** (3x)	1/8	1-1/2	49531	44.60	49531-C4	57.00
1/32	**5/32** (5x)	1/8	1-1/2	71331	53.90	71331-C4	66.30
1/32	**1/4** (8x)	1/8	1-1/2	955731	63.90		
.039 (1 mm)	**.118** (3x)	1/8	1-1/2	49539	45.10		
3/64	**9/64** (3x)	1/8	1-1/2	49547	37.80		
3/64	**1/4** (5x)	1/8	1-1/2	71347	46.90		
D_1 +.000″ −.002″	L_2 +.030″ −.000″	D_2	L_1	2 FL	PRICE	2 FL	PRICE
1/16	**3/32** (1.5x)	1/8	1-1/2	962362	33.30		
1/16	**3/16** (3x)	1/8	1-1/2	49562	33.30	49562-C4	45.70
1/16	**1/4** (4x)	1/8	1-1/2	784662	36.90		
1/16	**5/16** (5x)	1/8	2	71362	40.60	71362-C4	58.80
1/16	**1/2** (8x)	1/8	2	955762	60.70		
5/64	**15/64** (3x)	1/8	1-1/2	49578	33.30		
5/64	**13/32** (5x)	1/8	2	71378	40.60		
3/32	**9/32** (3x)	1/8	1-1/2	49593	33.30	49593-C4	45.70
3/32	**1/2** (5x)	1/8	2	71393	40.60		
.118 (3 mm)	**.354** (3x)	1/8	1-1/2	49605	33.60		
1/8	**3/16** (1.5x)	1/8	1-1/2	962408	33.30		
1/8	**3/8** (3x)	1/8	1-1/2	49608	33.30	49608-C4	45.70
1/8	**1/2** (4x)	1/8	2	784708	36.90		
1/8	**5/8** (5x)	1/8	2	71408	40.60	71408-C4	58.80
1/8	**1** (8x)	1/8	2-1/2	955808	60.70		
5/32	**15/32** (3x)	3/16	2	49610	43.90		
3/16	**9/32** (1.5x)	3/16	2	962412	43.90		
3/16	**9/16** (3x)	3/16	2	49612	43.90	49612-C4	61.00
3/16	**1** (5x)	3/16	3	71412	53.30		
1/4	**3/8** (1.5x)	1/4	2-1/2	962416	56.20		
1/4	**3/4** (3x)	1/4	2-1/2	49616	56.20	49616-C4	75.60
1/4	**1-1/4** (5x)	1/4	3	71416	64.40	71416-C4	83.80
3/8	**9/16** (1.5x)	3/8	3	962424	90.00		
3/8	**1-1/8** (3x)	3/8	3	49624	90.00	49624-C4	113.40
3/8	**2** (5x)	3/8	4	71424	102.60		
1/2	**3/4** (1.5x)	1/2	4	962432	155.20		
1/2	**1-1/2** (3x)	1/2	4	49632	155.20	49632-C4	183.30
1/2	**2-5/8** (5x)	1/2	5	71432	184.20		

PLEASE SEE SPEEDS & FEEDS ON PAGE 222

END MILLS FOR PLASTICS

Ball Upcut – Long Reach – 2 Flute



- Ball end has increased rake and relief for improved cutting action at tip of ball
- Reduced neck diameter to avoid heeling
- Ball end for profiling complex shapes
- Length of cut = 3x diameter
- Slower helix reduces lifting forces, making design preferable for fiber-reinforced applications and vacuum table setups
- Center cutting
- Solid carbide
- CNC ground in the USA

CUTTER DIAMETER	LENGTH OF CUT	OVERALL REACH	SHANK DIAMETER	OVERALL LENGTH	UNCOATED	
D_1 $^{+.000''}_{-.001''}$	L_2 $^{+.010''}_{-.000''}$	L_3 $^{+.010''}_{-.000''}$	D_2	L_1	2 FL	PRICE
1/32	3/32	**5/32** (5x)	1/8	1-1/2	964531	57.10
1/32	3/32	**1/4** (8x)	1/8	1-1/2	976231	58.90
3/64	9/64	**1/4** (5x)	1/8	1-1/2	964547	50.70
3/64	9/64	**3/8** (8x)	1/8	1-1/2	976247	51.90
D_1 $^{+.000''}_{-.002''}$	L_2 $^{+.030''}_{-.000''}$	L_3 $^{+.030''}_{-.000''}$	D_2	L_1	2 FL	PRICE
1/16	3/16	**5/16** (5x)	1/8	1-1/2	964562	46.00
1/16	3/16	**1/2** (8x)	1/8	1-1/2	976262	47.70
5/64	15/64	**13/32** (5x)	1/8	1-1/2	964578	46.00
5/64	15/64	**5/8** (8x)	1/8	2	976278	47.70
3/32	9/32	**1/2** (5x)	1/8	1-1/2	964593	46.00
3/32	9/32	**3/4** (8x)	1/8	2	976293	47.70
1/8	3/8	**5/8** (5x)	1/8	1-1/2	964608	46.00
1/8	3/8	**1** (8x)	1/8	2	976308	47.70
3/16	9/16	**1** (5x)	3/16	2	964612	56.30
1/4	3/4	**1-1/4** (5x)	1/4	2-1/2	964616	68.20

SPEEDS & FEEDS (Square & Ball – Long Reach Plastic Cutting End Mills)

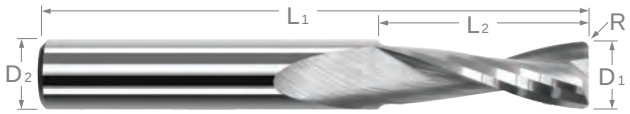
Important Note: Values in table are in inches and are based on reached (8x Dia) end mills. For shorter reaches, table values of IPT must be increased (for 5x, increase to 130%). For longer reaches, table values of IPT and DOC must be reduced (for 12x, reduce to 80%; for 15x, reduce to 67%). For complete speeds and feeds charts, please see www.harveytool.com.

Material Type		SFM		Chip Load Per Tooth (IPT) By Cutter Diameter														Depth of Cut	
				.015	.031	.047	.062	.078	.093	.125	.187	.250	.312	.375	.500	.625	.750	Radial	Axial
Unfilled	Unfilled	800-1200	Slot - Rough	.0003	.0006	.0010	.0013	.0016	.0019	.0026	.0039	.0051	.0055	.0066	.0088	.0109	.0131	1 x Dia	1 x Dia
			Profile	.0004	.0007	.0011	.0015	.0018	.0022	.0030	.0044	.0059	.0063	.0075	.0101	.0126	.0151	.35 x Dia	1 x Dia
Filled Plastics	Carbon/Glass Filled 5% < 20%	600-800	Slot - Rough	.0003	.0006	.0010	.0013	.0016	.0019	.0026	.0039	.0051	.0055	.0066	.0088	.0109	.0131	1 x Dia	1 x Dia
			Profile	.0004	.0007	.0011	.0015	.0018	.0022	.0030	.0044	.0059	.0063	.0075	.0101	.0126	.0151	.35 x Dia	1 x Dia
	Carbon/Glass Filled 21% < 40%	500-700	Slot - Rough	.0003	.0005	.0008	.0010	.0013	.0016	.0021	.0032	.0042	.0045	.0054	.0072	.0090	.0107	1 x Dia	1 x Dia
			Profile	.0003	.0006	.0009	.0012	.0015	.0018	.0024	.0036	.0048	.0051	.0062	.0082	.0103	.0124	.35 x Dia	1 x Dia
Fiber Reinforced	Carbon/Glass Fiber 5% < 20%	500-700	Slot - Rough	.0003	.0006	.0010	.0013	.0016	.0019	.0026	.0039	.0051	.0055	.0066	.0088	.0109	.0131	1 x Dia	1 x Dia
			Profile	.0004	.0007	.0011	.0015	.0018	.0022	.0030	.0044	.0059	.0063	.0075	.0101	.0126	.0151	.35 x Dia	1 x Dia
	Carbon/Glass Fiber 21% < 40%	300-400	Slot - Rough	.0003	.0005	.0008	.0010	.0013	.0016	.0021	.0032	.0042	.0045	.0054	.0072	.0090	.0107	1 x Dia	1 x Dia
			Profile	.0003	.0006	.0009	.0012	.0015	.0018	.0024	.0036	.0048	.0051	.0062	.0082	.0103	.0124	.35 x Dia	1 x Dia

NEW SIZES!

END MILLS FOR PLASTICS

Corner Radius Upcut – 2 Flute



- High rake, high relief design with large flute valley maximizes chip removal and performance
- Slower helix reduces lifting forces, making design preferable for fiber-reinforced applications and vacuum table setups
- Center cutting design improves plunging and ramping
- Solid carbide
- CNC ground in the USA

CUTTER DIAMETER	CORNER RADIUS	LENGTH OF CUT	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		
D_1 $^{+.000''}_{-.001''}$	R $^{+.001''}_{-.001''}$	L_2 $^{+.010''}_{-.000''}$	D_2	L_1	2 FL	PRICE	
1/32	.005	**3/32** (3x)	1/8	1-1/2	54031	33.30	NEW

D_1 $^{+.000''}_{-.002''}$	R $^{+.001''}_{-.001''}$	L_2 $^{+.030''}_{-.000''}$	D_2	L_1	2 FL	PRICE	
1/16	.005	**3/16** (3x)	1/8	1-1/2	54062	33.30	
1/16	.010	**3/16** (3x)	1/8	1-1/2	55462	33.30	
1/16	.010	**5/16** (5x)	1/8	2	861862	41.00	
1/16	.015	**3/16** (3x)	1/8	1-1/2	69362	33.30	
1/16	.015	**5/16** (5x)	1/8	2	862462	41.00	
3/32	.005	**9/32** (3x)	1/8	1-1/2	54093	33.30	
3/32	.010	**9/32** (3x)	1/8	1-1/2	55493	33.30	
3/32	.010	**1/2** (5x)	1/8	2	861893	41.00	
3/32	.015	**9/32** (3x)	1/8	1-1/2	69393	33.30	
3/32	.015	**1/2** (5x)	1/8	2	862493	41.00	
3/32	.020	**9/32** (3x)	1/8	1-1/2	69893	33.30	
3/32	.030	**9/32** (3x)	1/8	1-1/2	70693	33.30	
1/8	.005	**3/16** (1.5x)	1/8	1-1/2	767508	33.30	NEW
1/8	.005	**3/8** (3x)	1/8	1-1/2	54108	33.30	
1/8	.005	**5/8** (5x)	1/8	2	768908	41.00	NEW
1/8	.010	**3/8** (3x)	1/8	1-1/2	55508	33.30	
1/8	.010	**5/8** (5x)	1/8	2	861908	41.00	
1/8	.015	**3/8** (3x)	1/8	1-1/2	56408	33.30	
1/8	.015	**5/8** (5x)	1/8	2	862508	41.00	
1/8	.020	**3/8** (3x)	1/8	1-1/2	69908	33.30	
1/8	.030	**3/16** (1.5x)	1/8	1-1/2	768708	33.30	NEW
1/8	.030	**3/8** (3x)	1/8	1-1/2	70708	33.30	
1/8	.030	**5/8** (5x)	1/8	2	863108	41.00	
3/16	.005	**9/16** (3x)	3/16	2	54112	43.90	
3/16	.010	**9/16** (3x)	3/16	2	55512	43.90	
3/16	.015	**9/16** (3x)	3/16	2	56412	43.90	
3/16	.020	**9/16** (3x)	3/16	2	69912	43.90	
3/16	.030	**9/16** (3x)	3/16	2	70712	43.90	
3/16	.030	**1** (5x)	3/16	3	863112	53.70	
1/4	.010	**3/4** (3x)	1/4	2-1/2	55516	56.20	
1/4	.015	**3/4** (3x)	1/4	2-1/2	56416	56.20	
1/4	.020	**3/8** (1.5x)	1/4	2-1/2	767116	56.20	NEW
1/4	.020	**3/4** (3x)	1/4	2-1/2	69916	56.20	
1/4	.020	**1-1/4** (5x)	1/4	4	767716	64.70	NEW
1/4	.030	**3/4** (3x)	1/4	2-1/2	70716	56.20	
1/4	.030	**1-1/4** (5x)	1/4	4	863116	64.70	
3/8	.015	**1-1/8** (3x)	3/8	3	56424	88.30	
3/8	.030	**1-1/8** (3x)	3/8	3	70724	88.30	
1/2	.015	**1-1/2** (3x)	1/2	4	56432	152.50	
1/2	.030	**1-1/2** (3x)	1/2	4	70732	152.50	

PLEASE SEE SPEEDS & FEEDS ON PAGE 222

NEW TYPE!

END MILLS FOR PLASTICS

Finishers – Square Upcut – 3 Flute (Slow Helix)



Wiper Flat Option for an Improved Finish

- 3 flute design strengthens rigidity and improves wall finish
- Choose from two types:
  - Without Wiper Flat (Type I): Standard end geometry designed with a dish angle to a sharp corner
  - With Wiper Flat (Type II): Wiper flat end geometry that enhances bottom finish by reducing traditional circular marks; with a slight chamfer to protect corners
- Slower helix (approx. 22°) reduces lifting forces for fiber-reinforced applications and vacuum table setups
- Center cutting
- Solid carbide
- CNC ground in the USA

	CUTTER DIAMETER	LENGTH OF CUT		TYPE	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AMORPHOUS DIAMOND	
	D_1 +.000″ −.001″	L_2 +.010″ −.000″			D_2	L_1	3 FL	PRICE	3 FL	PRICE
	1/32	**3/32**	(3x)	II	1/8	1-1/2	915631	49.80		
	1/32	**5/32**	(5x)	II	1/8	1-1/2	986431	49.80		
	1/32	**1/4**	(8x)	II	1/8	1-1/2	992331	54.00		
	3/64	**1/4**	(5x)	II	1/8	1-1/2	986447	38.30		
	3/64	**3/8**	(8x)	II	1/8	2	992347	41.70		
	D_1 +.000″ −.002″	L_2 +.030″ −.000″			D_2	L_1	3 FL	PRICE	3 FL	PRICE
NEW	1/16	**3/16**	(3x)	I	1/8	1-1/2	770262	31.50		
	1/16	**3/16**	(3x)	II	1/8	1-1/2	915662	31.50		
NEW	1/16	**5/16**	(5x)	I	1/8	2	769662	36.90		
	1/16	**5/16**	(5x)	II	1/8	2	986462	36.90	986462-C4	55.10
	1/16	**1/2**	(8x)	II	1/8	2	992362	40.50		
	1/16	**5/8**	(10x)	II	1/8	2	871662	51.30		
	5/64	**13/32**	(5x)	II	1/8	2	986478	36.90		
	5/64	**5/8**	(8x)	II	1/8	2	992378	40.50		
NEW	3/32	**9/32**	(3x)	I	1/8	1-1/2	770293	31.50		
	3/32	**9/32**	(3x)	II	1/8	1-1/2	915693	31.50		
NEW	3/32	**1/2**	(5x)	I	1/8	2	769693	36.90		
	3/32	**1/2**	(5x)	II	1/8	2	986493	36.90	986493-C4	55.10
	3/32	**3/4**	(8x)	II	1/8	2	992393	40.50		
NEW	1/8	**3/8**	(3x)	I	1/8	1-1/2	770308	31.50		
	1/8	**3/8**	(3x)	II	1/8	1-1/2	915708	31.50		
NEW	1/8	**5/8**	(5x)	I	1/8	2	769708	36.90		
	1/8	**5/8**	(5x)	II	1/8	2	986508	36.90	986508-C4	55.10
	1/8	**1**	(8x)	II	1/8	2	992408	40.50		
	1/8	**1-1/4**	(10x)	II	1/8	2-1/2	871708	51.30		

continued on next page

TYPE I - WITHOUT WIPER



TYPE II - WITH WIPER FLAT



PLEASE SEE SPEEDS & FEEDS ON PAGE 235

NEW TYPE!

END MILLS FOR PLASTICS

Finishers – Square Upcut – 3 Flute (Slow Helix) (cont.)

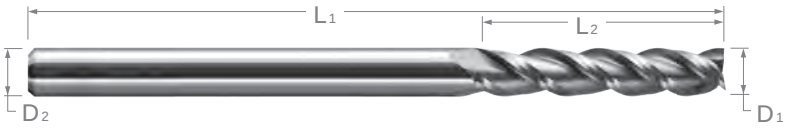
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CUTTER DIAMETER	LENGTH OF CUT		TYPE	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AMORPHOUS DIAMOND		
D_1 $^{+.000''}_{-.002''}$			L_2 $^{+.030''}_{-.000''}$	D_2	L_1	3 FL	PRICE	3 FL	PRICE	
5/32	**15/32**	(3x)	II	3/16	2	915710	48.80			
5/32	**3/4**	(5x)	II	3/16	3	986510	51.00			
3/16	**9/16**	(3x)	I	3/16	2	770312	48.80			NEW
3/16	**9/16**	(3x)	II	3/16	2	915712	48.80			
3/16	**1**	(5x)	I	3/16	3	769712	51.00			NEW
3/16	**1**	(5x)	II	3/16	3	986512	51.00	986512-C4	68.10	
3/16	**1-1/2**	(8x)	II	3/16	3	992412	60.90			
1/4	**3/8**	(1.5x)	II	1/4	2-1/2	869316	48.70			
1/4	**3/4**	(3x)	I	1/4	2-1/2	770316	51.00			NEW
1/4	**3/4**	(3x)	II	1/4	2-1/2	915716	51.00			
1/4	**1-1/4**	(5x)	I	1/4	3	769716	57.70			NEW
1/4	**1-1/4**	(5x)	II	1/4	3	986516	57.70	986516-C4	77.10	
1/4	**2**	(8x)	II	1/4	4	992416	75.80			
3/8	**9/16**	(1.5x)	II	3/8	3	869324	82.00			
3/8	**1-1/8**	(3x)	II	3/8	3	915724	85.10			
3/8	**2**	(5x)	II	3/8	4	986524	92.00			
1/2	**3/4**	(1.5x)	II	1/2	4	869332	142.40			
1/2	**1-1/2**	(3x)	II	1/2	4	915732	147.80			
1/2	**2-5/8**	(5x)	II	1/2	5	986532	154.70			

NEW TYPE!

END MILLS FOR PLASTICS

Finishers – Square Upcut – 3 Flute (High Helix)



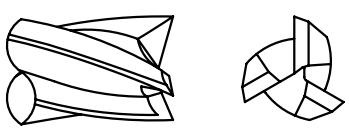
Wiper Flat Option for an Improved Finish

- 3 flute, higher helix (approx. 40°) design strengthens rigidity and increases cutting action to improve wall finish
- Choose from two types:
  - Without Wiper Flat (Type I): Standard end geometry designed with a dish angle to a sharp corner
  - With Wiper Flat (Type II): Wiper flat end geometry that enhances bottom finish by reducing traditional circular marks; with a slight chamfer to protect corners
- Design is ideally suited for thin-walled applications and tightly secured workpieces
- Center cutting
- Solid carbide
- CNC ground in the USA

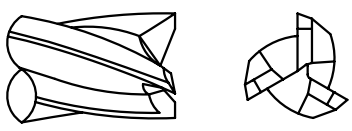
	CUTTER DIAMETER	LENGTH OF CUT	TYPE	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AMORPHOUS DIAMOND	
	D_1 +.000″ −.001″	L_2 +.010″ −.000″		D_2	L_1	3 FL	PRICE	3 FL	PRICE
	1/32	**3/32** (3x)	II	1/8	1-1/2	902131	49.30		
	1/32	**5/32** (5x)	II	1/8	1-1/2	941231	51.30		
	1/32	**1/4** (8x)	II	1/8	1-1/2	900731	55.60		
	3/64	**1/4** (5x)	II	1/8	1-1/2	941247	39.40		
	D_1 +.000″ −.002″	L_2 +.030″ −.000″		D_2	L_1	3 FL	PRICE	3 FL	PRICE
NEW	1/16	**3/16** (3x)	I	1/8	1-1/2	736762	36.40		
	1/16	**3/16** (3x)	II	1/8	1-1/2	902162	36.40		
NEW	1/16	**5/16** (5x)	I	1/8	2	769862	38.30		
	1/16	**5/16** (5x)	II	1/8	2	941262	38.30	941262-C4	56.50
	1/16	**1/2** (8x)	II	1/8	2	900762	41.70		
	1/16	**5/8** (10x)	II	1/8	2	854662	44.20		
	5/64	**13/32** (5x)	II	1/8	2	941278	38.30		
NEW	3/32	**9/32** (3x)	I	1/8	1-1/2	736793	36.40		
	3/32	**9/32** (3x)	II	1/8	1-1/2	902193	36.40		
NEW	3/32	**1/2** (5x)	I	1/8	2	769893	38.30		
	3/32	**1/2** (5x)	II	1/8	2	941293	38.30	941293-C4	56.50
	3/32	**3/4** (8x)	II	1/8	2	900793	41.70		
NEW	1/8	**3/8** (3x)	I	1/8	1-1/2	736808	36.40		
	1/8	**3/8** (3x)	II	1/8	1-1/2	902208	36.40		
NEW	1/8	**5/8** (5x)	I	1/8	2	769908	38.30		
	1/8	**5/8** (5x)	II	1/8	2	941308	38.30	941308-C4	56.50
	1/8	**1** (8x)	II	1/8	2	900808	41.70		
	1/8	**1-1/4** (10x)	II	1/8	2-1/2	854708	44.20		

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TYPE I - WITHOUT WIPER



TYPE II - WITH WIPER FLAT



PLEASE SEE SPEEDS & FEEDS ON PAGE 236

NEW TYPE!

END MILLS FOR PLASTICS

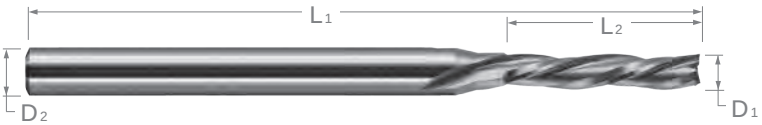
Finishers – Square Upcut – 3 Flute (High Helix) (cont.)

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CUTTER DIAMETER	LENGTH OF CUT		TYPE	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AMORPHOUS DIAMOND		
D_1 $^{+.000''}_{-.002''}$	L_2 $^{+.030''}_{-.000''}$			D_2	L_1	3 FL	PRICE	3 FL	PRICE	
5/32	**15/32**	(3x)	II	3/16	2	902210	49.10			
5/32	**3/4**	(5x)	II	3/16	3	941310	51.00			
3/16	**9/16**	(3x)	I	3/16	2	736812	49.10			NEW
3/16	**9/16**	(3x)	II	3/16	2	902212	49.10			
3/16	**1**	(5x)	I	3/16	3	769912	51.00			NEW
3/16	**1**	(5x)	II	3/16	3	941312	51.00	941312-C4	68.10	
3/16	**1-1/2**	(8x)	II	3/16	3	900812	55.30			
1/4	**3/8**	(1.5x)	II	1/4	2-1/2	852016	53.90			
1/4	**3/4**	(3x)	I	1/4	2-1/2	736816	56.00			NEW
1/4	**3/4**	(3x)	II	1/4	2-1/2	902216	56.00			
1/4	**1-1/4**	(5x)	I	1/4	3	769916	57.70			NEW
1/4	**1-1/4**	(5x)	II	1/4	3	941316	57.70	941316-C4	77.10	
1/4	**2**	(8x)	II	1/4	4	900816	75.80			
3/8	**9/16**	(1.5x)	II	3/8	3	852024	83.00			
3/8	**1-1/8**	(3x)	II	3/8	3	902224	85.10			
3/8	**2**	(5x)	II	3/8	4	941324	92.00			
1/2	**3/4**	(1.5x)	II	1/2	4	852032	141.30			
1/2	**1-1/2**	(3x)	II	1/2	4	902232	146.50			
1/2	**2-5/8**	(5x)	II	1/2	5	941332	154.70			

END MILLS FOR PLASTICS

Finishers – Square Downcut – 3 Flute (Slow Helix)



- 3 left hand spiral, right hand cut flute design strengthens rigidity and improves wall finish
- Slower helix (approx. 22°) ideal for overhung, less secure parts
- Center cutting
- Solid carbide
- CNC ground in the USA

CUTTER DIAMETER	LENGTH OF CUT	SHANK DIAMETER	OVERALL LENGTH	UNCOATED	
D_1 $^{+.000''}_{-.001''}$	L_2 $^{+.010''}_{-.000''}$	D_2	L_1	3 FL	PRICE
1/32	**5/32** (5x)	1/8	1-1/2	880431	49.80

D_1 $^{+.000''}_{-.002''}$	L_2 $^{+.030''}_{-.000''}$	D_2	L_1	3 FL	PRICE
1/16	**5/16** (5x)	1/8	2	880462	40.20
3/32	**1/2** (5x)	1/8	2	880493	40.20
1/8	**5/8** (5x)	1/8	2	880508	40.20
3/16	**1** (5x)	3/16	3	880512	52.90
1/4	**1-1/4** (5x)	1/4	3	880516	59.70
3/8	**1-1/8** (3x)	3/8	3	878124	87.10
1/2	**1-1/2** (3x)	1/2	4	878132	147.50

SPEEDS & FEEDS (3 Flute Plastic Finisher – Slow Helix)

Important Note: Values in table are in inches and are based on standard (5x Dia) length of cut end mills. For shorter lengths of cuts, table values of IPT must be increased (for 1.5x, increase to 120%; for 3x, increase to 110%). For longer lengths of cut, table values of IPT must be reduced (for 8x, reduce to 66%; for 10x, reduce to 55%). For complete speeds and feeds charts, please see www.harveytool.com

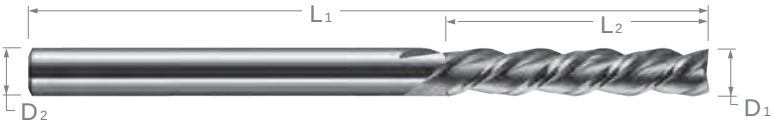
Material Type		SFM		Chip Load Per Tooth (IPT) By Cutter Diameter														Depth of Cut	
				.015	.031	.047	.062	.078	.093	.125	.187	.250	.312	.375	.500	.625	.750	Radial	Axial
Un-filled	Unfilled	800-1200	Semi-Roughing	.00041	.00084	.00128	.00168	.00212	.00253	.00340	.00508	.00679	.00721	.00866	.01155	.01444	.01732	.35 x Dia	1 x Dia
			Finishing	.00013	.00028	.00042	.00055	.00070	.00083	.00112	.00167	.00223	.00237	.00285	.00379	.00474	.00569	.10 x Dia	5 x Dia
Filled Plastics	Carbon/Glass Filled 5% < 20%	600-800	Semi-Roughing	.00041	.00084	.00128	.00168	.00212	.00253	.00340	.00508	.00679	.00721	.00866	.01155	.01444	.01732	.35 x Dia	1 x Dia
			Finishing	.00013	.00028	.00042	.00055	.00070	.00083	.00112	.00167	.00223	.00237	.00285	.00379	.00474	.00569	.10 x Dia	5 x Dia
	Carbon/Glass Filled 21% < 40%	500-700	Semi-Roughing	.00033	.00069	.00104	.00138	.00173	.00207	.00278	.00416	.00556	.00590	.00709	.00945	.01181	.01417	.35 x Dia	1 x Dia
			Finishing	.00011	.00023	.00034	.00045	.00057	.00068	.00091	.00137	.00183	.00194	.00233	.00310	.00388	.00466	.10 x Dia	5 x Dia
Fiber Reinforced	Carbon/Glass Fiber 5% < 20%	500-700	Semi-Roughing	.00041	.00084	.00128	.00168	.00212	.00253	.00340	.00508	.00679	.00721	.00866	.01155	.01444	.01732	.35 x Dia	1 x Dia
			Finishing	.00013	.00028	.00042	.00055	.00070	.00083	.00112	.00167	.00223	.00237	.00285	.00379	.00474	.00569	.10 x Dia	5 x Dia
	Carbon/Glass Fiber 21% < 40%	300-400	Semi-Roughing	.00033	.00069	.00104	.00138	.00173	.00207	.00278	.00416	.00556	.00590	.00709	.00945	.01181	.01417	.35 x Dia	1 x Dia
			Finishing	.00011	.00023	.00034	.00045	.00057	.00068	.00091	.00137	.00183	.00194	.00233	.00310	.00388	.00466	.10 x Dia	5 x Dia

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END MILLS FOR PLASTICS

Finishers – Square Downcut – 3 Flute (High Helix)



- 3 left hand spiral, right hand cut flute, higher helix (approx. 40°) design strengthens rigidity and increases cutting action to improve wall finish
- Design is ideally suited for thin-walled applications
- Solid carbide
- Center cutting
- CNC ground in the USA

CUTTER DIAMETER	LENGTH OF CUT	SHANK DIAMETER	OVERALL LENGTH	UNCOATED	
D_1 +.000″ −.001″	D_1 +.010″ −.000″	D_2	L_1	3 FL	PRICE
1/32	**5/32** (5x)	1/8	1-1/2	864331	55.70

D_1 +.000″ −.002″	D_1 +.030″ −.000″	D_2	L_1	3 FL	PRICE
1/16	**5/16** (5x)	1/8	2	864362	45.10
3/32	**1/2** (5x)	1/8	2	864393	44.10
1/8	**3/8** (3x)	1/8	1-1/2	873808	35.20
1/8	**5/8** (5x)	1/8	2	864408	38.80
3/16	**9/16** (3x)	3/16	2	873812	47.50
3/16	**1** (5x)	3/16	3	864412	52.90
1/4	**3/4** (3x)	1/4	2-1/2	873816	54.00
1/4	**1-1/4** (5x)	1/4	3	864416	59.70
3/8	**1-1/8** (3x)	3/8	3	873824	87.10
1/2	**1-1/2** (3x)	1/2	4	873832	148.60

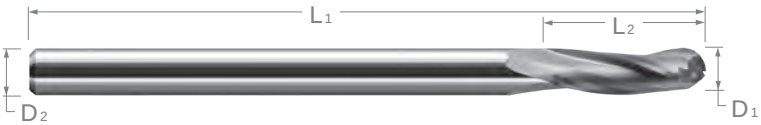
SPEEDS & FEEDS (3 Flute Plastic Finisher – High Helix)

Important Note: Values are in inches and are based on standard (3x Dia) length of cut end mills. For shorter lengths of cut, table values of IPT must be increased (for 1.5x, increase 115%). For longer lengths of cuts, table values of IPT must be reduced (for 5x, reduce to 90%). For complete speeds and feeds charts, please see www.harveytool.com

Material Type		SFM		Chip Load Per Tooth (IPT) By Cutter Diameter														Depth of Cut	
				.015	.031	.047	.062	.078	.093	.125	.187	.250	.312	.375	.500	.625	.750	Radial	Axial
Un-filled	Unfilled	800-1200	Semi-Roughing	.00043	.00089	.00135	.00178	.00224	.00267	.00359	.00536	.00717	.00761	.00914	.01219	.01524	.01829	.35 x Dia	1 x Dia
			Finishing	.00024	.00049	.00074	.00097	.00123	.00146	.00196	.00294	.00393	.00417	.00501	.00668	.00835	.01002	.10 x Dia	3 x Dia
Filled Plastics	Carbon/Glass Filled 5% < 20%	600-800	Semi-Roughing	.00043	.00089	.00135	.00178	.00224	.00267	.00359	.00536	.00717	.00761	.00914	.01219	.01524	.01829	.35 x Dia	1 x Dia
			Finishing	.00024	.00049	.00074	.00097	.00123	.00146	.00196	.00294	.00393	.00417	.00501	.00668	.00835	.01002	.10 x Dia	3 x Dia
	Carbon/Glass Filled 21% < 40%	500-700	Semi-Roughing	.00035	.00073	.00110	.00146	.00183	.00218	.00293	.00439	.00587	.00622	.00748	.00997	.01247	.01496	.35 x Dia	1 x Dia
			Finishing	.00019	.00040	.00060	.00080	.00100	.00120	.00161	.00240	.00321	.00341	.00410	.00546	.00683	.00820	.10 x Dia	3 x Dia
Fiber Reinforced	Carbon/Glass Fiber 5% < 20%	500-700	Semi-Roughing	.00043	.00089	.00135	.00178	.00224	.00267	.00359	.00536	.00717	.00761	.00914	.01219	.01524	.01829	.35 x Dia	1 x Dia
			Finishing	.00024	.00049	.00074	.00097	.00123	.00146	.00196	.00294	.00393	.00417	.00501	.00668	.00835	.01002	.10 x Dia	3 x Dia
	Carbon/Glass Fiber 21% < 40%	300-400	Semi-Roughing	.00035	.00073	.00110	.00146	.00183	.00218	.00293	.00439	.00587	.00622	.00748	.00997	.01247	.01496	.35 x Dia	1 x Dia
			Finishing	.00019	.00040	.00060	.00080	.00100	.00120	.00161	.00240	.00321	.00341	.00410	.00546	.00683	.00820	.10 x Dia	3 x Dia

END MILLS FOR PLASTICS

Finishers – Ball Upcut – 3 Flute (Slow Helix)



- Ball end has increased rake and relief for improved cutting action at the tip
- 3 Flute design strengthens rigidity and improves wall finish
- Slower helix reduces lifting forces for fiber-reinforced applications and vacuum table set ups
- Center cutting
- Ultrafine Grain Carbide to create a sharp cutting edge
- CNC ground in the USA

CUTTER DIAMETER	LENGTH OF CUT	SHANK DIAMETER	OVERALL LENGTH	UNCOATED	
D_1 $^{+.000''}_{-.002''}$	L_2 $^{+.030''}_{-.000''}$	D_2	L_1	3 FL	PRICE
1/16	**3/16** (3x)	1/8	1-1/2	808762	36.10
3/32	**9/32** (3x)	1/8	1-1/2	808793	36.10
1/8	**3/8** (3x)	1/8	1-1/2	808808	36.10
3/16	**9/16** (3x)	3/16	2	808812	54.90
1/4	**3/4** (3x)	1/4	2-1/2	808816	58.20
3/8	**1-1/8** (3x)	3/8	3	808824	91.80
1/2	**1-1/2** (3x)	1/2	4	808832	156.50

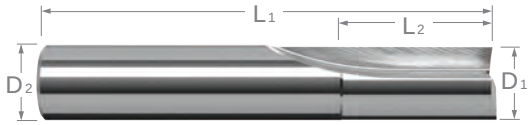
PLEASE SEE SPEEDS & FEEDS ON PAGE 235

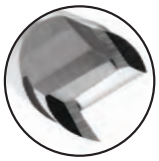
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END MILLS FOR COMPOSITES

Square – 2 Straight Flutes





2 Straight Flutes
(End View)

- Designed to mill abrasive, glass-filled plastics with reinforcing fiber and other additives
- Straight flute design improves finish and minimizes fraying of fiber-reinforced and layered materials by not "pulling" fibers
- Behind center design with high positive rake for smoother cuts
- Eccentric relief for improved edge life
- Allows shallow ramping, not suited for plunge cutting
- Select sizes available with oversized, router-style shanks
- Solid carbide
- CNC ground in the USA

CUTTER DIAMETER	LENGTH OF CUT	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AMORPHOUS DIAMOND	
D_1 +.000″ −.001″	L_2 +.010″ −.000″	D_2	L_1	2 FL	PRICE	2 FL	PRICE
1/32	**3/32** (3x)	1/8	1-1/2	69531	50.20	69531-C4	62.60

D_1 +.000″ −.002″	L_2 +.030″ −.000″	D_2	L_1	2 FL	PRICE	2 FL	PRICE
1/16	**3/32** (1.5x)	1/8	1-1/2	825162	33.80	825162-C4	46.20
1/16	**1/8** (2x)	1/4*	2	14604	38.30	14604-C4	57.70
1/16	**3/16** (3x)	1/8	1-1/2	69562	33.80	69562-C4	46.20
1/16	**5/16** (5x)	1/8	2	70462	38.90	70462-C4	52.60
5/64*	**5/32** (2x)	1/4*	2	14605	38.30	14605-C4	57.70
5/64	**1/4** (3x)	1/8	1-1/2	69578	33.80	69578-C4	46.20
5/64	**13/32** (5x)	1/8	2	70478	38.90	70478-C4	52.60
3/32	**9/64** (1.5x)	1/8	1-1/2	825193	33.80	825193-C4	46.20
3/32*	**3/16** (2x)	1/4*	2	14606	38.30	14606-C4	57.70
3/32	**5/16** (3x)	1/8	1-1/2	69593	33.80	69593-C4	46.20
3/32	**1/2** (5x)	1/8	2	70493	38.90	70493-C4	52.60
1/8	**3/16** (1.5x)	1/8	1-1/2	825208	33.80	825208-C4	46.20
1/8*	**1/4** (2x)	1/4*	2	14608	38.30	14608-C4	57.70
1/8	**3/8** (3x)	1/8	1-1/2	69608	33.80	69608-C4	46.20
1/8	**5/8** (5x)	1/8	2	70508	38.90	70508-C4	52.60
5/32	**1/2** (3x)	3/16	2	69610	35.90	69610-C4	53.00
3/16	**5/8** (3x)	3/16	2	69612	35.90	69612-C4	53.00
3/16*	**5/8** (3x)	1/4*	2	14612	38.30	14612-C4	57.70
3/16	**1** (5x)	3/16	3	70512	42.30	70512-C4	59.40
1/4	**3/8** (1.5x)	1/4	2-1/2	825216	34.90	825216-C4	54.30
1/4*	**3/4** (3x)	1/4	2-1/2	14616	34.90	14616-C4	54.30
1/4	**1-1/4** (5x)	1/4	3	70516	48.50	70516-C4	67.90
5/16	**7/8** (3x)	5/16	2-1/2	14620	65.20	14620-C4	88.60
3/8*	**7/8** (2x)	3/8	2-1/2	14624	65.20	14624-C4	88.60
3/8	**2** (5x)	3/8	4	70524	80.20	70524-C4	103.60
1/2*	**1** (2x)	1/2	3	14632	103.50	14632-C4	131.70
1/2	**2-1/2** (5x)	1/2	4	70532	127.70		

*Cutter diameter tolerance is +.000/-.004". Tools are ground on oversized, router-style shank.

SPEEDS & FEEDS (2 Straight Flutes)

Important Note: Values in table are in inches and are based on standard (3x Dia) length of cut end mills. For longer lengths of cut, table values of IPT must be reduced (for 5x, reduce to 90%). For complete speeds and feeds charts, please see www.harveytool.com

Material Type		SFM		Chip Load Per Tooth (IPT) By Cutter Diameter														Depth of Cut	
				.015	.031	.047	.062	.078	.093	.125	.187	.250	.312	.375	.500	.625	.750	Radial	Axial
Filled Plastics	Carbon/Glass Filled 5% < 20%	600-800	Slot - Rough	.0004	.0008	.0012	.0016	.0020	.0024	.0032	.0048	.0064	.0068	.0082	.0109	.0137	.0164	1 x Dia	1 x Dia
			Profile	.0004	.0009	.0014	.0018	.0023	.0028	.0037	.0055	.0074	.0079	.0094	.0126	.0157	.0189	.35 x Dia	1 x Dia
	Carbon/Glass Filled 21% < 40%	500-700	Slot - Rough	.0003	.0007	.0010	.0013	.0016	.0020	.0026	.0039	.0053	.0056	.0067	.0090	.0112	.0134	1 x Dia	1 x Dia
			Profile	.0004	.0008	.0011	.0015	.0019	.0023	.0030	.0045	.0061	.0064	.0077	.0103	.0129	.0154	.35 x Dia	1 x Dia
Fiber Reinforced	Carbon/Glass Fiber 5% < 20%	500-700	Slot - Rough	.0004	.0008	.0012	.0016	.0020	.0024	.0032	.0048	.0064	.0068	.0082	.0109	.0137	.0164	1 x Dia	1 x Dia
			Profile	.0004	.0009	.0014	.0018	.0023	.0028	.0037	.0055	.0074	.0079	.0094	.0126	.0157	.0189	.35 x Dia	1 x Dia
	Carbon/Glass Fiber 21% < 40%	300-400	Slot - Rough	.0003	.0007	.0010	.0013	.0016	.0020	.0026	.0039	.0053	.0056	.0067	.0090	.0112	.0134	1 x Dia	1 x Dia
			Profile	.0004	.0008	.0011	.0015	.0019	.0023	.0030	.0045	.0061	.0064	.0077	.0103	.0129	.0154	.35 x Dia	1 x Dia

END MILLS FOR COMPOSITES

Compression Cutter



Prevents Burrs & Delamination!

- Counteracting flute geometries compress material inwardly to avoid burrs, tear out, and delamination
- Produces enhanced edge finish on top and bottom of workpiece
- Offered in two diamond coatings for increased tool life in a variety of abrasive composite materials
- Stocked in 2, 4, and 6 flute configurations for rough and finish machining
- Center cutting
- Solid carbide
- CNC ground in the USA

CUTTER DIAMETER	LENGTH OF CUT	OVERLAP CENTER	OVERLAP LENGTH	FLUTES	SHANK DIA.	OAL	UNCOATED		AMORPHOUS DIAMOND		CVD DIAMOND (9 µm)	
D_1 +.000″ −.002″	L_2 +.030″ −.000″	L_3 +.001″ −.001″	L_4		D_2	L_1	TOOL #	PRICE	TOOL #	PRICE	TOOL #	PRICE
1/32	3/32	**1/32**	.006	2	1/8	1-1/2	994331	52.70	994331-C4	65.20	995031	119.20
3/64	9/64	**3/64**	.009	2	1/8	1-1/2	994347	52.70	994347-C4	65.20	995047	119.20
1/16	3/16	**1/16**	.013	2	1/8	1-1/2	994362	50.10	994362-C4	62.70	995062	116.40
5/64	1/4	**5/64**	.016	2	1/8	1-1/2	994378	50.10	994378-C4	62.70	995078	116.40
3/32	9/32	**3/32**	.019	2	1/8	1-1/2	994393	50.10	994393-C4	62.70	995093	116.40
1/8	3/8	**1/8**	.025	2	1/8	1-1/2	994408	48.60	994408-C4	61.10	995108	113.80
1/8	3/8	**1/8**	.028	4	1/8	1-1/2	993708	51.80	993708-C4	64.30	997708	118.80
3/16	9/16	**3/16**	.038	2	3/16	2	994412	54.20	994412-C4	71.50	995112	132.20
3/16	9/16	**3/16**	.041	4	3/16	2	993712	58.10	993712-C4	75.20	997712	139.40
1/4	3/4	**1/4**	.050	2	1/4	2-1/2	994416	64.80	994416-C4	84.20	995116	156.40
1/4	3/4	**1/4**	.055	4	1/4	2-1/2	993716	69.00	993716-C4	88.40	997716	163.40
5/16	1	**5/16**	.075	6	5/16	2-1/2	920120	82.50	920120-C4	106.10	918820	189.80
3/8	1-1/8	**3/8**	.090	6	3/8	2-1/2	920124	103.00	920124-C4	126.50	918824	251.30
1/2	1-1/2	**1/2**	.120	6	1/2	3	920132	184.30	920132-C4	212.70	918832	362.30

Choosing the Right Diamond

AMORPHOUS DIAMOND

A PVD amorphous diamond coating which improves lubricity and wear resistance. Coating is thin relative to CVD diamond, preventing edge rounding. Sharp edges improve results (performance and finish) over CVD in certain abrasive materials.

Thin coating maintains sharper edge.

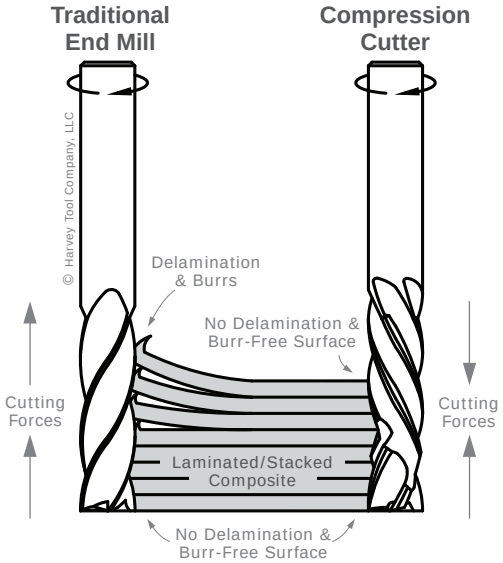


CVD DIAMOND

True Crystalline CVD diamond is grown directly into a carbide end mill. This dramatically improves hardness, which improves abrasion resistance and extends tool life up to 50x, allowing higher feed rates than uncoated carbide. Ideal for machining abrasive composite materials with high fiber or fill concentration (G10, FR4, etc.) Diamond layer is approximately 5 times thicker than Amorphous Diamond, improving wear resistance. Well suited for high production environments.

Thicker diamond layer for increased wear resistance.





Traditional End Mills: Upward lifting force causes burrs and delamination at the top of the part.

Compression Cutters: Counteracting cutting forces compress the material and stabilize the workpiece, creating a superior finish on the top and bottom of the part.

END MILLS FOR COMPOSITES

Chipbreaker Cutter





Type I
Bur-Style End



Type II
Center Cutting

- Optimized geometry with chipbreakers efficiently shears fibers and shortens chips for improved chip removal
- Suited for roughing and profiling in composite materials with high fiber or fill concentration (G10, FR4, etc.)
- Choose from two types:
  - -Type I: Bur-style end allows for shallow ramping (not suited for plunge cutting)
  - -Type II: Center cutting end allows for plunge cutting, reduced flute count prevents chip packing, designed specifically for CFRP
- Solid carbide
- CNC ground in the USA

CUTTER DIAMETER	LENGTH OF CUT		FLUTES	TYPE	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AMORPHOUS DIAMOND		CVD DIAMOND (9 µm)	
D_1 +.000″ −.001″	L_2 +.010″ −.000″				D_2	L_1	TOOL #	PRICE	TOOL #	PRICE	TOOL #	PRICE
1/32	**3/32**	(3x)	4	I	1/8	1-1/2	969231	50.70	969231-C4	63.10		
3/64	**9/64**	(3x)	4	I	1/8	1-1/2	969247	50.70	969247-C4	63.10		
1/16	**3/16**	(3x)	3	II	1/8	1-1/2	801962	50.10			803762	116.40
1/16	**3/16**	(3x)	4	I	1/8	1-1/2	969262	48.60	969262-C4	61.00		
5/64	**15/64**	(3x)	4	I	1/8	1-1/2	969278	48.60	969278-C4	61.00		
3/32	**9/32**	(3x)	3	II	1/8	1-1/2	801993	50.10			803793	116.40
3/32	**9/32**	(3x)	4	I	1/8	1-1/2	969293	48.60	969293-C4	61.00	791593	116.40
D_1 +.000″ −.002″	L_2 +.030″ −.000″				D_2	L_1	TOOL #	PRICE	TOOL #	PRICE	TOOL #	PRICE
1/8	**3/8**	(3x)	5	II	1/8	1-1/2	802008	48.30	802008-C4	60.70	803808	113.50
1/8	**3/8**	(3x)	6	I	1/8	1-1/2	969308	46.90	969308-C4	59.30	791608	113.50
1/8	**5/8**	(5x)	5	II	1/8	1-1/2	818508	51.30			803008	116.40
1/8	**5/8**	(5x)	6	I	1/8	1-1/2	884908	49.80	884908-C4	62.20		
3/16	**9/16**	(3x)	5	II	3/16	2	802012	53.40			803812	131.40
3/16	**9/16**	(3x)	6	I	3/16	2	969312	51.80	969312-C4	68.90		
3/16	**1**	(3x)	5	II	3/16	2	818512	56.20			803012	134.30
3/16	**1**	(5x)	6	I	3/16	2	884912	54.60	884912-C4	71.70		
1/4	**3/4**	(3x)	5	II	1/4	2-1/2	802016	63.90	802016-C4	83.30	803816	155.50
1/4	**3/4**	(3x)	6	I	1/4	2-1/2	969316	62.00	969316-C4	81.40	791616	155.50
1/4	**1-1/4**	(5x)	5	II	1/4	2-1/2	818516	66.90			803016	161.40
1/4	**1-1/4**	(5x)	6	I	1/4	2-1/2	884916	65.00	884916-C4	84.40		
3/8	**1-1/8**	(3x)	5	II	3/8	3	802024	104.90			803824	253.20
3/8	**1-1/8**	(3x)	8	I	3/8	3	969324	101.80	969324-C4	125.20	791624	253.20
1/2	**1-1/2**	(3x)	5	II	1/2	4	802032	184.90			803832	362.90
1/2	**1-1/2**	(3x)	8	I	1/2	4	969332	179.50	969332-C4	207.60		

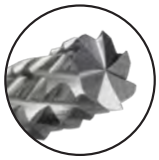
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END MILLS FOR COMPOSITES

Diamond Cut – Bur Style





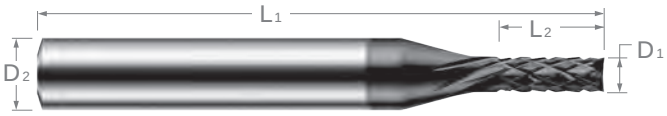
Bur-Style End

- Diamond cut style and high flute count allows for effective deburring with the outer diameter in abrasive composites
- Ideally suited for Carbon and Glass Fiber composites and other composites with high fiber reinforcement
- Bur-style end allows for shallow ramping, not suited for plunge cutting
- Total flute count on the bur-style end is equal to the amount of right hand teeth
- Downcut geometry on the OD
- Solid carbide
- CNC ground in the USA

CUTTER DIAMETER	LENGTH OF CUT	RIGHT HAND TEETH	LEFT HAND TEETH	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AMORPHOUS DIAMOND	
D_1 $^{+.000''}_{-.001''}$	L_2 $^{+.020''}_{-.000''}$			D_2	L_1	TOOL #	PRICE	TOOL #	PRICE
.062 (1/16)	**.186** (3x)	6	8	1/8	1-1/2	798462	40.30	798462-C4	52.70
.078 (5/64)	**.234** (3x)	7	9	1/8	1-1/2	798478	40.30	798478-C4	52.70
.093 (3/32)	**.279** (3x)	7	9	1/8	1-1/2	798493	40.30	798493-C4	52.70
D_1 $^{+.000''}_{-.002''}$	L_2 $^{+.030''}_{-.000''}$			D_2	L_1	TOOL #	PRICE	TOOL #	PRICE
.125 (1/8)	**.375** (3x)	8	10	1/8	1-1/2	798508	40.30	798508-C4	52.70
.187 (3/16)	**.563** (3x)	9	11	3/16	2	798512	48.10	798512-C4	65.20
.250 (1/4)	**.750** (3x)	10	12	1/4	2-1/2	798516	66.40	798516-C4	85.80

END MILLS FOR COMPOSITES

Diamond Cut – End Mill Style





End Mill Style

- Diamond cut style and high flute count allows for effective roughing and profiling in abrasive composites
- Ideally suited for Carbon and Glass Fiber composites and other composites with high fiber reinforcement
- Center cutting (two flutes to center) on end with downcut geometry on OD
- Solid carbide
- CNC ground in the USA

CUTTER DIAMETER	LENGTH OF CUT		RIGHT HAND TEETH	LEFT HAND TEETH	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AMORPHOUS DIAMOND		CVD DIAMOND (4 µm)	
D_1 +.000″ −.001″	L_2 +.020″ −.000″				D_2	L_1	TOOL #	PRICE	TOOL #	PRICE	TOOL #	PRICE
.062 (1/16)	**.186**	(3x)	6	8	1/8	1-1/2	920962	40.30	920962-C4	52.70		
.078 (5/64)	**.234**	(3x)	7	9	1/8	1-1/2	920978	40.30	920978-C4	52.70		
.093 (3/32)	**.279**	(3x)	7	9	1/8	1-1/2	920993	40.30	920993-C4	52.70		
.109 (7/64)	**.327**	(3x)	8	10	1/8	1-1/2	921002	43.60	921002-C4	56.00		

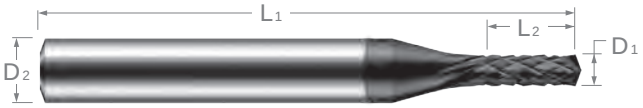
D_1 +.000″ −.002″	L_2 +.030″ −.000″				D_2	L_1	TOOL #	PRICE	TOOL #	PRICE	TOOL #	PRICE
.125 (1/8)	**.375**	(3x)	8	10	1/8	1-1/2	921008	40.30	921008-C4	52.70	799008	89.70
.125 (1/8)	**.625**	(5x)	8	10	1/8	1-1/2	894508	43.60	894508-C4	56.00		
.125 (1/8)	**1.000**	(8x)	8	10	1/8	2-1/2	785208	46.00	785208-C4	58.40		
.156 (5/32)	**.469**	(3x)	9	11	3/16	2	921010	48.10	921010-C4	65.20		
.187 (3/16)	**.563**	(3x)	9	11	3/16	2	921012	48.10	921012-C4	65.20	799012	107.00
.187 (3/16)	**1.000**	(5x)	9	11	3/16	2	894512	52.40	894512-C4	69.50		
.250 (1/4)	**.750**	(3x)	10	12	1/4	2-1/2	921016	66.40	921016-C4	85.80	799016	134.00
.250 (1/4)	**1.250**	(5x)	10	12	1/4	2-1/2	894516	72.10	894516-C4	91.50		
.250 (1/4)	**2.000**	(8x)	10	12	1/4	4	785216	89.60	785216-C4	109.00		
.312 (5/16)	**1.000**	(3x)	10	12	5/16	2-1/2	921020	86.10	921020-C4	109.50		
.375 (3/8)	**1.125**	(3x)	11	13	3/8	2-1/2	921024	104.30	921024-C4	127.70		
.500 (1/2)	**1.500**	(3x)	12	14	1/2	3	921032	176.70	921032-C4	204.90		

View a comprehensive library of **Speeds & Feeds** charts for every Harvey Tool End Mill on the new Harveytool.com.

Access **Simulation Files** in DXF format for every Harvey Tool product, downloadable now from the new Harveytool.com.

END MILLS FOR COMPOSITES

Diamond Cut – Drill Mill Style





Drill Point

- 140° point angle allows for efficient plunging through composite sheet material
- Diamond cut style and high flute count allows for effective roughing and profiling in abrasive composites
- Ideally suited for Carbon and Glass Fiber composites and other composites with high fiber reinforcement
- Downcut geometry on OD
- Solid carbide
- CNC ground in the USA

CUTTER DIAMETER	LENGTH OF CUT	RIGHT HAND TEETH	LEFT HAND TEETH	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AMORPHOUS DIAMOND	
D_1 +.000″ −.001″	L_2 +.020″ −.000″			D_2	L_1	TOOL #	PRICE	TOOL #	PRICE
.062 (1/16)	**.186** (3x)	6	8	1/8	1-1/2	908062	43.00	908062-C4	55.40
.078 (5/64)	**.234** (3x)	7	9	1/8	1-1/2	908078	43.00	908078-C4	55.40
.093 (3/32)	**.279** (3x)	7	9	1/8	1-1/2	908093	43.00	908093-C4	55.40
D_1 +.000″ −.002″	L_2 +.030″ −.000″			D_2	L_1	TOOL #	PRICE	TOOL #	PRICE
.125 (1/8)	**.375** (3x)	8	10	1/8	1-1/2	908108	43.00	908108-C4	55.40
.187 (3/16)	**.563** (3x)	9	11	3/16	2	908112	50.70	908112-C4	67.80
.250 (1/4)	**.750** (3x)	10	12	1/4	2-1/2	908116	69.80	908116-C4	89.20
.375 (3/8)	**1.125** (3x)	11	13	3/8	2-1/2	908124	82.80	908124-C4	106.20
.500 (1/2)	**1.500** (3x)	12	14	1/2	3	908132	169.30	908132-C4	197.50



★★★★★

"Nothing like a fresh @harveytool when cutting carbon fiber!!!"

— @KeyBar

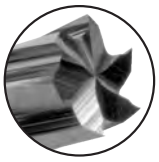
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NEW SIZES!

END MILLS FOR COMPOSITES

Finisher

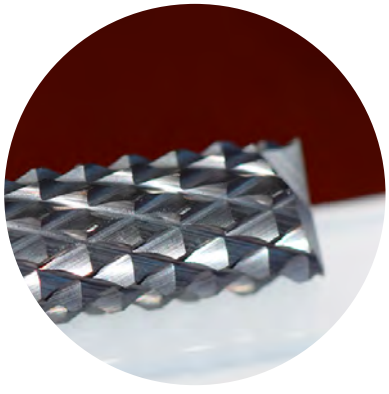




Bur-Style End

- Optimized geometry and high flute count for finishing in composite materials with high fiber or fill concentration
- Slow helix improves finish and minimizes fraying of fiber-reinforced and layered materials by reducing vertical forces on the workpiece
- Bur-style end allows for shallow ramping, not suited for plunge cutting
- Solid carbide
- CNC ground in the USA

CUTTER DIAMETER	LENGTH OF CUT	FLUTES	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AMORPHOUS DIAMOND		CVD DIAMOND (9 µm)		
D_1 +.000″ −.001″	L_2 +.010″ −.000″		D_2	L_1	TOOL #	PRICE	TOOL #	PRICE	TOOL #	PRICE	
1/32	**3/32** (3x)	4	1/8	1-1/2	944731	51.30	944731-C4	63.70			
3/64	**9/64** (3x)	4	1/8	1-1/2	944747	51.30	944747-C4	63.70			
1/16	**3/16** (3x)	6	1/8	1-1/2	944762	48.90	944762-C4	61.30	798862	115.30	
1/16	**5/16** (5x)	6	1/8	1-1/2	889262	51.30	889262-C4	63.70			
5/64	**15/64** (3x)	6	1/8	1-1/2	944778	48.90	944778-C4	61.30			
3/32	**9/64** (1.5x)	6	1/8	1-1/2	794793	48.90	794793-C4	61.30			
3/32	**9/32** (3x)	6	1/8	1-1/2	944793	48.90	944793-C4	61.30	798893	115.30	
3/32	**1/2** (5x)	6	1/8	1-1/2	889293	51.30	889293-C4	63.70			
D_1 +.000″ −.002″	L_2 +.030″ −.000″		D_2	L_1	TOOL #	PRICE	TOOL #	PRICE	TOOL #	PRICE	
1/8	**3/16** (1.5x)	8	1/8	1-1/2	794808	47.20	794808-C4	59.60			
1/8	**3/8** (3x)	8	1/8	1-1/2	944808	47.20	944808-C4	59.60	798908	112.40	
1/8	**5/8** (5x)	8	1/8	2	889208	49.60	889208-C4	62.20			
3/16	**9/16** (3x)	8	3/16	2	944812	52.10	944812-C4	69.20	798912	129.90	NEW
3/16	**1** (5x)	8	3/16	2-1/2	889212	54.60	889212-C4	71.70			
1/4	**3/8** (1.5x)	8	1/4	2-1/2	794816	62.50	794816-C4	81.90			
1/4	**3/4** (3x)	8	1/4	2-1/2	944816	62.50	944816-C4	81.90	798916	143.80	
1/4	**1-1/4** (5x)	8	1/4	2-1/2	889216	76.10	889216-C4	95.50			
3/8	**1-1/8** (3x)	10	3/8	3	944824	102.70	944824-C4	126.10			
1/2	**1-1/2** (3x)	10	1/2	4	944832	180.70	944832-C4	208.80	798932	361.00	NEW



Ideal Tooling for Machining Composites

Composites are a very beneficial, unique material group for their rewarding properties. But machining composites can lead to challenges if not done right. Learn why certain tools are capable of machining composites in our "In the Loupe" blog post **Ideal Tooling for Machining Composites**.

Read more on harveyperformance.com/in-the-loupe/

END MILLS FOR WOOD

Square Upcut



Outstanding in MDF and Plywood!

- Designed for milling natural and engineered woods
- Wedge angle optimized for shearing wood fiber materials without causing tear-out or leaving a fuzzy grain finish
- 2-flute style with deep flute valleys to maximize space for chip evacuation
- Center cutting
- Solid carbide
- CNC ground in the USA

CUTTER DIAMETER	LENGTH OF CUT	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AMORPHOUS DIAMOND	
D_1 $^{+.000''}_{-.002''}$	L_2 $^{+.030''}_{-.000''}$	D_2	L_1	2 FL	PRICE	2 FL	PRICE
1/16	**.186** (3x)	1/4	2	809562	37.90	809562-C4	57.30
1/16	**.312** (5x)	1/4	2-1/2	809362	41.60	809362-C4	61.00
5/64	**.234** (3x)	1/4	2	809578	37.90	809578-C4	57.30
5/64	**.406** (5x)	1/4	2-1/2	809378	41.60	809378-C4	61.00
3/32	**.279** (3x)	1/4	2	809593	37.90	809593-C4	57.30
3/32	**.500** (5x)	1/4	2-1/2	809393	41.60	809393-C4	61.00
1/8	**.375** (3x)	1/4	2	809608	37.90	809608-C4	57.30
1/8	**.625** (5x)	1/4	2-1/2	809408	41.60	809408-C4	61.00
3/16	**.563** (3x)	1/4	2	809612	37.90	809612-C4	57.30
3/16	**1.000** (5x)	1/4	3	809412	44.70	809412-C4	64.10
1/4	**.750** (3x)	1/4	2-1/2	809616	46.70	809616-C4	66.10
1/4	**1.250** (5x)	1/4	3	809416	53.50	809416-C4	72.90
3/8	**1.125** (3x)	3/8	3	809624	80.20	809624-C4	103.60
3/8	**1.875** (5x)	3/8	4	809424	92.50	809424-C4	115.90
1/2	**1.500** (3x)	1/2	4	809632	141.20	809632-C4	169.30
1/2	**2.500** (5x)	1/2	5	809432	162.30	809432-C4	190.80

PLEASE SEE SPEEDS & FEEDS ON PAGE 246

View a comprehensive library of **Speeds & Feeds** charts for every Harvey Tool End Mill on the new Harveytool.com.

Access **Simulation Files** in DXF format for every Harvey Tool product, downloadable now from the new Harveytool.com.

END MILLS FOR WOOD

Square Downcut



Outstanding in MDF and Plywood!

- Designed for milling natural and engineered woods
- Wedge angle optimized for shearing wood fiber materials without causing tear-out or leaving a fuzzy grain finish
- Prevents tear-outs and splintering on the top of the workpiece
- Prevents lifting on vacuum tables
- 2 left hand spiral, right hand cut flutes
- Deep flute valleys to maximize space for chip evacuation
- Center cutting
- Solid carbide
- CNC ground in the USA

CUTTER DIAMETER	LENGTH OF CUT	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AMORPHOUS DIAMOND	
D_1 $^{+.000''}_{-.002''}$	L_2 $^{+.030''}_{-.000''}$	D_2	L_1	2 FL	PRICE	2 FL	PRICE
1/16	**.186** (3x)	1/4	2	809162	44.60	809162-C4	64.00
1/16	**.312** (5x)	1/4	2-1/2	808962	49.00	808962-C4	68.40
5/64	**.234** (3x)	1/4	2	809178	44.60	809178-C4	64.00
5/64	**.406** (5x)	1/4	2-1/2	808978	49.00	808978-C4	68.40
3/32	**.279** (3x)	1/4	2	809193	44.60	809193-C4	64.00
3/32	**.500** (5x)	1/4	2-1/2	808993	49.00	808993-C4	68.40
1/8	**.375** (3x)	1/4	2	809208	44.60	809208-C4	64.00
1/8	**.625** (5x)	1/4	2-1/2	809008	49.00	809008-C4	68.40
3/16	**.563** (3x)	1/4	2	809212	44.60	809212-C4	64.00
3/16	**1.000** (5x)	1/4	3	809012	52.60	809012-C4	72.00
1/4	**.750** (3x)	1/4	2-1/2	809216	54.60	809216-C4	74.00
1/4	**1.250** (5x)	1/4	3	809016	59.60	809016-C4	79.00
3/8	**1.125** (3x)	3/8	3	809224	92.80	809224-C4	116.20
3/8	**1.875** (5x)	3/8	4	809024	108.80	809024-C4	132.20
1/2	**1.500** (3x)	1/2	4	809232	167.20	809232-C4	195.30
1/2	**2.500** (5x)	1/2	5	809032	185.30	809032-C4	213.80

SPEEDS & FEEDS (Square – End Mills for Wood)

Important Note: Values in table are in inches and are based on (3x Dia) length of cut end mills. For longer length of cuts, table values of IPT must be reduced (for 5x, reduce to 90%). For complete speeds and feeds charts, please see www.harveytool.com

Material	Janka Hardness	SFM	Chip Load Per Tooth (IPT) By Cutter Diameter															Depth of Cut	
				.015	.031	.047	.062	.078	.093	.125	.187	.250	.312	.375	.500	.625	.750	1.000	Radial	Axial
Softer Woods White Pine, Sugar Pine, Western Red Cedar, Douglas Fir, Redwood	< 1200	400 - 2000	Slot - Rough	.0007	.0015	.0022	.0029	.0037	.0044	.0059	.0088	.0118	.0125	.0150	.0200	.0250	.0300	.0400	1 x Dia	1 x Dia
		800 - 2400	Finishing	.0005	.0011	.0017	.0022	.0028	.0033	.0045	.0067	.0090	.0097	.0116	.0155	.0194	.0233	.0310	.1 x Dia	3 x Dia
Harder Woods Red Oak, Maple, Ash, Hickory, Black Walnut, Cherry, Beech	> 1200	400 - 2000	Slot - Rough	.0006	.0013	.0020	.0026	.0033	.0039	.0053	.0079	.0106	.0112	.0135	.0180	.0225	.0270	.0360	1 x Dia	1 x Dia
		800 - 2400	Finishing	.0005	.0010	.0015	.0020	.0025	.0030	.0041	.0061	.0081	.0087	.0105	.0140	.0174	.0209	.0279	.1 x Dia	3 x Dia
Engineered Woods Medium Density Fiberboard (MDF), Particle Board, Laminated Board	Varies	400 - 2000	Slot - Rough	.0008	.0016	.0024	.0032	.0040	.0048	.0065	.0097	.0129	.0137	.0165	.0220	.0275	.0330	.0440	1 x Dia	1 x Dia
		800 - 2400	Finishing	.0006	.0012	.0019	.0025	.0031	.0037	.0050	.0074	.0099	.0106	.0128	.0171	.0213	.0256	.0341	.1 x Dia	3 x Dia
Phenolic Wood	Varies	400 - 1200	Slot - Rough	.0003	.0006	.0009	.0012	.0015	.0017	.0024	.0035	.0047	.0050	.0060	.0080	.0100	.0120	.0160	1 x Dia	1 x Dia
		800 - 1600	Finishing	.0002	.0004	.0007	.0009	.0011	.0013	.0018	.0027	.0036	.0039	.0047	.0062	.0078	.0093	.0124	.1 x Dia	3 x Dia

SPECIALTY PROFILES

At Harvey Tool, we know the details are critical to your machining processes. With that in mind, we offer a broad range of Specialty Profiles to help you make those difficult cuts. For printer-friendly **Speeds & Feeds** and downloadable **Simulation Files** for all products, visit **www.harveytool.com/technical**.

Undercutting End Mills *New Sizes!* 248

Drill / End Mills *New Sizes!* 263

Chamfer Cutters *New Sizes!* mm & in 275

Picatinny Form Cutters *New Sizes!* 296

Runner Cutters *New Sizes!* 298

Hexalobe Cutters 301

Engraving Cutters *New Sizes!* mm & in 303

Double Angle Shank Cutters *New Sizes!* 325

Back Deburring Mills 335

Keyseat Cutters *New Sizes!* 336

Slitting Saws 366

Concave Radius End Mills 369

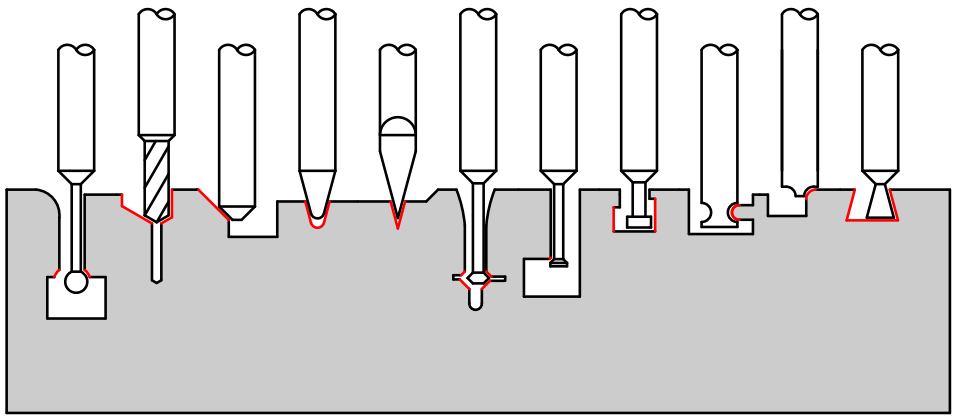
Corner Rounding End Mills *New Sizes!* 370

Boring Bars 382

BackDraft Cutters 383

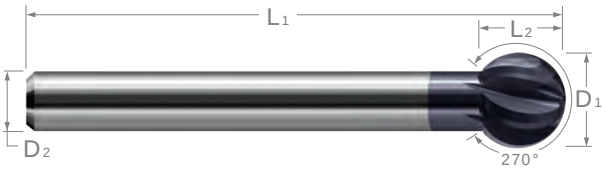
Dovetail Cutters *New Sizes!* 385

Machine a Variety of Difficult Profiles!



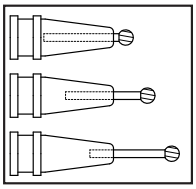
UNDERCUTTING END MILLS

270° Reduced Shank



- 270° spherical ball
- Designed for undercutting, deburring, and multi-axis machining
- Reduced straight shank allows any chucking depth
- Center cutting
- Solid carbide construction for maximum rigidity
- 6 flutes
- CNC ground in the USA

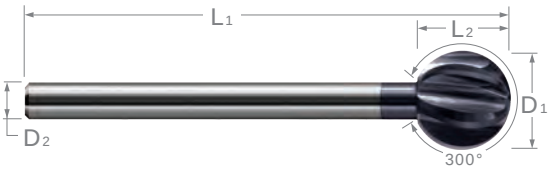
Chuck at Any Depth!



CUTTER DIAMETER	LENGTH OF CUT	FLUTES	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN COATED	
D_1 +.000″ −.002″	L_2 +.020″ −.000″		D_2	L_1	6 FL	PRICE	6 FL	PRICE
1/4	.217	6	4 mm	3-1/2	956116	241.00	956116-C3	249.40
5/16	.273	6	3/16	3-1/2	956120	245.70	956120-C3	254.10
3/8	.324	6	6 mm	3-1/2	956124	248.20	956124-C3	257.70
1/2	.432	6	5/16	4	956132	260.80	956132-C3	275.00
5/8	.546	6	3/8	4	956140	299.00	956140-C3	314.40
3/4	.645	6	1/2	5	956148	430.10	956148-C3	437.60
1	.873	6	5/8	5	956164	608.60	956164-C3	634.40

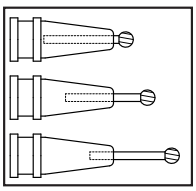
UNDERCUTTING END MILLS

300° Reduced Shank



- 300° spherical ball
- Designed for undercutting, deburring, and multi-axis machining
- Reduced straight shank allows any chucking depth
- Center cutting
- Solid carbide construction for maximum rigidity
- 6 flutes
- CNC ground in the USA

Chuck at Any Depth!

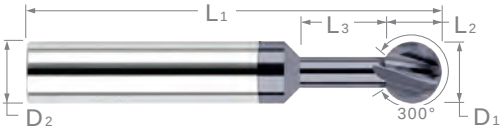


CUTTER DIAMETER	LENGTH OF CUT	FLUTES	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN COATED	
D_1 +.000″ −.002″	L_2 +.020″ −.000″		D_2	L_1	6 FL	PRICE	6 FL	PRICE
1/4	.232	6	3 mm	3-1/2	947416	258.30	947416-C3	266.70
3/8	.355	6	4 mm	3-1/2	947424	264.50	947424-C3	274.00
1/2	.472	6	3/16	4	947432	277.00	947432-C3	291.20
5/8	.589	6	1/4	4	947440	315.10	947440-C3	330.50
3/4	.706	6	5/16	5	947448	446.30	947448-C3	462.70
1	.939	6	7/16	5	947464	623.90	947464-C3	649.70

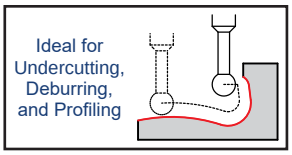
NEW SIZES!

UNDERCUTTING END MILLS

300°



- 300° spherical ball
- Designed for undercutting, deburring, and multi-axis machining
- Center cutting
- Solid carbide
- CNC ground in the USA





	CUTTER DIAMETER	LENGTH OF CUT	NECK DIA.	NECK LENGTH	FLUTES	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN COATED	
	D_1 +.000″ −.001″	L_2 +.010″ −.000″		L_3 +.020″ −.000″		D_2	L_1	TOOL #	PRICE	TOOL #	PRICE
	1/32	.028	.010	**.031**	2	1/8	1-1/2	983931	68.50	983931-C3	73.40
	1/32	.028	.010	**.062**	2	1/8	1-1/2	979131	68.50	979131-C3	73.40
	.0394 (1 mm)	.036	.014	**.047**	2	1/8	1-1/2	98391M	68.50	98391M-C3	73.40
	.0394 (1 mm)	.036	.014	**.078**	2	1/8	1-1/2	97911M	68.50	97911M-C3	73.40
	3/64	.043	.018	**.062**	2	1/8	1-1/2	983947	68.50	983947-C3	73.40
	3/64	.043	.018	**.093**	2	1/8	1-1/2	979147	68.50	979147-C3	73.40
	3/64	.043	.018	**.125**	2	1/8	1-1/2	940047	68.50	940047-C3	73.40
	1/16	.057	.024	**.031**	2	1/8	1-1/2	989562	48.60	989562-C3	53.50
	1/16	.057	.024	**.062**	2	1/8	1-1/2	875762	48.60	875762-C3	53.50
	1/16	.057	.024	**.078**	2	1/8	1-1/2	983962	48.60	983962-C3	53.50
	1/16	.057	.024	**.125**	2	1/8	1-1/2	979162	48.60	979162-C3	53.50
	1/16	.057	.024	**.187**	2	1/8	1-1/2	940062	48.60	940062-C3	53.50
NEW	1/16	.057	.024	**.250**	2	1/8	1-1/2	767862	48.60	767862-C3	53.50
	5/64	.072	.031	**.047**	2	1/8	1-1/2	989578	48.60	989578-C3	53.50
	5/64	.072	.031	**.093**	2	1/8	1-1/2	983978	48.60	983978-C3	53.50
	5/64	.072	.031	**.156**	2	1/8	1-1/2	979178	48.60	979178-C3	53.50
	5/64	.072	.031	**.218**	2	1/8	1-1/2	940078	48.60	940078-C3	53.50
	3/32	.086	.038	**.062**	2	1/8	1-1/2	989593	48.60	989593-C3	53.50
	3/32	.086	.038	**.093**	2	1/8	1-1/2	875793	48.60	875793-C3	53.50
	3/32	.086	.038	**.125**	2	1/8	1-1/2	983993	48.60	983993-C3	53.50
	3/32	.086	.038	**.156**	2	1/8	1-1/2	926893	48.60	926893-C3	53.50
	3/32	.086	.038	**.218**	2	1/8	1-1/2	979193	48.60	979193-C3	53.50
	3/32	.086	.038	**.281**	2	1/8	1-1/2	940093	48.60	940093-C3	53.50
NEW	3/32	.086	.038	**.375**	2	1/8	1-1/2	766693	48.60	766693-C3	53.50
	7/64	.101	.047	**.156**	2	1/8	1-1/2	984007	49.20	984007-C3	54.10
	7/64	.101	.047	**.250**	2	1/8	1-1/2	979207	49.20	979207-C3	54.10
	.1181 (3 mm)	.110	.051	**.078**	2	1/8	1-1/2	98953M	48.60	98953M-C3	53.50
	.1181 (3 mm)	.110	.051	**.156**	2	1/8	1-1/2	98393M	48.60	98393M-C3	53.50
	.1181 (3 mm)	.110	.051	**.218**	2	1/8	1-1/2	92683M	48.60	92683M-C3	53.50

	D_1 +.000″ −.002″	L_2 +.020″ −.000″		L_3 +.030″ −.000″		D_2	L_1	TOOL #	PRICE	TOOL #	PRICE
	1/8	.116	.053	**.047**	4	1/8	1-1/2	943608	36.10	943608-C3	41.00
	1/8	.116	.053	**.093**	4	1/8	1-1/2	990608	39.70	990608-C3	44.60
	1/8	.116	.053	**.125**	4	1/8	1-1/2	933008	42.70	933008-C3	47.60
	1/8	.116	.053	**.156**	4	1/8	1-1/2	875808	46.40	875808-C3	51.30
	1/8	.116	.053	**.187**	4	1/8	1-1/2	984008	46.40	984008-C3	51.30
	1/8	.116	.053	**.250**	4	1/8	1-1/2	843208	51.70	843208-C3	56.60
	1/8	.116	.053	**.281**	4	1/8	1-1/2	979208	51.70	979208-C3	56.60

continued on next page

NEW SIZES!

UNDERCUTTING END MILLS

300° (cont.)

continued from previous page

CUTTER DIAMETER	LENGTH OF CUT	NECK DIA.	NECK LENGTH	FLUTES	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		ALTiN COATED		
D_1 +.000″ −.002″	L_2 +.020″ −.000″		L_3 +.030″ −.000″		D_2	L_1	TOOL #	PRICE	TOOL #	PRICE	
1/8	.116	.053	**.312**	4	1/8	1-1/2	794608	53.70	794608-C3	58.60	
1/8	.116	.053	**.375**	4	1/8	1-1/2	940108	57.00	940108-C3	61.90	
1/8	.116	.053	**.500**	4	1/8	1-1/2	952308	61.10	952308-C3	66.00	
1/8	.116	.053	**.625**	4	1/8	2	911908	82.30	911908-C3	87.20	
1/8	.116	.053	**.750**	4	1/8	3	877908	85.00	877908-C3	89.90	
9/64	.130	.062	**.218**	4	3/16	2	984009	55.80	984009-C3	61.10	
9/64	.130	.062	**.312**	4	3/16	2	979209	62.40	979209-C3	67.70	
5/32	.145	.071	**.047**	4	3/16	2	943610	50.00	943610-C3	55.30	
5/32	.145	.071	**.125**	4	3/16	2	990610	50.00	990610-C3	55.30	
5/32	.145	.071	**.250**	4	3/16	2	984010	56.70	984010-C3	62.00	
5/32	.145	.071	**.375**	4	3/16	2	979210	65.60	979210-C3	70.90	
5/32	.145	.071	**.500**	4	3/16	2	940110	69.30	940110-C3	74.60	
5/32	.145	.071	**.625**	4	3/16	2	952310	70.70	952310-C3	76.00	
3/16	.174	.082	**.062**	4	3/16	2	943612	50.00	943612-C3	55.30	
3/16	.174	.082	**.125**	4	3/16	2	990612	50.00	990612-C3	55.30	
3/16	.174	.082	**.187**	4	3/16	2	933012	53.40	933012-C3	58.70	NEW
3/16	.174	.082	**.250**	4	3/16	2	984012	56.70	984012-C3	62.00	
3/16	.174	.082	**.312**	4	3/16	2	926912	61.10	926912-C3	66.40	
3/16	.174	.082	**.375**	4	3/16	2	843212	63.30	843212-C3	68.60	
3/16	.174	.082	**.437**	4	3/16	2	979212	65.60	979212-C3	70.90	
3/16	.174	.082	**.625**	4	3/16	2	940112	68.00	940112-C3	73.30	
3/16	.174	.082	**.750**	4	3/16	2	952312	71.30	952312-C3	76.60	
3/16	.174	.082	**.875**	4	3/16	2-1/2	834612	74.30	834612-C3	79.60	
3/16	.174	.082	**1.000**	4	3/16	2-1/2	911912	75.80	911912-C3	81.10	
3/16	.174	.082	**1.250**	4	3/16	3	877912	78.90	877912-C3	84.20	NEW
.1969 (5 mm)	.182	.086	**.156**	4	1/4	2-1/2	99065M	69.20	99065M-C3	76.40	
.1969 (5 mm)	.182	.086	**.250**	4	1/4	2-1/2	98405M	72.50	98405M-C3	79.70	
7/32	.203	.098	**.156**	4	1/4	2-1/2	990614	69.20	990614-C3	76.40	
7/32	.203	.098	**.312**	4	1/4	2-1/2	984014	76.90	984014-C3	84.10	
.2362 (6 mm)	.220	.106	**.156**	4	1/4	2-1/2	99066M	68.30	99066M-C3	75.50	
.2362 (6 mm)	.220	.106	**.312**	4	1/4	2-1/2	98406M	76.90	98406M-C3	84.10	
.2362 (6 mm)	.220	.106	**.437**	4	1/4	2-1/2	92696M	79.60	92696M-C3	86.80	
.2362 (6 mm)	.220	.106	**.562**	4	1/4	2-1/2	97926M	83.80	97926M-C3	91.00	
1/4	.233	.112	**.093**	4	1/4	2-1/2	943616	67.00	943616-C3	74.20	
1/4	.233	.112	**.187**	4	1/4	2-1/2	990616	67.00	990616-C3	74.20	
1/4	.233	.112	**.250**	4	1/4	2-1/2	933016	70.70	933016-C3	77.90	
1/4	.233	.112	**.375**	4	1/4	2-1/2	984016	73.80	984016-C3	81.00	
1/4	.233	.112	**.500**	4	1/4	2-1/2	926916	81.50	926916-C3	88.70	
1/4	.233	.112	**.625**	4	1/4	2-1/2	979216	89.40	979216-C3	96.60	
1/4	.233	.112	**.750**	4	1/4	2-1/2	940116	95.20	940116-C3	102.40	
1/4	.233	.112	**1.000**	4	1/4	2-1/2	952316	102.10	952316-C3	109.30	
1/4	.233	.112	**1.250**	4	1/4	3	911916	110.30	911916-C3	117.50	
1/4	.233	.112	**1.500**	4	1/4	4	877916	118.40	877916-C3	126.80	
9/32	.262	.127	**.187**	4	5/16	2-1/2	990618	94.60	990618-C3	103.00	
9/32	.262	.127	**.375**	4	5/16	2-1/2	984018	111.00	984018-C3	119.40	

continued on next page

UNDERCUTTING END MILLS

300° (cont.)

continued from previous page

CUTTER DIAMETER	LENGTH OF CUT	NECK DIA.	NECK LENGTH	FLUTES	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN COATED	
D_1 $^{+.000''}_{-.002''}$	L_2 $^{+.020''}_{-.000''}$		L_3 $^{+.030''}_{-.000''}$		D_2	L_1	TOOL #	PRICE	TOOL #	PRICE
5/16	.291	.143	**.250**	4	5/16	2-1/2	990620	91.50	990620-C3	99.90
5/16	.291	.143	**.437**	4	5/16	2-1/2	984020	108.70	984020-C3	117.10
5/16	.291	.143	**.750**	4	5/16	2-1/2	979220	122.20	979220-C3	130.60
5/16	.291	.143	**1.000**	4	5/16	2-1/2	940120	135.90	940120-C3	144.30
3/8	.349	.172	**.156**	4	3/8	2-1/2	943624	96.00	943624-C3	105.50
3/8	.349	.172	**.250**	4	3/8	2-1/2	990624	97.60	990624-C3	107.10
3/8	.349	.172	**.375**	4	3/8	2-1/2	933024	106.10	933024-C3	115.60
3/8	.349	.172	**.500**	4	3/8	2-1/2	984024	114.60	984024-C3	124.10
3/8	.349	.172	**.687**	4	3/8	2-1/2	926924	123.70	926924-C3	133.20
3/8	.349	.172	**.750**	4	3/8	2-1/2	843224	127.20	843224-C3	136.70
3/8	.349	.172	**1.000**	4	3/8	3	979224	133.10	979224-C3	142.60
3/8	.349	.172	**1.250**	4	3/8	3	940124	139.30	940124-C3	148.80
3/8	.349	.172	**1.500**	4	3/8	4	952324	161.70	952324-C3	174.70
.3937 (10 mm)	.366	.181	**.312**	4	7/16	2-3/4	990625	120.40	990625-C3	132.30
.3937 (10 mm)	.366	.181	**.562**	4	7/16	2-3/4	984025	143.30	984025-C3	155.20
1/2	.466	.230	**.187**	4	1/2	3	943632	147.80	943632-C3	162.00
1/2	.466	.230	**.312**	4	1/2	3	990632	148.90	990632-C3	163.10
1/2	.466	.230	**.750**	4	1/2	3	984032	169.10	984032-C3	183.30
1/2	.466	.230	**1.000**	4	1/2	3	926932	183.00	926932-C3	197.20
1/2	.466	.230	**1.250**	4	1/2	4	979232	205.40	979232-C3	219.60
1/2	.466	.230	**1.625**	4	1/2	4	940132	201.70	940132-C3	215.90
1/2	.466	.230	**2.000**	4	1/2	4	952332	225.50	952332-C3	239.70
5/8	.583	.292	**1.625**	4	5/8	4	979240	257.10	979240-C3	272.50
3/4	.699	.355	**2.000**	4	3/4	6	979248	324.40	979248-C3	346.70

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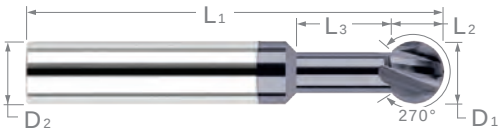


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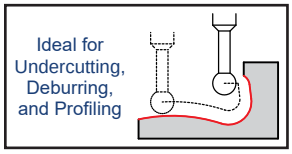
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UNDERCUTTING END MILLS

270°



- 270° spherical ball
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- Center cutting
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Stocked in Multiple Reach Lengths



CUTTER DIAMETER	LENGTH OF CUT	NECK DIAMETER	NECK LENGTH	FLUTES	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN COATED		
D_1 +.000″ −.001″	L_2 +.010″ −.000″		L_3 +.020″ −.000″		D_2	L_1	TOOL #	PRICE	TOOL #	PRICE	
.0200	.017	.012	**.016**	2	1/8	1-1/2	974220	71.80	974220-C3	76.70	
.0200	.017	.012	**.031**	2	1/8	1-1/2	52820	71.80	52820-C3	76.70	
.0200	.017	.012	**.047**	2	1/8	1-1/2	23200	76.40	23200-C3	81.30	
.0200	.017	.012	**.062**	2	1/8	1-1/2	54620	78.80	54620-C3	83.70	
.0250	.021	.014	**.031**	2	1/8	1-1/2	974225	63.30	974225-C3	68.20	
.0250	.021	.014	**.047**	2	1/8	1-1/2	52825	63.30	52825-C3	68.20	
.0250	.021	.014	**.062**	2	1/8	1-1/2	23201	68.00	23201-C3	72.90	
.0250	.021	.014	**.078**	2	1/8	1-1/2	54625	70.40	54625-C3	75.30	
1/32	.027	.016	**.015**	2	1/8	1-1/2	931502	58.00	931502-C3	62.90	
1/32	.027	.016	**.031**	2	1/8	1-1/2	23102	58.00	23102-C3	62.90	
1/32	.027	.016	**.047**	2	1/8	1-1/2	974231	58.00	974231-C3	62.90	
1/32	.027	.016	**.062**	2	1/8	1-1/2	52831	58.00	52831-C3	62.90	
1/32	.027	.016	**.078**	2	1/8	1-1/2	39731	58.00	39731-C3	62.90	
1/32	.027	.016	**.093**	2	1/8	1-1/2	23202	59.60	23202-C3	64.50	
1/32	.027	.016	**.125**	2	1/8	1-1/2	54631	68.00	54631-C3	72.90	
1/32	.027	.016	**.187**	2	1/8	1-1/2	55202	68.00	55202-C3	72.90	
1/32	.027	.016	**.218**	2	1/8	1-1/2	867731	58.00	867731-C3	62.90	
.0394 (1 mm)	.033	.024	**.047**	2	1/8	1-1/2	2311M	58.00	2311M-C3	62.90	
.0394 (1 mm)	.033	.024	**.062**	2	1/8	1-1/2	97421M	58.00	97421M-C3	62.90	
.0394 (1 mm)	.033	.024	**.078**	2	1/8	1-1/2	5281M	58.00	5281M-C3	62.90	
.0394 (1 mm)	.033	.024	**.093**	2	1/8	1-1/2	3971M	58.00	3971M-C3	62.90	
.0394 (1 mm)	.033	.024	**.125**	2	1/8	1-1/2	2321M	66.30	2321M-C3	71.20	
.0394 (1 mm)	.033	.024	**.187**	2	1/8	1-1/2	54639	68.00	54639-C3	72.90	
.0394 (1 mm)	.033	.024	**.250**	2	1/8	1-1/2	5521M	75.20	5521M-C3	80.10	
.0400	.034	.024	**.093**	2	1/8	1-1/2	39771	58.00	39771-C3	62.90	NEW
.0400	.034	.024	**.125**	2	1/8	1-1/2	23271	58.00	23271-C3	62.90	NEW
3/64	.040	.029	**.047**	2	1/8	1-1/2	23103	58.00	23103-C3	62.90	
3/64	.040	.029	**.062**	2	1/8	1-1/2	974247	58.00	974247-C3	62.90	
3/64	.040	.029	**.093**	2	1/8	1-1/2	52847	58.00	52847-C3	62.90	
3/64	.040	.029	**.125**	2	1/8	1-1/2	39703	58.00	39703-C3	62.90	
3/64	.040	.029	**.156**	2	1/8	1-1/2	23203	68.00	23203-C3	72.90	
3/64	.040	.029	**.187**	2	1/8	1-1/2	41303	68.00	41303-C3	72.90	
3/64	.040	.029	**.250**	2	1/8	1-1/2	54647	68.00	54647-C3	72.90	
3/64	.040	.029	**.375**	2	1/8	1-1/2	55203	71.50	55203-C3	76.40	
3/64	.040	.029	**.437**	2	1/8	2	867747	78.60	867747-C3	83.50	
.0500	.042	.030	**.093**	2	1/8	1-1/2	52850	48.30	52850-C3	53.20	
.0500	.042	.030	**.125**	2	1/8	1-1/2	39750	48.30	39750-C3	53.20	
.0500	.042	.030	**.156**	2	1/8	1-1/2	23250	58.30	23250-C3	63.20	
1/16	.053	.037	**.031**	2	1/8	1-1/2	931504	38.60	931504-C3	43.50	
1/16	.053	.037	**.047**	2	1/8	1-1/2	774262	38.60	774262-C3	43.50	
1/16	.053	.037	**.062**	2	1/8	1-1/2	23104	38.60	23104-C3	43.50	
1/16	.053	.037	**.078**	2	1/8	1-1/2	974262	38.60	974262-C3	43.50	

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UNDERCUTTING END MILLS

270° (cont.)

continued from previous page

	CUTTER DIAMETER	LENGTH OF CUT	NECK DIAMETER	NECK LENGTH	FLUTES	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN COATED	
	D_1 +.000″ −.001″	L_2 +.010″ −.000″		L_3 +.020″ −.000″		D_2	L_1	TOOL #	PRICE	TOOL #	PRICE
	1/16	.053	.037	**.093**	2	1/8	1-1/2	52862	38.60	52862-C3	43.50
	1/16	.053	.037	**.125**	2	1/8	1-1/2	39704	40.20	39704-C3	45.10
	1/16	.053	.037	**.156**	2	1/8	1-1/2	794362	40.20	794362-C3	45.10
	1/16	.053	.037	**.187**	2	1/8	1-1/2	23204	40.20	23204-C3	45.10
NEW	1/16	.053	.037	**.218**	2	1/8	1-1/2	41304	45.30	41304-C3	50.20
	1/16	.053	.037	**.250**	2	1/8	1-1/2	54662	49.70	54662-C3	54.60
	1/16	.053	.037	**.312**	2	1/8	1-1/2	909062	49.70	909062-C3	54.60
	1/16	.053	.037	**.375**	2	1/8	1-1/2	55204	49.70	55204-C3	54.60
	1/16	.053	.037	**.437**	2	1/8	2	867762	56.90	867762-C3	61.80
	1/16	.053	.037	**.500**	2	1/8	2	775462	56.90	775462-C3	61.80
	5/64	.067	.045	**.031**	2	1/8	1-1/2	931505	39.30	931505-C3	44.20
	5/64	.067	.045	**.062**	2	1/8	1-1/2	23105	39.30	23105-C3	44.20
	5/64	.067	.045	**.093**	2	1/8	1-1/2	974278	39.30	974278-C3	44.20
	5/64	.067	.045	**.125**	2	1/8	1-1/2	52878	39.30	52878-C3	44.20
	5/64	.067	.045	**.187**	2	1/8	1-1/2	39705	41.10	39705-C3	46.00
	5/64	.067	.045	**.250**	2	1/8	1-1/2	23205	42.20	23205-C3	47.10
	5/64	.067	.045	**.312**	2	1/8	1-1/2	41305	42.20	41305-C3	47.10
	5/64	.067	.045	**.375**	2	1/8	2	54678	50.50	54678-C3	55.40
	5/64	.067	.045	**.500**	2	1/8	2	55205	50.50	55205-C3	55.40
	5/64	.067	.045	**.625**	2	1/8	2	867778	50.50	867778-C3	55.40
	3/32	.079	.054	**.031**	2	1/8	1-1/2	931506	39.30	931506-C3	44.20
	3/32	.079	.054	**.062**	2	1/8	1-1/2	23106	39.30	23106-C3	44.20
	3/32	.079	.054	**.093**	2	1/8	1-1/2	789893	39.30	789893-C3	44.20
	3/32	.079	.054	**.125**	2	1/8	1-1/2	974293	39.30	974293-C3	44.20
	3/32	.079	.054	**.187**	2	1/8	1-1/2	905106	39.30	905106-C3	44.20
	3/32	.079	.054	**.250**	2	1/8	1-1/2	52893	39.30	52893-C3	44.20
	3/32	.079	.054	**.312**	2	1/8	1-1/2	39706	42.90	39706-C3	47.80
	3/32	.079	.054	**.375**	2	1/8	1-1/2	23206	42.90	23206-C3	47.80
	3/32	.079	.054	**.437**	2	1/8	2	41306	50.50	41306-C3	55.40
	3/32	.079	.054	**.500**	2	1/8	2	54693	50.50	54693-C3	55.40
	3/32	.079	.054	**.625**	2	1/8	2	55206	58.00	55206-C3	62.90
NEW	.1000	.085	.060	**.312**	2	1/8	1-1/2	39783	42.90	39783-C3	47.80
NEW	.1000	.085	.060	**.375**	2	1/8	1-1/2	23283	42.90	23283-C3	47.80
	7/64	.093	.064	**.187**	2	1/8	1-1/2	905107	38.60	905107-C3	43.50
	7/64	.093	.064	**.250**	2	1/8	1-1/2	52907	38.60	52907-C3	43.50
	7/64	.093	.064	**.375**	2	1/8	1-1/2	39707	42.20	39707-C3	47.10
	7/64	.093	.064	**.500**	2	1/8	2	23207	49.70	23207-C3	54.60
	7/64	.093	.064	**1.000**	2	1/8	3	29507	56.90	29507-C3	61.80
	.1181 (3 mm)	.100	.070	**.093**	2	1/8	1-1/2	2313M	38.60	2313M-C3	43.50
	.1181 (3 mm)	.100	.070	**.187**	2	1/8	1-1/2	90513M	38.60	90513M-C3	43.50
	.1181 (3 mm)	.100	.070	**.250**	2	1/8	1-1/2	5283M	38.60	5283M-C3	43.50
	.1181 (3 mm)	.100	.070	**.375**	2	1/8	1-1/2	3973M	42.20	3973M-C3	47.10
	.1181 (3 mm)	.100	.070	**.500**	2	1/8	2	2323M	49.70	2323M-C3	54.60

	D_1 +.000″ −.002″	L_2 +.020″ −.000″		L_3 +.030″ −.000″		D_2	L_1	TOOL #	PRICE	TOOL #	PRICE
	1/8	.107	.076	**.062**	4	1/8	1-1/2	931508	34.00	931508-C3	38.90
	1/8	.107	.076	**.093**	4	1/8	1-1/2	787908	34.00	787908-C3	38.90
	1/8	.107	.076	**.125**	4	1/8	1-1/2	23108	34.00	23108-C3	38.90
	1/8	.107	.076	**.187**	4	1/8	1-1/2	974308	34.90	974308-C3	39.80
	1/8	.107	.076	**.250**	4	1/8	1-1/2	52908	36.00	52908-C3	40.90
	1/8	.107	.076	**.312**	4	1/8	1-1/2	828408	36.40	828408-C3	41.30

continued on next page

NEW SIZES!

UNDERCUTTING END MILLS

270° (cont.)

continued from previous page

CUTTER DIAMETER	LENGTH OF CUT	NECK DIAMETER	NECK LENGTH	FLUTES	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		ALTiN COATED	
D_1 $^{+.000''}_{-.002''}$	L_2 $^{+.020''}_{-.000''}$		L_3 $^{+.030''}_{-.000''}$		D_2	L_1	TOOL #	PRICE	TOOL #	PRICE
1/8	.107	.076	**.375**	4	1/8	1-1/2	39708	36.70	39708-C3	41.60
1/8	.107	.076	**.500**	4	1/8	1-1/2	23208	39.30	23208-C3	44.20
1/8	.107	.076	**.625**	4	1/8	2	922908	42.00	922908-C3	46.90
1/8	.107	.076	**.750**	4	1/8	2	41308	42.00	41308-C3	46.90
1/8	.107	.076	**.875**	4	1/8	3	846608	43.80	846608-C3	48.70
1/8	.107	.076	**1.000**	4	1/8	3	29508	45.60	29508-C3	50.50
1/8	.107	.076	**1.125**	4	1/8	3	769508	47.20	769508-C3	52.10 NEW
1/8	.107	.076	**1.250**	4	1/8	3	960608	48.80	960608-C3	53.70
1/8	.107	.076	**1.500**	4	1/8	3	55208	52.00	55208-C3	56.90
1/8	.107	.076	**1.750**	4	1/8	3	929608	54.70	929608-C3	59.60
9/64	.119	.084	**.125**	4	3/16	2	23109	40.50	23109-C3	45.80
9/64	.119	.084	**.250**	4	3/16	2	52909	43.90	52909-C3	49.20
9/64	.119	.084	**.375**	4	3/16	2	39709	46.70	39709-C3	52.00
9/64	.119	.084	**.500**	4	3/16	2	23209	49.50	23209-C3	54.80
9/64	.119	.084	**.750**	4	3/16	2	41309	53.10	41309-C3	58.40
5/32	.133	.098	**.078**	4	3/16	2	931510	40.50	931510-C3	45.80
5/32	.133	.098	**.125**	4	3/16	2	23110	40.50	23110-C3	45.80
5/32	.133	.098	**.250**	4	3/16	2	52910	43.90	52910-C3	49.20
5/32	.133	.098	**.375**	4	3/16	2	39710	46.20	39710-C3	51.50
5/32	.133	.098	**.500**	4	3/16	2	23210	49.50	23210-C3	54.80
5/32	.133	.098	**.750**	4	3/16	2	41310	53.10	41310-C3	58.40
5/32	.133	.098	**1.000**	4	3/16	3	29510	57.40	29510-C3	62.70
5/32	.133	.098	**1.500**	4	3/16	3	55210	59.80	55210-C3	65.10
3/16	.160	.117	**.078**	4	3/16	2	931512	40.50	931512-C3	45.80
3/16	.160	.117	**.093**	4	3/16	2	787912	40.50	787912-C3	45.80
3/16	.160	.117	**.125**	4	3/16	2	23112	40.50	23112-C3	45.80
3/16	.160	.117	**.187**	4	3/16	2	974312	43.90	974312-C3	49.20
3/16	.160	.117	**.250**	4	3/16	2	52912	43.90	52912-C3	49.20
3/16	.160	.117	**.375**	4	3/16	2	39712	46.20	39712-C3	51.50
3/16	.160	.117	**.500**	4	3/16	2	23212	47.90	23212-C3	53.20
3/16	.160	.117	**.625**	4	3/16	2	922912	50.60	922912-C3	55.90
3/16	.160	.117	**.750**	4	3/16	2	41312	53.10	41312-C3	58.40
3/16	.160	.117	**.875**	4	3/16	3	846612	55.30	846612-C3	60.60
3/16	.160	.117	**1.000**	4	3/16	3	29512	57.40	29512-C3	62.70
3/16	.160	.117	**1.250**	4	3/16	3	960612	59.70	960612-C3	65.00
3/16	.160	.117	**1.500**	4	3/16	3	55212	61.90	55212-C3	67.20
3/16	.160	.117	**1.750**	4	3/16	3	929612	73.10	929612-C3	78.40
.1969 (5 mm)	.167	.119	**.250**	4	1/4	2-1/2	5295M	56.70	5295M-C3	63.90
.1969 (5 mm)	.167	.119	**.500**	4	1/4	2-1/2	2325M	58.00	2325M-C3	65.20
.1969 (5 mm)	.167	.119	**1.000**	4	1/4	4	2955M	65.90	2955M-C3	74.30
7/32	.186	.138	**.250**	4	1/4	2-1/2	52914	60.90	52914-C3	68.10
7/32	.186	.138	**.500**	4	1/4	2-1/2	23214	63.30	23214-C3	70.50
7/32	.186	.138	**.750**	4	1/4	2-1/2	41314	66.10	41314-C3	73.30
.2362 (6 mm)	.201	.148	**.250**	4	1/4	2-1/2	97436M	56.20	97436M-C3	63.40
.2362 (6 mm)	.201	.148	**.375**	4	1/4	2-1/2	5296M	56.20	5296M-C3	63.40
.2362 (6 mm)	.201	.148	**.500**	4	1/4	2-1/2	3976M	59.20	3976M-C3	66.40
.2362 (6 mm)	.201	.148	**.750**	4	1/4	2-1/2	2326M	62.80	2326M-C3	70.00
.2362 (6 mm)	.201	.148	**1.250**	4	1/4	4	2956M	71.50	2956M-C3	79.90
.2362 (6 mm)	.201	.148	**2.000**	4	1/4	4	96066M	83.40	96066M-C3	91.80

continued on next page

UNDERCUTTING END MILLS

270° (cont.)

continued from previous page

	CUTTER DIAMETER	LENGTH OF CUT	NECK DIAMETER	NECK LENGTH	FLUTES	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN COATED	
	D_1 +.000″ −.002″	L_2 +.020″ −.000″		L_3 +.030″ −.000″		D_2	L_1	TOOL #	PRICE	TOOL #	PRICE
	1/4	.213	.158	**.078**	4	1/4	2-1/2	931516	54.00	931516-C3	61.20
	1/4	.213	.158	**.125**	4	1/4	2-1/2	23116	54.00	23116-C3	61.20
	1/4	.213	.158	**.187**	4	1/4	2-1/2	789916	54.00	789916-C3	61.20
	1/4	.213	.158	**.250**	4	1/4	2-1/2	974316	56.70	974316-C3	63.90
	1/4	.213	.158	**.312**	4	1/4	2-1/2	905116	56.70	905116-C3	63.90
	1/4	.213	.158	**.375**	4	1/4	2-1/2	52916	57.40	52916-C3	64.60
	1/4	.213	.158	**.500**	4	1/4	2-1/2	39716	59.20	39716-C3	66.40
	1/4	.213	.158	**.625**	4	1/4	2-1/2	927616	59.70	927616-C3	66.90
	1/4	.213	.158	**.750**	4	1/4	2-1/2	23216	62.80	23216-C3	70.00
	1/4	.213	.158	**.875**	4	1/4	2-1/2	786916	62.80	786916-C3	70.00
	1/4	.213	.158	**1.000**	4	1/4	2-1/2	922916	63.70	922916-C3	70.90
	1/4	.213	.158	**1.125**	4	1/4	2-1/2	41316	65.50	41316-C3	72.70
	1/4	.213	.158	**1.250**	4	1/4	4	846616	70.30	846616-C3	78.70
	1/4	.213	.158	**1.500**	4	1/4	4	29516	72.70	29516-C3	81.10
	1/4	.213	.158	**2.000**	4	1/4	4	960616	77.20	960616-C3	85.60
	1/4	.213	.158	**2.250**	4	1/4	4	55216	81.90	55216-C3	90.30
	1/4	.213	.158	**2.500**	4	1/4	4	929616	107.80	929616-C3	116.20
	9/32	.240	.180	**.375**	4	5/16	2-1/2	52918	76.40	52918-C3	84.80
	9/32	.240	.180	**.750**	4	5/16	2-1/2	23218	78.60	23218-C3	87.00
	5/16	.266	.201	**.187**	4	5/16	2-1/2	23120	72.30	23120-C3	80.70
	5/16	.266	.201	**.375**	4	5/16	2-1/2	52920	75.20	52920-C3	83.60
	5/16	.266	.201	**.500**	4	5/16	2-1/2	39720	77.00	39720-C3	85.40
	5/16	.266	.201	**.750**	4	5/16	2-1/2	23220	81.10	23220-C3	89.50
	5/16	.266	.201	**1.125**	4	5/16	4	41320	92.00	41320-C3	102.10
	5/16	.266	.201	**1.500**	4	5/16	4	29520	98.40	29520-C3	108.50
	5/16	.266	.201	**2.000**	4	5/16	4	960620	104.40	960620-C3	114.50
	5/16	.266	.201	**2.250**	4	5/16	4	55220	106.10	55220-C3	116.20
	5/16	.266	.201	**2.500**	4	5/16	4	929620	106.10	929620-C3	116.20
	3/8	.320	.241	**.093**	4	3/8	2-1/2	931524	78.00	931524-C3	87.50
	3/8	.320	.241	**.187**	4	3/8	2-1/2	23124	78.00	23124-C3	87.50
	3/8	.320	.241	**.375**	4	3/8	2-1/2	52924	79.90	52924-C3	89.40
	3/8	.320	.241	**.500**	4	3/8	2-1/2	39724	79.90	39724-C3	89.40
	3/8	.320	.241	**.750**	4	3/8	2-1/2	23224	81.10	23224-C3	90.60
NEW	3/8	.320	.241	**1.000**	4	3/8	2-1/2	922924	90.80	922924-C3	100.30
	3/8	.320	.241	**1.125**	4	3/8	4	41324	100.40	41324-C3	113.40
	3/8	.320	.241	**1.500**	4	3/8	4	29524	103.20	29524-C3	116.20
	3/8	.320	.241	**2.000**	4	3/8	4	960624	106.80	960624-C3	119.80
	3/8	.320	.241	**2.250**	4	3/8	4	55224	109.70	55224-C3	122.70
	3/8	.320	.241	**2.500**	4	3/8	4	929624	114.20	929624-C3	127.20
	.3937 (10 mm)	.335	.252	**.375**	4	7/16	2-3/4	52925	112.80	52925-C3	124.70
	.3937 (10 mm)	.335	.252	**.750**	4	7/16	2-3/4	23225	113.20	23225-C3	125.10
	7/16	.373	.285	**.500**	4	7/16	2-3/4	52928	109.50	52928-C3	121.40
	7/16	.373	.285	**1.000**	4	7/16	2-3/4	23228	113.20	23228-C3	125.10
	.4724 (12 mm)	.403	.308	**.500**	4	1/2	3	52931	142.50	52931-C3	156.70
	.4724 (12 mm)	.403	.308	**1.000**	4	1/2	3	23231	150.60	23231-C3	164.80

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NEW SIZES!

UNDERCUTTING END MILLS

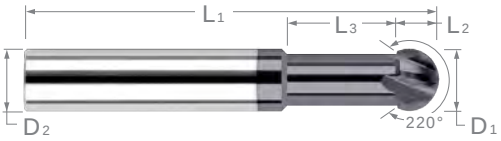
270° (cont.)

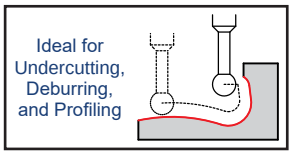
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CUTTER DIAMETER	LENGTH OF CUT	NECK DIAMETER	NECK LENGTH	FLUTES	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		ALTiN COATED		
D_1 $^{+.000''}_{-.002''}$	L_2 $^{+.020''}_{-.000''}$		L_3 $^{+.030''}_{-.000''}$		D_2	L_1	TOOL #	PRICE	TOOL #	PRICE	
1/2	.427	.323	**.187**	4	1/2	3	23132	110.90	23132-C3	125.10	
1/2	.427	.323	**.500**	4	1/2	3	52932	113.00	52932-C3	127.20	
1/2	.427	.323	**.750**	4	1/2	3	39732	114.90	39732-C3	129.10	
1/2	.427	.323	**1.000**	4	1/2	3	23232	116.70	23232-C3	130.90	
1/2	.427	.323	**1.250**	4	1/2	3	922932	120.20	922932-C3	134.40	NEW
1/2	.427	.323	**1.500**	4	1/2	6	41332	196.80	41332-C3	211.00	
1/2	.427	.323	**2.000**	4	1/2	6	29532	201.30	29532-C3	215.50	
1/2	.427	.323	**2.500**	4	1/2	6	960632	203.40	960632-C3	217.60	
1/2	.427	.323	**3.000**	4	1/2	6	55232	215.10	55232-C3	229.30	
1/2	.427	.323	**3.500**	4	1/2	6	929632	226.60	929632-C3	240.80	
5/8	.533	.412	**1.000**	4	5/8	3-1/2	39740	234.50	39740-C3	248.70	
5/8	.533	.412	**1.500**	4	5/8	3-1/2	23240	234.50	23240-C3	248.70	
3/4	.640	.500	**1.500**	4	3/4	4	23248	322.90	23248-C3	338.30	

UNDERCUTTING END MILLS

220°





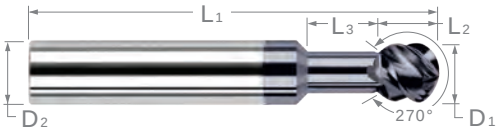


- 220° spherical ball
- Designed for undercutting, deburring, and multi-axis machining
- Center cutting
- Solid carbide
- CNC ground in the USA

CUTTER DIAMETER	LENGTH OF CUT	NECK DIAMETER	NECK LENGTH	FLUTES	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN COATED	
D_1 +.000″ −.001″	L_2 +.010″ −.000″		L_3 +.020″ −.000″		D_2	L_1	TOOL #	PRICE	TOOL #	PRICE
1/32	.021	.023	**.093**	2	1/8	1-1/2	22802	58.60	22802-C3	63.50
.0394 (1 mm)	.026	.030	**.093**	2	1/8	1-1/2	785839	58.60	785839-C3	63.50
.0394 (1 mm)	.026	.030	**.125**	2	1/8	1-1/2	2281M	65.50	2281M-C3	70.40
3/64	.031	.035	**.156**	2	1/8	1-1/2	22803	58.60	22803-C3	63.50
1/16	.042	.047	**.062**	2	1/8	1-1/2	22704	39.90	22704-C3	44.80
1/16	.042	.047	**.125**	2	1/8	1-1/2	785862	41.60	785862-C3	46.50
1/16	.042	.047	**.187**	2	1/8	1-1/2	22804	41.60	22804-C3	46.50
1/16	.042	.047	**.250**	2	1/8	1-1/2	22904	41.60	22904-C3	46.50
5/64	.052	.059	**.062**	2	1/8	1-1/2	22705	39.90	22705-C3	44.80
5/64	.052	.059	**.250**	2	1/8	1-1/2	22805	41.60	22805-C3	46.50
3/32	.063	.070	**.062**	2	1/8	1-1/2	22706	39.90	22706-C3	44.80
3/32	.063	.070	**.375**	2	1/8	1-1/2	22806	42.20	22806-C3	47.10
.1181 (3 mm)	.079	.090	**.500**	2	1/8	2	2283M	42.90	2283M-C3	47.80
D_1 +.000″ −.002″	L_2 +.020″ −.000″		L_3 +.030″ −.000″		D_2	L_1	TOOL #	PRICE	TOOL #	PRICE
1/8	.084	.094	**.125**	4	1/8	1-1/2	22708	34.40	22708-C3	39.30
1/8	.084	.094	**.250**	4	1/8	1-1/2	826708	36.00	826708-C3	40.90
1/8	.084	.094	**.500**	4	1/8	1-1/2	22808	38.80	22808-C3	43.70
1/8	.084	.094	**.750**	4	1/8	2	833808	41.80	833808-C3	46.70
1/8	.084	.094	**1.000**	4	1/8	3	22908	44.80	22908-C3	49.70
1/8	.084	.094	**1.500**	4	1/8	3	971608	54.70	971608-C3	59.60
5/32	.105	.125	**.500**	4	3/16	2	22810	48.60	22810-C3	53.90
3/16	.126	.141	**.125**	4	3/16	2	22712	40.90	22712-C3	46.20
3/16	.126	.141	**.250**	4	3/16	2	826712	43.40	826712-C3	48.70
3/16	.126	.141	**.500**	4	3/16	2	22812	48.60	22812-C3	53.90
3/16	.126	.141	**.750**	4	3/16	2	833812	52.30	833812-C3	57.60
3/16	.126	.141	**1.000**	4	3/16	3	22912	56.20	22912-C3	61.50
.2362 (6 mm)	.158	.172	**.750**	4	1/4	2-1/2	2286M	61.50	2286M-C3	68.70
1/4	.168	.188	**.125**	4	1/4	2-1/2	22716	54.90	22716-C3	62.10
1/4	.168	.188	**.375**	4	1/4	2-1/2	826716	57.00	826716-C3	64.20
1/4	.168	.188	**.750**	4	1/4	2-1/2	22816	61.50	22816-C3	68.70
1/4	.168	.188	**1.000**	4	1/4	2-1/2	833816	64.80	833816-C3	72.00
1/4	.168	.188	**1.500**	4	1/4	4	22916	71.50	22916-C3	79.90
1/4	.168	.188	**2.250**	4	1/4	4	971616	93.30	971616-C3	101.70
5/16	.210	.235	**.187**	4	5/16	2-1/2	22720	73.10	22720-C3	81.50
5/16	.210	.235	**.750**	4	5/16	2-1/2	22820	79.90	22820-C3	88.30
5/16	.210	.235	**1.500**	4	5/16	4	22920	96.40	22920-C3	106.50
3/8	.252	.281	**.187**	4	3/8	2-1/2	22724	78.60	22724-C3	88.10
3/8	.252	.281	**.750**	4	3/8	2-1/2	22824	83.70	22824-C3	93.20
3/8	.252	.281	**1.500**	4	3/8	4	22924	101.30	22924-C3	114.30
3/8	.252	.281	**2.250**	4	3/8	4	971624	140.50	971624-C3	153.50
1/2	.336	.375	**.187**	4	1/2	3	22732	112.40	22732-C3	126.60
1/2	.336	.375	**1.000**	4	1/2	3	22832	120.60	22832-C3	134.80
1/2	.336	.375	**2.000**	4	1/2	6	22932	197.90	22932-C3	212.10

UNDERCUTTING END MILLS

270° High Helix



High Helix for Improved Performance!



270° Spherical Ball

- 45° helix for faster chip removal and better finish
- 270° spherical ball
- Center cutting
- Designed for undercutting, deburring, and multi-axis machining
- Solid carbide
- CNC ground in the USA

CUTTER DIA.	LENGTH OF CUT	NECK DIA.	NECK LENGTH	FLUTES	SHANK DIA.	OAL	UNCOATED		AlTiN COATED		TiB_2 COATED	
D_1 +.000″ −.001″	L_2 +.010″ −.000″		L_3 +.020″ −.000″		D_2	L_1	TOOL #	PRICE	TOOL #	PRICE	TOOL #	PRICE
1/32	.027	.016	**.062**	2	1/8	1-1/2	951131	66.30	951131-C3	71.20		
1/32	.027	.016	**.093**	2	1/8	1-1/2	966531	66.30	966531-C3	71.20		
.0394 (1 mm)	.033	.024	**.078**	2	1/8	1-1/2	95111M	66.30	95111M-C3	71.20		
.0394 (1 mm)	.033	.024	**.125**	2	1/8	1-1/2	96651M	66.30	96651M-C3	71.20		
3/64	.040	.029	**.093**	2	1/8	1-1/2	951147	66.30	951147-C3	71.20		
3/64	.040	.029	**.156**	2	1/8	1-1/2	966547	66.30	966547-C3	71.20		
1/16	.053	.037	**.093**	2	1/8	1-1/2	951162	48.00	951162-C3	52.90	951162-C8	55.20
1/16	.053	.037	**.125**	2	1/8	1-1/2	773762	49.60	773762-C3	54.50		
1/16	.053	.037	**.187**	2	1/8	1-1/2	966562	49.60	966562-C3	54.50	966562-C8	56.80
1/16	.053	.037	**.250**	2	1/8	1-1/2	970462	60.60	970462-C3	65.50	970462-C8	67.80
5/64	.067	.045	**.125**	2	1/8	1-1/2	951178	48.00	951178-C3	52.90	951178-C8	55.20
5/64	.067	.045	**.250**	2	1/8	1-1/2	966578	49.60	966578-C3	54.50	966578-C8	56.80
5/64	.067	.045	**.375**	2	1/8	2	970478	60.60	970478-C3	65.50	970478-C8	67.80
3/32	.079	.054	**.062**	2	1/8	1-1/2	774493	45.80	774493-C3	50.70		
3/32	.079	.054	**.125**	2	1/8	1-1/2	837393	45.80	837393-C3	50.70	837393-C8	53.00
3/32	.079	.054	**.250**	2	1/8	1-1/2	951193	48.00	951193-C3	52.90	951193-C8	55.20
3/32	.079	.054	**.375**	2	1/8	1-1/2	966593	52.50	966593-C3	57.40	966593-C8	59.70
3/32	.079	.054	**.500**	2	1/8	2	970493	60.60	970493-C3	65.50	970493-C8	67.80

D_1 +.000″ −.002″	L_2 +.020″ −.000″		L_3 +.030″ −.000″		D_2	L_1	TOOL #	PRICE	TOOL #	PRICE	TOOL #	PRICE
1/8	.107	.076	**.125**	4	1/8	1-1/2	934108	42.00	934108-C3	46.90	934108-C8	49.20
1/8	.107	.076	**.187**	4	1/8	1-1/2	808608	42.90	808608-C3	47.80	808608-C8	50.10
1/8	.107	.076	**.250**	4	1/8	1-1/2	951208	43.80	951208-C3	48.70	951208-C8	51.00
1/8	.107	.076	**.375**	4	1/8	1-1/2	863708	46.00	863708-C3	50.90	863708-C8	53.20
1/8	.107	.076	**.500**	4	1/8	1-1/2	994708	48.00	994708-C3	52.90	994708-C8	55.20
1/8	.107	.076	**1.000**	4	1/8	3	997108	54.30	997108-C3	59.20	997108-C8	61.50
1/8	.107	.076	**1.500**	4	1/8	3	928808	57.90	928808-C3	62.80	928808-C8	65.10
5/32	.133	.098	**.250**	4	3/16	2	951210	56.80	951210-C3	62.10	951210-C8	64.00
5/32	.133	.098	**.500**	4	3/16	2	994710	61.10	994710-C3	66.40	994710-C8	68.30
5/32	.133	.098	**1.000**	4	3/16	3	997110	69.80	997110-C3	75.10	997110-C8	77.00
3/16	.160	.117	**.125**	4	3/16	2	934112	52.50	934112-C3	57.80	934112-C8	59.70
3/16	.160	.117	**.250**	4	3/16	2	951212	54.00	951212-C3	59.30	951212-C8	61.20
3/16	.160	.117	**.500**	4	3/16	2	994712	58.40	994712-C3	63.70	994712-C8	65.60
3/16	.160	.117	**.750**	4	3/16	2	897712	61.10	897712-C3	66.40	897712-C8	68.30
3/16	.160	.117	**1.000**	4	3/16	3	997112	69.80	997112-C3	75.10	997112-C8	77.00
3/16	.160	.117	**1.250**	4	3/16	3	893512	73.40	893512-C3	78.70	893512-C8	80.60

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UNDERCUTTING END MILLS

270° High Helix (cont.)

continued from previous page

CUTTER DIA.	LENGTH OF CUT	NECK DIA.	NECK LENGTH	FLUTES	SHANK DIA.	OAL	UNCOATED		AlTiN COATED		TiB_2 COATED	
D_1 +.000″ −.002″	L_2 +.020″ −.000″		L_3 +.030″ −.000″		D_2	L_1	TOOL #	PRICE	TOOL #	PRICE	TOOL #	PRICE
1/4	.213	.158	**.125**	4	1/4	2-1/2	934116	75.10	934116-C3	82.30	934116-C8	82.80
1/4	.213	.158	**.250**	4	1/4	2-1/2	808616	76.80	808616-C3	84.00	808616-C8	84.50
1/4	.213	.158	**.375**	4	1/4	2-1/2	951216	78.60	951216-C3	85.80	951216-C8	86.30
1/4	.213	.158	**.500**	4	1/4	2-1/2	863716	81.10	863716-C3	88.30	863716-C8	88.80
1/4	.213	.158	**.750**	4	1/4	2-1/2	994716	86.10	994716-C3	93.30	994716-C8	93.80
1/4	.213	.158	**1.000**	4	1/4	2-1/2	808516	87.40	808516-C3	94.60	808516-C8	95.10
1/4	.213	.158	**1.125**	4	1/4	2-1/2	897716	88.60	897716-C3	95.80	897716-C8	96.30
1/4	.213	.158	**1.500**	4	1/4	4	997116	94.80	997116-C3	103.20	997116-C8	103.50
1/4	.213	.158	**2.250**	4	1/4	4	928816	104.90	928816-C3	113.30	928816-C8	113.60
5/16	.266	.201	**.750**	4	5/16	2-1/2	994720	100.10	994720-C3	108.50	994720-C8	116.50
5/16	.266	.201	**1.500**	4	5/16	4	997120	118.90	997120-C3	129.00	997120-C8	138.80
3/8	.320	.241	**.375**	4	3/8	2-1/2	951224	112.30	951224-C3	121.80	951224-C8	132.20
3/8	.320	.241	**.750**	4	3/8	2-1/2	994724	113.60	994724-C3	123.10	994724-C8	133.50
3/8	.320	.241	**1.125**	4	3/8	4	897724	122.00	897724-C3	135.00	897724-C8	145.40
3/8	.320	.241	**1.500**	4	3/8	4	997124	125.10	997124-C3	138.10	997124-C8	148.50
1/2	.427	.323	**.500**	4	1/2	3	951232	160.30	951232-C3	174.50	951232-C8	183.70
1/2	.427	.323	**1.000**	4	1/2	3	994732	164.40	994732-C3	178.60	994732-C8	187.80
1/2	.427	.323	**1.500**	4	1/2	6	897732	236.50	897732-C3	250.70	897732-C8	278.50
1/2	.427	.323	**2.000**	4	1/2	6	997132	242.80	997132-C3	257.00	997132-C8	284.80
1/2	.427	.323	**3.000**	4	1/2	6	928832	270.80	928832-C3	285.00	928832-C8	312.80

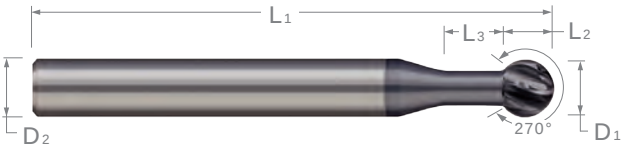


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UNDERCUTTING END MILLS

270° for Hardened Steels



- Optimized for hardened steels 45-68 Rc
- Increased flute count for added strength and tool life
- Latest generation AlTiN Nano coating offers superior hardness and heat resistance
- 270° spherical ball
- Designed for undercutting, deburring, and multi-axis machining
- Center cutting
- Solid carbide
- CNC ground in the USA

Stocked in Multiple Reach Lengths



CUTTER DIAMETER	LENGTH OF CUT	NECK DIA.	NECK LENGTH	FLUTES	SHANK DIAMETER	OVERALL LENGTH	AlTiN NANO COATED	
D_1 +.000″ −.001″	L_2 +.010″ −.000″		L_3 +.020″ −.000″		D_2	L_1	TOOL #	PRICE
1/32	.027	.016	**.062**	4	1/8	1-1/2	823231-C6	66.00
1/32	.027	.016	**.078**	4	1/8	1-1/2	819831-C6	66.00
3/64	.040	.029	**.093**	4	1/8	1-1/2	823247-C6	66.00
3/64	.040	.029	**.125**	4	1/8	1-1/2	819847-C6	66.00
1/16	.053	.037	**.062**	4	1/8	1-1/2	831562-C6	45.50
1/16	.053	.037	**.093**	4	1/8	1-1/2	823262-C6	45.50
1/16	.053	.037	**.125**	4	1/8	1-1/2	819862-C6	47.30
5/64	.067	.045	**.125**	4	1/8	1-1/2	823278-C6	46.40
5/64	.067	.045	**.187**	4	1/8	1-1/2	819878-C6	48.10
3/32	.080	.054	**.062**	4	1/8	1-1/2	831593-C6	46.40
3/32	.080	.054	**.250**	4	1/8	1-1/2	823293-C6	46.40
3/32	.080	.054	**.312**	4	1/8	1-1/2	819893-C6	50.10
D_1 +.000″ −.002″	L_2 +.020″ −.000″		L_3 +.030″ −.000″		D_2	L_1	TOOL #	PRICE
1/8	.107	.076	**.125**	6	1/8	1-1/2	831608-C6	40.70
1/8	.107	.076	**.250**	6	1/8	1-1/2	823308-C6	42.80
1/8	.107	.076	**.375**	6	1/8	1-1/2	819908-C6	43.60
3/16	.160	.117	**.125**	6	3/16	2	831612-C6	48.00
3/16	.160	.117	**.250**	6	3/16	2	823312-C6	51.60
3/16	.160	.117	**.375**	6	3/16	2	819912-C6	54.00
1/4	.213	.158	**.125**	8	1/4	2-1/2	831616-C6	64.30
1/4	.213	.158	**.375**	6	1/4	2-1/2	823316-C6	67.80
1/4	.213	.158	**.500**	6	1/4	2-1/2	819916-C6	69.70
3/8	.320	.241	**.375**	8	3/8	2-1/2	823324-C6	93.80
3/8	.320	.241	**.500**	8	3/8	2-1/2	819924-C6	93.80
1/2	.427	.323	**.500**	8	1/2	3	823332-C6	133.40
1/2	.427	.323	**.750**	8	1/2	3	819932-C6	135.40

NEW SIZES!

UNDERCUTTING END MILLS

270° Deburring Undercut





High Number of Flutes

- 270° spherical ball is ideal for deburring complex shapes and multi-axis machining
- Deburr in your CNC machine with these high-precision burs held to end mill tolerances
- Stop scrapping expensive parts due to handheld operator errors
- High flute count allows for increased feeds which reduces cycle times
- Achieve better finish than with milling-type cutters
- Double cut style flute pattern
- Center cutting
- Solid carbide
- CNC ground in the USA

Stocked in Multiple Reach Lengths



	CUTTER DIA.	LOC	NECK DIA.	NECK LENGTH	RIGHT HAND TEETH	LEFT HAND TEETH	SHANK DIA.	OAL	UNCOATED		AlTiN COATED	
	D_1	L_2 +.010″ −.000″		L_3 +.020″ −.000″			D_2	L_1	TOOL #	PRICE	TOOL #	PRICE
	.031 (1/32)	.026	.014	**.031**	12	10	1/8	1-1/2	899631	68.00	899631-C3	72.90
	.031 (1/32)	.026	.014	**.062**	12	10	1/8	1-1/2	980531	68.00	980531-C3	72.90
	.031 (1/32)	.026	.014	**.093**	12	10	1/8	1-1/2	926431	70.10	926431-C3	75.00
	.031 (1/32)	.026	.014	**.125**	12	10	1/8	1-1/2	883231	72.40	883231-C3	77.30
	.039 (1 mm)	.033	.019	**.047**	12	10	1/8	1-1/2	89961M	68.00	89961M-C3	72.90
	.039 (1 mm)	.033	.019	**.125**	12	10	1/8	1/1/2	92641M	72.40	92641M-C3	77.30
	.047 (3/64)	.040	.024	**.093**	12	10	1/8	1-1/2	980547	68.00	980547-C3	72.90
	.047 (3/64)	.040	.024	**.125**	12	10	1/8	1-1/2	890847	70.10	890847-C3	75.00
	.047 (3/64)	.040	.024	**.156**	12	10	1/8	1-1/2	926447	70.10	926447-C3	75.00
	.047 (3/64)	.040	.024	**.250**	12	10	1/8	1-1/2	883247	72.40	883247-C3	77.30
	.062 (1/16)	.053	.032	**.062**	15	12	1/8	1-1/2	899662	51.10	899662-C3	56.00
	.062 (1/16)	.053	.032	**.093**	15	12	1/8	1-1/2	980562	51.10	980562-C3	56.00
	.062 (1/16)	.053	.032	**.125**	15	12	1/8	1-1/2	890862	52.80	890862-C3	57.70
	.062 (1/16)	.053	.032	**.187**	15	12	1/8	1-1/2	926462	52.80	926462-C3	57.70
	.062 (1/16)	.053	.032	**.250**	15	12	1/8	1-1/2	883262	54.70	883262-C3	59.60
	.062 (1/16)	.053	.032	**.312**	15	12	1/8	1-1/2	808362	54.70	808362-C3	59.60
	.078 (5/64)	.067	.035	**.062**	15	12	1/8	1-1/2	899678	51.10	899678-C3	56.00
	.078 (5/64)	.067	.035	**.125**	15	12	1/8	1-1/2	980578	51.10	980578-C3	56.00
	.078 (5/64)	.067	.035	**.250**	15	12	1/8	1-1/2	926478	52.80	926478-C3	57.70
	.078 (5/64)	.067	.035	**.375**	15	12	1/8	2	883278	53.60	883278-C3	58.50
	.093 (3/32)	.079	.038	**.062**	15	12	1/8	1-1/2	899693	54.20	899693-C3	59.10
	.093 (3/32)	.079	.038	**.125**	15	12	1/8	1-1/2	895393	54.20	895393-C3	59.10
	.093 (3/32)	.079	.038	**.187**	15	12	1/8	1-1/2	809693	54.20	809693-C3	59.10
	.093 (3/32)	.079	.038	**.250**	15	12	1/8	1-1/2	980593	54.20	980593-C3	59.10
	.093 (3/32)	.079	.038	**.312**	15	12	1/8	1-1/2	890893	55.70	890893-C3	60.60
	.093 (3/32)	.079	.038	**.375**	15	12	1/8	1-1/2	926493	55.70	926493-C3	60.60
	.093 (3/32)	.079	.038	**.500**	15	12	1/8	2	883293	61.70	883293-C3	66.60
	.118 (3 mm)	.101	.056	**.250**	15	12	1/8	1-1/2	98053M	56.50	98053M-C3	61.40
NEW	.118 (3 mm)	.101	.056	**.375**	15	12	1/8	1-1/2	89083M	58.00	89083M-C3	62.90
	.118 (3 mm)	.101	.056	**.500**	15	12	1/8	2	92643M	60.00	92643M-C3	64.90

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NEW SIZES!

UNDERCUTTING END MILLS

270° Deburring Undercut (cont.)

continued from previous page

CUTTER DIA.	LOC	NECK DIA.	NECK LENGTH	RIGHT HAND TEETH	LEFT HAND TEETH	SHANK DIA.	OAL	UNCOATED		AlTiN COATED		
D_1	L_2 $^{+.020''}_{-.000''}$		L_3 $^{+.030''}_{-.000''}$			D_2	L_1	TOOL #	PRICE	TOOL #	PRICE	
.125 (1/8)	.107	.059	**.125**	16	13	1/8	1-1/2	899708	52.30	899708-C3	57.20	
.125 (1/8)	.107	.059	**.187**	16	13	1/8	1-1/2	809908	52.50	809908-C3	57.40	
.125 (1/8)	.107	.059	**.250**	16	13	1/8	1-1/2	980608	54.20	980608-C3	59.10	
.125 (1/8)	.107	.059	**.375**	16	13	1/8	1-1/2	890908	55.10	890908-C3	60.00	
.125 (1/8)	.107	.059	**.500**	16	13	1/8	2	926508	56.20	926508-C3	61.10	
.125 (1/8)	.107	.059	**.750**	16	13	1/8	2	886108	58.90	886108-C3	63.80	
.125 (1/8)	.107	.059	**1.000**	16	13	1/8	3	883308	62.30	883308-C3	67.20	
.156 (5/32)	.133	.078	**.250**	16	13	3/16	2	980610	58.90	980610-C3	64.20	NEW
.156 (5/32)	.133	.078	**.500**	16	13	3/16	2	926510	64.00	926510-C3	69.30	NEW
.187 (3/16)	.160	.097	**.125**	16	13	3/16	2	899712	55.70	899712-C3	61.00	
.187 (3/16)	.160	.097	**.250**	16	13	3/16	2	980612	58.90	980612-C3	64.20	
.187 (3/16)	.160	.097	**.375**	16	13	3/16	2	890912	60.90	890912-C3	66.20	
.187 (3/16)	.160	.097	**.500**	16	13	3/16	2	926512	64.00	926512-C3	69.30	
.187 (3/16)	.160	.097	**.750**	16	13	3/16	2	886112	69.10	886112-C3	74.40	
.187 (3/16)	.160	.097	**1.000**	16	13	3/16	3	883312	72.70	883312-C3	78.00	
.250 (1/4)	.213	.136	**.125**	16	13	1/4	2-1/2	899716	69.70	899716-C3	76.90	
.250 (1/4)	.213	.136	**.375**	16	13	1/4	2-1/2	980616	70.40	980616-C3	77.60	
.250 (1/4)	.213	.136	**.500**	16	13	1/4	2-1/2	890916	72.30	890916-C3	79.50	
.250 (1/4)	.213	.136	**.750**	16	13	1/4	2-1/2	926516	75.70	926516-C3	82.90	
.250 (1/4)	.213	.136	**1.125**	16	13	1/4	2-1/2	886116	78.10	886116-C3	85.30	
.375 (3/8)	.320	.200	**.375**	16	13	3/8	2-1/2	980624	93.00	980624-C3	102.50	NEW
.375 (3/8)	.320	.200	**.750**	16	13	3/8	2-1/2	926524	98.40	926524-C3	107.90	NEW

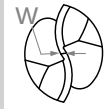
DRILL / END MILLS

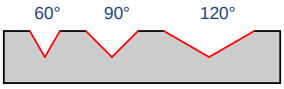
Helical Tip – 2 Flute



HELICAL TIP

Recommended For	
Chamfering	Yes
O.D. Milling	Yes
Drilling	No
Spotting	Light Duty

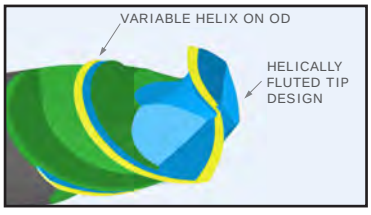




Stocked in *Three* Included Angles!

- Designed for chamfering, milling, and some spotting applications
- Not recommended for drilling
- 2 flutes
- Specialized helically fluted tip design for superior performance, surface finish and chip evacuation
- Variable helix design on OD (approx. 35°) reduces chatter and harmonics and increases material removal rates
- AlTiN Nano coating for superior performance in ferrous and difficult to machine materials.
- TiB_2 coating for outstanding performance in non-ferrous materials due to its extremely low affinity to aluminum.
- h6 shank tolerance for high precision tool holders
- Solid carbide
- CNC ground in the USA

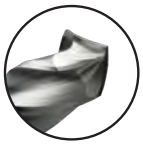
INCLUDED ANGLE	CUTTER DIAMETER	LENGTH OF CUT	WEB THICKNESS	SHANK DIAMETER	OVERALL LENGTH	AlTiN NANO COATED		TiB_2 COATED	
A $^{+1°}_{-1°}$	D_1 $^{+.000″}_{-.002″}$	L_2 $^{+.030″}_{-.000″}$	W	D_2 (h6)	L_1	2 FL	PRICE	2 FL	PRICE
60°	1/32	3/32	.003	1/8	1-1/2	872502-C6	50.20	872502-C8	48.40
	1/16	3/16	.005	1/8	1-1/2	872504-C6	50.20	872504-C8	48.40
	1/8	1/2	.008	1/8	1-1/2	872508-C6	50.20	872508-C8	50.20
	3/16	5/8	.009	3/16	2	872512-C6	55.50	872512-C8	55.50
	1/4	3/4	.009	1/4	2-1/2	872516-C6	70.60	872516-C8	70.60
	3/8	7/8	.012	3/8	2-1/2	872524-C6	87.30	872524-C8	87.30
	1/2	1	.012	1/2	3	872532-C6	111.60	872532-C8	111.60
90°	1/32	3/32	.003	1/8	1-1/2	859602-C6	45.60	859602-C8	43.90
	1/16	3/16	.005	1/8	1-1/2	859604-C6	45.60	859604-C8	43.90
	5/64	1/4	.006	1/8	1-1/2	859605-C6	47.80	859605-C8	46.00
	3/32	3/8	.007	1/8	1-1/2	859606-C6	47.80	859606-C8	46.00
	1/8	1/2	.008	1/8	1-1/2	859608-C6	50.20	859608-C8	50.20
	3/16	5/8	.009	3/16	2	859612-C6	55.50	859612-C8	55.50
	1/4	3/4	.009	1/4	2-1/2	859616-C6	70.60	859616-C8	70.60
	3/8	7/8	.012	3/8	2-1/2	859624-C6	87.30	859624-C8	87.30
	1/2	1	.012	1/2	3	859632-C6	111.60	859632-C8	111.60
120°	1/8	1/2	.008	1/8	1-1/2	847708-C6	50.20	847708-C8	50.20
	3/16	5/8	.009	3/16	2	847712-C6	55.50	847712-C8	55.50
	1/4	3/4	.009	1/4	2-1/2	847716-C6	70.60	847716-C8	70.60
	3/8	7/8	.012	3/8	2-1/2	847724-C6	87.30	847724-C8	87.30
	1/2	1	.012	1/2	3	847732-C6	111.60	847732-C8	111.60



DRILL / END MILLS

Helical Tip – 4 Flute





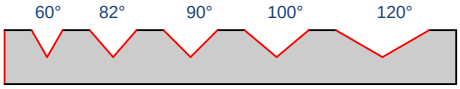
Specialized Helically Fluted Tip Design

- Designed for chamfering, milling, and some spotting applications
- Not recommended for drilling
- 4 flutes (two flutes to center, two flutes cut back)
- Specialized helically fluted tip design for superior performance, surface finish and chip evacuation
- Variable helix design on OD (approx. 35°) reduces chatter and harmonics and increases material removal rates
- Latest generation AlTiN Nano coating offers superior hardness and heat resistance
- h6 shank tolerance for high precision tool holders
- Solid carbide
- CNC ground in the USA

HELICAL TIP

Recommended For	
Chamfering	Yes
O.D. Milling	Yes
Drilling	No
Spotting	Light Duty

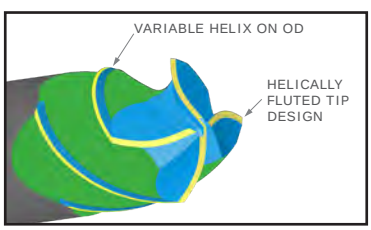




Stocked in *Five* Included Angles!

INCLUDED ANGLE	CUTTER DIAMETER	LENGTH OF CUT	WEB THICKNESS	SHANK DIAMETER	OVERALL LENGTH	AlTiN NANO COATED	
A +1° −1°	D1 +.000″ −.002″	L2 +.030″ −.000″	W	D2 (h6)	L1	4 FL	PRICE
60°	1/16	3/16	.005	1/8	1-1/2	899204-C6	52.90
	3/32	3/8	.007	1/8	1-1/2	899206-C6	52.90
	1/8	1/2	.008	1/8	1-1/2	899208-C6	52.90
	3/16	5/8	.009	3/16	2	899212-C6	58.50
	1/4	3/4	.009	1/4	2-1/2	899216-C6	74.30
	5/16	13/16	.010	5/16	2-1/2	899220-C6	81.90
	3/8	7/8	.012	3/8	2-1/2	899224-C6	91.80
	1/2	1	.012	1/2	3	899232-C6	117.40
82°	1/8	1/2	.008	1/8	1-1/2	788208-C6	52.90
	3/16	5/8	.009	3/16	2	788212-C6	58.50
	1/4	3/4	.009	1/4	2-1/2	788216-C6	74.30
90°	1/32	3/32	.003	1/8	1-1/2	881102-C6	48.30
	3/64	9/64	.004	1/8	1-1/2	881103-C6	48.30
	1/16	3/16	.005	1/8	1-1/2	881104-C6	48.30
	5/64	1/4	.006	1/8	1-1/2	881105-C6	50.50
	3/32	3/8	.007	1/8	1-1/2	881106-C6	50.50
	1/8	1/2	.008	1/8	1-1/2	881108-C6	52.90
	9/64	9/16	.009	3/16	2	881109-C6	58.50
	5/32	9/16	.009	3/16	2	881110-C6	58.50
	3/16	5/8	.009	3/16	2	881112-C6	58.50
	1/4	3/4	.009	1/4	2-1/2	881116-C6	74.30
	5/16	13/16	.010	5/16	2-1/2	881120-C6	81.90
	3/8	7/8	.012	3/8	2-1/2	881124-C6	91.80
	1/2	1	.012	1/2	3	881132-C6	117.40
	5/8	1-1/4	.014	5/8	3-1/2	881140-C6	156.00
	3/4	1-1/2	.015	3/4	4	881148-C6	195.00

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DRILL / END MILLS

Helical Tip – 4 Flute (cont.)

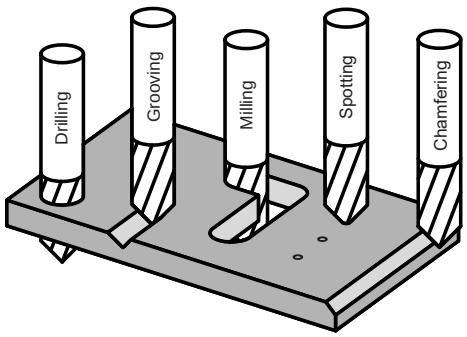
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INCLUDED ANGLE	CUTTER DIAMETER	LENGTH OF CUT	WEB THICKNESS	SHANK DIAMETER	OVERALL LENGTH	AlTiN NANO COATED	
A $^{+1°}_{-1°}$	D_1 $^{+.000″}_{-.002″}$	L_2 $^{+.030″}_{-.000″}$	W	D_2 (h6)	L_1	4 FL	PRICE
100°	1/8	1/2	.008	1/8	1-1/2	826208-C6	52.90
	1/4	3/4	.009	1/4	2-1/2	826216-C6	74.30
	3/8	7/8	.012	3/8	2-1/2	826224-C6	91.80
	1/2	1	.012	1/2	3	826232-C6	117.40
120°	1/8	1/2	.008	1/8	1-1/2	865408-C6	52.90
	3/16	5/8	.009	3/16	2	865412-C6	58.50
	1/4	3/4	.009	1/4	2-1/2	865416-C6	74.30
	3/8	7/8	.012	3/8	2-1/2	865424-C6	91.80
	1/2	1	.012	1/2	3	865432-C6	117.40

Drill / End Mills

Our extensive offering of Drill / End Mills are available in multiple point angles. They allow you to...

- Perform multiple operations with a single tool
- Free up space on your tool carousel
- Improve cycle time with fewer tool changes



DRILL / END MILLS

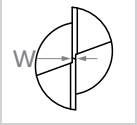
Mill Style – 2 Flute



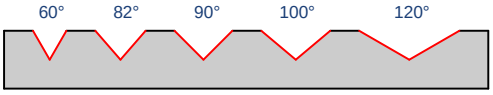
MILL STYLE

Flat relief with end mill style gash to thin web.

Recommended For	Included Angle	
	60°	82°, 90°, 100°, 120°
Chamfering	Yes	Yes
O.D. Milling	Yes	Yes
Drilling	No	Non-Ferrous Only
Spotting	No	Light Duty



- Designed for chamfering, milling, and some spotting applications
- Not recommended for drilling steel
- 2 flutes
- Solid carbide
- CNC ground in the USA



Stocked in *Five* Included Angles!

OUTSTANDING IN ALUMINUM!

INCLUDED ANGLE	CUTTER DIAMETER	LENGTH OF CUT	WEB THICKNESS	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN COATED		TiB_2 COATED	
A +1° −1°	D_1 +.000″ −.002″	L_2 +.030″ −.000″	W	D_2	L_1	2 FL	PRICE	2 FL	PRICE	2 FL	PRICE
60°	1/32	3/32	.0030	1/8	1-1/2	991702	31.30	991702-C3	36.20		
	1/16	3/16	.0050	1/8	1-1/2	991704	31.30	991704-C3	36.20		
	3/32	3/8	.0050	1/8	1-1/2	991706	31.30	991706-C3	36.20		
	1/8	1/2	.0050	1/8	1-1/2	991708	31.30	991708-C3	36.20	991708-C8	38.50
	5/32	9/16	.0060	3/16	2	991710	32.50	991710-C3	37.80		
	3/16	5/8	.0060	3/16	2	991712	32.50	991712-C3	37.80	991712-C8	39.70
	1/4	3/4	.0060	1/4	2-1/2	991716	45.90	991716-C3	53.10	991716-C8	53.60
	5/16	13/16	.0070	5/16	2-1/2	991720	48.30	991720-C3	56.70		
	3/8	7/8	.0080	3/8	2-1/2	991724	57.80	991724-C3	67.30	991724-C8	77.70
	1/2	1	.0080	1/2	3	991732	91.60	991732-C3	105.80	991732-C8	115.00
	5/8	1-1/4	.0090	5/8	3-1/2	991740	140.00	991740-C3	154.20		
	3/4	1-1/2	.0100	3/4	4	991748	212.30	991748-C3	227.70		
82°	1/16	3/16	.0050	1/8	1-1/2	949404	33.30	949404-C3	38.20		
	3/32	3/8	.0050	1/8	1-1/2	949406	33.30	949406-C3	38.20		
	1/8	1/2	.0050	1/8	1-1/2	949408	33.30	949408-C3	38.20	949408-C8	40.50
	3/16	5/8	.0060	3/16	2	949412	34.20	949412-C3	39.50		
	1/4	3/4	.0060	1/4	2-1/2	949416	48.60	949416-C3	55.80	949416-C8	56.30
	5/16	13/16	.0070	5/16	2-1/2	949420	50.70	949420-C3	59.10		
	3/8	7/8	.0080	3/8	2-1/2	949424	61.20	949424-C3	70.70		
	1/2	1	.0080	1/2	3	949432	96.70	949432-C3	110.90		
90°	1/64	3/64	.0015	1/8	1-1/2	15301-2	31.30	72201-C3	36.20		
	.020	1/16	.0020	1/8	1-1/2	15367-2	31.30	72220-C3	36.20		
	1/32	3/32	.0030	1/8	1-1/2	15302-2	31.30	72231-C3	36.20	72231-C8	38.50
	1 mm	1/8	.0030	1/8	1-1/2	1531M-2	31.30	72239-C3	36.20		
	.040	1/8	.0030	1/8	1-1/2	15371-2	31.30	72240-C3	36.20		
	3/64	9/64	.0040	1/8	1-1/2	15303-2	31.30	72247-C3	36.20		
	1/16	3/16	.0050	1/8	1-1/2	15304-2	29.80	72262-C3	34.70	72262-C8	37.00

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DRILL / END MILLS

Mill Style – 2 Flute (cont.)

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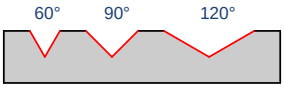
INCLUDED ANGLE	CUTTER DIAMETER	LENGTH OF CUT	WEB THICKNESS	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN COATED		TiB_2 COATED	
A $^{+1°}_{-1°}$	D_1 $^{+.000″}_{-.002″}$	L_2 $^{+.030″}_{-.000″}$	W	D_2	L_1	2 FL	PRICE	2 FL	PRICE	2 FL	PRICE
90°	5/64	1/4	.0050	1/8	1-1/2	15305-2	29.80	72278-C3	34.70	72278-C8	37.00
	3/32	3/8	.0050	1/8	1-1/2	15306-2	29.80	72293-C3	34.70	72293-C8	37.00
	7/64	3/8	.0050	1/8	1-1/2	15307-2	31.30	72302-C3	36.20		
	3 mm	3/8	.0050	1/8	1-1/2	1533M-2	31.30	72305-C3	36.20		
	1/8	1/2	.0050	1/8	1-1/2	15308-2	29.80	72308-C3	34.70	72308-C8	37.00
	9/64	9/16	.0060	3/16	2	15309-2	32.50	72309-C3	37.80		
	5/32	9/16	.0060	3/16	2	15310-2	32.50	72310-C3	37.80		
	3/16	5/8	.0060	3/16	2	15312-2	30.80	72312-C3	36.10	72312-C8	38.00
	1/4	3/4	.0060	1/4	2-1/2	15316-2	43.60	72316-C3	50.80	72316-C8	51.30
	5/16	13/16	.0070	5/16	2-1/2	15320-2	45.70	72320-C3	54.10	72320-C8	62.10
	3/8	7/8	.0080	3/8	2-1/2	15324-2	54.70	72324-C3	64.20	72324-C8	74.60
	1/2	1	.0080	1/2	3	15332-2	86.80	72332-C3	101.00	72332-C8	110.20
	5/8	1-1/4	.0090	5/8	3-1/2	15340-2	132.60	72340-C3	146.80		
	3/4	1-1/2	.0100	3/4	4	15348-2	201.20	72348-C3	216.60		
100°	1/16	3/16	.0050	1/8	1-1/2	928562	31.30	928562-C3	36.20		
	3/32	3/8	.0050	1/8	1-1/2	928593	31.30	928593-C3	36.20		
	1/8	1/2	.0050	1/8	1-1/2	928508	33.30	928508-C3	38.20	928508-C8	40.50
	3/16	5/8	.0060	3/16	2	928512	34.20	928512-C3	39.50		
	1/4	3/4	.0060	1/4	2-1/2	928516	48.60	928516-C3	55.80	928516-C8	56.30
	5/16	13/16	.0070	5/16	2-1/2	928520	50.70	928520-C3	59.10		
	3/8	7/8	.0080	3/8	2-1/2	928524	61.20	928524-C3	70.70		
	1/2	1	.0080	1/2	3	928532	96.70	928532-C3	110.90		
120°	1/16	3/16	.0050	1/8	1-1/2	985504	33.30	985504-C3	38.20		
	3/32	3/8	.0050	1/8	1-1/2	985506	33.30	985506-C3	38.20		
	1/8	1/2	.0050	1/8	1-1/2	985508	33.30	985508-C3	38.20	985508-C8	40.50
	3/16	5/8	.0060	3/16	2	985512	34.30	985512-C3	39.60		
	1/4	3/4	.0060	1/4	2-1/2	985516	48.10	985516-C3	55.30	985516-C8	55.80
	5/16	13/16	.0070	5/16	2-1/2	985520	50.10	985520-C3	58.50		
	3/8	7/8	.0080	3/8	2-1/2	985524	59.70	985524-C3	69.20	985524-C8	79.60
	1/2	1	.0080	1/2	3	985532	93.30	985532-C3	107.50		

NEW SIZES!

DRILL / END MILLS

Mill Style – 3 Flute





Stocked in *Three* Included Angles!

- Designed for chamfering, milling, and some spotting applications
- Not recommended for drilling
- 3 flutes to center
- Solid carbide
- CNC ground in the USA

MILL STYLE

Flat relief with end mill style and 3 flutes to center.

Recommended For	Included Angle
	60°, 90°, 120°
Chamfering	Yes
O.D. Milling	Yes
Drilling	No
Spotting	Light Duty



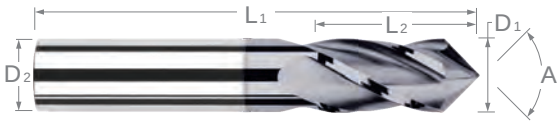
INCLUDED ANGLE	CUTTER DIAMETER	LENGTH OF CUT	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		ALTiN COATED		
A +1° −1°	D1 +.000″ −.002″	L2 +.030″ −.000″	D2	L1	3 FL	PRICE	3 FL	PRICE	
60°	1/8	1/2	1/8	1-1/2	784808	29.80	784808-C3	34.70	
	1/4	3/4	1/4	2-1/2	784816	43.60	784816-C3	50.80	
	3/8	7/8	3/8	2-1/2	784824	54.70	784824-C3	64.20	
90°	1/16	3/16	1/8	1-1/2	823762	29.80	823762-C3	34.70	NEW
	3/32	3/8	1/8	1-1/2	823793	29.80	823793-C3	34.70	NEW
	1/8	1/2	1/8	1-1/2	823808	29.80	823808-C3	36.80	
	3/16	5/8	3/16	2	823812	30.80	823812-C3	36.10	
	1/4	3/4	1/4	2-1/2	823816	43.60	823816-C3	48.90	
	3/8	7/8	3/8	2-1/2	823824	54.70	823824-C3	64.20	
	1/2	1	1/2	3	823832	83.40	823832-C3	97.60	NEW
120°	1/8	1/2	1/8	1-1/2	784508	29.80	784508-C3	34.70	
	1/4	3/4	1/4	2-1/2	784516	43.60	784516-C3	50.80	
	3/8	7/8	3/8	2-1/2	784524	54.70	784524-C3	64.20	

View a comprehensive library of **Speeds & Feeds** charts for every Harvey Tool End Mill on the new Harveytool.com.

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DRILL / END MILLS

Mill Style – 4 Flute

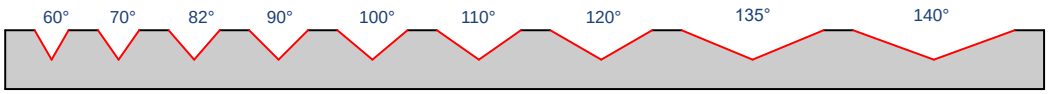


- Designed for chamfering, milling, and some spotting applications
- Not recommended for drilling steel
- 4 flutes (two flutes to center, two flutes cut back)
- Solid carbide
- CNC ground in the USA

MILL STYLE

Flat relief with end mill style gash to thin web.

Recommended For	Included Angle	
	60°, 70°	82°, 90°, 100°, 110°, 120°, 135°, 140°
Chamfering	Yes	Yes
O.D. Milling	Yes	Yes
Drilling	No	Non-Ferrous Only
Spotting	No	Light Duty



Stocked in *Nine* Included Angles!

INCLUDED ANGLE	CUTTER DIAMETER	LENGTH OF CUT	WEB THICKNESS	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		TiN COATED		AlTiN COATED	
A +1° −1°	D1 +.000″ −.002″	L2 +.030″ −.000″	W	D2	L1	4 FL	PRICE	4 FL	PRICE	4 FL	PRICE
60°	1/32	3/32	.003	1/8	1-1/2	15402	31.30			15402-C3	36.20
	3/64	9/64	.004	1/8	1-1/2	15403	31.30			15403-C3	36.20
	1/16	3/16	.005	1/8	1-1/2	15404	31.30			15404-C3	36.20
	5/64	1/4	.005	1/8	1-1/2	15405	31.30			15405-C3	36.20
	3/32	3/8	.005	1/8	1-1/2	15406	31.30			15406-C3	36.20
	7/64	3/8	.005	1/8	1-1/2	15407	32.50			15407-C3	37.40
	3 mm	3/8	.005	1/8	1-1/2	1543M	33.90			1543M-C3	38.80
	1/8	1/2	.005	1/8	1-1/2	15408	31.30			15408-C3	36.20
	9/64	9/16	.006	3/16	2	15409	32.50			15409-C3	37.80
	5/32	9/16	.006	3/16	2	15410	32.50			15410-C3	37.80
	3/16	5/8	.006	3/16	2	15412	32.50			15412-C3	37.80
	1/4	3/4	.006	1/4	2-1/2	15416	45.90			15416-C3	53.10
	5/16	13/16	.007	5/16	2-1/2	15420	48.30			15420-C3	56.70
	3/8	7/8	.008	3/8	2-1/2	15424	57.80			15424-C3	67.30
	7/16	1	.008	7/16	2-3/4	15428	89.50			15428-C3	101.40
	1/2	1	.008	1/2	3	15432	91.60			15432-C3	105.80
	5/8	1-1/4	.009	5/8	3-1/2	15440	140.00			15440-C3	154.20
	3/4	1-1/2	.010	3/4	4	15448	212.30			15448-C3	227.70
	1	2	.010	1	4	15464	319.80			15464-C3	343.20
70°	1/8	1/2	.005	1/8	1-1/2	824608	35.00			824608-C3	39.90
	1/4	3/4	.006	1/4	2-1/2	824616	50.60			824616-C3	57.80
	3/8	7/8	.008	3/8	2-1/2	824624	63.20			824624-C3	72.70
	1/2	1	.008	1/2	3	824632	98.70			824632-C3	112.90

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NEW SIZES!

DRILL / END MILLS

Mill Style – 4 Flute (cont.)

continued from previous page

INCLUDED ANGLE	CUTTER DIAMETER	LENGTH OF CUT	WEB THICKNESS	SHANK DIAMETER	OVERALL LENGTH		UNCOATED		TiN COATED		AlTiN COATED		
A +1° −1°	D1 +.000″ −.002″	L2 +.030″ −.000″	W	D2	L1		4 FL	PRICE	4 FL	PRICE	4 FL	PRICE	
82°	1/32	3/32	.003	1/8	1-1/2		26502	35.00			26502-C3	39.90	
	1/16	3/16	.005	1/8	1-1/2		26504	35.00			26504-C3	39.90	
	5/64	1/4	.005	1/8	1-1/2		26505	35.00			26505-C3	39.90	
	3/32	3/8	.005	1/8	1-1/2		26506	35.00			26506-C3	39.90	
	1/8	1/2	.005	1/8	1-1/2		26508	35.00			26508-C3	39.90	
	5/32	9/16	.006	3/16	2		26510	36.30			26510-C3	41.60	
	3/16	5/8	.006	3/16	2		26512	36.30			26512-C3	41.60	
	1/4	3/4	.006	1/4	2-1/2		26516	50.60			26516-C3	57.80	
	5/16	13/16	.007	5/16	2-1/2		26520	52.80			26520-C3	61.20	
	3/8	7/8	.008	3/8	2-1/2		26524	63.20			26524-C3	72.70	
	1/2	1	.008	1/2	3		26532	98.70			26532-C3	112.90	
	5/8	1-1/4	.009	5/8	3-1/2		26540	149.40			26540-C3	163.60	
	3/4	1-1/2	.010	3/4	4		26548	225.90			26548-C3	241.30	
90°	1/64	3/64	.0015	1/8	1-1/2		15301	31.30			15301-C3	36.20	
	.020	1/16	.002	1/8	1-1/2		15367	31.30			15367-C3	36.20	NEW
	1/32	3/32	.003	1/8	1-1/2		15302	31.30			15302-C3	36.20	
	1 mm	1/8	.003	1/8	1-1/2		1531M	33.90			1531M-C3	38.80	
	3/64	9/64	.004	1/8	1-1/2		15303	31.30			15303-C3	36.20	
	1/16	3/16	.005	1/8	1-1/2		15304	29.80	15304-C1	33.10	15304-C3	34.70	
	1/16	5/16	.005	1/8	2-1/2		823904	32.30			823904-C3	37.20	
	5/64	1/4	.005	1/8	1-1/2		15305	29.80	15305-C1	33.10	15305-C3	34.70	
	3/32	3/8	.005	1/8	1-1/2		15306	29.80	15306-C1	33.10	15306-C3	34.70	
	7/64	3/8	.005	1/8	1-1/2		15307	31.30			15307-C3	36.20	
	3 mm	3/8	.005	1/8	1-1/2		1533M	31.30			1533M-C3	36.20	
	1/8	1/2	.005	1/8	1-1/2		15308	29.80	15308-C1	33.10	15308-C3	34.70	
	1/8	1/2	.005	1/8	3	LONG	824208	33.40			824208-C3	40.60	
	1/8	5/8	.005	1/8	2-1/2		824008	32.30			824008-C3	37.20	
	9/64	9/16	.006	3/16	2		15309	32.50			15309-C3	37.80	
	5/32	9/16	.006	3/16	2		15310	32.50			15310-C3	37.80	
	11/64	5/8	.006	3/16	2		15311	32.50			15311-C3	37.80	
	3/16	5/8	.006	3/16	2		15312	30.80	15312-C1	34.50	15312-C3	36.10	
	3/16	1	.006	3/16	3		824012	33.90			824012-C3	39.20	
	13/64	3/4	.006	1/4	2-1/2		15313	47.90			15313-C3	55.10	
	7/32	3/4	.006	1/4	2-1/2		15314	47.90			15314-C3	55.10	
	6 mm	3/4	.006	1/4	2-1/2		1536M	48.50			1536M-C3	55.70	
	1/4	3/4	.006	1/4	2-1/2		15316	43.60	15316-C1	47.50	15316-C3	50.80	
	1/4	3/4	.006	1/4	4		824216	48.10			824216-C3	53.40	
	1/4	1-1/4	.006	1/4	4		824016	50.40			824016-C3	58.80	
	5/16	13/16	.007	5/16	2-1/2		15320	45.70	15320-C1	51.20	15320-C3	54.10	
	3/8	7/8	.008	3/8	2-1/2		15324	54.70	15324-C1	60.40	15324-C3	64.20	
	3/8	2	.008	3/8	4		824024	58.00			824024-C3	71.00	
	7/16	1	.008	7/16	2-3/4		15328	89.50			15328-C3	101.40	
	1/2	1	.008	1/2	3		15332	86.80	15332-C1	93.20	15332-C3	101.00	
	1/2	1	.008	1/2	6	LONG	824032	107.50			824032-C3	121.70	NEW
	5/8	1-1/4	.009	5/8	3-1/2		15340	132.60	15340-C1	141.00	15340-C3	146.80	
	3/4	1-1/2	.010	3/4	4		15348	201.20	15348-C1	210.70	15348-C3	216.60	
	7/8	2	.010	7/8	4		15356	319.80			15356-C3	335.70	NEW
	1	2	.010	1	4		15364	319.80			15364-C3	343.20	

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DRILL / END MILLS

Mill Style – 4 Flute (cont.)

continued from previous page

INCLUDED ANGLE	CUTTER DIAMETER	LENGTH OF CUT	WEB THICKNESS	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		TiN COATED		AlTiN COATED	
A +1° −1°	D_1 +.000″ −.002″	L_2 +.030″ −.000″	W	D_2	L_1	4 FL	PRICE	4 FL	PRICE	4 FL	PRICE
100°	1/32	3/32	.003	1/8	1-1/2	27402	35.00			27402-C3	39.90
	1/16	3/16	.005	1/8	1-1/2	27404	35.00			27404-C3	39.90
	5/64	1/4	.005	1/8	1-1/2	27405	35.00			27405-C3	39.90
	3/32	3/8	.005	1/8	1-1/2	27406	35.00			27406-C3	39.90
	1/8	1/2	.005	1/8	1-1/2	27408	35.00			27408-C3	39.90
	5/32	9/16	.006	3/16	2	27410	36.30			27410-C3	41.60
	3/16	5/8	.006	3/16	2	27412	36.30			27412-C3	41.60
	1/4	3/4	.006	1/4	2-1/2	27416	50.60			27416-C3	57.80
	5/16	13/16	.007	5/16	2-1/2	27420	52.80			27420-C3	61.20
	3/8	7/8	.008	3/8	2-1/2	27424	63.20			27424-C3	72.70
	1/2	1	.008	1/2	3	27432	98.70			27432-C3	112.90
	5/8	1-1/4	.009	5/8	3-1/2	27440	149.40			27440-C3	163.60
	3/4	1-1/2	.010	3/4	4	27448	225.90			27448-C3	241.30
110°	1/8	1/2	.005	1/8	1-1/2	824408	35.00			824408-C3	39.90
	1/4	3/4	.006	1/4	2-1/2	824416	50.60			824416-C3	57.80
	3/8	7/8	.008	3/8	2-1/2	824424	63.20			824424-C3	72.70
	1/2	1	.008	1/2	3	824432	98.70			824432-C3	112.90
120°	1/32	3/32	.003	1/8	1-1/2	988102	33.30			988102-C3	38.20
	1/16	3/16	.005	1/8	1-1/2	988104	33.30			988104-C3	38.20
	3/32	3/8	.005	1/8	1-1/2	988106	33.30			988106-C3	38.20
	7/64	3/8	.005	1/8	1-1/2	988107	32.50			988107-C3	37.40
	3 mm	3/8	.005	1/8	1-1/2	98813M	33.90			98813M-C3	38.80
	1/8	1/2	.005	1/8	1-1/2	988108	33.30			988108-C3	38.20
	9/64	9/16	.006	3/16	2	988109	34.30			988109-C3	39.60
	5/32	9/16	.006	3/16	2	988110	34.30			988110-C3	39.60
	3/16	5/8	.006	3/16	2	988112	34.30			988112-C3	39.60
	1/4	3/4	.006	1/4	2-1/2	988116	48.10			988116-C3	55.30
	5/16	13/16	.007	5/16	2-1/2	988120	50.10			988120-C3	58.50
	3/8	7/8	.008	3/8	2-1/2	988124	59.70			988124-C3	69.20
	1/2	1	.008	1/2	3	988132	93.30			988132-C3	107.50
	5/8	1-1/4	.009	5/8	3-1/2	988140	141.50			988140-C3	155.70
	3/4	1-1/2	.010	3/4	4	988148	213.80			988148-C3	229.20
	1	2	.010	1	4	988164	321.40			988164-C3	344.80
135°	1/8	1/2	.005	1/8	1-1/2	870208	35.00			870208-C3	39.90
	3/16	5/8	.006	3/16	2	870212	36.30			870212-C3	41.60
	1/4	3/4	.006	1/4	2-1/2	870216	50.60			870216-C3	57.80
	3/8	7/8	.008	3/8	2-1/2	870224	63.20			870224-C3	72.70
	1/2	1	.008	1/2	3	870232	98.70			870232-C3	112.90
140°	1/8	1/2	.005	1/8	1-1/2	817208	35.00			817208-C3	39.90
	1/4	3/4	.006	1/4	2-1/2	817216	50.60			817216-C3	57.80

DRILL / END MILLS

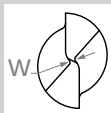
Drill Style – 2 Flute



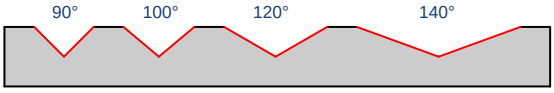
DRILL STYLE

Cammed relief with split point with "S" style gash to thin web.

Recommended For	
Chamfering	Light Duty
O.D. Milling	Yes
Drilling	Yes
Spotting	Yes



- Designed for drilling and milling applications
- 2 flutes
- Solid carbide
- CNC ground in the USA



Stocked in *Four* Included Angles!

INCLUDED ANGLE	CUTTER DIAMETER	LENGTH OF CUT	WEB THICKNESS	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN COATED		TiB_2 COATED	
A $^{+1°}_{-1°}$	D_1 $^{+.000″}_{-.002″}$	L_2 $^{+.030″}_{-.000″}$	W	D_2	L_1	2 FL	PRICE	2 FL	PRICE	TOOL #	PRICE
90°	1/32	3/32	.003	1/8	1-1/2	46502	33.90	46502-C3	38.80		
	1 mm	1/8	.003	1/8	1-1/2	4651M	36.50	4651M-C3	41.40		
	3/64	9/64	.004	1/8	1-1/2	46503	33.90	46503-C3	38.80	46503-C8	41.10
	1/16	3/16	.005	1/8	1-1/2	46504	33.90	46504-C3	38.80		
	5/64	1/4	.005	1/8	1-1/2	46505	33.90	46505-C3	38.80		
	3/32	3/8	.005	1/8	1-1/2	46506	33.90	46506-C3	38.80		
	7/64	3/8	.005	1/8	1-1/2	46507	33.90	46507-C3	38.80		
	3 mm	3/8	.005	1/8	1-1/2	4653M	36.50	4653M-C3	41.40		
	1/8	1/2	.005	1/8	1-1/2	46508	33.90	46508-C3	38.80	46508-C8	41.10
	9/64	9/16	.006	3/16	2	46509	34.30	46509-C3	39.60		
	5/32	9/16	.006	3/16	2	46510	34.30	46510-C3	39.60		
	3/16	5/8	.006	3/16	2	46512	34.30	46512-C3	39.60		
	7/32	3/4	.006	1/4	2-1/2	46514	48.10	46514-C3	55.30		
	1/4	3/4	.006	1/4	2-1/2	46516	48.10	46516-C3	55.30	46516-C8	55.80
	5/16	13/16	.007	5/16	2-1/2	46520	50.10	46520-C3	58.50		
	3/8	7/8	.008	3/8	2-1/2	46524	59.70	46524-C3	69.20		
	7/16	1	.008	7/16	2-3/4	46528	91.40	46528-C3	103.30		
	1/2	1	.008	1/2	3	46532	93.30	46532-C3	107.50		
	5/8	1-1/4	.010	5/8	3-1/2	46540	141.50	46540-C3	155.70		
	3/4	1-1/2	.012	3/4	4	46548	213.80	46548-C3	229.20		
	1	2	.015	1	4	46564	316.50	46564-C3	339.90		
100°	1/8	1/2	.005	1/8	1-1/2	849108	35.00	849108-C3	39.90		
	3/16	5/8	.006	3/16	2	849112	36.30	849112-C3	41.60		
	1/4	3/4	.006	1/4	2-1/2	849116	50.60	849116-C3	57.80		
	3/8	7/8	.008	3/8	2-1/2	849124	63.20	849124-C3	72.70		

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DRILL / END MILLS

Drill Style – 2 Flute (cont.)

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INCLUDED ANGLE	CUTTER DIAMETER	LENGTH OF CUT	WEB THICKNESS	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN COATED		TiB_2 COATED	
A $^{+1°}_{-1°}$	D_1 $^{+.000″}_{-.002″}$	L_2 $^{+.030″}_{-.000″}$	W	D_2	L_1	2 FL	PRICE	2 FL	PRICE	TOOL #	PRICE
120°	1/32	3/32	.003	1/8	1-1/2	12902	33.90	12902-C3	38.80		
	1 mm	1/8	.003	1/8	1-1/2	1291M	36.50	1291M-C3	41.40		
	3/64	9/64	.004	1/8	1-1/2	12903	33.90	12903-C3	38.80		
	1/16	3/16	.005	1/8	1-1/2	12904	32.10	12904-C3	37.00		
	5/64	1/4	.005	1/8	1-1/2	12905	32.10	12905-C3	37.00		
	3/32	3/8	.005	1/8	1-1/2	12906	32.10	12906-C3	37.00		
	3 mm	3/8	.005	1/8	1-1/2	1293M	36.50	1293M-C3	41.40		
	1/8	1/2	.005	1/8	1-1/2	12908	32.10	12908-C3	37.00	12908-C8	39.30
	9/64	9/16	.006	3/16	2	12909	34.30	12909-C3	39.60		
	5/32	9/16	.006	3/16	2	12910	34.30	12910-C3	39.60		
	3/16	5/8	.006	3/16	2	12912	32.40	12912-C3	37.70		
	7/32	3/4	.006	1/4	2-1/2	12914	48.10	12914-C3	55.30		
	1/4	3/4	.006	1/4	2-1/2	12916	45.60	12916-C3	52.80	12916-C8	53.30
	5/16	13/16	.007	5/16	2-1/2	12920	47.60	12920-C3	56.00		
	3/8	7/8	.008	3/8	2-1/2	12924	56.60	12924-C3	66.10	12924-C8	76.50
	7/16	1	.008	7/16	2-3/4	12928	91.40	12928-C3	103.30		
	1/2	1	.008	1/2	3	12932	88.30	12932-C3	102.50		
	5/8	1-1/4	.010	5/8	3-1/2	12940	134.10	12940-C3	148.30		
	3/4	1-1/2	.012	3/4	4	12948	202.70	12948-C3	218.10		
	1	2	.015	1	4	12964	316.50	12964-C3	339.90		
140°	1/16	3/16	.005	1/8	1-1/2	950504	35.00	950504-C3	39.90		
	5/64	1/4	.005	1/8	1-1/2	950505	35.00	950505-C3	39.90		
	3/32	3/8	.005	1/8	1-1/2	950506	35.00	950506-C3	39.90		
	1/8	1/2	.005	1/8	1-1/2	950508	35.00	950508-C3	39.90		
	3/16	5/8	.006	3/16	2	950512	36.30	950512-C3	41.60		
	1/4	3/4	.006	1/4	2-1/2	950516	50.60	950516-C3	57.80		
	5/16	13/16	.007	5/16	2-1/2	950520	52.80	950520-C3	61.20		
	3/8	7/8	.008	3/8	2-1/2	950524	63.20	950524-C3	72.70		
	1/2	1	.008	1/2	3	950532	98.70	950532-C3	112.90		
	5/8	1-1/4	.010	5/8	3-1/2	950540	149.40	950540-C3	163.60		
	3/4	1-1/2	.012	3/4	4	950548	225.90	950548-C3	241.30		

DRILL / END MILLS

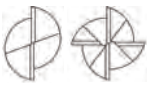
Cobalt – Mill Style – 2 & 4 Flute



- M-42 steel (8% cobalt)
- 90° included angle point
- Weldon flat
- CNC ground in the USA

MILL STYLE

END VIEW:



Flat Relief with end mill style gash to thin web

Recommended For	
Chamfering	Yes
O.D. Milling	Yes
Drilling	Non-Ferrous Only
Spotting	Light Duty

INCLUDED ANGLE	CUTTER DIAMETER	LENGTH OF CUT	FLUTES*	SHANK DIAMETER	OVERALL LENGTH	UNCOATED	
A +1° −1°	D1 +.000″ −.002″	L2 +.030″ −.000″		D2	L1	TOOL #	PRICE
90°	1/8	3/8	4	3/8	2-5/16	14308	64.50
	1/8	3/8	2	3/8	2-5/16	14308-2	64.50
	3/16	1/2	4	3/8	2-3/8	14312	64.50
	1/4	5/8	4	3/8	2-1/2	14316	64.50
	1/4	5/8	2	3/8	2-1/2	14316-2	64.50
	5/16	3/4	4	3/8	2-1/2	14320	64.50
	3/8	3/4	4	3/8	2-1/2	14324	64.50
	3/8	3/4	2	3/8	2-1/2	14324-2	64.50
	7/16	1	4	3/8	2-11/16	14328	76.10
	1/2	1-1/4	4	1/2	3-1/4	14332	76.10
	5/8	1-5/8	4	5/8	3-1/4	14340	111.30
	3/4	1-5/8	4	3/4	3-7/8	14348	130.80
	1	1-7/8	4	3/4	4-1/8	14364-A	190.50
	1	2	4	1	4-1/2	14364	190.50

*2 flute style is two flutes to center. 4 flute style is two flutes to center and two flutes cut back.

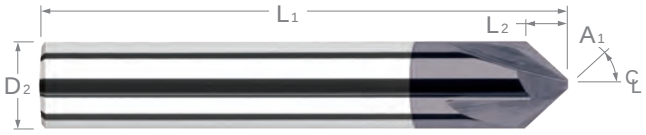
View a comprehensive library of **Speeds & Feeds** charts for every Harvey Tool End Mill on the new Harveytool.com.

Access **Simulation Files** in DXF format for every Harvey Tool product, downloadable now from the new Harveytool.com.

NEW SIZES!

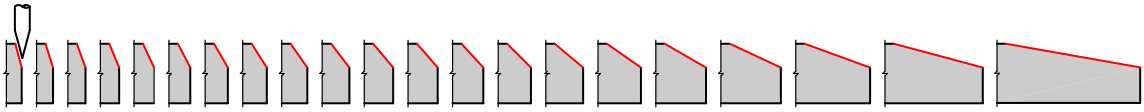
CHAMFER CUTTERS

Pointed & Flat End



Available in 2, 3, 4 & 6 Flutes!

- Choose from three types:
  - Pointed (Type I): 2 flute style for deburring and chamfering in narrow grooves, slots and small holes
  - Flat End (Type II): (non-cutting) multi-flute design improves tool life and finish for profiling and chamfering larger features
  - End Cutting (Type III): 4 flute center cutting geometry to blend the floor and a chamfered wall in a single pass
- Solid carbide
- CNC ground in the USA

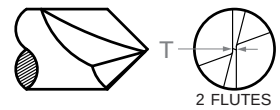


Stocked in *21* Angles Per Side, Ranging from 15°-80°!

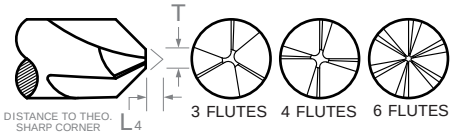
ANGLE PER SIDE	DIA.	FLUTES	TIP	TYPE	LOC		OAL		UNCOATED		AlTiN COATED		TiB_2 COATED	
A_1 $^{+0°30'}_{-0°30'}$	D_2		T (MAX.)		L_2	L_4 (MAX.)	L_1		TOOL #	PRICE	TOOL #	PRICE	TOOL #	PRICE
	1/8	2	.010	I	.233		1-1/2		18715	18.70	18715-C3	23.60	18715-C8	25.90
	1/8	2	.010	I	.233		3	LONG!	50615	23.60	50615-C3	28.50		
	1/8	3	.040	II	.159	.075	1-1/2		968615	19.70	968615-C3	24.60		
	1/8	4	.040	II	.159	.075	1-1/2		866115	20.70	866115-C3	25.60		
	3/16	2	.010	I	.350		2		72415	25.60	72415-C3	30.90		
	3/16	2	.010	I	.350		4	LONG!	986915	37.90	986915-C3	45.10		
	3/16	3	.040	II	.275	.075	2		978115	29.20	978115-C3	34.50		
	3/16	4	.040	II	.275	.075	2		848715	30.60	848715-C3	35.90		
	1/4	2	.010	I	.448		2-1/2		47615	36.70	47615-C3	43.90	47615-C8	44.40
	1/4	3	.060	II	.355	.112	2-1/2		18515	34.80	18515-C3	42.00		
	1/4	3	.060	II	.355	.112	4	LONG!	48515	47.00	48515-C3	51.50		
15°	1/4	4	.060	II	.355	.112	2-1/2		876415	38.50	876415-C3	45.70		
	1/4	4	.040	III	.391	.075	2-1/2		833115	40.50	833115-C3	47.70		
	5/16	3	.060	II	.471	.112	2-1/2		977015	43.20	977015-C3	51.60		
	3/8	2	.010	I	.700		2-1/2		72515	49.20	72515-C3	58.70		
	3/8	3	.060	II	.588	.112	2-1/2		18415	46.70	18415-C3	56.20	18415-C8	66.60
	3/8	3	.060	II	.588	.112	4	LONG!	981215	71.00	981215-C3	84.00		
	3/8	4	.060	II	.588	.112	2-1/2		895115	51.70	895115-C3	61.20		
	1/2	2	.010	I	.933		3		960415	82.80	960415-C3	97.00		
	1/2	4	.080	II	.784	.149	3		18315	69.30	18315-C3	83.50		
	1/2	6	.080	II	.784	.149	3		839215	76.80	839215-C3	91.00		
	5/8	6	.080	II	1.017	.149	3-1/2		952815	120.60	952815-C3	134.80		
	3/4	6	.100	II	1.213	.187	4		949315	180.60	949315-C3	196.00		

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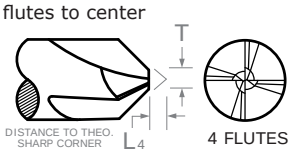
TYPE I - POINTED
Flat relief ground to center, yielding a web thickness at tip (T)



TYPE II - FLAT END Flat relief ground to a *non-end cutting* flat tip (T)



TYPE III - END CUTTING
Flat relief ground to an end cutting tip diameter (T), two flutes to center



NEW SIZES!

CHAMFER CUTTERS

Pointed & Flat End (cont.)

continued from previous page

ANGLE PER SIDE	DIA.	FLUTES	TIP	TYPE	LOC		OAL		UNCOATED		AlTiN COATED		TiB_2 COATED	
A_1 $^{+0°30'}_{-0°30'}$	D_2		$T_{(MAX.)}$		L_2	$L_{4\ (MAX.)}$	L_1		TOOL #	PRICE	TOOL #	PRICE	TOOL #	PRICE
17.5°	1/8	2	.010	I	.198		1-1/2		18718	21.60	18718-C3	26.50		
	1/4	2	.010	I	.396		2-1/2		47618	39.30	47618-C3	46.50		
	1/4	3	.060	II	.301	.095	2-1/2		18518	39.30	18518-C3	46.50		
	1/2	4	.080	II	.666	.127	3		18318	78.40	18318-C3	92.60		
20°	1/8	2	.010	I	.172		1-1/2		18720	18.70	18720-C3	23.60	18720-C8	25.90
	1/8	2	.010	I	.172		3	*LONG!*	50620	23.60	50620-C3	28.50		
	1/8	3	.040	II	.117	.055	1-1/2		968620	19.70	968620-C3	24.60		
	1/8	4	.040	II	.117	.055	1-1/2		866120	20.70	866120-C3	25.60		
	3/16	2	.010	I	.258		2		72420	25.60	72420-C3	30.90		
	3/16	2	.010	I	.258		4	*LONG!*	986920	37.90	986920-C3	45.10		
	3/16	3	.040	II	.203	.055	2		978120	29.20	978120-C3	34.50		
	3/16	4	.040	II	.203	.055	2		848720	30.60	848720-C3	35.90		
	1/4	2	.010	I	.343		2-1/2		47620	36.70	47620-C3	43.90	47620-C8	44.40
	1/4	3	.060	II	.261	.082	2-1/2		18520	34.80	18520-C3	42.00	18520-C8	42.50
	1/4	3	.060	II	.261	.082	4	*LONG!*	48520	47.00	48520-C3	51.50		
	1/4	4	.060	II	.261	.082	2-1/2		876420	41.00	876420-C3	48.20		
	1/4	4	.040	III	.288	.055	2-1/2		833120	42.60	833120-C3	49.80		
	5/16	3	.060	II	.347	.082	2-1/2		977020	49.20	977020-C3	57.60		
	3/8	2	.010	I	.515		2-1/2		72520	49.20	72520-C3	58.70		
	3/8	3	.060	II	.433	.082	2-1/2		18420	46.70	18420-C3	56.20		
	3/8	3	.060	II	.433	.082	4	*LONG!*	981220	71.00	981220-C3	84.00		
	3/8	4	.060	II	.433	.082	2-1/2		895120	55.00	895120-C3	64.50		
	1/2	2	.010	I	.687		3		960420	82.80	960420-C3	97.00		
	1/2	4	.080	II	.577	.110	3		18320	69.30	18320-C3	83.50		
	1/2	6	.080	II	.577	.110	3		839220	76.80	839220-C3	91.00		
22.5°	1/8	2	.010	I	.151		1-1/2		18723	20.90	18723-C3	25.80	18723-C8	28.10
	1/8	3	.040	II	.103	.048	1-1/2		968623	20.90	968623-C3	25.80		
	3/16	2	.010	I	.226		2		72423	27.40	72423-C3	32.70		
	3/16	3	.040	II	.178	.048	2		978123	27.40	978123-C3	32.70		
	1/4	2	.010	I	.302		2-1/2		47623	39.30	47623-C3	46.50		
	1/4	3	.060	II	.229	.072	2-1/2		18523	39.30	18523-C3	46.50		
	3/8	2	.010	I	.453		2-1/2		72523	52.80	72523-C3	62.30		
	3/8	3	.060	II	.380	.072	2-1/2		18423	52.80	18423-C3	62.30		
	1/2	2	.010	I	.604		3		960423	84.00	960423-C3	98.20		
	1/2	4	.080	II	.507	.097	3		18323	74.30	18323-C3	88.50		
25°	1/8	2	.010	I	.134		1-1/2		18725	20.90	18725-C3	25.80	18725-C8	28.10
	1/8	3	.040	II	.091	.043	1-1/2		968625	20.90	968625-C3	25.80		
	3/16	2	.010	I	.201		2		72425	27.20	72425-C3	32.50		
	3/16	3	.040	II	.158	.043	2		978125	27.20	978125-C3	32.50		
	1/4	2	.010	I	.268		2-1/2		47625	39.30	47625-C3	46.50		
	1/4	3	.060	II	.204	.064	2-1/2		18525	39.10	18525-C3	46.30		
	1/4	4	.060	II	.204	.064	2-1/2		876425	40.80	876425-C3	48.00		
	3/8	2	.010	I	.402		2-1/2		72525	52.40	72525-C3	61.90		
	3/8	3	.060	II	.338	.064	2-1/2		18425	52.40	18425-C3	61.90		
	1/2	2	.010	I	.536		3		960425	83.20	960425-C3	97.40		
	1/2	4	.080	II	.450	.086	3		18325	73.40	18325-C3	87.60		

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CHAMFER CUTTERS

Pointed & Flat End (cont.)

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ANGLE PER SIDE	DIA.	FLUTES	TIP	TYPE	LOC		OAL		UNCOATED		AlTiN COATED		TiB_2 COATED	
A_1 $^{+0°30'}_{-0°30'}$	D_2		$T_{(MAX.)}$		L_2	$L_{4\ (MAX.)}$	L_1		TOOL #	PRICE	TOOL #	PRICE	TOOL #	PRICE
27.5°	1/8	2	.010	I	.120		1-1/2		18728	21.60	18728-C3	26.50		
	1/4	2	.010	I	.240		2-1/2		47628	39.30	47628-C3	46.50		
	1/4	3	.060	II	.182	.058	2-1/2		18528	39.30	18528-C3	46.50		
	1/2	4	.080	II	.403	.077	3		18328	74.30	18328-C3	88.50		
30°	3 mm	2	.120 mm	I	2.60 mm		38 mm		900230	20.70	900230-C3	25.60		
	1/8	2	.010	I	.108		1-1/2		18730	18.70	18730-C3	23.60	18730-C8	25.90
	1/8	2	.010	I	.108		3	LONG!	50630	23.60	50630-C3	28.50		
	1/8	3	.040	II	.074	.035	1-1/2		968630	19.70	968630-C3	24.60		
	1/8	4	.040	II	.074	.035	1-1/2		866130	20.70	866130-C3	25.60		
	1/8	4	.040	III	.074	.035	1-1/2		802830	22.70	802830-C3	27.60		
	3/16	2	.010	I	.162		2		72430	25.60	72430-C3	30.90	72430-C8	32.80
	3/16	2	.010	I	.162		4	LONG!	986930	37.90	986930-C3	45.10		
	3/16	3	.040	II	.128	.035	2		978130	31.80	978130-C3	37.10		
	3/16	4	.040	II	.128	.035	2		848730	33.20	848730-C3	38.50		
	1/4	2	.010	I	.217		2-1/2		47630	36.70	47630-C3	43.90	47630-C8	44.40
	1/4	3	.060	II	.165	.052	2-1/2		18530	34.80	18530-C3	42.00	18530-C8	42.50
	1/4	3	.060	II	.165	.052	4	LONG!	48530	47.00	48530-C3	51.50		
	1/4	4	.060	II	.165	.052	2-1/2		876430	38.50	876430-C3	45.70		
	1/4	4	.040	III	.181	.035	2-1/2		833130	40.60	833130-C3	47.80		
	5/16	2	.010	I	.271		2-1/2		880330	44.40	880330-C3	52.80		
	5/16	3	.060	II	.219	.052	2-1/2		977030	43.20	977030-C3	51.60		
	5/16	4	.060	II	.219	.052	2-1/2		873230	46.00	873230-C3	54.40		
	3/8	2	.010	I	.325		2-1/2		72530	49.20	72530-C3	58.70		
	3/8	3	.060	II	.273	.052	2-1/2		18430	46.70	18430-C3	56.20	18430-C8	66.60
	3/8	3	.060	II	.273	.052	4	LONG!	981230	71.00	981230-C3	84.00		
	3/8	4	.060	II	.273	.052	2-1/2		895130	51.70	895130-C3	61.20		
	3/8	4	.060	III	.273	.052	2-1/2		827830	54.20	827830-C3	63.70		
	1/2	2	.010	I	.433		3		960430	78.20	960430-C3	92.40		
	1/2	3	.080	II	.364	.069	3		871830	77.00	871830-C3	91.20		
	1/2	4	.080	II	.364	.069	3		18330	65.40	18330-C3	79.60		
	1/2	4	.080	III	.364	.069	3		820230	70.60	820230-C3	84.80		
	1/2	6	.080	II	.364	.069	3		839230	72.40	839230-C3	86.60		
	5/8	6	.080	II	.472	.069	3-1/2		952830	120.60	952830-C3	134.80		
	3/4	6	.100	II	.563	.087	4		949330	180.60	949330-C3	196.00		
32.5°	1/8	2	.010	I	.098		1-1/2		18733	21.60	18733-C3	26.50		
	1/4	3	.060	II	.149	.047	2-1/2		18533	39.30	18533-C3	46.50		
	1/2	4	.080	II	.330	.063	3		18333	74.30	18333-C3	88.50		
35°	1/8	2	.010	I	.089		1-1/2		18735	20.20	18735-C3	25.10		
	1/8	3	.040	II	.061	.029	1-1/2		968635	20.20	968635-C3	25.10		
	3/16	2	.010	I	.134		2		72435	26.10	72435-C3	31.40		
	3/16	3	.040	II	.105	.029	2		978135	26.10	978135-C3	31.40		
	1/4	2	.010	I	.179		2-1/2		47635	47.70	47635-C3	54.90		
	1/4	3	.060	II	.136	.043	2-1/2		18535	37.50	18535-C3	44.70		
	3/8	2	.010	I	.268		2-1/2		72535	50.50	72535-C3	60.00		
	3/8	3	.060	II	.225	.043	2-1/2		18435	50.50	18435-C3	60.00		
	1/2	2	.010	I	.357		3		960435	80.10	960435-C3	94.30		
	1/2	4	.080	II	.300	.057	3		18335	70.60	18335-C3	84.80		

continued on next page

NEW SIZES!

CHAMFER CUTTERS

Pointed & Flat End (cont.)

continued from previous page

ANGLE PER SIDE	DIA.	FLUTES	TIP	TYPE	LOC		OAL		UNCOATED		AlTiN COATED		TiB_2 COATED		
A_1 $^{+0°30'}_{-0°30'}$	D_2		$T_{(MAX.)}$		L_2	$L_{4\ (MAX.)}$	L_1		TOOL #	PRICE	TOOL #	PRICE	TOOL #	PRICE	
37.5°	1/8	2	.010	I	.081		1-1/2		18738	21.60	18738-C3	26.50			
	1/4	2	.010	I	.163		2-1/2		47638	50.00	47638-C3	57.20			
	1/4	3	.060	II	.124	.039	2-1/2		18538	39.30	18538-C3	46.50			
	1/2	4	.080	II	.274	.052	3		18338	74.30	18338-C3	88.50			
40°	1/8	2	.010	I	.074		1-1/2		18740	20.20	18740-C3	25.10			
	1/8	3	.040	II	.051	.024	1-1/2		968640	19.70	968640-C3	24.60			
	1/8	4	.040	II	.051	.024	1-1/2		866140	20.70	866140-C3	25.60			
	3/16	2	.010	I	.112		2		72440	26.10	72440-C3	31.40			
	1/4	2	.010	I	.149		2-1/2		47640	47.70	47640-C3	54.90			
	1/4	3	.060	II	.113	.036	2-1/2		18540	37.50	18540-C3	44.70			
	1/4	4	.040	III	.125		2-1/2		833140	46.40	833140-C3	53.60			
	1/4	4	.060	II	.113	.036	2-1/2		876440	40.70	876440-C3	47.90			
	3/8	3	.060	II	.188	.036	2-1/2		18440	50.50	18440-C3	60.00			
	1/2	4	.080	II	.25	.048	3		18340	70.60	18340-C3	84.80			
41°	1/8	2	.010	I	.072		1-1/2		18741	19.70	18741-C3	24.60	18741-C8	26.90	
	1/8	3	.040	II	.049	.023	1-1/2		968641	22.20	968641-C3	27.10			
	3/16	2	.010	I	.108		2		72441	28.70	72441-C3	34.00			
	3/16	3	.040	II	.085	.023	2		978141	27.60	978141-C3	32.90			
	1/4	2	.010	I	.144		2-1/2		47641	40.70	47641-C3	47.90			
	1/4	3	.060	II	.109	.035	2-1/2		18541	36.90	18541-C3	44.10			
	3/8	2	.010	I	.216		2-1/2		72541	55.60	72541-C3	65.10			
	3/8	3	.060	II	.181	.035	2-1/2		18441	55.60	18441-C3	65.10			
	1/2	2	.010	I	.288		3		960441	84.00	960441-C3	98.20			
	1/2	4	.080	II	.242	.046	3		18341	69.30	18341-C3	83.50			
42.5°	1/8	2	.010	I	.068		1-1/2		18743	21.60	18743-C3	26.50			
	1/4	3	.060	II	.104	.033	2-1/2		18543	39.30	18543-C3	46.50			
	1/2	4	.080	II	.229	.044	3		18343	74.30	18343-C3	88.50			
45°	3 mm	2	.25 mm	I	1.50 mm		38 mm		900245	22.50	900245-C3	27.40			
	3 mm	3	1.00 mm	II	1.00 mm	.500 mm	38 mm		899545	22.50	899545-C3	27.40			
	3 mm	4	1.00 mm	III	1.00 mm	.500 mm	38 mm		764845	24.10	764845-C3	29.00			NEW
	1/8	2	.010	I	.063		1-1/2		18745	18.70	18745-C3	23.60	18745-C8	25.90	
	1/8	2	.010	I	.063		3	*LONG!*	50645	23.60	50645-C3	28.50	50645-C8	30.80	
	1/8	3	.040	II	.043	.020	1-1/2		968645	19.70	968645-C3	24.60	968645-C8	26.90	
	1/8	3	.040	II	.043	.020	3	*LONG!*	790245	24.20	790245-C3	29.10			
	1/8	4	.040	II	.043	.020	1-1/2		866145	20.70	866145-C3	25.60			
	1/8	4	.040	III	.042	.020	1-1/2		802845	22.30	802845-C3	27.20			
	4 mm	2	.25 mm	I	2.00 mm		50 mm		878445	28.70	878445-C3	34.00			
	4 mm	3	1.00 mm	II	1.50 mm	.500 mm	50 mm		863845	28.70	863845-C3	34.00			
	3/16	2	.010	I	.094		2		72445	26.40	72445-C3	31.70	72445-C8	33.60	
	3/16	2	.010	I	.094		4	*LONG!*	986945	37.90	986945-C3	45.10			
	3/16	3	.040	II	.074	.020	2		978145	31.80	978145-C3	37.10	978145-C8	39.00	
	3/16	3	.040	II	.074	.020	3	*LONG!*	790945	31.80	790945-C3	37.10			
	3/16	4	.040	II	.074	.020	2		848745	33.20	848745-C3	38.50			
	3/16	4	.040	III	.073	.020	2		809745	34.80	809745-C3	40.10			
	6 mm	2	.25 mm	I	3.00 mm		63 mm		840045	39.90	840045-C3	47.10			
	6 mm	3	1.50 mm	II	2.25 mm	.750 mm	63 mm		837745	39.90	837745-C3	47.10			
	6 mm	4	1.50 mm	II	2.25 mm	.750 mm	63 mm		777645	41.30	777645-C3	48.50			
	6 mm	4	1.50 mm	III	2.25 mm	.750 mm	63 mm		764545	44.50	764545-C3	51.70			NEW

continued on next page

CHAMFER CUTTERS

Pointed & Flat End (cont.)

continued from previous page

	ANGLE PER SIDE	DIA.	FLUTES	TIP	TYPE	LOC		OAL		UNCOATED		AlTiN COATED		TiB_2 COATED	
	A_1 $^{+0°30'}_{-0°30'}$	D_2		T (MAX.)		L_2	L_4 (MAX.)	L_1		TOOL #	PRICE	TOOL #	PRICE	TOOL #	PRICE
	45°	1/4	2	.010	I	.125		2-1/2		47645	36.70	47645-C3	43.90	47645-C8	44.40
		1/4	2	.010	I	.125		4	LONG!	790345	46.60	790345-C3	55.00		
		1/4	3	.060	II	.095	.030	2-1/2		18545	35.00	18545-C3	42.20	18545-C8	42.70
		1/4	3	.060	II	.095	.030	4	LONG!	48545	47.00	48545-C3	51.50		
NEW		1/4	4	.060	II	.095	.030	2-1/2		876445	43.20	876445-C3	50.40	876445-C8	50.90
NEW		1/4	4	.060	II	.095	.030	4	LONG!	771545	54.80	771545-C3	63.20		
		1/4	4	.040	III	.105	.020	2-1/2		833145	46.40	833145-C3	53.60		
		1/4	4	.060	III	.095	.030	2-1/2		794145	46.40	794145-C3	53.60		
		5/16	2	.010	I	.156		2-1/2		880345	43.20	880345-C3	51.60		
		5/16	3	.060	II	.126	.030	2-1/2		977045	43.20	977045-C3	51.60		
		5/16	4	.060	II	.126	.030	2-1/2		873245	46.00	873245-C3	54.40		
		5/16	4	.060	III	.126	.030	2-1/2		777545	48.40	777545-C3	56.80		
		8 mm	3	1.50 mm	II	3.25 mm	.750 mm	63 mm		868845	52.80	868845-C3	61.20		
		3/8	2	.010	I	.188		2-1/2		72545	50.50	72545-C3	60.00	72545-C8	70.40
		3/8	2	.010	I	.188		4	LONG!	791745	72.30	791745-C3	85.30		
		3/8	3	.060	II	.158	.030	2-1/2		18445	46.70	18445-C3	56.20	18445-C8	66.60
		3/8	3	.060	II	.158	.030	4	LONG!	981245	71.00	981245-C3	84.00		
		3/8	4	.060	II	.158	.030	2-1/2		895145	53.70	895145-C3	63.20		
NEW		3/8	4	.040	III	.167	.020	2-1/2		764245	56.50	764245-C3	66.00		
		3/8	4	.060	III	.158	.030	2-1/2		827845	56.50	827845-C3	66.00		
		10 mm	4	1.50 mm	II	4.25 mm	.750 mm	75 mm		871045	82.60	871045-C3	96.80		
		12 mm	4	1.50 mm	II	5.25 mm	.750 mm	75 mm		881245	82.60	881245-C3	96.80		
		1/2	2	.010	I	.250		3		960445	78.20	960445-C3	92.40	960445-C8	101.60
		1/2	3	.080	II	.210	.040	3		871845	77.00	871845-C3	91.20		
		1/2	4	.080	II	.210	.040	3		18345	65.40	18345-C3	79.60	18345-C8	88.80
		1/2	4	.080	II	.210	.040	6	LONG!	982445	118.90	982445-C3	133.10		
		1/2	4	.080	III	.210	.040	3		820245	70.60	820245-C3	84.80		
		1/2	6	.080	II	.210	.040	3		839245	72.40	839245-C3	86.60		
NEW		5/8	4	.080	II	.273	.040	3-1/2		763645	114.60	763645-C3	128.80		
NEW		5/8	4	.080	III	.273	.040	3-1/2		765445	115.90	765445-C3	130.10		
		5/8	6	.080	II	.273	.040	3-1/2		952845	120.60	952845-C3	134.80		
NEW		3/4	4	.100	II	.325	.050	4		764045	173.60	764045-C3	189.00		
NEW		3/4	4	.100	III	.325	.050	4		765145	174.90	765145-C3	190.30		
		3/4	6	.100	II	.325	.050	4		949345	180.60	949345-C3	196.00		
		1	6	.120	II	.440	.060	4		884745	320.70	884745-C3	344.10		
	50°	1/8	2	.010	I	.052		1-1/2		18750	20.20	18750-C3	25.10	18750-C8	27.40
		1/8	3	.040	II	.036	.017	1-1/2		968650	20.20	968650-C3	25.10		
		3/16	2	.010	I	.079		2		72450	26.10	72450-C3	31.40		
		3/16	3	.040	II	.062	.017	2		978150	32.40	978150-C3	37.70		
		1/4	2	.010	I	.105		2-1/2		47650	37.50	47650-C3	44.70		
		1/4	3	.060	II	.080	.025	2-1/2		18550	37.50	18550-C3	44.70		
		1/4	4	.060	II	.080	.025	2-1/2		876450	40.70	876450-C3	47.90		
NEW		1/4	4	.040	III	.088	.017	2-1/2		833150	46.40	833150-C3	53.60		
		3/8	2	.010	I	.157		2-1/2		72550	50.50	72550-C3	60.00		
		3/8	3	.060	II	.132	.025	2-1/2		18450	50.50	18450-C3	60.00		
		3/8	4	.060	II	.132	.025	2-1/2		895150	53.60	895150-C3	63.10		
		1/2	2	.010	I	.210		3		960450	80.10	960450-C3	94.30		
		1/2	4	.080	II	.176	.034	3		18350	70.60	18350-C3	84.80		

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NEW SIZES!

CHAMFER CUTTERS

Pointed & Flat End (cont.)

continued from previous page

ANGLE PER SIDE	DIA.	FLUTES	TIP	TYPE	LOC		OAL		UNCOATED		AlTiN COATED		TiB_2 COATED	
A_1 $^{+0°30'}_{-0°30'}$	D_2		$T_{(MAX.)}$		L_2	$L_{4\ (MAX.)}$	L_1		TOOL #	PRICE	TOOL #	PRICE	TOOL #	PRICE
55°	1/8	2	.010	I	.044		1-1/2		18755	22.20	18755-C3	27.10		
	3/16	2	.010	I	.066		2		72455	27.40	72455-C3	32.70		
	1/4	2	.010	I	.088		2-1/2		47655	52.00	47655-C3	59.20		
	1/4	3	.060	II	.067	.021	2-1/2		18555	40.70	18555-C3	47.90		
	3/8	3	.060	II	.110	.021	2-1/2		18455	52.80	18455-C3	62.30		
	1/2	4	.080	II	.147	.028	3		18355	76.30	18355-C3	90.50		
60°	3 mm	2	.120 mm	I	.87 mm		38 mm		900260	20.00	900260-C3	24.90		
	1/8	2	.010	I	.036		1-1/2		18760	18.70	18760-C3	23.60	18760-C8	25.90
	1/8	2	.010	I	.036		3	*LONG!*	50660	23.60	50660-C3	28.50		
	1/8	3	.040	II	.025	.012	1-1/2		968660	19.70	968660-C3	24.60		
	3/16	2	.010	I	.054		2		72460	25.60	72460-C3	30.90		
	3/16	3	.040	II	.043	.012	2		978160	31.80	978160-C3	37.10		
	1/4	2	.010	I	.072		2-1/2		47660	36.70	47660-C3	43.90		
	1/4	3	.060	II	.055	.017	2-1/2		18560	34.80	18560-C3	42.00		
	1/4	3	.060	II	.055	.017	4	*LONG!*	48560	47.00	48560-C3	51.50		
	1/4	4	.060	II	.055	.017	2-1/2		876460	38.50	876460-C3	45.70		
	1/4	4	.040	III	.060	.012	2-1/2		833160	40.20	833160-C3	47.40		
	5/16	3	.060	II	.073	.017	2-1/2		977060	43.20	977060-C3	51.60		
	3/8	2	.010	I	.108		2-1/2		72560	49.20	72560-C3	58.70		
	3/8	3	.060	II	.091	.017	2-1/2		18460	46.70	18460-C3	56.20		
	3/8	4	.060	II	.091	.017	2-1/2		895160	50.60	895160-C3	60.10		
	3/8	4	.060	III	.091	.017	2-1/2		827860	56.50	827860-C3	66.00		NEW
	1/2	2	.010	I	.144		3		960460	78.20	960460-C3	92.40		
	1/2	4	.080	II	.121	.023	3		18360	65.40	18360-C3	79.60		
	1/2	4	.080	III	.121	.023	3		820260	69.50	820260-C3	83.70		
	5/8	6	.080	II	.157	.023	3-1/2		952860	120.60	952860-C3	134.80		
	3/4	6	.100	II	.188	.029	4		949360	180.60	949360-C3	196.00		
65°	1/8	2	.010	I	.029		1-1/2		18765	20.90	18765-C3	25.80		
	3/16	2	.010	I	.044		2		72465	27.40	72465-C3	32.70		
	1/4	2	.010	I	.058		2-1/2		47665	50.00	47665-C3	57.20		
	1/4	3	.060	II	.044	.014	2-1/2		18565	39.30	18565-C3	46.50		
	3/8	3	.060	II	.073	.014	2-1/2		18465	52.80	18465-C3	62.30		
	1/2	4	.080	II	.098	.019	3		18365	74.30	18365-C3	88.50		
70°	1/8	2	.010	I	.023		1-1/2		18770	20.20	18770-C3	25.10		
	3/16	2	.010	I	.034		2		72470	26.10	72470-C3	31.40		
	1/4	2	.010	I	.045		2-1/2		47670	47.70	47670-C3	54.90		
	1/4	3	.060	II	.035	.011	2-1/2		18570	37.50	18570-C3	44.70		
	3/8	3	.060	II	.057	.011	2-1/2		18470	54.40	18470-C3	63.90		
	1/2	4	.080	II	.076	.015	3		18370	70.60	18370-C3	84.80		

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CHAMFER CUTTERS

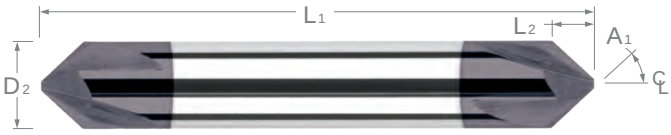
Pointed & Flat End (cont.)

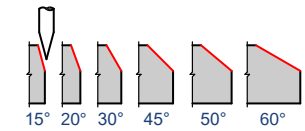
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ANGLE PER SIDE	DIA.	FLUTES	TIP	TYPE	LOC		OAL	UNCOATED		AlTiN COATED		TiB_2 COATED	
A_1 $^{+0°30'}_{-0°30'}$	D_2		$T_{(MAX.)}$		L_2	$L_{4\ (MAX.)}$	L_1	TOOL #	PRICE	TOOL #	PRICE	TOOL #	PRICE
75°	1/8	2	.010	I	.017		1-1/2	18775	22.20	18775-C3	27.10	18775-C8	29.40
	1/8	3	.040	II	.011	.005	1-1/2	968675	22.20	968675-C3	27.10		
	3/16	2	.010	I	.025		2	72475	28.70	72475-C3	34.00		
	3/16	3	.040	II	.020	.005	2	978175	33.90	978175-C3	38.60		
	1/4	2	.010	I	.033		2-1/2	47675	40.70	47675-C3	47.90		
	1/4	3	.060	II	.025	.008	2-1/2	18575	41.40	18575-C3	48.60		
	1/4	4	.060	II	.025	.008	2-1/2	876475	44.60	876475-C3	51.80		
	3/8	2	.010	I	.050		2-1/2	72575	55.60	72575-C3	65.10		
	3/8	3	.060	II	.042	.008	2-1/2	18475	55.60	18475-C3	65.10		
	1/2	2	.010	I	.067		3	960475	88.20	960475-C3	102.40		
	1/2	4	.080	II	.056	.011	3	18375	77.90	18375-C3	92.10		
80°	1/8	2	.010	I	.011		1-1/2	18780	22.00	18780-C3	26.90		
	1/4	3	.060	II	.017	.005	2-1/2	18580	29.80	18580-C3	37.00		
	1/2	4	.080	II	.037	.007	3	18380	92.20	18380-C3	106.40		

CHAMFER CUTTERS

Pointed & Flat End – Double-Ended





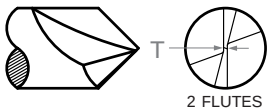
Stocked in *Six* Angles Per Side!

- Double-ended
- Choose from three types:
  - Pointed (Type I): 2 flute style for deburring and chamfering in narrow grooves, slots, and small holes
  - Flat End (Type II): (non-cutting) multi-flute design improves tool life and finish for profiling and chamfering larger features
  - End Cutting (Type III): 4 flute center cutting geometry to blend the floor and a chamfered wall in a single pass
- Solid carbide
- CNC ground in the USA

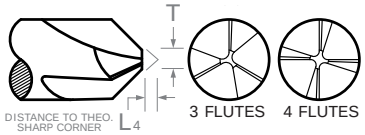
ANGLE PER SIDE	DIAMETER	FLUTES	TIP	TYPE	LENGTH OF CUT		OVERALL LENGTH	UNCOATED		AlTiN COATED	
A_1 $^{+0°30'}_{-0°30'}$	D_2		T (MAX.)		L_2	L_4 (MAX.)	L_1	TOOL #	PRICE	TOOL #	PRICE
15°	1/8	2	.010	I	.233		1-1/2	988415	37.40	988415-C3	43.40
	1/4	2	.010	I	.467		2-1/2	977615	54.90	977615-C3	64.40
	1/4	3	.060	II	.355	.112	2-1/2	891015	61.00	891015-C3	70.50
	3/8	2	.010	I	.700		3	998315	79.50	998315-C3	91.40
	3/8	3	.060	II	.588	.112	2-1/2	934015	91.80	934015-C3	106.00
	1/2	4	.080	II	.784	.149	3	18615	110.60	18615-C3	130.10
20°	1/8	2	.010	I	.172		1-1/2	988420	37.40	988420-C3	43.40
	1/4	2	.010	I	.343		2-1/2	977620	54.90	977620-C3	64.40
	1/4	3	.060	II	.261	.082	2-1/2	891020	61.00	891020-C3	70.50
	3/8	2	.010	I	.515		2-1/2	998320	79.50	998320-C3	93.70
	3/8	3	.060	II	.433	.082	2-1/2	934020	91.80	934020-C3	106.00
	1/2	4	.080	II	.577	.110	3	18620	110.60	18620-C3	130.10
30°	1/8	2	.010	I	.108		1-1/2	988430	31.80	988430-C3	37.80
	3/16	2	.010	I	.162		2	902330	31.80	902330-C3	39.00
	3/16	3	.040	II	.128	.035	2	897130	42.50	897130-C3	49.70
	1/4	2	.010	I	.217		2-1/2	977630	49.00	977630-C3	58.50
	1/4	3	.060	II	.165	.052	2-1/2	891030	58.10	891030-C3	67.60
	3/8	2	.010	I	.325		2-1/2	998330	73.70	998330-C3	87.90
	3/8	3	.060	II	.273	.052	2-1/2	934030	81.50	934030-C3	95.70
	1/2	2	.010	I	.433		3	905830	99.70	905830-C3	119.20
	1/2	4	.080	II	.364	.069	3	18630	102.50	18630-C3	122.00

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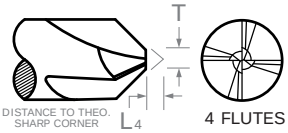
TYPE I - POINTED
Flat relief ground to center, yielding a web thickness at tip (T)



TYPE II - FLAT END Flat relief ground to a *non-end cutting* flat tip (T)



TYPE III - END CUTTING
Flat relief ground to an end cutting tip diameter (T), two flutes to center



CHAMFER CUTTERS

Pointed & Flat End – Double-Ended (cont.)

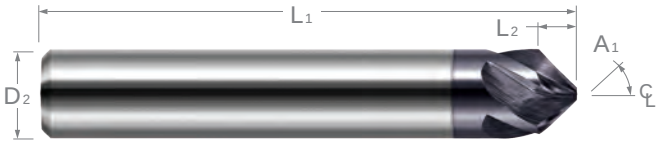
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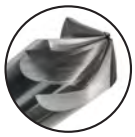
ANGLE PER SIDE	DIAMETER	FLUTES	TIP	TYPE	LENGTH OF CUT		OVERALL LENGTH	UNCOATED		AlTiN COATED	
A_1 $^{+0°30'}_{-0°30'}$	D_2		$T_{(MAX.)}$		L_2	$L_{4\ (MAX.)}$	L_1	TOOL #	PRICE	TOOL #	PRICE
45°	1/8	2	.010	I	.063		1-1/2	988445	31.80	988445-C3	37.80
	1/8	3	.040	II	.043	.020	1-1/2	873945	41.50	873945-C3	47.50
	1/8	4	.040	II	.043	.020	1-1/2	808245	43.40	808245-C3	49.40
	1/8	4	.040	III	.043	.020	1-1/2	794245	45.50	794245-C3	51.50
	3/16	2	.010	I	.094		2	902345	31.80	902345-C3	39.00
	3/16	3	.040	II	.074	.020	2	897145	41.50	897145-C3	48.70
	3/16	4	.040	II	.074	.020	2	808145	43.40	808145-C3	48.60
	1/4	2	.010	I	.125		2-1/2	977645	49.00	977645-C3	58.50
	1/4	3	.060	II	.095	.030	2-1/2	891045	58.10	891045-C3	67.60
	1/4	4	.060	II	.095	.030	2-1/2	842445	61.40	842445-C3	70.90
	1/4	4	.040	III	.105	.020	2-1/2	790045	62.80	790045-C3	72.30
	5/16	3	.060	II	.126	.030	2-1/2	966645	64.00	966645-C3	75.90
	3/8	2	.010	I	.188		2-1/2	998345	73.70	998345-C3	87.90
	3/8	3	.060	II	.158	.030	2-1/2	934045	81.50	934045-C3	95.70
	3/8	4	.060	II	.158	.030	2-1/2	833645	85.90	833645-C3	100.10
	1/2	2	.010	I	.250		3	905845	99.70	905845-C3	119.20
	1/2	4	.080	II	.210	.040	3	18645	102.50	18645-C3	122.00
	1/2	4	.080	III	.210	.040	3	788045	106.30	788045-C3	125.80
	5/8	4	.080	II	.273	.040	3-1/2	976445	148.30	976445-C3	169.50
	3/4	4	.100	II	.325	.050	4	984645	188.40	984645-C3	212.90
50°	1/8	2	.010	I	.052		1-1/2	988450	31.80	988450-C3	37.80
	1/4	2	.010	I	.105		2-1/2	977650	49.00	977650-C3	58.50
	1/4	3	.060	II	.080	.025	2-1/2	891050	59.60	891050-C3	69.10
	3/8	2	.010	I	.157		2-1/2	998350	73.70	998350-C3	87.90
	3/8	3	.060	II	.132	.025	2-1/2	934050	83.40	934050-C3	97.60
	1/2	2	.010	I	.210		3	905850	99.70	905850-C3	119.20
	1/2	4	.080	II	.173	.034	3	18650	105.00	18650-C3	124.50
60°	1/8	2	.010	I	.036		1-1/2	988460	31.80	988460-C3	37.80
	3/16	2	.010	I	.054		2	902360	31.80	902360-C3	39.00
	1/4	2	.010	I	.072		2-1/2	977660	49.00	977660-C3	58.50
	1/4	3	.060	II	.055	.017	2-1/2	891060	58.10	891060-C3	67.60
	3/8	2	.010	I	.108		2-1/2	998360	73.70	998360-C3	87.90
	3/8	3	.060	II	.091	.017	2-1/2	934060	81.50	934060-C3	95.70
	1/2	2	.010	I	.144		3	905860	99.70	905860-C3	119.20
	1/2	4	.080	II	.121	.023	3	18660	102.50	18660-C3	122.00

NEW SIZES!

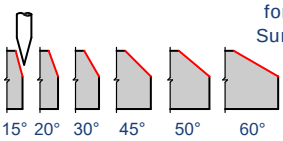
CHAMFER CUTTERS

Pointed & Flat End – Helical Flutes





Free Cutting Action for Excellent Surface Finish



Stocked in *Six* Angles Per Side!

- **Specialized helical flute design for superior performance**
- Free cutting action provides excellent surface finish and chip evacuation
- Choose from three types:
  - Pointed (Type I): Used for deburring and chamfering in narrow grooves, slots and small holes
  - Flat End (Type II): (non-cutting) Improves tool life for profiling and chamfering larger features
  - End Cutting (Type III): Center cutting geometry to blend the floor and a chamfered wall in a single pass
- h6 shank tolerance for high precision tool holders
- Solid carbide
- CNC ground in the USA

CHAMFER CUTTERS

ANGLE PER SIDE	DIAMETER	FLUTES	TIP	TYPE	LENGTH OF CUT	OAL			UNCOATED		AlTiN COATED	
A_1 $^{+0°15'}_{-0°15'}$	D_2 (h6)		T*		L_2	L_4 (MAX.)	L_1		TOOL #	PRICE	TOOL #	PRICE
15°	1/8	3	.040	II	.159	.078	1-1/2		831308	23.50	831308-C3	28.40
	1/4	3	.060	II	.355	.116	2-1/2		831316	40.00	831316-C3	46.80
	1/4	5	.060	II	.355	.116	2-1/2	*LONG!*	832516	42.30	832516-C3	49.00
	3/8	3	.070	II	.569	.134	2-1/2		831324	53.50	831324-C3	62.50
	3/8	5	.070	II	.569	.134	2-1/2		832524	55.70	832524-C3	64.60
	1/2	3	.080	II	.784	.153	3		831332	75.00	831332-C3	87.30
	1/2	5	.080	II	.784	.153	3		832532	77.30	832532-C3	89.60
20°	1/8	3	.040	II	.117	.085	1-1/2		844608	23.50	844608-C3	28.40
	1/4	3	.060	II	.261	.085	2-1/2		844616	40.00	844616-C3	46.80
	1/4	5	.060	II	.261	.085	2-1/2		851416	42.30	851416-C3	49.00
	3/8	3	.070	II	.419	.099	2-1/2		844624	53.50	844624-C3	62.50
	3/8	5	.070	II	.419	.099	2-1/2		851424	55.70	851424-C3	64.60
	1/2	3	.080	II	.577	.113	3		844632	75.00	844632-C3	87.30
	1/2	5	.080	II	.577	.113	3		851432	77.30	851432-C3	89.60

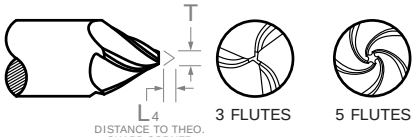
* Tolerance for Type I is +.000"/-.005". Tolerance for type II is +.002"/-.002".

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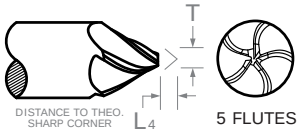
TYPE I - POINTED Flat relief ground to center, yielding a web thickness at tip (T)



TYPE II - FLAT END Flat relief ground to a *non-end cutting* flat tip (T)



TYPE III - END CUTTING
Flat relief ground to an end cutting tip diameter (T), one flute to center



CHAMFER CUTTERS

Pointed & Flat End – Helical Flutes (cont.)

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ANGLE PER SIDE	DIAMETER	FLUTES	TIP	TYPE	LENGTH OF CUT		OAL		UNCOATED		AlTiN COATED	
A_1 $^{+0°15'}_{-0°15'}$	D_2 (h6)		T*		L_2	L_4 (MAX.)	L_1		TOOL #	PRICE	TOOL #	PRICE
30°	1/8	2	.010	I	.100		1-1/2		900108	23.50	900108-C3	28.30
	1/8	3	.040	II	.074	.036	1-1/2		916508	23.50	916508-C3	28.30
	1/8	5	.040	II	.074	.036	1-1/2		899008	25.90	899008-C3	30.50
	3/16	2	.010	I	.154		2		900112	31.80	900112-C3	36.70
	3/16	3	.050	II	.119	.045	2		916512	31.80	916512-C3	36.70
	3/16	4	.010	I	.154		2		889712	33.90	889712-C3	38.90
	3/16	5	.050	II	.119	.045	2		899012	33.90	899012-C3	38.90
	1/4	2	.010	I	.208		2-1/2		900116	40.00	900116-C3	46.80
	1/4	3	.060	II	.164	.054	2-1/2		916516	37.80	916516-C3	44.20
	1/4	4	.010	I	.208		2-1/2		889716	42.30	889716-C3	49.00
	1/4	5	.060	II	.164	.054	2-1/2		899016	40.10	899016-C3	46.40
	3/8	2	.010	I	.316		2-1/2		900124	53.50	900124-C3	62.50
	3/8	3	.070	II	.264	.062	2-1/2		916524	50.70	916524-C3	59.20
	3/8	4	.010	I	.316		2-1/2		889724	53.50	889724-C3	62.50
	3/8	5	.070	II	.264	.062	2-1/2		899024	50.70	899024-C3	59.20
	1/2	2	.010	I	.424		3		900132	75.00	900132-C3	87.30
	1/2	3	.080	II	.364	.071	3		916532	71.10	916532-C3	82.80
	1/2	4	.010	I	.424		3		889732	75.00	889732-C3	87.30
	1/2	5	.080	II	.364	.071	3		899032	71.10	899032-C3	82.80
	5/8	3	.090	II	.463	.080	3		916540	73.30	916540-C3	85.00
	5/8	5	.090	II	.463	.080	3		899040	124.60	899040-C3	137.30
	3/4	3	.100	II	.562	.088	3		916548	176.50	916548-C3	190.30
	3/4	4	.015	I	.637		3		889748	186.30	889748-C3	200.80
	3/4	5	.100	II	.562	.088	3		899048	178.80	899048-C3	192.60
45°	1/8	2	.010	I	.058		1-1/2		860508	23.50	860508-C3	26.20
	1/8	3	.040	II	.043	.021	1-1/2		897208	23.50	897208-C3	28.30
	1/8	4	.010	I	.058		1-1/2		859708	25.90	859708-C3	30.80
NEW	1/8	4	.010	I	.058		3	LONG!	765008	28.60	765008-C3	33.50
	1/8	5	.040	II	.043	.021	1-1/2		908408	25.90	908408-C3	30.50
	1/8	5	.040	II	.043	.021	3	LONG!	789008	28.60	789008-C3	33.50
	1/8	5	.040	III	.043	.021	1-1/2		773608	25.90	773608-C3	30.80
	3/16	2	.010	I	.089		2		860512	31.80	860512-C3	36.70
	3/16	3	.050	II	.069	.026	2		897212	31.80	897212-C3	36.70
	3/16	4	.010	I	.089		2		859712	33.90	859712-C3	38.90
	3/16	5	.050	II	.069	.026	2		908412	33.90	908412-C3	38.90
	1/4	2	.010	I	.120		2-1/2		860516	40.00	860516-C3	46.80
	1/4	3	.060	II	.095	.031	2-1/2		897216	37.80	897216-C3	44.20
NEW	1/4	3	.060	II	.095	.031	4	LONG!	765316	47.90	765316-C3	56.30
	1/4	4	.010	I	.120		2-1/2		859716	42.30	859716-C3	49.00
NEW	1/4	4	.010	I	.120		4	LONG!	765016	47.90	765016-C3	56.30
	1/4	5	.060	II	.095	.031	2-1/2		908416	40.10	908416-C3	46.40
	1/4	5	.060	II	.095	.031	4	LONG!	789016	47.90	789016-C3	56.30
	1/4	5	.060	III	.095	.031	2-1/2		773616	40.70	773616-C3	47.90

* Tolerance for Type I is +.000"/-.005". Tolerance for type II is +.002"/-.002".

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NEW SIZES!

CHAMFER CUTTERS

Pointed & Flat End – Helical Flutes (cont.)

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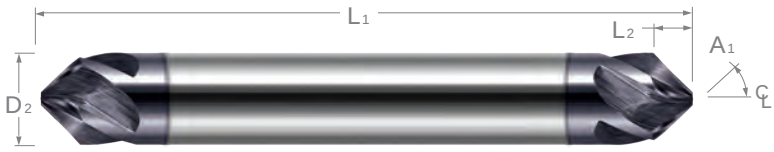
ANGLE PER SIDE	DIAMETER	FLUTES	TIP	TYPE	LENGTH OF CUT	OAL		UNCOATED		AlTiN COATED		
A_1 $^{+0°15'}_{-0°15'}$	D_2 (h6)		T*		L_2	L_4 (MAX.)	L_1	TOOL #	PRICE	TOOL #	PRICE	
45°	5/16	3	.060	II	.126	.031	2-1/2	897220	48.70	897220-C3	57.10	
	5/16	5	.060	II	.126	.031	2-1/2	908420	48.70	908420-C3	57.10	
	3/8	2	.010	I	.183		2-1/2	860524	53.50	860524-C3	62.50	
	3/8	3	.070	II	.153	.036	2-1/2	897224	50.70	897224-C3	59.20	
	3/8	4	.010	I	.183		2-1/2	859724	53.50	859724-C3	62.50	
	3/8	5	.070	II	.153	.036	2-1/2	908424	50.70	908424-C3	59.20	
	3/8	5	.070	II	.153	.036	4	789024	47.90	789024-C3	60.90	NEW
	1/2	2	.010	I	.245		3	860532	75.00	860532-C3	87.30	
	1/2	3	.080	II	.210	.041	3	897232	71.10	897232-C3	82.80	
	1/2	4	.010	I	.245		3	859732	75.00	859732-C3	87.30	
	1/2	5	.080	II	.210	.041	3	908432	71.10	908432-C3	82.80	
	1/2	5	.080	III	.210	.041	3	773632	72.10	773632-C3	86.30	
	5/8	3	.090	II	.268	.046	3	897240	122.30	897240-C3	135.00	
	5/8	5	.090	II	.268	.046	3	908440	124.60	908440-C3	137.30	
	3/4	3	.100	II	.325	.051	3	897248	176.50	897248-C3	190.30	
	3/4	4	.015	I	.368		3	859748	186.30	859748-C3	200.80	
	3/4	5	.100	II	.325	.051	3	908448	178.80	908448-C3	192.60	
50°	1/4	3	.060	II	.080	.026	2-1/2	875016	40.00	875016-C3	46.80	
	1/4	5	.060	II	.080	.026	2-1/2	871116	42.30	871116-C3	49.00	
	3/8	3	.070	II	.128	.030	2-1/2	875024	53.50	875024-C3	62.50	
	3/8	5	.070	II	.128	.030	2-1/2	871124	55.70	871124-C3	64.60	
	1/2	3	.080	II	.176	.034	3	875032	75.00	875032-C3	87.30	
	1/2	5	.080	II	.176	.034	3	871132	77.30	871132-C3	89.60	
60°	1/8	2	.010	I	.033		1-1/2	872108	25.90	872108-C3	30.50	
	3/16	2	.010	I	.051		2	872112	31.80	872112-C3	36.70	
	3/16	4	.010	I	.051		2	888812	31.80	888812-C3	36.70	
	1/4	2	.010	I	.069		2-1/2	872116	40.00	872116-C3	46.80	
	1/4	3	.060	II	.057	.018	2-1/2	863416	37.80	863416-C3	44.20	
	1/4	4	.010	I	.069		2-1/2	888816	42.30	888816-C3	49.00	
	1/4	5	.060	II	.057	.018	2-1/2	867616	40.10	867616-C3	46.40	
	3/8	2	.010	I	.105		2-1/2	872124	53.50	872124-C3	62.50	
	3/8	3	.070	II	.091	.021	2-1/2	863424	50.70	863424-C3	59.20	
	3/8	4	.010	I	.105		2-1/2	888824	55.70	888824-C3	64.60	
	3/8	5	.070	II	.091	.021	2-1/2	867624	52.80	867624-C3	61.30	
	1/2	2	.010	I	.141		3	872132	75.00	872132-C3	87.30	
	1/2	3	.080	II	.126	.024	3	863432	71.10	863432-C3	82.80	
	1/2	4	.010	I	.141		3	888832	75.00	888832-C3	87.30	
	1/2	5	.080	II	.126	.024	3	867632	73.30	867632-C3	85.00	
	5/8	3	.090	II	.157	.027	3	863440	122.30	863440-C3	135.00	
	5/8	5	.090	II	.157	.027	3	867640	124.60	867640-C3	137.30	
	3/4	3	.100	II	.195	.029	3	863448	176.50	863448-C3	190.30	
	3/4	4	.015	I	.212		3	888848	186.30	888848-C3	200.80	
	3/4	5	.100	II	.195	.029	3	867648	178.80	867648-C3	192.60	

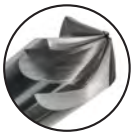
LONG!

* Tolerance for Type I is +.000"/-.005". Tolerance for type II is +.002"/-.002".

CHAMFER CUTTERS

Pointed & Flat End – Helical Flutes – Double-Ended





Free Cutting Action for Excellent Surface Finish

- Double-ended
- **Specialized helical flute design for superior performance**
- Free cutting action provides excellent surface finish and chip evacuation
- Offered in Type I pointed and Type II flat end (non-cutting) styles
- 4 and 5 flute options
- h6 shank tolerance for high precision tool holders
- Solid carbide
- CNC ground in the USA

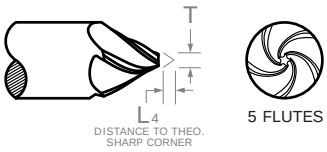
ANGLE PER SIDE	DIAMETER	FLUTES	TIP	TYPE	LENGTH OF CUT		OVERALL LENGTH	UNCOATED		AlTiN COATED	
A_1 $^{+0°15'}_{-0°15'}$	D_2 (h6)		T*		L_2	L_4 (MAX.)	L_1	TOOL #	PRICE	TOOL #	PRICE
45°	1/4	4	.010	I	.120		2-1/2	785016	58.10	785016-C3	67.60
	1/4	5	.060	II	.095	.031	2-1/2	784916	55.90	784916-C3	65.40
	3/8	4	.010	I	.183		2-1/2	785024	73.60	785024-C3	87.80
	3/8	5	.070	II	.153	.036	2-1/2	784924	69.70	784924-C3	83.90
	1/2	4	.010	I	.245		3	785032	103.20	785032-C3	122.70
	1/2	5	.080	II	.210	.041	3	784932	97.80	784932-C3	117.30

* Tolerance for Type I is +.000"/-.005". Tolerance for type II is +.002"/-.002".

TYPE I - POINTED Flat relief ground to center, yielding a web thickness at tip (T)



TYPE II - FLAT END Flat relief ground to a *non-end cutting* flat tip (T)





The Multiple Uses of a Chamfer Mill

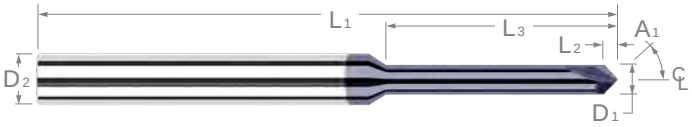
Did you know that a Chamfer Cutter, or Chamfer Mill, is one of the most versatile tools you can have in your carousel? Learn how this single tool can perform several different machining operations in our "In the Loupe" blog post **The Multiple Uses of a Chamfer Mill**.

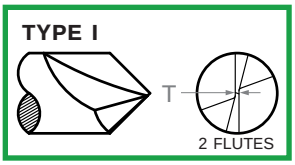
Read more on harveyperformance.com/in-the-loupe/

NEW SIZES!

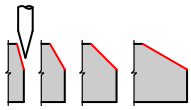
CHAMFER CUTTERS

Pointed – Long Reach





- **Reduced diameter for clearance along walls and in small features**
- Type I pointed style ground to a point, yielding web thickness at tip (T)
- Available in multiple reaches and reduced diameters
- 2 flutes
- Solid carbide
- CNC ground in the USA



Stocked in *Four* Angles Per Side!

ANGLE PER SIDE	NECK DIAMETER	OVERALL REACH	LENGTH OF CUT	TIP	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		ALTiN COATED	
A_1 $^{+0°30'}_{-0°30'}$	D_1 $^{+.000''}_{-.001''}$	L_3 $^{+.010''}_{-.000''}$	L_2	T (MAX.)	D_2	L_1	2 FL	PRICE	2 FL	PRICE
15°	.031 (1/32)	.156 (5x)	.058	.005	1/8	2-1/2	56815	27.90	56815-C3	32.80
	.031 (1/32)	.250 (8x)	.058	.005	1/8	2-1/2	57215	30.20	57215-C3	35.10
	.062 (1/16)	.312 (5x)	.116	.006	1/8	2-1/2	54715	27.90	54715-C3	32.80
	.062 (1/16)	.500 (8x)	.116	.006	1/8	2-1/2	55615	30.20	55615-C3	35.10
	.093 (3/32)	.500 (5x)	.174	.006	1/8	2-1/2	52115	27.90	52115-C3	32.80
	.093 (3/32)	.750 (8x)	.174	.006	1/8	2-1/2	53515	30.20	53515-C3	35.10
30°	.031 (1/32)	.093 (3x)	.027	.005	1/8	1-1/2	994830	26.10	994830-C3	31.00
	.031 (1/32)	.156 (5x)	.027	.005	1/8	2-1/2	56830	27.90	56830-C3	32.80
	.031 (1/32)	.250 (8x)	.027	.005	1/8	2-1/2	57230	30.20	57230-C3	35.10
	.047 (3/64)	.140 (3x)	.041	.005	1/8	1-1/2	911030	26.10	911030-C3	31.00
	.047 (3/64)	.250 (5x)	.041	.005	1/8	2-1/2	996830	27.60	996830-C3	32.50
	.047 (3/64)	.375 (8x)	.041	.005	1/8	2-1/2	999230	27.60	999230-C3	32.50
	.062 (1/16)	.187 (3x)	.054	.006	1/8	1-1/2	998930	26.10	998930-C3	31.00
	.062 (1/16)	.312 (5x)	.054	.006	1/8	2-1/2	54730	27.90	54730-C3	32.80
	.062 (1/16)	.500 (8x)	.054	.006	1/8	2-1/2	55630	30.20	55630-C3	35.10
	.078 (5/64)	.406 (5x)	.068	.006	1/8	2-1/2	996930	27.60	996930-C3	32.50
	.093 (3/32)	.279 (3x)	.081	.006	1/8	1-1/2	995330	26.10	995330-C3	31.00
	.093 (3/32)	.500 (5x)	.081	.006	1/8	2-1/2	52130	27.90	52130-C3	32.80
	.093 (3/32)	.750 (8x)	.081	.006	1/8	2-1/2	53530	30.20	53530-C3	35.10
45°	.015 (1/64)	.078 (5x)	.008	.003	1/8	2-1/2	997545	31.30	997545-C3	36.20
	.015 (1/64)	.125 (8x)	.008	.003	1/8	2-1/2	995945	34.90	995945-C3	39.80
	.020	.060 (3x)	.010	.003	1/8	1-1/2	794045	30.70	794045-C3	35.60
	.020	.100 (5x)	.010	.003	1/8	2-1/2	940245	30.70	940245-C3	35.60
	.020	.160 (8x)	.010	.003	1/8	2-1/2	948545	34.30	948545-C3	39.20
	.020	.200 (10x)	.010	.003	1/8	2-1/2	765545	36.00	765545-C3	40.90 NEW
	.025	.125 (5x)	.013	.003	1/8	2-1/2	821945	30.70	821945-C3	35.60
	.031 (1/32)	.093 (3x)	.016	.005	1/8	1-1/2	994845	26.50	994845-C3	31.40
	.031 (1/32)	.125 (4x)	.016	.005	1/8	2-1/2	862745	27.90	862745-C3	32.80
	.031 (1/32)	.156 (5x)	.016	.005	1/8	2-1/2	56845	27.90	56845-C3	32.80
	.031 (1/32)	.187 (6x)	.016	.005	1/8	2-1/2	870845	29.00	870845-C3	33.90
	.031 (1/32)	.218 (7x)	.016	.005	1/8	2-1/2	855445	29.00	855445-C3	33.90
	.031 (1/32)	.250 (8x)	.016	.005	1/8	2-1/2	57245	30.20	57245-C3	35.10
	.031 (1/32)	.312 (10x)	.016	.005	1/8	2-1/2	838445	31.90	838445-C3	36.80
	.031 (1/32)	.375 (12x)	.016	.005	1/8	2-1/2	998245	33.70	998245-C3	38.60
	.031 (1/32)	.470 (15x)	.016	.005	1/8	2-1/2	918245	36.30	918245-C3	41.20
	.039	.203 (5x)	.020	.005	1/8	2-1/2	788445	28.00	788445-C3	32.90

continued on next page

CHAMFER CUTTERS

Pointed Long Reach (cont.)

continued from previous page

	ANGLE PER SIDE	NECK DIAMETER	OVERALL REACH	LENGTH OF CUT	TIP	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN COATED	
	A_1 $^{+0°30'}_{-0°30'}$	D_1 $^{+.000"}_{-.001"}$	L_3 $^{+.010"}_{-.000"}$	L_2	T (MAX.)	D_2	L_1	2 FL	PRICE	2 FL	PRICE
	45°	.040	.203 (5x)	.020	.005	1/8	2-1/2	830645	28.00	830645-C3	32.90
		.047 (3/64)	.141 (3x)	.024	.005	1/8	1-1/2	911045	25.90	911045-C3	30.80
		.047 (3/64)	.187 (4x)	.024	.005	1/8	2-1/2	788745	26.90	788745-C3	31.80
		.047 (3/64)	.250 (5x)	.024	.005	1/8	2-1/2	996845	28.00	996845-C3	32.90
NEW		.047 (3/64)	.281 (6x)	.024	.005	1/8	2-1/2	772545	29.10	772545-C3	34.00
		.047 (3/64)	.375 (8x)	.024	.005	1/8	2-1/2	999245	30.20	999245-C3	35.10
		.047 (3/64)	.570 (12x)	.024	.005	1/8	2-1/2	919045	33.00	919045-C3	37.90
		.050	.250 (5x)	.025	.005	1/8	2-1/2	788645	27.90	788645-C3	32.80
		.060	.312 (5x)	.030	.006	1/8	2-1/2	788545	27.90	788545-C3	32.80
		.062 (1/16)	.187 (3x)	.031	.006	1/8	1-1/2	998945	26.50	998945-C3	31.40
		.062 (1/16)	.250 (4x)	.031	.006	1/8	2-1/2	853945	27.90	853945-C3	32.80
		.062 (1/16)	.312 (5x)	.031	.006	1/8	2-1/2	54745	27.90	54745-C3	32.80
		.062 (1/16)	.375 (6x)	.031	.006	1/8	2-1/2	846045	29.00	846045-C3	33.90
		.062 (1/16)	.437 (7x)	.031	.006	1/8	2-1/2	869745	29.00	869745-C3	33.90
		.062 (1/16)	.500 (8x)	.031	.006	1/8	2-1/2	55645	30.20	55645-C3	35.10
		.062 (1/16)	.625 (10x)	.031	.006	1/8	2-1/2	844145	31.90	844145-C3	36.80
		.062 (1/16)	.750 (12x)	.031	.006	1/8	2-1/2	997245	33.70	997245-C3	38.60
		.062 (1/16)	.950 (15x)	.031	.006	1/8	2-1/2	913345	36.30	913345-C3	41.20
		.078 (5/64)	.234 (3x)	.039	.006	1/8	1-1/2	906645	25.90	906645-C3	30.80
		.078 (5/64)	.312 (4x)	.039	.006	1/8	2-1/2	787045	26.90	787045-C3	31.80
		.078 (5/64)	.406 (5x)	.039	.006	1/8	2-1/2	996945	28.00	996945-C3	32.90
		.078 (5/64)	.625 (8x)	.039	.006	1/8	2-1/2	999545	30.20	999545-C3	35.10
NEW		.078 (5/64)	.800 (10x)	.039	.006	1/8	2-1/2	764145	32.20	764145-C3	37.10
		.078 (5/64)	.940 (12x)	.039	.006	1/8	2-1/2	924045	33.00	924045-C3	37.90
		.093 (3/32)	.279 (3x)	.047	.006	1/8	1-1/2	995345	26.50	995345-C3	31.40
		.093 (3/32)	.375 (4x)	.047	.006	1/8	2-1/2	874345	27.90	874345-C3	32.80
		.093 (3/32)	.500 (5x)	.047	.006	1/8	2-1/2	52145	27.90	52145-C3	32.80
		.093 (3/32)	.585 (6x)	.047	.006	1/8	2-1/2	849445	29.00	849445-C3	33.90
		.093 (3/32)	.670 (7x)	.047	.006	1/8	2-1/2	843045	29.00	843045-C3	33.90
		.093 (3/32)	.750 (8x)	.047	.006	1/8	2-1/2	53545	30.20	53545-C3	35.10
		.093 (3/32)	.950 (10x)	.047	.006	1/8	2-1/2	825645	31.90	825645-C3	36.80
		.093 (3/32)	1.125 (12x)	.047	.006	1/8	2-1/2	999645	33.70	999645-C3	38.60
		.093 (3/32)	1.400 (15x)	.047	.006	1/8	2-1/2	902845	36.30	902845-C3	41.20
		.118	.591 (5x)	.059	.006	1/8	2-1/2	788345	27.90	788345-C3	32.80
	60°	.031 (1/32)	.156 (5x)	.009	.005	1/8	2-1/2	56860	27.90	56860-C3	32.80
		.031 (1/32)	.250 (8x)	.009	.005	1/8	2-1/2	57260	30.20	57260-C3	35.10
		.062 (1/16)	.312 (5x)	.018	.006	1/8	2-1/2	54760	27.90	54760-C3	32.80
		.062 (1/16)	.500 (8x)	.018	.006	1/8	2-1/2	55660	30.20	55660-C3	35.10
		.093 (3/32)	.500 (5x)	.027	.006	1/8	2-1/2	52160	27.90	52160-C3	32.80
		.093 (3/32)	.750 (8x)	.027	.006	1/8	2-1/2	53560	30.20	53560-C3	35.10

NEW SIZES!

CHAMFER CUTTERS

Back Chamfer Cutters



- Low profile design and greater radial projection ideal for generating chamfered features on the backside of small holes or slots
- Decrease costs by avoiding time-consuming changes to part set-ups
- Slightly undersized to fit in common hole sizes
- 90° included angle, cutting on angle only
- Left hand shear flute / right hand cut evacuates chip away from part
- Multiple flutes for improved finish
- Solid carbide
- CNC ground in the USA



Left Hand Shear Flute & Right Hand Cut Evacuate Chips Away From Part

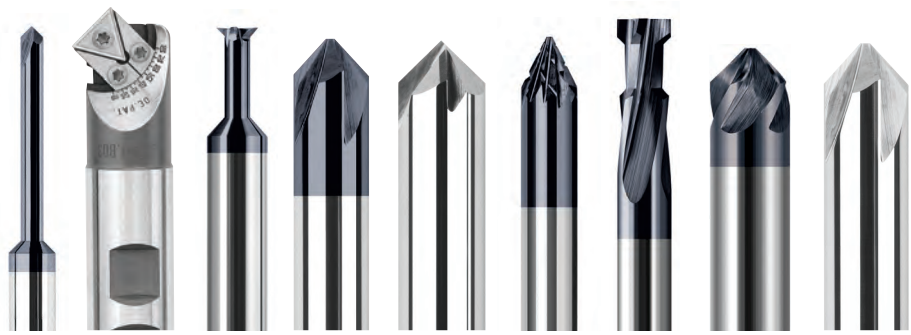
HEAD DIAMETER	AXIAL LOC	NECK DIAMETER	NECK LENGTH	FLUTES	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN COATED		
D_1 $^{+.000"}_{-.001"}$	L_2	D_3	L_3 $^{+.010"}_{-.000"}$		D_2	L_1	TOOL #	PRICE	TOOL #	PRICE	
.055	.010	.033	**.093** (1.5x)	4	1/8	1-1/2	943355	64.70	943355-C3	69.60	
.055	.010	.033	**.156** (3x)	4	1/8	1-1/2	938155	64.70	938155-C3	69.60	
.055	.010	.033	**.250** (4.5x)	4	1/8	1-1/2	910355	64.10	910355-C3	69.00	
.080	.014	.047	**.070** (0.8x)	4	1/8	1-1/2	906080	63.40	906080-C3	68.30	
.080	.014	.047	**.140** (1.5x)	4	1/8	1-1/2	943380	63.40	943380-C3	68.30	
.080	.014	.047	**.250** (4x)	4	1/8	1-1/2	938180	63.40	938180-C3	68.30	
.080	.014	.047	**.375** (4.5x)	4	1/8	1-1/2	910380	62.90	910380-C3	67.80	
.115	.020	.068	**.109** (0.8x)	4	1/8	1-1/2	906015	62.10	906015-C3	67.00	
.115	.020	.068	**.218** (1.5x)	4	1/8	1-1/2	943410	62.10	943410-C3	67.00	
.115	.020	.068	**.312** (2.5x)	4	1/8	1-1/2	772010	62.10	772010-C3	67.00	
.115	.020	.068	**.375** (3x)	4	1/8	1-1/2	938210	62.10	938210-C3	67.00	
.115	.020	.068	**.562** (5x)	4	1/8	2	910410	64.10	910410-C3	69.00	
D_1 $^{+.000"}_{-.002"}$	L_2	D_3	L_3 $^{+.030"}_{-.000"}$		D_2	L_1	TOOL #	PRICE	TOOL #	PRICE	
.125	.022	.075	**.218** (3x)	5	1/8	1-1/2	943415	63.30	943415-C3	68.20	NEW
.125	.022	.075	**.375** (5x)	5	1/8	1-1/2	938215	65.40	938215-C3	70.30	NEW
.135	.024	.081	**.125** (0.8x)	5	3/16	2	906119	72.10	906119-C3	77.40	
.135	.024	.081	**.250** (1.5x)	5	3/16	2	943420	72.10	943420-C3	77.40	
.135	.024	.081	**.406** (3x)	5	3/16	2	938220	72.10	938220-C3	77.40	
.135	.024	.081	**.625** (5x)	5	3/16	2	910420	71.50	910420-C3	76.80	
.165	.029	.101	**.156** (0.8x)	5	3/16	2	906130	72.10	906130-C3	77.40	
.165	.029	.101	**.312** (2x)	5	3/16	2	943430	72.10	943430-C3	77.40	
.165	.029	.101	**.500** (3x)	5	3/16	2	938230	72.10	938230-C3	77.40	
.165	.029	.101	**.750** (4.5x)	5	3/16	2	910430	71.50	910430-C3	76.80	
.187	.033	.115	**.375** (3x)	5	3/16	2	943435	73.30	943435-C3	78.60	NEW
.187	.033	.115	**.562** (5x)	5	3/16	2	938235	72.70	938235-C3	78.00	NEW
.210	.037	.130	**.187** (0.8x)	5	1/4	2-1/2	906140	81.70	906140-C3	88.90	
.210	.037	.130	**.375** (1.5x)	5	1/4	2-1/2	943440	81.70	943440-C3	88.90	
.210	.037	.130	**.500** (2x)	5	1/4	2-1/2	772140	81.70	772140-C3	88.90	
.210	.037	.130	**.625** (3x)	5	1/4	2-1/2	938240	81.70	938240-C3	88.90	
.210	.037	.130	**1.000** (5x)	5	1/4	2-1/2	910440	81.00	910440-C3	88.20	
.250	.044	.156	**.250** (1x)	5	1/4	2-1/2	906116	81.70	906116-C3	88.90	
.250	.044	.156	**.437** (2x)	5	1/4	2-1/2	943416	81.70	943416-C3	88.90	
.250	.044	.156	**.625** (2.5x)	5	1/4	2-1/2	772116	81.70	772116-C3	88.90	
.250	.044	.156	**.750** (3x)	5	1/4	2-1/2	938216	81.70	938216-C3	88.90	
.250	.044	.156	**1.250** (5x)	5	1/4	3	910450	83.70	910450-C3	90.90	

CHAMFER CUTTERS

Back Chamfer Cutters (cont.)

continued from previous page

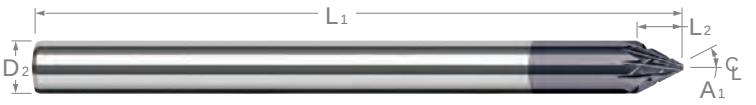
HEAD DIAMETER	AXIAL LOC	NECK DIAMETER	NECK LENGTH	FLUTES	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN COATED	
D_1 $^{+.000"}_{-.002"}$	L_2	D_3	L_3 $^{+.030"}_{-.000"}$		D_2	L_1	TOOL #	PRICE	TOOL #	PRICE
.312	.055	.196	**.281** (0.8x)	6	5/16	2-1/2	906120	86.40	906120-C3	94.80
.312	.055	.196	**.562** (2x)	6	5/16	2-1/2	943460	86.40	943460-C3	94.80
.312	.055	.196	**1.500** (5x)	6	5/16	3	910460	88.60	910460-C3	97.00
.375	.066	.237	**.375** (1x)	6	3/8	2-1/2	906124	93.20	906124-C3	102.70
.375	.066	.237	**.750** (2x)	6	3/8	2-1/2	943470	93.20	943470-C3	102.70
.375	.066	.237	**1.870** (5x)	6	3/8	4	910470	98.10	910470-C3	105.90
.500	.088	.317	**.500** (1x)	6	1/2	3	906132	128.40	906132-C3	142.60
.500	.088	.317	**1.000** (2x)	6	1/2	3	943480	128.40	943480-C3	142.60
.500	.088	.317	**2.500** (5x)	6	1/2	4	910480	132.90	910480-C3	147.10



Check Out All of Our Chamfering Solutions!

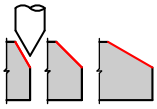
CHAMFER CUTTERS

Deburring Chamfer Cutters



End Mill Tolerances with Bur-Style Geometry!

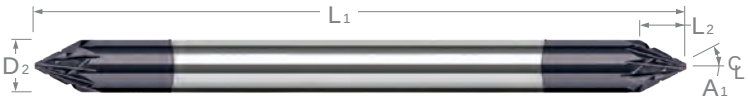
- Deburr in your CNC machine with these high precision burs held to end mill tolerances
- Stop scrapping expensive parts due to handheld operator errors
- High flute count allows for increased feeds which reduces cycle times
- Achieve better finish than with milling type cutters
- Tight end mill tolerances allow use of standard programming and tool paths
- Cone shaped burs are effective in removing burrs and/or adding a small controlled edge break with superior finish
- Double cut style flute pattern
- Solid carbide
- CNC ground in the USA

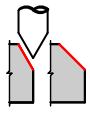


Stocked in *Three* Angles Per Side!

Single-Ended

ANGLE PER SIDE	LOC	RIGHT HAND TEETH	LEFT HAND TEETH	MINOR DIA.	SHANK DIA.	OAL	UNCOATED		AlTiN COATED		AMORPHOUS DIAMOND	
A_1 $^{+0°30'}_{-0°30'}$	L_2				D_2	L_1	TOOL #	PRICE	TOOL #	PRICE	TOOL #	PRICE
30°	.099	12	6	.012 (Max.)	1/8	2-1/2	58130	25.70	58130-C3	30.60		
	.207	12	6	.012 (Max.)	1/4	2-1/2	994030	36.50	994030-C3	43.70		
45°	.057	12	6	.012 (Max.)	1/8	2-1/2	58145	25.70	58145-C3	30.60	58145-C4	38.10
	.088	12	6	.012 (Max.)	3/16	2-1/2	891145	32.10	891145-C3	37.40	891145-C4	49.20
	.120	12	6	.012 (Max.)	1/4	2-1/2	994045	36.50	994045-C3	43.70	994045-C4	55.90
	.181	14	7	.012 (Max.)	3/8	2-1/2	784445	51.20	784445-C3	60.70	784445-C4	74.60
60°	.033	12	6	.012 (Max.)	1/8	2-1/2	58160	25.70	58160-C3	30.60		





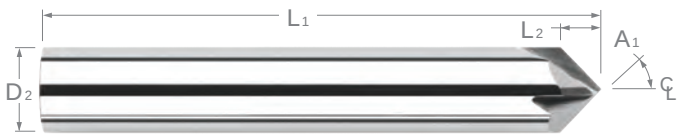
Stocked in *Two* Angles Per Side!

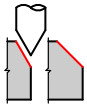
Double-Ended

ANGLE PER SIDE	LENGTH OF CUT	RIGHT HAND TEETH	LEFT HAND TEETH	MINOR DIAMETER	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN COATED	
A_1 $^{+0°30'}_{-0°30'}$	L_2				D_2	L_1	TOOL #	PRICE	TOOL #	PRICE
30°	.099	12	6	.012 (Max.)	1/8	2-1/2	898330	38.60	898330-C3	44.60
45°	.057	12	6	.012 (Max.)	1/8	2-1/2	898345	38.60	898345-C3	44.60
	.088	12	6	.012 (Max.)	3/16	2-1/2	879745	46.40	879745-C3	53.60
	.120	12	6	.012 (Max.)	1/4	2-1/2	867545	54.90	867545-C3	64.40
	.181	14	7	.012 (Max.)	3/8	2-1/2	788145	70.00	788145-C3	84.20

CHAMFER CUTTERS

Cobalt – Pointed

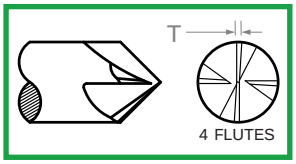




Stocked in *Two* Angles Per Side!

- 4 flutes (2 flutes to center)
- M-42 steel (8% cobalt)
- Type I pointed style ground to a point, yielding web thickness at tip (T)
- CNC ground in the USA

ANGLE PER SIDE	LENGTH OF CUT	TIP	SHANK DIAMETER	OVERALL LENGTH	UNCOATED	
A_1 $^{+0°30'}_{-0°30'}$	L_2	$T_{(MAX.)}$	D_2	L_1	4 FL	PRICE
30°	.217	.010	1/4	2	18116	40.70
	.325	.010	3/8	2-1/2	18124	49.00
	.433	.010	1/2	3	18132	63.20
45°	.125	.010	1/4	2	18016	40.70
	.188	.010	3/8	2-1/2	18024	49.00
	.250	.010	1/2	3	18032	63.20



CHAMFER CUTTERS

Adjustable Chamfer Cutters



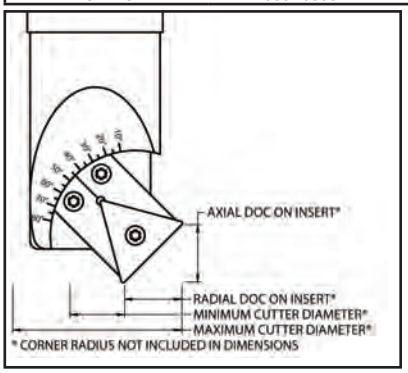
- **Mills any angle from 10° to 80°**
- Change chamfer angle with quick adjustment
- TPET-321 carbide insert (TiN coated) and wrench included
- TPET-321-AL carbide insert has polished face and upsharp relief for optimized performance in non-ferrous materials

SHANK DIAMETER	OVERALL LENGTH	TOOL #	PRICE
3/4	3-3/4	81250	362.00
1	3-3/4	81260	362.00

DESCRIPTION	TOOL #	PRICE	
TPET-321 Insert with TiN Coating	60031	13.60	(Box of 10)
TPET-321-AL Insert for Non-Ferrous Materials	60038	15.00	(Box of 10)
Clamp Plate (Replacement)	81245	21.10	(Each)
Screw (Replacement)	81247	7.80	(Each)
Seat Pocket (Replacement)	81249	77.00	(Each)

SPEEDS & FEEDS (Adjustable Chamfer Cutter)

MATERIAL	SPEED (RPM)	FEED (Inches/Min)	DEPTH (Inches)
STEEL	600–2000	1″–4″	1/8″ MAX.
ALUMINUM	1000–6000 MAX.	3″–8″	1/8″ MAX.

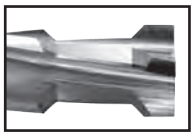


Angle Setting on Tool	Minimum Diameter*	Maximum Diameter*	Radial DOC of Insert*	Axial DOC of Insert*
10°	0.0717	1.2466	0.587	0.104
15°	0.1149	1.2672	0.576	0.154
20°	0.1617	1.2828	0.561	0.204
25°	0.2119	1.2931	0.541	0.252
30°	0.2649	1.2981	0.517	0.298
35°	0.3205	1.2977	0.489	0.342
40°	0.3781	1.2920	0.457	0.383
45°	0.4374	1.2810	0.422	0.422
50°	0.4978	1.2647	0.383	0.457
55°	0.5590	1.2433	0.342	0.489
60°	0.6205	1.2170	0.298	0.517
65°	0.6818	1.1860	0.252	0.541
70°	0.7424	1.1504	0.204	0.561
75°	0.8018	1.1106	0.154	0.576
80°	0.8597	1.0669	0.104	0.587

CHAMFER CUTTERS

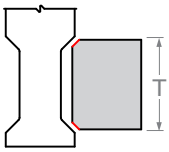
Plate Chamfer Cutters



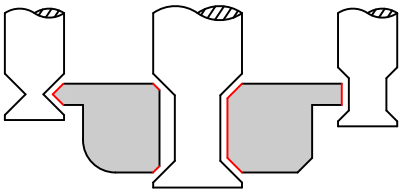


Cutting Along Entirety of Concave Form

- Tool designed to chamfer top and bottom in a single pass
- Cutting along entirety of concave form (L_2) only
- Minor diameter (D_3) relieved for light profiling and trimming edges
- 10° helix
- 4 flutes
- Solid carbide
- CNC ground in the USA



Nominal Plate Thickness

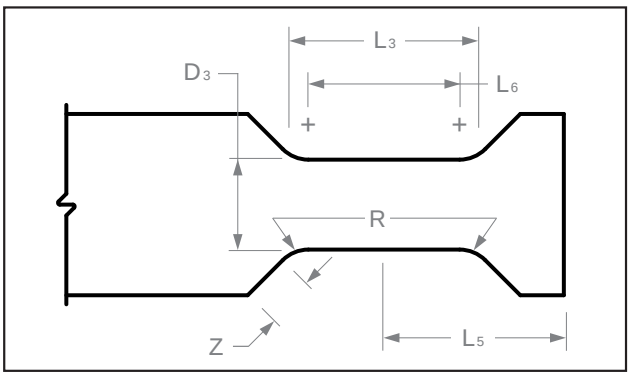


Capable of Performing Full Form Engagement, Light Profiling, & Edge Trimming

MAX OPENING WIDTH	MIN OPENING WIDTH	CHAMFER LENGTH	MINOR DIA.	MINOR DIA. LENGTH	RADIUS	END LENGTH	END TO CENTER	NOMINAL PLATE THICKNESS*	SHANK DIA.	OAL	UNCOATED		AlTiN COATED	
L_2 +.001" −.001"	L_3	Z	D_3 +.000" −.002"	L_6	R (MAX.)	L_4	L_5 +.001" −.001"	T	D_2	L_1	4 FL	PRICE	4 FL	PRICE
.037	.010	**.019**	.096	.008	.005	.040	.059	.031	1/8	1-1/2	955202	54.80	955202-C3	59.70
.068	.037	**.022**	.091	.029	.006	.040	.074	.062	1/8	1-1/2	955204	54.80	955204-C3	59.70
.074	.012	**.044**	.184	.001	.008	.060	.097	.068	1/4	2-1/2	971104	60.60	971104-C3	67.80
.099	.037	**.044**	.184	.026	.008	.060	.110	.093	1/4	2-1/2	971106	60.60	971106-C3	67.80
.135	.104	**.019**	.091	.096	.005	.040	.108	.125	1/8	1-1/2	955208	54.80	955208-C3	59.70
.135	.073	**.044**	.184	.062	.008	.060	.128	.125	1/4	2-1/2	971108	60.60	971108-C3	67.80
.197	.135	**.044**	.184	.124	.008	.060	.159	.187	1/4	2-1/2	971112	60.60	971112-C3	67.80
.197	.105	**.065**	.278	.093	.008	.060	.159	.187	3/8	2-1/2	980812	75.80	980812-C3	85.30
.260	.198	**.044**	.184	.187	.008	.060	.190	.250	1/4	2-1/2	971116	60.60	971116-C3	67.80
.260	.137	**.087**	.372	.126	.008	.060	.190	.250	1/2	3	965916	115.50	965916-C3	129.70
.385	.293	**.065**	.278	.281	.008	.060	.253	.375	3/8	2-1/2	980824	75.80	980824-C3	85.30
.385	.262	**.087**	.372	.251	.008	.060	.253	.375	1/2	3	965924	115.50	965924-C3	129.70
.510	.387	**.087**	.372	.376	.008	.060	.315	.500	1/2	3	965932	115.50	965932-C3	129.70

*Nominal Plate Thickness is ideal thickness of plate for chamfering top and bottom simultaneously.

For additional tool dimensions, search for keyword PLATECHAMFER on www.harveytool.com.

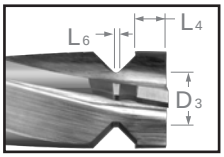


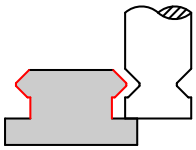
NEW SIZES!

PICATINNY FORM CUTTERS

Picatinny Rail Form Cutters





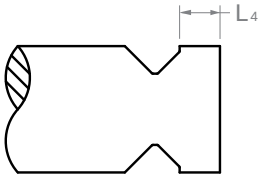


- Designed to the MIL-STD-1913 specifications
- Mill the entire Picatinny Rail in a single pass without tool changes
- Choose from two types:
  - Type I: Slight undercut at end of End Length (L_4)
  - Type II: .005" radius tangent to angle and End Length (L_4)
- Cutting on entirety of concave form and OD flat at end
- 4 helical flutes allow for better cutting action
- .005" max radii for all internal corners
- Solid carbide
- CNC ground in the USA

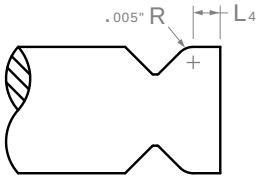
OUTSTANDING IN ALUMINUM!

CUTTER DIAMETER	LENGTH OF CUT	MINOR DIAMETER	MINOR DIA. LENGTH (TSC)	END LENGTH	TYPE	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		TiB2 COATED		
D_1 +.000" −.002"	L_2 +.008" −.000"	D_3 +.001" −.001"	L_6	L_4		D_2	L_1	4 FL	PRICE	4 FL	PRICE	
.500 (1/2)	.377	.282	.021	.160	I	1/2	3	875632	148.00	875632-C8	171.40	
.500 (1/2)	.377	.282	.021	.137	II	1/2	3	830032	148.00	830032-C8	171.40	
.625 (5/8)	.377	.407	.021	.160	I	5/8	3-1/2	875640	169.60	875640-C8	203.70	
.625 (5/8)	.377	.407	.021	.137	II	5/8	3-1/2	830040	169.60	830040-C8	193.00	NEW

Type I - Picatinny Rail Form 1995 Standard

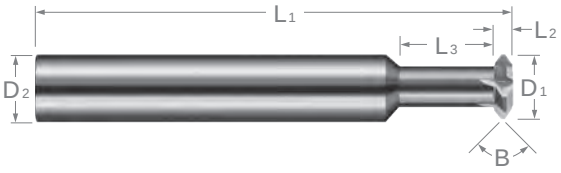


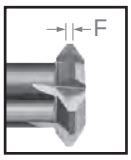
Type II - Picatinny Rail Form 1999 Standard



PICATINNY FORM CUTTERS

Picatinny Attachment Cutters





- Mill the inverse form for the Picatinny Rail used for attachments
- Cutting on entirety of angle and flat
- Short reaches for maximum strength
- 6 flutes
- Solid carbide
- CNC ground in the USA

OUTSTANDING IN ALUMINUM!

INCLUDED ANGLE	CUTTER DIAMETER	TIP FLAT	CUTTER WIDTH	NECK DIAMETER	NECK LENGTH	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		TiB_2 COATED	
B $^{+0.5°}_{-0.5°}$	D_1 $^{+.000″}_{-.002″}$	F	L_2 $^{+.002″}_{-.000″}$		L_3 $^{+.030″}_{-.000″}$	D_2	L_1	6 FL	PRICE	6 FL	PRICE
90°	.500 (1/2)	.021	.2075	1/4	.375	1/2	3	859232	132.90	859232-C8	156.30
	.625 (5/8)	.021	.2075	3/8	.500	5/8	3-1/2	859240	173.00	859240-C8	207.10

PICATINNY FORM CUTTERS

Picatinny Recoil Groove End Mills



Stocked in sharp corner, .005", or .010" corner radius

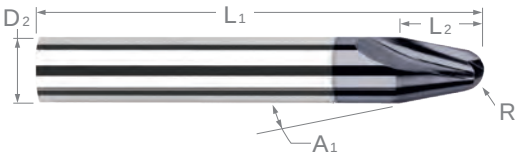
- Optimized for the grooves across the Picatinny Rail
- Diameter allows for a single pass to create the groove
- Stub flute length for improved strength
- Cutting on transition to allow for slight edge break at top of groove
- High helix and optimized geometry for improved performance
- 3 flutes
- Center cutting
- Solid carbide
- CNC ground in the USA

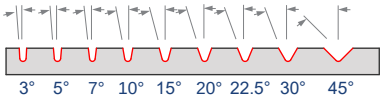
OUTSTANDING IN ALUMINUM!

CUTTER DIAMETER	CORNER RADIUS	LENGTH OF CUT	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		TiB_2 COATED	
D_1 $^{+.002″}_{-.000″}$	R $^{+.001″}_{-.001″}$	L_2 $^{+.008″}_{-.000″}$	D_2	L_1	3 FL	PRICE	3 FL	PRICE
.206	SHARP!	.118	1/4	2-1/2	864806	35.60	864806-C8	43.30
.206	.005	.118	1/4	2-1/2	874406	39.10	874406-C8	46.80
.206	.010	.118	1/4	2-1/2	862606	39.10	862606-C8	46.80
.210	SHARP!	.118	1/4	2-1/2	864810	35.60	864810-C8	43.30
.210	.005	.118	1/4	2-1/2	874410	39.10	874410-C8	46.80
.210	.010	.118	1/4	2-1/2	862610	39.10	862610-C8	46.80

NEW SIZES!

RUNNER CUTTERS





Stocked in *Nine* Angles Per Side!

- Designed to mill 3°, 5°, 7°, 10°, 15°, 20°, 22.5°, 30°, or 45° channels in molds
- 2 helical flutes (12° helix)
- AlTiN coating for increased performance in ferrous materials
- AlTiN Nano coating for superior performance in ferrous and difficult to machine materials
- Center cutting
- Solid carbide
- CNC ground in the USA

ANGLE PER SIDE	RADIUS	LENGTH OF CUT	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN COATED		AlTiN NANO COATED		
A_1 $^{+0°30'}_{-0°30'}$	R $^{+.0005"}_{-.0005"}$	L_2	D_2 (h6)	L_1	2 FL	PRICE	2 FL	PRICE	2 FL	PRICE	
3°	1/64	.921	1/8	1-1/2	843600	45.10	843600-C3	50.00			
	1/32	.631	1/8	1-1/2	843602	45.10	843602-C3	50.00			
	1/16	.666	3/16	2	843604	49.70	843604-C3	55.00			
5°	1/64	.557	1/8	1-1/2	936300	45.10	936300-C3	50.00			
	1/32	.390	1/8	1-1/2	936302	45.10	936302-C3	50.00			
	3/64	.579	3/16	2	936303	49.70	936303-C3	55.00			
	1/16	.422	3/16	2	936304	49.70	936304-C3	55.00			
	3/32	.812	5/16	2-1/2	936306	63.80	936306-C3	72.20			
	1/8	.834	3/8	2-1/2	936308	71.60	936308-C3	81.10			
7°	1/64	.401	1/8	1-1/2	764600	45.10	764600-C3	50.00			NEW
	1/32	.286	1/8	1-1/2	764602	45.10	764602-C3	50.00			NEW
	1/16	.571	1/4	2-1/2	764604	49.70	764604-C3	56.90			NEW
10°	.005	.331	1/8	1-1/2	75050	39.60	75050-C3	44.50			
	.010	.307	1/8	1-1/2	75052	39.60	75052-C3	44.50	75052-C6	46.80	
	1/64	.283	1/8	1-1/2	75000	39.60	75000-C3	44.50	75000-C6	46.80	
	.020	.259	1/8	1-1/2	75001	39.60	75001-C3	44.50	75001-C6	46.80	
	.025	.235	1/8	1-1/2	75054	39.60	75054-C3	44.50			
	1/32	.384	3/16	2	75002	45.10	75002-C3	50.40	75002-C6	52.80	
	.040	.341	3/16	2	75062	49.70	75062-C3	55.00			
	3/64	.308	3/16	2	75003	49.70	75003-C3	55.00			
	1/16	.414	1/4	2-1/2	75004	55.70	75004-C3	62.90	75004-C6	66.30	
	5/64	.338	1/4	2-1/2	75005	57.10	75005-C3	64.30			
	3/32	.444	5/16	2-1/2	75006	63.80	75006-C3	72.20			
	7/64	.367	5/16	2-1/2	75007	64.00	75007-C3	72.40			
	1/8	.469	3/8	2-1/2	75008	71.60	75008-C3	81.10			
	5/32	.675	1/2	3	75010	84.20	75010-C3	98.40			

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RUNNER CUTTERS

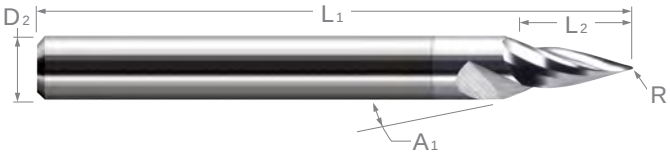
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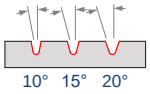
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ANGLE PER SIDE	RADIUS	LENGTH OF CUT	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN COATED		AlTiN NANO COATED	
A_1 $^{+0°30'}_{-0°30'}$	R $^{+.0005"}_{-.0005"}$	L_2	D_2 (h6)	L_1	2 FL	PRICE	2 FL	PRICE	2 FL	PRICE
15°	.005	.219	1/8	1-1/2	75150	40.30	75150-C3	45.20		
	.010	.205	1/8	1-1/2	75152	39.60	75152-C3	44.50	75152-C6	46.80
	1/64	.190	1/8	1-1/2	75100	39.60	75100-C3	44.50	75100-C6	46.80
	.020	.176	1/8	1-1/2	75101	39.60	75101-C3	44.50	75101-C6	46.80
	.025	.162	1/8	1-1/2	75154	39.60	75154-C3	44.50		
	1/32	.261	3/16	2	75102	45.10	75102-C3	50.40	75102-C6	52.80
	.039	.238	3/16	2	75160	49.70	75160-C3	55.00		
	.040	.235	3/16	2	75162	49.70	75162-C3	55.00		
	3/64	.215	3/16	2	75103	49.70	75103-C3	55.00		
	1/16	.289	1/4	2-1/2	75104	55.70	75104-C3	62.90	75104-C6	66.30
	5/64	.243	1/4	2-1/2	75105	57.10	75105-C3	64.30		
	3/32	.317	5/16	2-1/2	75106	63.80	75106-C3	72.20		
	7/64	.271	5/16	2-1/2	75107	64.00	75107-C3	72.40		
	1/8	.342	3/8	2-1/2	75108	71.60	75108-C3	81.10		
	5/32	.486	1/2	3	75110	84.20	75110-C3	98.40		
20°	.005	.162	1/8	1-1/2	979950	41.40	979950-C3	46.30		
	.010	.152	1/8	1-1/2	979952	41.40	979952-C3	46.30		
	1/64	.143	1/8	1-1/2	979900	39.60	979900-C3	44.50	979900-C6	46.80
	.020	.133	1/8	1-1/2	979901	42.60	979901-C3	47.50	979901-C6	49.80
	.025	.124	1/8	1-1/2	979954	42.60	979954-C3	47.50		
	1/32	.198	3/16	2	979902	45.10	979902-C3	50.40	979902-C6	52.80
	3/64	.167	3/16	2	979903	49.70	979903-C3	55.00		
	1/16	.224	1/4	2-1/2	979904	55.70	979904-C3	62.90		
	5/64	.193	1/4	2-1/2	979905	57.10	979905-C3	64.30		
	3/32	.250	5/16	2-1/2	979906	63.80	979906-C3	72.20		
	1/8	.275	3/8	2-1/2	979908	71.60	979908-C3	81.10		
NEW 22.5°	.010	.135	1/8	1-1/2	867852	41.40	867852-C3	46.30		
	1/64	.127	1/8	1-1/2	867800	39.60	867800-C3	44.50		
	.020	.194	3/16	2	867801	45.10	867801-C3	50.40		
	1/32	.176	3/16	2	867802	45.10	867802-C3	50.40		
	1/16	.277	5/16	2-1/2	867804	63.80	867804-C3	72.20		
30°	.005	.157	3/16	2	934550	58.90	934550-C3	64.20		
	.010	.152	3/16	2	934552	58.90	934552-C3	64.20		
	1/64	.147	3/16	2	934500	57.10	934500-C3	62.40	934500-C6	64.80
	.020	.142	3/16	2	934501	57.10	934501-C3	62.40		
	1/32	.186	1/4	2-1/2	934502	57.10	934502-C3	64.30	934502-C6	67.70
	3/64	.224	5/16	2-1/2	934503	63.80	934503-C3	72.20		
	1/16	.263	3/8	2-1/2	934504	71.60	934504-C3	81.10		
45°	.010	.121	1/4	2-1/2	856552	60.00	856552-C3	67.20		
	1/64	.119	1/4	2-1/2	856500	58.20	856500-C3	65.40		
	.020	.148	5/16	2-1/2	856501	58.20	856501-C3	66.60		
	1/32	.143	5/16	2-1/2	856502	64.80	856502-C3	73.20		
	3/64	.168	3/8	2-1/2	856503	72.90	856503-C3	82.40		
	1/16	.224	1/2	3	856504	88.00	856504-C3	102.20		

RUNNER CUTTERS

For Non-Ferrous Materials





Stocked in *Three* Angles Per Side!

- Optimized for aluminum and aluminum alloys with excellent performance in copper, brass, and bronze alloys
- Designed to mill 10°, 15°, and 20° channels in molds
- 2 helical flutes (approx. 25° helix)
- Offered with TiB_2 coating to minimize galling
- Center cutting
- Solid carbide
- CNC ground in the USA

ANGLE PER SIDE	RADIUS	LENGTH OF CUT	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		TiB_2 COATED	
A_1 $^{+0°30'}_{-0°30'}$	R $^{+.0005''}_{-.0005''}$	L_2	D_2 (h6)	L_1	2 FL	PRICE	2 FL	PRICE
10°	.010	.307	1/8	1-1/2	773452	40.50	773452-C8	47.70
	.015	.283	1/8	1-1/2	773400	40.50	773400-C8	47.70
	.031	.384	3/16	2	773402	46.00	773402-C8	53.20
15°	.010	.205	1/8	1-1/2	772252	40.50	772252-C8	47.70
	.015	.190	1/8	1-1/2	772200	40.50	772200-C8	47.70
	.031	.261	3/16	2	772202	46.00	772202-C8	53.20
20°	.010	.152	1/8	1-1/2	771252	40.50	771252-C8	47.70
	.015	.143	1/8	1-1/2	771200	40.50	771200-C8	47.70
	.031	.198	3/16	2	771202	46.00	771202-C8	53.20

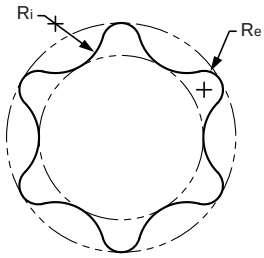
HEXALOBE CUTTERS



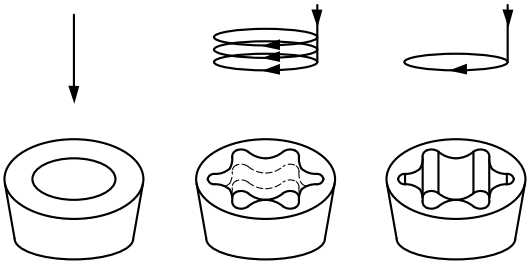
- Optimized for titanium alloys, Inconel, nickel alloys and other high temperature materials with outstanding performance in difficult-to-machine steels, stainless steels and tool steels
- Cutter diameters are slightly undersized common hexalobe sizes, created to contour the radii with ease and maximize the strength of the tool
- h6 shank tolerance for high precision tool holders
- Center cutting
- Solid carbide
- CNC ground in the USA

HEXALOBULAR SOCKET NUMBER	CUTTER DIAMETER	LENGTH OF CUT	SHANK DIAMETER	OVERALL LENGTH	AlTiN NANO COATED	
	D_1 $^{+.0005''}_{-.0005''}$	L_2 $^{+.010''}_{-.000''}$	D_2 (h6)	L_1	4 FL	PRICE
T8 / T10	.014	**.084** (6x)	.1575 (4 mm)	1.575 (40 mm)	793314-C6	45.80
T15 / T20	.020	**.120** (6x)	.1575 (4 mm)	1.575 (40 mm)	793320-C6	45.80
T25 / T30	.028	**.168** (6x)	.1575 (4 mm)	1.575 (40 mm)	793328-C6	45.80

Hexalobe Order of Operations



There are a few different approaches when machining a hexalobe pattern. In terms of milling, miniature tooling is required to properly contour the multiple radii surfaces to achieve the desired pattern and finish. Harvey Tool supplies multiple sizes to help create the shape and depth for the desired specification.



1. Pre-drill minor diameter with a drill and countersink top of the hole with appropriate angle chamfer
2. Select a **Long Reach Hexalobe Cutter** for either traditional roughing step downs or helical interpolation
   (Diameters have undersized radii (Re) to allow for contouring)
3. Finish with a Hexalobe Cutter to remove any witness marks and achieve required finish

HEXALOBE CUTTERS

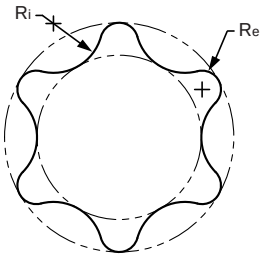
Long Reach



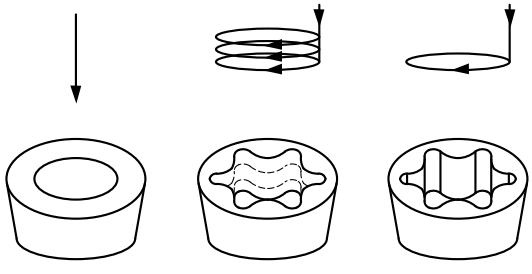
- Optimized for titanium alloys, Inconel, nickel alloys and other high temperature materials with outstanding performance in difficult-to-machine steels, stainless steels and tool steels
- Cutter diameters are slightly undersized common hexalobe sizes, created to contour the radii with ease and maximize the strength of the tool
- Reduced neck diameter to avoid heeling
- h6 shank tolerance for high precision tool holders
- Center Cutting
- Solid carbide
- CNC ground in the USA

HEXALOBULAR SOCKET NUMBER	CUTTER DIAMETER	LENGTH OF CUT	OVERALL REACH	SHANK DIAMETER	OVERALL LENGTH	AlTiN NANO COATED	
	D_1 $^{+.0005''}_{-.0005''}$	L_2 $^{+.010''}_{-.000''}$	L_3 $^{+.010''}_{-.000''}$	D_2 (h6)	L_1	4 FL	PRICE
T8 / T10	**.014**	.023	**.045** (3x)	.1575 (4 mm)	1.575 (40 mm)	792714-C6	48.20
T8 / T10	**.014**	.023	**.084** (6x)	.1575 (4 mm)	1.575 (40 mm)	791814-C6	51.40
T15 / T20	**.020**	.030	**.060** (3x)	.1575 (4 mm)	1.575 (40 mm)	792720-C6	48.20
T15 / T20	**.020**	.030	**.120** (6x)	.1575 (4 mm)	1.575 (40 mm)	791820-C6	51.40
T25 / T30	**.028**	.042	**.084** (3x)	.1575 (4 mm)	1.575 (40 mm)	792728-C6	48.20
T25 / T30	**.028**	.042	**.168** (6x)	.1575 (4 mm)	1.575 (40 mm)	791828-C6	51.40

Hexalobe Order of Operations



There are a few different approaches when machining a hexalobe pattern. In terms of milling, miniature tooling is required to properly contour the multiple radii surfaces to achieve the desired pattern and finish. Harvey Tool supplies multiple sizes to help create the shape and depth for the desired specification.

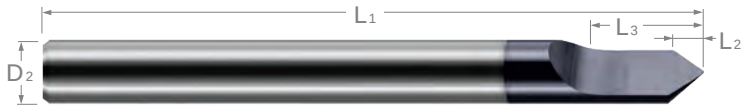


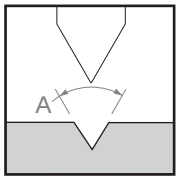
1. Pre-drill minor diameter with a drill and countersink top of the hole with appropriate angle chamfer
2. Select a **Long Reach Hexalobe Cutter** for either traditional roughing step downs or helical interpolation
   (Diameters have undersized radii (Re) to allow for contouring)
3. Finish with a Hexalobe Cutter to remove any witness marks and achieve required finish

NEW SIZE!

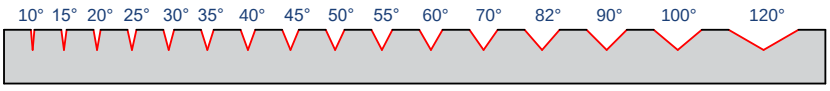
ENGRAVING CUTTERS

Pointed





- Ground to a point
- Half-round drill style
- Relieved for right hand milling
- Solid carbide
- CNC ground in the USA



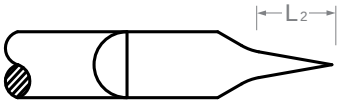
Stocked in *Sixteen* Included Angles!

mm & in

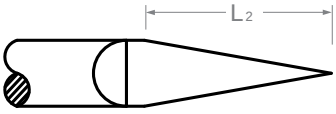
INCL. ANGLE	DIA.	LENGTH OF CUT	TYPE	SPLIT LENGTH	OVERALL LENGTH		UNCOATED		AlTiN COATED		AMORPHOUS DIAMOND	
A	D_2	L_2		L_3	L_1		TOOL #	PRICE	TOOL #	PRICE	TOOL #	PRICE
	1/8	.080	I	.200	1-1/2		996508	22.40	996508-C3	27.30		
10°	3/16	.080	I	1/4	2		996512	22.60	996512-C3	27.90		
	1/4	.080	I	5/16	2-1/2		996516	27.40	996516-C3	34.60		
	1/8	.080	I	.200	1-1/2		998108	22.40	998108-C3	27.30		
15°	3/16	.080	I	1/4	2		998112	22.60	998112-C3	27.90		
	1/4	.080	I	5/16	2-1/2		998116	27.40	998116-C3	34.60		
	1/8	.080	I	.200	1-1/2		999708	22.40	999708-C3	27.30	999708-C4	34.80
20°	3/16	.080	I	1/4	2		999712	22.60	999712-C3	27.90		
	1/4	.080	I	5/16	2-1/2		999716	27.40	999716-C3	34.60		
	1/8	.080	I	.200	1-1/2		983808	22.40	983808-C3	27.30		
25°	3/16	.080	I	1/4	2		983812	22.60	983812-C3	27.90		
	1/4	.080	I	5/16	2-1/2		983816	27.40	983816-C3	34.60		
	1/8	.080	I	.200	1-1/2		981508	19.90	981508-C3	24.80		
	1/8	.233	II	3/8	1-1/2		25010	15.20	25010-C3	20.10	25010-C4	27.60
30°	1/8	.233	II	3/8	4	*LONG!*	941708	25.00	941708-C3	30.30		
	3/16	.350	II	3/8	2		25020	19.70	25020-C3	25.00		
NEW	1/4	.466	II	1/2	2-1/2		25030	24.40	25030-C3	31.60	25030-C4	43.80
35°	1/8	.198	II	3/8	1-1/2		853508	18.10	853508-C3	23.00		
	1/8	.080	I	.200	1-1/2		978608	20.80	978608-C3	25.70		
	1/8	.171	II	3/8	1-1/2		25110	15.80	25110-C3	20.70	25110-C4	28.20
40°	1/8	.171	II	3/8	4	*LONG!*	937808	26.10	937808-C3	31.40		
	3/16	.257	II	3/8	2		25120	21.10	25120-C3	26.40		
	1/4	.343	II	3/8	2-1/2		25130	25.60	25130-C3	32.80		
	1/8	.151	II	3/8	1-1/2		997308	16.70	997308-C3	21.60	997308-C4	29.10
45°	3/16	.226	II	3/8	2		997312	21.50	997312-C3	26.80		
	1/4	.302	II	3/8	2-1/2		997316	26.80	997316-C3	34.00		
	1/8	.134	II	3/8	1-1/2		998408	16.80	998408-C3	21.70		
50°	3/16	.201	II	3/8	2		998412	21.90	998412-C3	26.90		
	1/4	.268	II	3/8	2-1/2		998416	27.40	998416-C3	34.60		
55°	1/8	.120	II	3/8	1-1/2		855508	18.10	855508-C3	23.00		

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TYPE I



TYPE II



ENGRAVING CUTTERS

Pointed (cont.)

mm & in continued from previous page

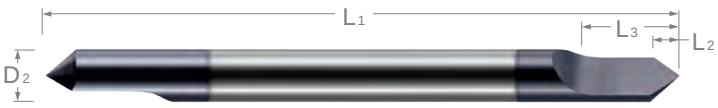
INCL. ANGLE	DIA.	LENGTH OF CUT	TYPE	SPLIT LENGTH	OVERALL LENGTH		UNCOATED		AlTiN COATED		AMORPHOUS DIAMOND	
A	D_2	L_2		L_3	L_1		TOOL #	PRICE	TOOL #	PRICE	TOOL #	PRICE
60°	3 mm	2.60 mm	II	10 mm	38 mm		898657	17.40	898657-C3	22.30		
	1/8	.108	II	3/8	1-1/2		30010	15.20	30010-C3	20.10	30010-C4	27.60
	1/8	.108	II	3/8	4	*LONG!*	30410	25.00	30410-C3	30.30	30410-C4	37.40
	3/16	.162	II	3/8	2		30020	19.70	30020-C3	25.00	30020-C4	36.80
	3/16	.162	II	3/8	4	*LONG!*	30420	33.00	30420-C3	40.20		
	6 mm	5.20 mm	II	10 mm	63 mm		898666	28.20	898666-C3	35.40		
	1/4	.216	II	3/8	2-1/2		30030	24.40	30030-C3	31.60	30030-C4	43.80
	1/4	.216	II	3/8	6	*LONG!*	30430	47.40	30430-C3	56.90		
	3/8	.325	II	3/8	2-1/2		30040	34.40	30040-C3	43.90		
70°	1/8	.089	II	3/8	1-1/2		937208	16.80	937208-C3	21.70		
	3/16	.134	II	3/8	2		937212	21.90	937212-C3	26.90		
	1/4	.179	II	3/8	2-1/2		937216	27.40	937216-C3	34.60		
82°	1/8	.072	II	3/8	1-1/2		971708	16.80	971708-C3	21.70		
	3/16	.108	II	3/8	2		971712	21.90	971712-C3	26.90		
	1/4	.144	II	3/8	2-1/2		971716	27.40	971716-C3	34.60		
90°	3 mm	1.50 mm	II	10 mm	38 mm		884157	17.40	884157-C3	22.30		
	1/8	.062	II	3/8	1-1/2		30110	15.20	30110-C3	20.10	30110-C4	27.60
	1/8	.062	II	3/8	4	*LONG!*	30510	25.00	30510-C3	30.30		
	3/16	.093	II	3/8	2		30120	19.70	30120-C3	25.00	30120-C4	36.80
	3/16	.093	II	3/8	4	*LONG!*	30520	33.00	30520-C3	40.20		
	6 mm	3.00 mm	II	10 mm	63 mm		884166	28.20	884166-C3	35.40		
	1/4	.125	II	3/8	2-1/2		30130	24.40	30130-C3	31.60	30130-C4	43.80
	1/4	.125	II	3/8	6	*LONG!*	30530	47.40	30530-C3	56.90		
	3/8	.187	II	3/8	2-1/2		30140	34.40	30140-C3	43.90		
100°	1/8	.052	II	3/8	1-1/2		983508	16.80	983508-C3	21.70		
	3/16	.079	II	3/8	2		983512	21.90	983512-C3	26.90		
	1/4	.105	II	3/8	2-1/2		983516	27.40	983516-C3	34.60		
120°	1/8	.036	II	3/8	1-1/2		990508	15.20	990508-C3	20.10		
	3/16	.054	II	3/8	2		990512	19.70	990512-C3	25.00		
	1/4	.072	II	3/8	2-1/2		990516	24.40	990516-C3	31.60		

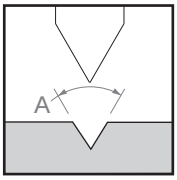


Check Out All of Our Engraving Solutions!

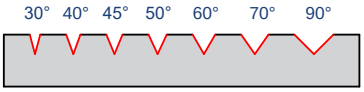
ENGRAVING CUTTERS

Pointed – Double-Ended





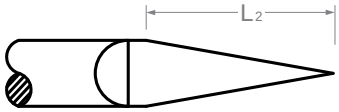
- Double-ended
- 180° opposing split lengths for improved balance at higher RPMs
- Ground to a point
- Half-round drill style
- Relieved for right hand milling
- Solid carbide
- CNC ground in the USA



Stocked in *Seven* Included Angles!

INCLUDED ANGLE	DIA.	LENGTH OF CUT	TYPE	SPLIT LENGTH	OVERALL LENGTH	UNCOATED		AlTiN COATED		AMORPHOUS DIAMOND	
A	D_2	L_2		L_3	L_1	TOOL #	PRICE	TOOL #	PRICE	TOOL #	PRICE
30°	1/8	.233	II	3/8	2	938408	26.20	938408-C3	32.20		
	3/16	.350	II	3/8	2	938410	32.50	938410-C3	39.70		
	1/4	.466	II	1/2	2-1/2	938412	38.70	938412-C3	48.20		
40°	1/8	.172	II	3/8	2	854008	28.40	854008-C3	34.40		
	3/16	.258	II	3/8	2	854010	34.80	854010-C3	42.00		
	1/4	.343	II	3/8	2-1/2	854012	41.30	854012-C3	50.80		
45°	1/8	.151	II	3/8	2	854508	28.40	854508-C3	34.40		
	3/16	.226	II	3/8	2	854510	34.80	854510-C3	42.00		
	1/4	.302	II	3/8	2-1/2	854512	41.30	854512-C3	50.80		
50°	1/8	.134	II	3/8	2	855008	28.40	855008-C3	34.40		
	3/16	.201	II	3/8	2	855010	34.80	855010-C3	42.00		
	1/4	.268	II	3/8	2-1/2	855012	41.30	855012-C3	50.80		
60°	1/8	.108	II	3/8	2	954608	26.20	954608-C3	32.20	954608-C4	48.40
	3/16	.162	II	3/8	2	954610	32.50	954610-C3	39.70		
	1/4	.216	II	3/8	2-1/2	954612	38.70	954612-C3	48.20		
70°	1/8	.089	II	3/8	2	857008	28.40	857008-C3	34.40		
	3/16	.134	II	3/8	2	857010	34.80	857010-C3	42.00		
	1/4	.179	II	3/8	2-1/2	857012	41.30	857012-C3	50.80		
90°	1/8	.062	II	3/8	2	975108	26.20	975108-C3	32.20	975108-C4	48.40
	3/16	.093	II	3/8	2	975110	32.50	975110-C3	39.70		
	1/4	.125	II	3/8	2-1/2	975112	38.70	975112-C3	48.20		

TYPE II

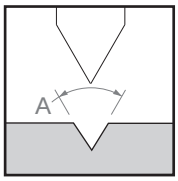


NEW SIZES!

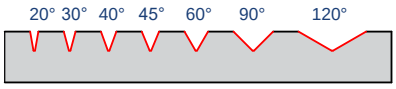
ENGRAVING CUTTERS

Pointed – Pyramid Point





- 3 facet design increases tip strength
- Ground to a point
- Solid carbide
- CNC ground in the USA



Stocked in *Seven* Included Angles!

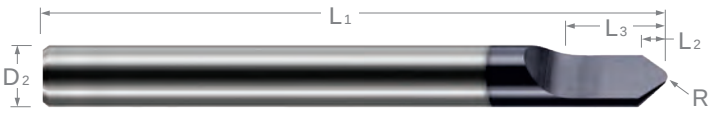
INCLUDED ANGLE	DIAMETER	LENGTH OF CUT	OVERALL LENGTH	UNCOATED		AlTiN COATED		
A	D_2	L_2	L_1	TOOL #	PRICE	TOOL #	PRICE	
20°	1/8	.354	1-1/2	842810	25.90	842810-C3	30.80	
	3/16	.532	2	822010	28.20	822010-C3	33.50	
	1/4	.709	2-1/2	834010	40.20	834010-C3	47.40	
30°	1/8	.233	1-1/2	842815	25.90	842815-C3	30.80	
	3/16	.350	2	822015	28.20	822015-C3	33.50	
	1/4	.467	2-1/2	834015	40.20	834015-C3	47.40	
40°	1/8	.172	1-1/2	842820	25.90	842820-C3	30.80	
45°	1/8	.151	1-1/2	842823	25.90	842823-C3	30.80	
	1/4	.302	2-1/2	834023	28.20	834023-C3	35.40	
60°	1/8	.108	1-1/2	842830	25.90	842830-C3	30.80	
	3/16	.162	2	822030	28.20	822030-C3	33.50	
	1/4	.217	2-1/2	834030	40.20	834030-C3	47.40	
90°	1/8	.063	1-1/2	842845	25.90	842845-C3	30.80	
	3/16	.094	2	822045	28.20	822045-C3	33.50	
	1/4	.125	2-1/2	834045	40.20	834045-C3	47.40	
120°	1/8	.036	1-1/2	842860	25.90	842860-C3	30.80	NEW

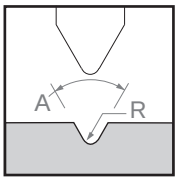
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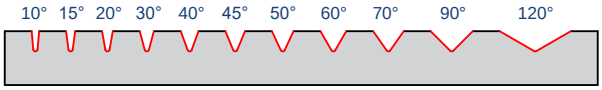
ENGRAVING CUTTERS

Tip Radius





- Radius on tip creates radius in bottom of groove and improves strength
- Half-round drill style
- Relieved for right-hand milling
- Solid carbide
- CNC ground in the USA

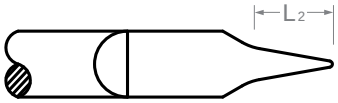


Stocked in *Eleven* Included Angles!

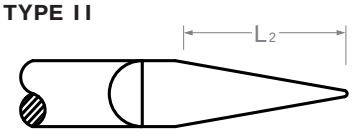
INCL. ANGLE	DIA.	RADIUS	LENGTH OF CUT	TYPE	SPLIT LENGTH	OVERALL LENGTH		UNCOATED		AlTiN COATED		AMORPHOUS DIAMOND	
A	D_2	R	L_2		L_3	L_1		TOOL #	PRICE	TOOL #	PRICE	TOOL #	PRICE
10°	1/8	.0050	.080	I	.200	1-1/2		940410	24.50	940410-C3	29.40		
	1/8	.0100	.080	I	.200	1-1/2		948010	24.50	948010-C3	29.40		
15°	1/8	.0050	.080	I	.200	1-1/2		952910	24.50	952910-C3	29.40		
	1/8	.0100	.080	I	.200	1-1/2		963510	24.50	963510-C3	29.40		
20°	1/8	.0050	.080	I	.200	1-1/2		989310	24.50	989310-C3	29.40		
	1/8	.0100	.080	I	.200	1-1/2		956010	24.50	956010-C3	29.40		
30°	1/8	.0025	.226	II	3/8	1-1/2		72715	22.50	72715-C3	27.40	72715-C4	34.90
	1/8	.0050	.219	II	3/8	1-1/2		47510	22.50	47510-C3	27.40	47510-C4	34.90
	1/8	.0100	.207	II	3/8	1-1/2		48810	22.50	48810-C3	27.40	48810-C4	34.90
	1/8	.0150	.190	II	3/8	1-1/2		49710	22.50	49710-C3	27.40		
	1/8	.0200	.176	II	3/8	1-1/2		58610	22.50	58610-C3	27.40		
	1/8	.0300	.147	II	3/8	1-1/2		868910	22.50	868910-C3	27.40		
	3/16	.0050	.336	II	3/8	2		47520	27.50	47520-C3	32.80		
	3/16	.0100	.321	II	3/8	2		48820	27.50	48820-C3	32.80		
	1/4	.0050	.452	II	1/2	2-1/2		47530	38.70	47530-C3	45.90		
	1/4	.0100	.438	II	1/2	2-1/2		48830	38.70	48830-C3	45.90		
40°	1/8	.0025	.167	II	3/8	1-1/2		72720	23.60	72720-C3	28.50		
	1/8	.0050	.162	II	3/8	1-1/2		57610	23.60	57610-C3	28.50		
	1/8	.0100	.152	II	3/8	1-1/2		58210	23.60	58210-C3	28.50		
	1/8	.0150	.143	II	3/8	1-1/2		59310	23.60	59310-C3	28.50		
	1/8	.0200	.133	II	3/8	1-1/2		60510	23.60	60510-C3	28.50		
45°	1/8	.0050	.143	II	3/8	1-1/2		946502	24.10	946502-C3	29.00		
	1/8	.0100	.135	II	3/8	1-1/2		957910	24.10	957910-C3	29.00		
50°	1/8	.0050	.127	II	3/8	1-1/2		845010	24.10	845010-C3	29.00		
	1/8	.0100	.120	II	3/8	1-1/2		847210	24.10	847210-C3	29.00		
60°	1/8	.0025	.106	II	3/8	1-1/2		72730	22.50	72730-C3	27.40	72730-C4	34.90
	1/8	.0050	.103	II	3/8	1-1/2		48110	22.50	48110-C3	27.40	48110-C4	34.90
	1/8	.0050	.103	II	3/8	4	*LONG!*	974910	40.50	974910-C3	45.80		
	1/8	.0075	.101	II	3/8	1-1/2		967310	22.50	967310-C3	27.40		
	1/8	.0100	.098	II	3/8	1-1/2		49410	22.50	49410-C3	27.40	49410-C4	34.90
	1/8	.0125	.096	II	3/8	1-1/2		817110	22.50	817110-C3	27.40		
	1/8	.0150	.093	II	3/8	1-1/2		51710	22.50	51710-C3	27.40		
	1/8	.0200	.088	II	3/8	1-1/2		58910	22.50	58910-C3	27.40		
	1/8	.0300	.078	II	3/8	1-1/2		877010	22.50	877010-C3	27.40		

continued on next page

TYPE I



TYPE II



ENGRAVING CUTTERS

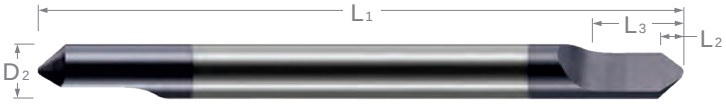
Tip Radius (cont.)

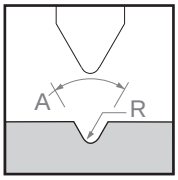
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INCL. ANGLE	DIA.	RADIUS	LENGTH OF CUT	TYPE	SPLIT LENGTH	OVERALL LENGTH		UNCOATED		AlTiN COATED		AMORPHOUS DIAMOND	
A	D_2	R	L_2		L_3	L_1		TOOL #	PRICE	TOOL #	PRICE	TOOL #	PRICE
60°	3/16	.0025	.160	II	3/8	2		964830	27.50	964830-C3	32.80		
	3/16	.0050	.157	II	3/8	2		48120	27.50	48120-C3	32.80		
	3/16	.0075	.155	II	3/8	2		967320	27.50	967320-C3	32.80		
	3/16	.0100	.152	II	3/8	2		49420	27.50	49420-C3	32.80		
	3/16	.0150	.147	II	3/8	2		51720	27.50	51720-C3	32.80		
	3/16	.0200	.142	II	3/8	2		58920	27.50	58920-C3	32.80		
	1/4	.0025	.214	II	3/8	2-1/2		943730	30.20	943730-C3	37.40		
	1/4	.0050	.212	II	3/8	2-1/2		48130	30.20	48130-C3	37.40		
	1/4	.0075	.209	II	3/8	2-1/2		967330	30.20	967330-C3	37.40		
	1/4	.0100	.207	II	3/8	2-1/2		49430	30.20	49430-C3	37.40		
	1/4	.0150	.202	II	3/8	2-1/2		51730	30.20	51730-C3	37.40		
	1/4	.0200	.196	II	3/8	2-1/2		58930	30.20	58930-C3	37.40		
70°	1/8	.0050	.086	II	3/8	1-1/2		843810	24.10	843810-C3	29.00		
	1/8	.0100	.082	II	3/8	1-1/2		844710	24.10	844710-C3	29.00		
90°	1/8	.0025	.061	II	3/8	1-1/2		72745	22.50	72745-C3	27.40	72745-C4	34.90
	1/8	.0050	.060	II	3/8	1-1/2		48410	22.50	48410-C3	27.40	48410-C4	34.90
	1/8	.0050	.060	II	3/8	4	*LONG!*	986810	40.50	986810-C3	45.80		
	1/8	.0075	.059	II	3/8	1-1/2		959810	22.50	959810-C3	27.40		
	1/8	.0100	.058	II	3/8	1-1/2		49110	22.50	49110-C3	27.40	49110-C4	34.90
	1/8	.0125	.057	II	3/8	1-1/2		817010	22.50	817010-C3	27.40		
	1/8	.0150	.056	II	3/8	1-1/2		50810	22.50	50810-C3	27.40		
	1/8	.0200	.054	II	3/8	1-1/2		59910	22.50	59910-C3	27.40		
	1/8	.0300	.050	II	3/8	1-1/2		891410	22.50	891410-C3	27.40		
	3/16	.0025	.093	II	3/8	2		964845	27.50	964845-C3	32.80		
	3/16	.0050	.092	II	3/8	2		48420	27.50	48420-C3	32.80		
	3/16	.0100	.090	II	3/8	2		49120	27.50	49120-C3	32.80		
	3/16	.0150	.088	II	3/8	2		50820	27.50	50820-C3	32.80		
	3/16	.0200	.085	II	3/8	2		59920	27.50	59920-C3	32.80		
	1/4	.0025	.124	II	3/8	2-1/2		943745	30.20	943745-C3	37.40		
	1/4	.0050	.123	II	3/8	2-1/2		48430	30.20	48430-C3	37.40		
	1/4	.0100	.121	II	3/8	2-1/2		49130	30.20	49130-C3	37.40		
	1/4	.0150	.119	II	3/8	2-1/2		50830	30.20	50830-C3	37.40		
	1/4	.0200	.116	II	3/8	2-1/2		59930	30.20	59930-C3	37.40		
120°	1/8	.0050	.035	II	3/8	1-1/2		947310	22.50	947310-C3	27.40		
	1/8	.0100	.035	II	3/8	1-1/2		939110	22.50	939110-C3	27.40		

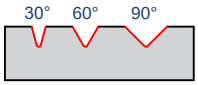
ENGRAVING CUTTERS

Tip Radius – Double-Ended





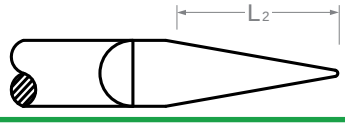
- Double-ended
- 180° opposing split lengths for improved balance at higher RPMs
- Radius on tip creates radius in bottom of groove and improves strength
- Half-round drill style
- Relieved for right-hand milling
- Solid carbide
- CNC ground in the USA



Stocked in *Three* Included Angles!

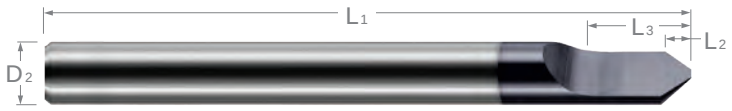
INCLUDED ANGLE	DIAMETER	RADIUS	LENGTH OF CUT	TYPE	SPLIT LENGTH	OVERALL LENGTH	UNCOATED		AlTiN COATED	
A	D_2	R	L_2		L_3	L_1	TOOL #	PRICE	TOOL #	PRICE
30°	1/8	.0025	.226	II	3/8	2	842008	34.70	842008-C3	40.70
	1/8	.0050	.219	II	3/8	2	834408	34.70	834408-C3	40.70
	1/8	.0100	.205	II	3/8	2	835008	34.70	835008-C3	40.70
	1/8	.0200	.176	II	3/8	2	836108	34.70	836108-C3	40.70
	1/4	.0050	.452	II	1/2	2-1/2	834416	45.60	834416-C3	55.10
	1/4	.0100	.438	II	1/2	2-1/2	835016	45.60	835016-C3	55.10
60°	1/8	.0025	.106	II	3/8	2	834708	34.70	834708-C3	40.70
	1/8	.0050	.103	II	3/8	2	828208	34.70	828208-C3	40.70
	1/8	.0100	.098	II	3/8	2	828808	34.70	828808-C3	40.70
	1/8	.0200	.088	II	3/8	2	829908	34.70	829908-C3	40.70
	1/4	.0050	.212	II	3/8	2-1/2	828216	45.60	828216-C3	55.10
	1/4	.0100	.207	II	3/8	2-1/2	828816	45.60	828816-C3	55.10
90°	1/8	.0025	.061	II	3/8	2	828908	34.70	828908-C3	40.70
	1/8	.0050	.060	II	3/8	2	818308	34.70	818308-C3	40.70
	1/8	.0100	.058	II	3/8	2	818908	34.70	818908-C3	40.70
	1/8	.0200	.054	II	3/8	2	820108	34.70	820108-C3	40.70
	1/4	.0050	.123	II	3/8	2-1/2	818316	45.60	818316-C3	55.10
	1/4	.0100	.121	II	3/8	2-1/2	818916	45.60	818916-C3	55.10

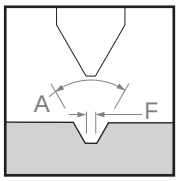
TYPE II



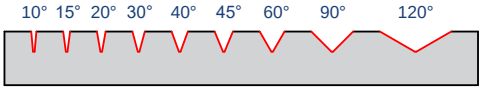
ENGRAVING CUTTERS

Tipped Off





- Tipped off end diameter for improved cutting
- Flat (F) represents flat generated in workpiece
- Half-round drill style
- Relieved for right hand milling
- Solid carbide
- CNC ground in the USA

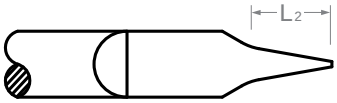


Stocked in *Nine* Included Angles!

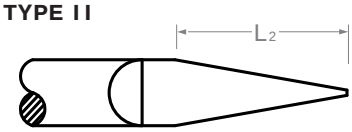
INCL. ANGLE	DIA.	FLAT ON PART	LENGTH OF CUT	TYPE	SPLIT LENGTH	OAL	UNCOATED		AlTiN COATED		AMORPHOUS DIAMOND	
A	D_2	F	L_2		L_3	L_1	TOOL #	PRICE	TOOL #	PRICE	TOOL #	PRICE
10°	1/8	.005	.080	I	.200	1-1/2	993002	23.80	993002-C3	28.70		
	1/8	.010	.080	I	.200	1-1/2	993010	23.80	993010-C3	28.70		
	1/8	.020	.080	I	.200	1-1/2	993052	23.80	993052-C3	28.70		
15°	1/8	.005	.080	I	.200	1-1/2	990002	23.80	990002-C3	28.70		
	1/8	.010	.080	I	.200	1-1/2	990010	23.80	990010-C3	28.70		
	1/8	.020	.080	I	.200	1-1/2	990052	23.80	990052-C3	28.70		
20°	1/8	.005	.080	I	.200	1-1/2	987002	23.80	987002-C3	28.70		
	1/8	.010	.080	I	.200	1-1/2	987010	23.80	987010-C3	28.70		
	1/8	.020	.080	I	.200	1-1/2	987052	23.80	987052-C3	28.70		
30°	1/8	.005	.224	II	3/8	1-1/2	25202	17.30	25202-C3	22.20	25202-C4	29.70
	1/8	.010	.215	II	3/8	1-1/2	25210	17.30	25210-C3	22.20	25210-C4	29.70
	1/8	.015	.205	II	3/8	1-1/2	25242	17.30	25242-C3	22.20		
	1/8	.020	.196	II	3/8	1-1/2	25252	17.30	25252-C3	22.20		
	1/8	.030	.177	II	3/8	1-1/2	25256	17.30	25256-C3	24.50		
	3/16	.010	.331	II	3/8	2	25220	22.50	25220-C3	27.80		
	3/16	.020	.313	II	3/8	2	25226	22.50	25226-C3	27.80		
	3/16	.030	.294	II	3/8	2	25224	22.50	25224-C3	27.40		
	1/4	.005	.457	II	1/2	2-1/2	25228	26.10	25228-C3	33.30		
	1/4	.010	.448	II	1/2	2-1/2	25230	26.10	25230-C3	33.30		
	1/4	.020	.429	II	1/2	2-1/2	25234	26.10	25234-C3	33.30		
	1/4	.030	.411	II	1/2	2-1/2	25236	26.10	25236-C3	35.60		
40°	1/8	.005	.165	II	3/8	1-1/2	25302	18.00	25302-C3	22.90		
	1/8	.010	.158	II	3/8	1-1/2	25310	18.00	25310-C3	22.90	25310-C4	30.40
	1/8	.015	.151	II	3/8	1-1/2	25342	18.00	25342-C3	22.90		
	1/8	.020	.144	II	3/8	1-1/2	25352	18.00	25352-C3	22.90		
	3/16	.010	.244	II	3/8	2	25320	23.60	25320-C3	28.90		
	1/4	.005	.337	II	3/8	2-1/2	25328	27.50	25328-C3	34.70		
	1/4	.010	.330	II	3/8	2-1/2	25330	27.50	25330-C3	34.70		

continued on next page

TYPE I



TYPE II



ENGRAVING CUTTERS

Tipped Off (cont.)

continued from previous page

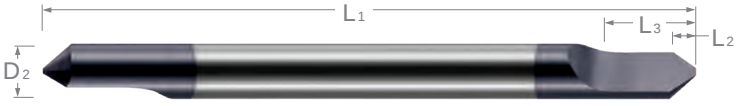
INCL. ANGLE	DIA.	FLAT ON PART	LENGTH OF CUT	TYPE	SPLIT LENGTH	OAL		UNCOATED		AlTiN COATED		AMORPHOUS DIAMOND	
A	D_2	F	L_2		L_3	L_1		TOOL #	PRICE	TOOL #	PRICE	TOOL #	PRICE
45°	1/8	.005	.145	II	3/8	1-1/2		955002	18.30	955002-C3	23.20		
	1/8	.010	.139	II	3/8	1-1/2		955010	18.30	955010-C3	23.20		
	3/16	.010	.214	II	3/8	2		955020	24.10	955020-C3	29.40		
	1/4	.010	.290	II	3/8	2-1/2		955030	28.00	955030-C3	35.20		
60°	1/8	.005	.104	II	3/8	1-1/2		50710	17.30	50710-C3	22.20	50710-C4	29.70
	1/8	.005	.104	II	3/8	4	LONG!	823602	17.30	823602-C3	30.20		
	1/8	.010	.099	II	3/8	1-1/2		30210	17.30	30210-C3	22.20	30210-C4	29.70
	1/8	.015	.095	II	3/8	1-1/2		18242	17.30	18242-C3	22.20		
	1/8	.020	.091	II	3/8	1-1/2		26910	17.30	26910-C3	22.20	26910-C4	29.70
	1/8	.025	.087	II	3/8	1-1/2		793055	17.30	793055-C3	22.20		
	1/8	.030	.082	II	3/8	1-1/2		27610	17.30	27610-C3	22.20	27610-C4	29.70
	3/16	.005	.158	II	3/8	2		50720	22.50	50720-C3	27.80		
	3/16	.005	.158	II	3/8	4	LONG!	823618	22.50	823618-C3	27.80		
	3/16	.010	.153	II	3/8	2		30220	22.50	30220-C3	27.80		
	3/16	.020	.145	II	3/8	2		26920	22.50	26920-C3	27.80		
	3/16	.030	.136	II	3/8	2		27620	22.50	27620-C3	27.80		
	1/4	.005	.212	II	3/8	2-1/2		50730	26.10	50730-C3	33.30		
	1/4	.005	.212	II	3/8	6	LONG!	823628	26.10	823628-C3	40.70		
	1/4	.010	.207	II	3/8	2-1/2		30230	26.10	30230-C3	33.30		
	1/4	.015	.204	II	3/8	2-1/2		18232	26.10	18232-C3	33.30		
	1/4	.020	.199	II	3/8	2-1/2		26930	26.10	26930-C3	33.30		
	1/4	.030	.191	II	3/8	2-1/2		27630	26.10	27630-C3	33.30		
90°	1/8	.005	.060	II	3/8	1-1/2		30302	17.30	30302-C3	22.20		
	1/8	.010	.057	II	3/8	1-1/2		30310	17.30	30310-C3	22.20	30310-C4	29.70
	1/8	.015	.055	II	3/8	1-1/2		30342	17.30	30342-C3	22.20		
	1/8	.020	.053	II	3/8	1-1/2		30352	17.30	30352-C3	22.20		
	1/8	.030	.048	II	3/8	1-1/2		30356	17.30	30356-C3	22.20		
	3/16	.010	.088	II	3/8	2		30320	22.50	30320-C3	27.80		
	3/16	.020	.084	II	3/8	2		30324	22.50	30324-C3	27.80		
	3/16	.030	.079	II	3/8	2		30326	22.50	30326-C3	32.00		
	1/4	.005	.123	II	3/8	2-1/2		30328	26.10	30328-C3	33.30		
	1/4	.010	.120	II	3/8	2-1/2		30330	26.10	30330-C3	33.30		
	1/4	.020	.115	II	3/8	2-1/2		30334	26.10	30334-C3	33.30		
	1/4	.030	.110	II	3/8	2-1/2		30336	26.10	30336-C3	31.00		
120°	1/8	.005	.035	II	3/8	1-1/2		954102	17.30	954102-C3	22.20		
	1/8	.010	.033	II	3/8	1-1/2		954110	17.30	954110-C3	22.20		

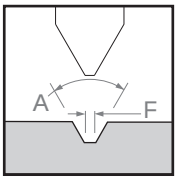
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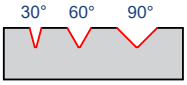
ENGRAVING CUTTERS

Tipped Off – Double-Ended





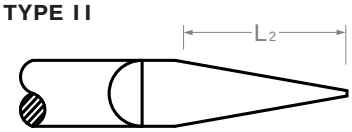
- Double-ended
- 180° opposing split lengths for improved balance at higher RPMs
- Tipped off end diameter for improved cutting
- Flat (F) represents flat generated in workpiece
- Half-round drill style
- Relieved for right hand milling
- Solid carbide
- CNC ground in the USA



Stocked in *Three* Included Angles!

INCLUDED ANGLE	DIAMETER	FLAT ON PART	LENGTH OF CUT	TYPE	SPLIT LENGTH	OVERALL LENGTH	UNCOATED		AlTiN COATED	
A	D_2	F	L_2		L_3	L_1	TOOL #	PRICE	TOOL #	PRICE
30°	1/8	**.005**	.224	II	3/8	2	834308	29.40	834308-C3	35.40
	1/8	**.010**	.215	II	3/8	2	834908	29.40	834908-C3	35.40
	1/8	**.015**	.205	II	3/8	2	835508	29.40	835508-C3	35.40
	1/8	**.020**	.196	II	3/8	2	836208	29.40	836208-C3	35.40
	1/4	**.010**	.448	II	1/2	2-1/2	834916	41.60	834916-C3	51.10
60°	1/8	**.005**	.104	II	3/8	2	828108	29.40	828108-C3	35.40
	1/8	**.010**	.100	II	3/8	2	828708	29.40	828708-C3	35.40
	1/8	**.015**	.095	II	3/8	2	829308	29.40	829308-C3	35.40
	1/8	**.020**	.091	II	3/8	2	829808	29.40	829808-C3	35.40
	1/4	**.010**	.208	II	3/8	2-1/2	828716	41.60	828716-C3	51.10
90°	1/8	**.005**	.060	II	3/8	2	818208	29.40	818208-C3	35.40
	1/8	**.010**	.058	II	3/8	2	818808	29.40	818808-C3	35.40
	1/8	**.015**	.055	II	3/8	2	819408	29.40	819408-C3	35.40
	1/8	**.020**	.053	II	3/8	2	820008	29.40	820008-C3	35.40
	1/4	**.010**	.120	II	3/8	2-1/2	818816	41.60	818816-C3	51.10

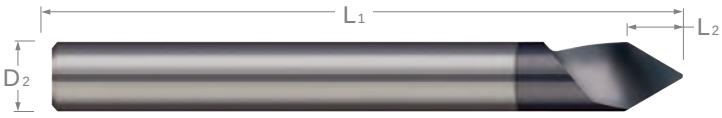
TYPE II

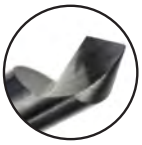


NEW SIZES!

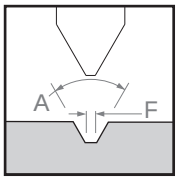
ENGRAVING CUTTERS

Tipped Off – Helical Flute

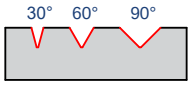




Spiral flute for soft materials



- Optimized geometry for superior engraving in softer materials such as plastics and aluminum
- Also excellent for stainless steel, Inconel, titanium, and other high temp alloys
- Free cutting action provides excellent surface finish and chip evacuation
- Tipped-off end diameter for improved cutting action
- AlTiN coating for increased performance in ferrous materials
- TiB_2 coating for outstanding performance in non-ferrous materials due to its extremely low affinity to aluminum
- Right hand spiral, right hand cut
- Solid carbide
- CNC ground in the USA

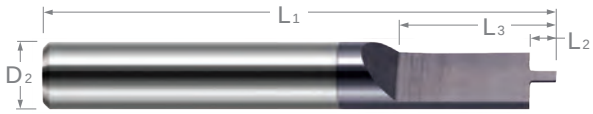


Stocked in *Three* Included Angles!

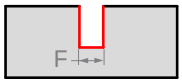
	INCLUDED ANGLE	DIAMETER	FLAT ON PART	LENGTH OF CUT	OVERALL LENGTH	UNCOATED		AlTiN COATED		TiB_2 COATED	
	A	D_2	F	L_2	L_1	TOOL #	PRICE	TOOL #	PRICE	TOOL #	PRICE
	30°	1/8	.010	.215	2	779008	18.20	779008-C3	23.10	779008-C8	25.40
		1/4	.010	.448	2-1/2	779016	27.60	779016-C3	34.80	779016-C8	35.30
NEW	60°	1/8	.005	.104	1-1/2	764708	18.20	764708-C3	23.10	764708-C8	25.40
		1/8	.010	.100	1-1/2	824708	18.20	824708-C3	23.10	824708-C8	25.40
		3/16	.010	.154	2	824712	23.70	824712-C3	28.60	824712-C8	30.90
		1/4	.010	.208	2-1/2	824716	27.60	824716-C3	32.40	824716-C8	35.30
	90°	1/8	.010	.058	1-1/2	814708	18.20	814708-C3	23.10	814708-C8	25.40
		3/16	.010	.089	2	814712	23.70	814712-C3	28.60	814712-C8	30.90
		1/4	.010	.120	2-1/2	814716	27.60	814716-C3	32.40	814716-C8	35.30

ENGRAVING CUTTERS

Parallel – Square



- Engraves a 90° vertical wall
- Flat (F) represents flat generated in workpiece
- Half-round drill style
- Non-cutting transition radius at end of length of cut
- Relieved for right hand milling
- Solid carbide
- CNC ground in the USA



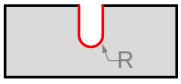
DIAMETER	FLAT ON PART	LENGTH OF CUT	SPLIT LENGTH	OVERALL LENGTH	UNCOATED		AlTiN COATED	
D_2	F	L_2	L_3	L_1	TOOL #	PRICE	TOOL #	PRICE
1/8	**.030**	.044	3/8	1-1/2	844230	18.90	844230-C3	23.80
1/8	**.060**	.090	3/8	1-1/2	844260	18.90	844260-C3	23.80
1/8	**.090**	.135	3/8	1-1/2	844290	18.90	844290-C3	23.80
3/16	**.060**	.090	3/8	2	827260	24.30	827260-C3	29.60
3/16	**.090**	.135	3/8	2	827290	24.30	827290-C3	29.60
3/16	**.125**	.190	1/2	2	827308	24.30	827308-C3	29.60
1/4	**.060**	.090	3/8	2-1/2	838960	28.30	838960-C3	35.50
1/4	**.090**	.135	3/8	2-1/2	838990	28.30	838990-C3	35.50
1/4	**.125**	.190	1/2	2-1/2	839008	28.30	839008-C3	35.50

ENGRAVING CUTTERS

Parallel – Ball



- Engraves a 90° vertical wall
- Radius on tip creates radius in the bottom of groove and improves strength
- Half-round drill style
- Non-cutting transition radius at end of length of cut
- Relieved for right hand milling
- Solid carbide
- CNC ground in the USA



DIAMETER	RADIUS	LENGTH OF CUT	SPLIT LENGTH	OVERALL LENGTH	UNCOATED		AlTiN COATED	
D_2	R	L_2	L_3	L_1	TOOL #	PRICE	TOOL #	PRICE
1/8	**.0150**	.044	3/8	1-1/2	828530	21.20	828530-C3	26.10
1/8	**.0300**	.090	3/8	1-1/2	828560	21.20	828560-C3	26.10
1/8	**.0450**	.135	3/8	1-1/2	828590	21.20	828590-C3	26.10
3/16	**.0300**	.090	3/8	2	832660	26.60	832660-C3	31.90
3/16	**.0450**	.135	3/8	2	832690	26.60	832690-C3	31.90
3/16	**.0625**	.190	1/2	2	832708	26.60	832708-C3	31.90
1/4	**.0300**	.090	3/8	2-1/2	841360	30.60	841360-C3	37.80
1/4	**.0450**	.135	3/8	2-1/2	841390	30.60	841390-C3	37.80
1/4	**.0625**	.190	1/2	2-1/2	841408	30.60	841408-C3	37.80



★★★★★

"Harvey Tool always has the perfect tool in stock, never needing to be modified. So many unique tools in stock for almost all applications without having to wait for custom made tools. Amazing company and products."

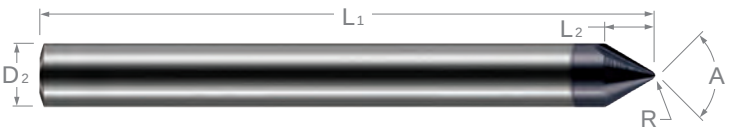
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NEW SIZES!

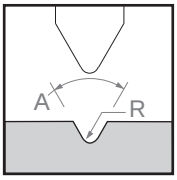
ENGRAVING CUTTERS

Tip Radius – 2 Flute – For Hardened Steels

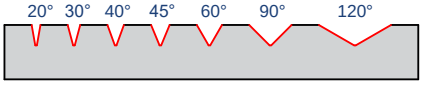




2 Shallow Flute Design



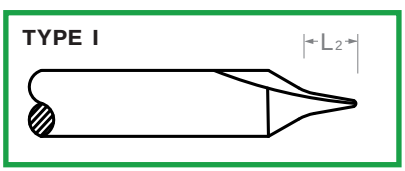
- **Strong 2 flute design for engraving hardened steels 46–68Rc**
- Eccentric relief increases durability and tool life
- Tip radius end diameter and shallow flute design for improved cutting and strength
- Latest generation AlTiN Nano coating offers superior hardness and heat resistance
- Solid carbide
- CNC ground in the USA

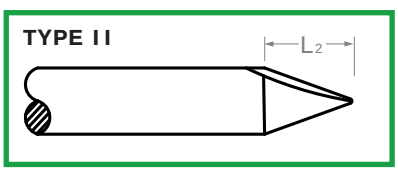


Stocked in *Seven* Included Angles!

INCLUDED ANGLE	DIAMETER	RADIUS	LENGTH OF CUT	TYPE	OVERALL LENGTH	AlTiN NANO COATED	
A +0°30' −0°30'	D_2	R	L_2		L_1	2 FL	PRICE
20°	1/8	**.0050**	.080	I	1-1/2	873308-C6	30.70
	1/8	**.0100**	.080	I	1-1/2	857508-C6	30.70
	1/8	**.0150**	.080	I	1-1/2	763308-C6	30.70 NEW
	1/4	**.0100**	.080	I	2-1/2	857516-C6	47.40
30°	1/8	**.0050**	.218	II	1-1/2	858308-C6	29.60
	1/8	**.0075**	.211	II	1-1/2	825508-C6	29.60
	1/8	**.0100**	.204	II	1-1/2	851208-C6	29.60
	1/8	**.0150**	.190	II	1-1/2	821208-C6	29.60
	1/8	**.0200**	.175	II	1-1/2	843708-C6	29.60
	1/8	**.0250**	.161	II	1-1/2	821008-C6	29.60
	3/16	**.0050**	.335	II	2	858312-C6	36.10
	3/16	**.0100**	.331	II	2	851212-C6	36.10
	1/4	**.0050**	.452	II	2-1/2	858316-C6	45.40
	1/4	**.0100**	.437	II	2-1/2	851216-C6	45.40
	1/4	**.0200**	.409	II	2/12	843716-C6	45.40
40°	1/8	**.0050**	.162	II	1-1/2	837508-C6	30.70
	1/8	**.0100**	.152	II	1-1/2	859308-C6	30.70
	1/4	**.0100**	.324	II	2-1/2	859316-C6	47.40
45°	1/8	**.0050**	.142	II	1-1/2	825808-C6	30.70
	1/8	**.0100**	.152	II	1-1/2	825708-C6	30.70
60°	1/8	**.0050**	.103	II	1-1/2	860008-C6	29.60
	1/8	**.0075**	.100	II	1-1/2	838108-C6	29.60
	1/8	**.0100**	.098	II	1-1/2	877308-C6	29.60
	1/8	**.0150**	.093	II	1-1/2	849008-C6	29.60
	1/8	**.0200**	.088	II	1-1/2	845808-C6	29.60
	1/8	**.0250**	.083	II	1-1/2	820908-C6	29.60
	3/16	**.0050**	.157	II	2	860012-C6	36.10
	3/16	**.0100**	.152	II	2	877312-C6	36.10

continued on next page





ENGRAVING CUTTERS

Tip Radius – 2 Flute – For Hardened Steels (cont.)

continued from previous page

	INCLUDED ANGLE	DIAMETER	RADIUS	LENGTH OF CUT	TYPE	OVERALL LENGTH	AlTiN NANO COATED	
	A $^{+0°30'}_{-0°30'}$	D_2	R	L_2		L_1	2 FL	PRICE
	60°	1/4	.0050	.211	II	2-1/2	860016-C6	45.40
		1/4	.0075	.209	II	2-1/2	838116-C6	45.40
		1/4	.0100	.206	II	2-1/2	877316-C6	45.40
		1/4	.0150	.201	II	2-1/2	849016-C6	45.40
		1/4	.0200	.196	II	2-1/2	845816-C6	45.40
	90°	1/8	.0050	.060	II	1-1/2	853108-C6	29.60
		1/8	.0075	.058	II	1-1/2	825908-C6	29.60
		1/8	.0100	.058	II	1-1/2	869408-C6	29.60
		1/8	.0150	.056	II	1-1/2	821108-C6	29.60
		1/8	.0200	.054	II	1-1/2	837108-C6	29.60
		1/8	.0250	.052	II	1-1/2	820808-C6	29.60
		3/16	.0050	.091	II	2	853112-C6	36.10
		3/16	.0100	.089	II	2	869412-C6	36.10
		1/4	.0050	.122	II	2-1/2	853116-C6	45.40
		1/4	.0100	.120	II	2-1/2	869416-C6	45.40
		1/4	.0200	.116	II	2-1/2	837116-C6	45.40
NEW	120°	1/8	.0050	.035	II	1-1/2	762908-C6	29.60
NEW		1/8	.0100	.034	II	1-1/2	762408-C6	29.60

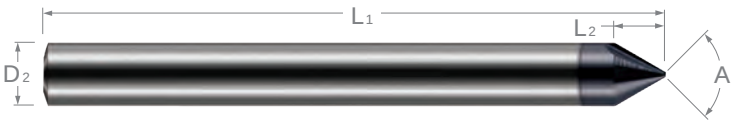
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NEW SIZES!

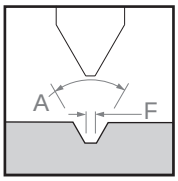
ENGRAVING CUTTERS

Tipped Off – 2 Flute – For Hardened Steels

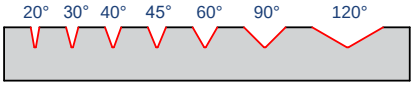




2 Shallow Flute Design



- **Strong 2 flute design for engraving hardened steels 46–68Rc**
- Eccentric relief increases durability and tool life
- Tipped off end diameter and shallow flute design for improved cutting and strength
- Latest generation AlTiN Nano coating offers superior hardness and heat resistance
- Solid carbide
- CNC ground in the USA

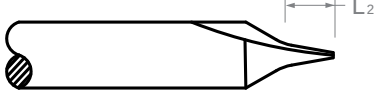


Stocked in *Seven* Included Angles!

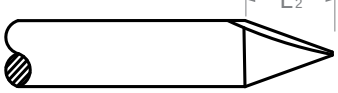
INCLUDED ANGLE	DIAMETER	TIP FLAT	LENGTH OF CUT	TYPE	OVERALL LENGTH	AlTiN NANO COATED		
A +0°30' −0°30'	D_2	F	L_2		L_1	2 FL	PRICE	
20°	1/8	.005	.080	I	1-1/2	775008-C6	25.00	
	1/8	.010	.080	I	1-1/2	892508-C6	25.00	
	1/4	.010	.080	I	2-1/2	892516-C6	40.20	
30°	1/8	.005	.223	II	1-1/2	896708-C6	23.80	
	1/8	.008	.218	II	1-1/2	763908-C6	23.80	NEW
	1/8	.010	.214	II	1-1/2	882008-C6	23.80	
	1/8	.015	.205	II	1-1/2	817908-C6	23.80	
	1/8	.020	.195	II	1-1/2	879608-C6	23.80	
	1/8	.030	.177	II	1-1/2	817608-C6	23.80	
	3/16	.010	.331	II	2	882012-C6	28.80	
	1/4	.010	.447	II	2-1/2	882016-C6	38.30	
40°	1/8	.005	.164	I	1-1/2	811708-C6	25.00	
	1/8	.010	.157	II	1-1/2	875108-C6	25.00	
	1/4	.010	.329	II	2-1/2	875116-C6	40.20	
45°	1/8	.005	.144	II	1-1/2	811608-C6	25.00	
	1/8	.010	.138	II	1-1/2	811508-C6	25.00	
60°	1/8	.005	.103	II	1-1/2	866708-C6	23.80	
	1/8	.008	.101	II	1-1/2	762508-C6	23.80	NEW
	1/8	.010	.099	II	1-1/2	889608-C6	23.80	
	1/8	.015	.095	II	1-1/2	868108-C6	23.80	
	1/8	.020	.090	II	1-1/2	892308-C6	23.80	
	1/8	.030	.082	II	1-1/2	817508-C6	23.80	
	3/16	.005	.158	II	2	866712-C6	28.80	
	3/16	.010	.153	II	2	889612-C6	28.80	
	1/4	.005	.212	II	2-1/2	866716-C6	38.30	
	1/4	.010	.207	II	2-1/2	889616-C6	38.30	
	1/4	.020	.199	II	2-1/2	892316-C6	38.30	
	1/4	.030	.190	II	2-1/2	817516-C6	38.30	

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TYPE I



TYPE II



ENGRAVING CUTTERS

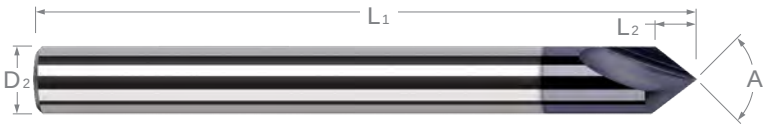
Tipped Off – 2 Flute – For Hardened Steels

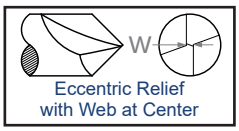
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INCLUDED ANGLE	DIAMETER	TIP FLAT	LENGTH OF CUT	TYPE	OVERALL LENGTH	AlTiN NANO COATED	
A $^{+0°30'}_{-0°30'}$	D_2	F	L_2		L_1	2 FL	PRICE
90°	1/8	**.005**	.060	II	1-1/2	880908-C6	23.80
	1/8	**.010**	.057	II	1-1/2	876508-C6	23.80
	1/8	**.015**	.055	II	1-1/2	817708-C6	23.80
	1/8	**.020**	.052	II	1-1/2	868408-C6	23.80
	1/8	**.030**	.047	II	1-1/2	817408-C6	23.80
	3/16	**.005**	.091	II	2	880912-C6	28.80
	3/16	**.010**	.088	II	2	876512-C6	28.80
	1/4	**.005**	.122	II	2-1/2	880916-C6	38.30
	1/4	**.010**	.120	II	2-1/2	876516-C6	38.30
120°	1/8	**.010**	.033	II	1-1/2	865308-C6	23.80
	1/4	**.010**	.069	II	2-1/2	865316-C6	38.30

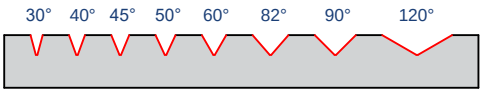
ENGRAVING CUTTERS

Marking Cutters for Ferrous Materials





- **Designed for milling legible part numbers in difficult-to-machine materials**
- Burr-free, two flute cutting design has improved strength over single point engravers
- Produces flat in bottom of groove
- Eccentric relief improves durability over half-round style engravers
- Requires less RPM than half-round engravers
- Solid carbide
- CNC ground in the USA



Stocked in *Eight* Included Angles!

INCLUDED ANGLE	DIAMETER	WEB THICKNESS	LENGTH OF CUT	OVERALL LENGTH		UNCOATED		AlTiN COATED		AMORPHOUS DIAMOND	
A +1° −1°	D_2	W	L_2	L_1		2 FL	PRICE	2 FL	PRICE	2 FL	PRICE
30°	1/8	.003	.228	1-1/2		923908	18.90	923908-C3	23.80		
	1/8	.005	.224	1-1/2		47708	18.90	47708-C3	23.80	47708-C4	31.30
	1/8	.010	.215	1-1/2		996108	18.90	996108-C3	23.80		
	1/8	.015	.205	1-1/2		954008	18.90	954008-C3	23.80		
	3/16	.003	.344	2		923912	23.50	923912-C3	28.80		
	3/16	.005	.341	2		47712	23.50	47712-C3	28.80		
	3/16	.010	.331	2		996112	23.50	996112-C3	28.80		
	1/4	.003	.461	2-1/2		923916	32.90	923916-C3	40.10		
	1/4	.005	.457	2-1/2		47716	32.90	47716-C3	40.10		
	1/4	.010	.448	2-1/2		996116	32.90	996116-C3	40.10		
40°	1/8	.005	.165	1-1/2		995508	20.20	995508-C3	25.10	995508-C4	32.60
	1/8	.010	.158	1-1/2		996708	20.20	996708-C3	25.10		
	3/16	.005	.251	2		995512	25.60	995512-C3	30.90		
	3/16	.010	.244	2		996712	25.60	996712-C3	30.90		
	1/4	.005	.337	2-1/2		995516	35.80	995516-C3	43.00		
	1/4	.010	.330	2-1/2		996716	35.80	996716-C3	43.00		
45°	1/8	.005	.145	1-1/2		987408	19.90	987408-C3	24.80		
	3/16	.005	.220	2		987412	25.60	987412-C3	30.90		
	1/4	.005	.296	2-1/2		987416	35.80	987416-C3	43.00		
50°	1/8	.005	.129	1-1/2		976608	20.20	976608-C3	25.10		
	3/16	.005	.196	2		976612	25.40	976612-C3	30.70		
	1/4	.005	.263	2-1/2		976616	35.70	976616-C3	42.90		
60°	1/8	.003	.106	1-1/2		905708	18.90	905708-C3	23.80		
	1/8	.005	.104	1-1/2		29608	18.90	29608-C3	23.80	29608-C4	31.30
	1/8	.005	.104	3	*LONG!*	957808	23.10	957808-C3	28.00		
	1/8	.010	.100	1-1/2		48308	18.90	48308-C3	23.80	48308-C4	31.30
	1/8	.015	.095	1-1/2		948108	18.90	948108-C3	23.80		
	3/16	.003	.160	2		905712	23.50	905712-C3	28.80		
	3/16	.005	.158	2		29612	23.50	29612-C3	28.80	29612-C4	40.60
	3/16	.010	.154	2		48312	23.50	48312-C3	28.80		
	3/16	.015	.149	2		948112	23.50	948112-C3	28.80		

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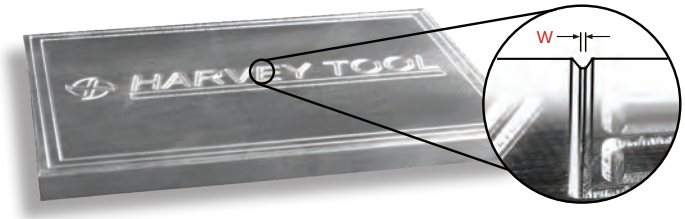
ENGRAVING CUTTERS

Marking Cutters for Ferrous Materials (cont.)

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INCLUDED ANGLE	DIAMETER	WEB THICKNESS	LENGTH OF CUT	OVERALL LENGTH		UNCOATED		AlTiN COATED		AMORPHOUS DIAMOND	
A $^{+1°}_{-1°}$	D_2	W	L_2	L_1		2 FL	PRICE	2 FL	PRICE	2 FL	PRICE
60°	1/4	.003	.214	2-1/2		905716	32.90	905716-C3	40.10		
	1/4	.005	.212	2-1/2		29616	32.90	29616-C3	40.10	29616-C4	52.30
	1/4	.010	.208	2-1/2		48316	32.90	48316-C3	40.10		
	1/4	.015	.204	2-1/2		948116	32.90	948116-C3	40.10		
	3/8	.005	.320	2-1/2		29624	41.70	29624-C3	51.20		
82°	1/8	.005	.069	1-1/2		974108	20.20	974108-C3	25.10		
90°	1/8	.003	.061	1-1/2		914608	18.90	914608-C3	23.80		
	1/8	.005	.060	1-1/2		23608	18.90	23608-C3	23.80	23608-C4	31.30
	1/8	.005	.060	3	*LONG!*	968108	23.10	968108-C3	28.00		
	1/8	.010	.058	1-1/2		50408	18.90	50408-C3	23.80	50408-C4	31.30
	1/8	.015	.055	1-1/2		939708	18.90	939708-C3	23.80		
	3/16	.003	.092	2		914612	23.50	914612-C3	28.80		
	3/16	.005	.091	2		23612	23.50	23612-C3	28.80	23612-C4	40.60
	3/16	.010	.089	2		50412	23.50	50412-C3	28.80		
	3/16	.015	.086	2		939712	23.50	939712-C3	28.80		
	1/4	.003	.124	2-1/2		914616	32.90	914616-C3	40.10		
	1/4	.005	.123	2-1/2		23616	32.90	23616-C3	40.10	23616-C4	52.30
	1/4	.010	.120	2-1/2		50416	32.90	50416-C3	40.10		
	1/4	.015	.118	2-1/2		939716	32.90	939716-C3	40.10		
	3/8	.005	.185	2-1/2		23600	41.70	23600-C3	51.20		
120°	1/8	.003	.035	1-1/2		844808	18.90	844808-C3	23.80		
	1/8	.005	.035	1-1/2		23708	18.90	23708-C3	23.80	23708-C4	31.30
	1/8	.010	.033	1-1/2		998808	18.90	998808-C3	23.80		
	3/16	.005	.053	2		23712	23.50	23712-C3	28.80		
	3/16	.010	.051	2		998812	23.50	998812-C3	28.80		
	1/4	.005	.071	2-1/2		23716	32.90	23716-C3	40.10		
	1/4	.010	.069	2-1/2		998816	32.90	998816-C3	40.10		

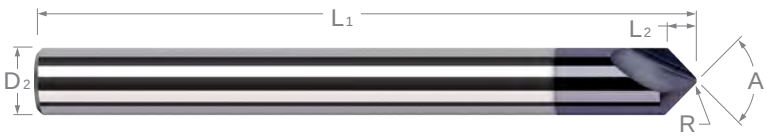
For Marking Cutters for Non-Ferrous Materials, please see page 323.

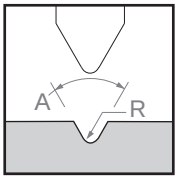


Produces Flat in Bottom of Groove

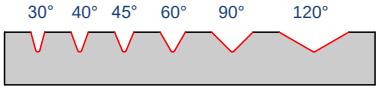
ENGRAVING CUTTERS

Marking Cutters – Tip Radius





- **Designed for milling legible part numbers in difficult-to-machine materials**
- Radiused tip design for improved strength
- 2 flute cutting design has improved strength over single point engravers
- Produces radius in bottom of groove
- Solid carbide
- CNC ground in the USA

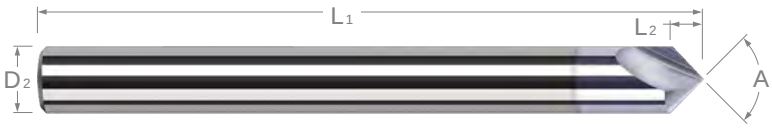


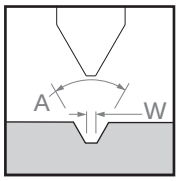
Stocked in *Six* Included Angles!

INCLUDED ANGLE	DIAMETER	RADIUS	LENGTH OF CUT	OVERALL LENGTH	UNCOATED		AlTiN COATED	
A $^{+1°}_{-1°}$	D_2	R	L_2	L_1	2 FL	PRICE	2 FL	PRICE
30°	1/8	.0050	.218	1-1/2	987615	23.30	987615-C3	28.20
	1/8	.0100	.204	1-1/2	961915	23.30	961915-C3	28.20
	1/8	.0150	.190	1-1/2	981815	23.30	981815-C3	28.20
	3/16	.0050	.335	2	958715	28.40	958715-C3	33.70
	3/16	.0100	.321	2	947215	28.40	947215-C3	33.70
	1/4	.0050	.452	2-1/2	966815	38.10	966815-C3	45.30
	1/4	.0100	.437	2-1/2	954915	38.10	954915-C3	45.30
40°	1/8	.0050	.162	1-1/2	987640	25.40	987640-C3	30.30
	1/8	.0100	.152	1-1/2	961940	25.40	961940-C3	30.30
	1/8	.0150	.142	1-1/2	981820	25.40	981820-C3	30.30
45°	1/8	.0050	.143	1-1/2	987622	25.40	987622-C3	30.30
	1/8	.0100	.135	1-1/2	961922	25.40	961922-C3	30.30
60°	1/8	.0050	.103	1-1/2	987630	23.30	987630-C3	28.20
	1/8	.0075	.100	1-1/2	926330	23.30	926330-C3	28.20
	1/8	.0100	.098	1-1/2	961930	23.30	961930-C3	28.20
	1/8	.0150	.093	1-1/2	981830	23.30	981830-C3	28.20
	1/8	.0200	.088	1-1/2	918430	23.30	918430-C3	28.20
	3/16	.0050	.157	2	958730	28.40	958730-C3	33.70
	3/16	.0100	.152	2	947230	28.40	947230-C3	33.70
	3/16	.0150	.147	2	914330	28.40	914330-C3	33.70
	1/4	.0050	.211	2-1/2	966830	38.10	966830-C3	45.30
	1/4	.0100	.206	2-1/2	954930	38.10	954930-C3	45.30
	1/4	.0150	.201	2-1/2	909730	38.10	909730-C3	45.30
	1/4	.0200	.197	2-1/2	831430	38.10	831430-C3	45.30
90°	1/8	.0050	.060	1-1/2	987645	23.30	987645-C3	28.20
	1/8	.0075	.059	1-1/2	926345	23.30	926345-C3	28.20
	1/8	.0100	.058	1-1/2	961945	23.30	961945-C3	28.20
	1/8	.0150	.056	1-1/2	981845	23.30	981845-C3	28.20
	1/8	.0200	.054	1-1/2	918445	23.30	918445-C3	28.20
	3/16	.0050	.091	2	958745	28.40	958745-C3	33.70
	3/16	.0100	.089	2	947245	28.40	947245-C3	33.70
	3/16	.0150	.087	2	914345	28.40	914345-C3	33.70
	1/4	.0050	.122	2-1/2	966845	38.10	966845-C3	45.30
	1/4	.0075	.122	2-1/2	830745	38.10	830745-C3	45.30
	1/4	.0100	.120	2-1/2	954945	38.10	954945-C3	45.30
	1/4	.0150	.118	2-1/2	909745	38.10	909745-C3	45.30
	1/4	.0200	.117	2-1/2	831445	38.10	831445-C3	45.30
120°	1/8	.0050	.035	1-1/2	987660	23.30	987660-C3	28.20
	1/8	.0100	.034	1-1/2	961960	23.30	961960-C3	28.20

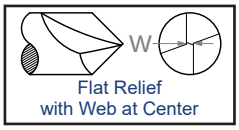
ENGRAVING CUTTERS

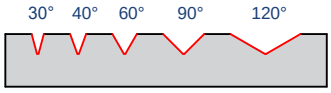
Marking Cutters for Non-Ferrous Materials





- **Designed for milling legible part numbers in non-ferrous and easy-to-machine materials**
- 2 flute cutting design has improved strength over single point engravers
- Flat relief design for improved results in aluminum and other non-ferrous applications
- Produces flat in bottom of groove
- Solid carbide
- CNC ground in the USA



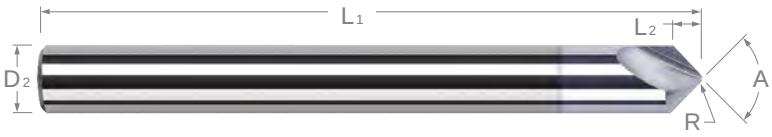


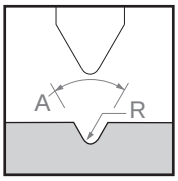
Stocked in *Five* Included Angles!

INCLUDED ANGLE	DIAMETER	WEB THICKNESS	LENGTH OF CUT	OVERALL LENGTH	UNCOATED		TiB_2 COATED	
A $^{+1°}_{-1°}$	D_2	W	L_2	L_1	2 FL	PRICE	2 FL	PRICE
30°	1/8	.005	.230	1-1/2	993215	18.90	993215-C8	26.10
	1/8	.010	.228	1-1/2	963215	18.90	963215-C8	26.10
	1/8	.015	.225	1-1/2	902915	18.90	902915-C8	26.10
	3/16	.005	.347	2	987815	23.50	987815-C8	30.70
	1/4	.005	.464	2-1/2	967415	32.90	967415-C8	40.60
40°	1/8	.005	.170	1-1/2	993220	20.20	993220-C8	27.40
	1/8	.010	.168	1-1/2	963220	20.20	963220-C8	27.40
	3/16	.005	.255	2	987820	23.80	987820-C8	31.00
	1/4	.005	.339	2-1/2	967420	33.00	967420-C8	40.70
60°	1/8	.005	.107	1-1/2	993230	18.90	993230-C8	26.10
	1/8	.010	.106	1-1/2	963230	18.90	963230-C8	26.10
	1/8	.015	.104	1-1/2	902930	18.90	902930-C8	26.10
	3/16	.005	.161	2	987830	23.50	987830-C8	30.70
	3/16	.010	.160	2	921230	23.50	921230-C8	30.70
	1/4	.005	.215	2-1/2	967430	32.90	967430-C8	40.60
	1/4	.010	.214	2-1/2	918630	32.90	918630-C8	40.60
90°	1/8	.005	.062	1-1/2	993245	18.90	993245-C8	26.10
	1/8	.010	.061	1-1/2	963245	18.90	963245-C8	26.10
	1/8	.015	.060	1-1/2	902945	18.90	902945-C8	26.10
	3/16	.005	.093	2	987845	23.50	987845-C8	30.70
	3/16	.010	.092	2	921245	23.50	921245-C8	30.70
	1/4	.005	.124	2-1/2	967445	32.90	967445-C8	40.60
	1/4	.010	.123	2-1/2	918645	32.90	918645-C8	40.60
120°	1/8	.005	.036	1-1/2	993260	18.90	993260-C8	26.10
	1/8	.010	.035	1-1/2	963260	18.90	963260-C8	26.10

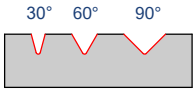
ENGRAVING CUTTERS

Marking Cutters – Tip Radius for Non-Ferrous Materials





- **Designed for milling legible part numbers in non-ferrous and easy-to-machine materials**
- Radiused tip design for improved strength
- Flat relief design for improved results
- Solid carbide
- CNC ground in the USA



Stocked in *Three* Included Angles!

INCLUDED ANGLE	DIAMETER	RADIUS	LENGTH OF CUT	OVERALL LENGTH	UNCOATED		TiB_2 COATED	
A $^{+1°}_{-1°}$	D_2	R	L_2	L_1	2 FL	PRICE	2 FL	PRICE
30°	1/8	.005	.219	1-1/2	847115	23.30	847115-C8	30.50
	1/8	.010	.205	1-1/2	854415	23.30	854415-C8	30.50
	1/4	.005	.452	2-1/2	774915	34.90	774915-C8	42.60
60°	1/8	.005	.103	1-1/2	847130	23.30	847130-C8	30.50
	1/8	.010	.098	1-1/2	854430	23.30	854430-C8	30.50
	1/4	.005	.212	2-1/2	774930	34.00	774930-C8	41.70
90°	1/8	.005	.060	1-1/2	847145	23.30	847145-C8	30.50
	1/8	.010	.058	1-1/2	854445	23.30	854445-C8	30.50
	1/4	.005	.123	2-1/2	774945	34.00	774945-C8	41.70



Main Differences Between Engravers vs. Marking Cutters

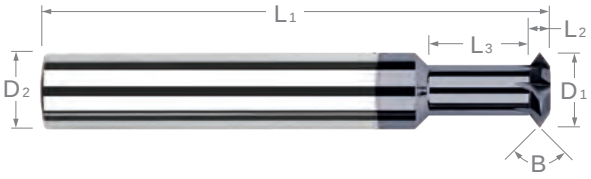
Although similar in look, Engravers and Marking Cutters serve different purposes. Do you need assistance deciding between the two? We can help! Our "In the Loupe" blog post **Main Differences Between Engravers & Marking Cutters** helps you decide which tooling option is best for you.

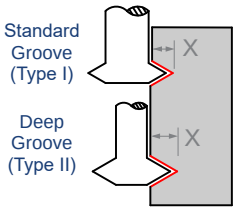
Read more on harveyperformance.com/in-the-loupe/

NEW SIZES!

DOUBLE ANGLE SHANK CUTTERS

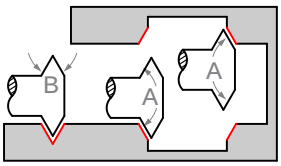
Pointed





- Ideal for back chamfering, chamfering, deburring, and milling a "V-groove"
- Reduced neck for long reach machining
- Tip of included angle ground to a point
- 60° angle can also be used for thread milling
- Solid carbide
- CNC ground in the USA

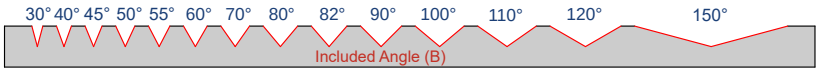
Great for Chamfering and Deburring



Included Angle Conversion

A = 180 - B	150°	140°	135°	130°	125°	120°	110°	100°	98°	90°	80°	70°	60°	30°
B = 180 - A	30°	40°	45°	50°	55°	60°	70°	80°	82°	90°	100°	110°	120°	150°

Stocked in *Fourteen* Included Angles!



INCL. ANGLE	CUTTER DIA.	CUTTER WIDTH	NECK DIA.	NECK LENGTH	TYPE	FLUTES	SHANK DIA.	OAL	UNCOATED		AlTiN COATED		AlTiN NANO COATED	
B +1° −1°	D1 +.000″ −.002″	L2		L3 +.020″ −.000″			D2	L1	TOOL #	PRICE	TOOL #	PRICE	TOOL #	PRICE
30°	1/16	.008	1/32	**.093**	I	2	1/8	1-1/2	66062	50.50	66062-C3	55.40		
	5/64	.010	.039	**.118**	I	2	1/8	1-1/2	66078	50.50	66078-C3	55.40		
	3/32	.012	3/64	**.141**	I	2	1/8	1-1/2	66093	50.50	66093-C3	55.40		
	1/8	.017	1/16	**.187**	I	4	1/8	1-1/2	66108	49.30	66108-C3	54.20		
	1/8	.017	1/16	**.500**	I	4	1/8	1-1/2	934308	50.50	934308-C3	55.40		
	3/16	.025	3/32	**.312**	I	4	3/16	2	66112	51.10	66112-C3	56.40		
	1/4	.033	1/8	**.312**	I	4	1/4	2	66116	64.90	66116-C3	72.10		
	1/4	.033	1/8	**.625**	I	4	1/4	2	921716	76.50	921716-C3	83.70		
	3/8	.033	1/4	**.500**	I	6	3/8	2-1/2	66105	85.40	66105-C3	94.90		
	3/8	.033	1/4	**1.500**	I	6	3/8	3-1/2	934324	101.60	934324-C3	111.10		
	1/2	.050	5/16	**.500**	I	6	1/2	3	66110	117.60	66110-C3	131.80		
	1/2	.050	5/16	**1.500**	I	6	1/2	4	934332	150.00	934332-C3	164.20		
40°	1/4	.045	1/8	**.312**	I	4	1/4	2	29720	65.30	29720-C3	72.50		
	1/4	.045	1/8	**.625**	I	4	1/4	2	918116	76.00	918116-C3	83.20		
	3/8	.045	1/4	**.500**	I	6	3/8	2-1/2	909924	82.60	909924-C3	92.10		
	3/8	.045	1/4	**1.500**	I	6	3/8	3-1/2	967505	102.60	967505-C3	112.10		
	1/2	.068	5/16	**.500**	I	6	1/2	3	909932	112.50	909932-C3	126.70		
	1/2	.068	5/16	**1.500**	I	6	1/2	4	967510	146.30	967510-C3	160.50		
45°	1/8	.026	1/16	**.187**	I	4	1/8	1-1/2	905608	50.50	905608-C3	55.40		
	3/16	.039	3/32	**.312**	I	4	3/16	2	905612	51.10	905612-C3	56.40		
	1/4	.052	1/8	**.312**	I	4	1/4	2	29723	64.90	29723-C3	72.10		
	1/4	.052	1/8	**.625**	I	4	1/4	2	917016	76.50	917016-C3	83.70		
	1/4	.052	1/8	**1.000**	I	4	1/4	3	984903	79.50	984903-C3	86.70		
	3/8	.052	1/4	**.500**	I	6	3/8	2-1/2	905624	82.20	905624-C3	91.70		
	3/8	.052	1/4	**1.000**	I	6	3/8	2-1/2	917024	93.70	917024-C3	103.20		
	3/8	.052	1/4	**1.500**	I	6	3/8	3-1/2	984905	102.10	984905-C3	111.60		
	1/2	.078	5/16	**.500**	I	6	1/2	3	905632	112.00	905632-C3	126.20		
	1/2	.078	5/16	**1.500**	I	6	1/2	4	984910	145.60	984910-C3	159.80		

continued on next page

For tool selection tips, search for keyword **AnglesUntangled** on www.harveytool.com

NEW SIZES!

DOUBLE ANGLE SHANK CUTTERS

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INCL. ANGLE	CUTTER DIA.	CUTTER WIDTH	NECK DIA.	NECK LENGTH	TYPE	FLUTES	SHANK DIA.	OAL	UNCOATED		AlTiN COATED		AlTiN NANO COATED	
B $^{+1°}_{-1°}$	D_1 $^{+.000″}_{-.002″}$	L_2		L_3 $^{+.020″}_{-.000″}$			D_2	L_1	TOOL #	PRICE	TOOL #	PRICE	TOOL #	PRICE
50°	1/8	.029	1/16	**.187**	I	4	1/8	1-1/2	985801	48.80	985801-C3	53.70		
	1/8	.029	1/16	**.500**	I	4	1/8	1-1/2	974401	58.30	974401-C3	63.20		
	3/16	.044	3/32	**.312**	I	4	3/16	2	985802	52.10	985802-C3	57.40		
	3/16	.044	3/32	**.750**	I	4	3/16	2-1/2	974402	60.50	974402-C3	65.80		
	1/4	.058	1/8	**.312**	I	4	1/4	2	29725	69.00	29725-C3	76.20		
	1/4	.058	1/8	**1.000**	I	4	1/4	3	974403	79.90	974403-C3	87.10		
	3/8	.058	1/4	**.500**	I	6	3/8	2-1/2	985805	84.90	985805-C3	94.40		
	3/8	.058	1/4	**1.500**	I	6	3/8	3-1/2	974405	104.10	974405-C3	113.60		
	1/2	.088	5/16	**.500**	I	6	1/2	3	985810	115.70	985810-C3	129.90		
	1/2	.088	5/16	**1.500**	I	6	1/2	4	974410	148.40	974410-C3	162.60		
55°	1/4	.065	1/8	**.312**	I	4	1/4	2	29728	69.40	29728-C3	76.60		
60°	1/16	.018	1/32	**.093**	I	2	1/8	1-1/2	47362	49.00	47362-C3	53.90		
	1/16	.018	1/32	**.156**	I	2	1/8	1-1/2	965562	49.00	965562-C3	53.90		
	5/64	.023	.039	**.118**	I	2	1/8	1-1/2	47378	49.00	47378-C3	53.90		
	3/32	.027	3/64	**.141**	I	2	1/8	1-1/2	47393	49.00	47393-C3	53.90		
	3/32	.027	3/64	**.250**	I	2	1/8	1-1/2	965593	49.00	965593-C3	53.90		
	1/8	.036	1/16	**.125**	I	4	1/8	1-1/2	937501	45.20	937501-C3	50.10		
	1/8	.036	1/16	**.187**	I	4	1/8	1-1/2	16201	45.20	16201-C3	50.10		
	1/8	.036	1/16	**.312**	I	4	1/8	1-1/2	984401	50.80	984401-C3	55.70		
	1/8	.036	1/16	**.500**	I	4	1/8	2	27501	55.30	27501-C3	60.20		
	1/8	.036	1/16	**.875**	I	4	1/8	2	981001	60.40	981001-C3	65.30		
	5/32	.045	5/64	**.250**	I	4	3/16	2	16256	49.00	16256-C3	54.30		
	5/32	.045	5/64	**.625**	I	4	3/16	2-1/2	27556	55.30	27556-C3	60.60		
	3/16	.055	3/32	**.187**	I	4	3/16	2	937502	48.10	937502-C3	53.40		
	3/16	.055	3/32	**.312**	I	4	3/16	2	16202	48.10	16202-C3	53.40		
	3/16	.055	3/32	**.500**	I	4	3/16	2	984402	55.70	984402-C3	61.00		
	3/16	.055	3/32	**.750**	I	4	3/16	2-1/2	27502	59.20	27502-C3	64.50		
	3/16	.055	3/32	**1.000**	I	4	3/16	2-1/2	925502	61.90	925502-C3	67.20		
	1/4	.072	1/8	**.187**	I	4	1/4	2	937503	64.90	937503-C3	72.10		
	1/4	.072	1/8	**.312**	I	4	1/4	2	16203	64.90	16203-C3	72.10		
	1/4	.072	1/8	**.312**	I	6	1/4	2	808016	69.60	808016-C3	76.80		
	1/4	.072	1/8	**.625**	I	4	1/4	2-1/2	984403	72.80	984403-C3	80.00		
	1/4	.072	1/8	**1.000**	I	4	1/4	3	27503	77.70	27503-C3	84.90		
	1/4	.072	1/8	**1.312**	I	4	1/4	3	925503	78.10	925503-C3	85.30		
	1/4	.072	1/8	**1.750**	I	4	1/4	3	981003	79.20	981003-C3	86.40		
	5/16	.072	3/16	**.375**	I	6	5/16	2-1/2	16272	78.70	16272-C3	87.10		
	5/16	.072	3/16	**.875**	I	6	5/16	2-1/2	984472	81.00	984472-C3	89.40		
	3/8	.072	1/4	**.312**	I	6	3/8	2-1/2	937505	82.80	937505-C3	92.30		
	3/8	.072	1/4	**.500**	I	6	3/8	2-1/2	16205	82.80	16205-C3	92.30		
	3/8	.072	1/4	**.750**	I	6	3/8	2-1/2	773305	88.00	773305-C3	97.50		
	3/8	.072	1/4	**1.000**	I	6	3/8	2-1/2	984405	93.30	984405-C3	102.80		
	3/8	.072	1/4	**1.500**	I	6	3/8	3-1/2	27505	103.70	27505-C3	113.20		
	3/8	.072	1/4	**2.000**	I	6	3/8	3-1/2	925505	108.60	925505-C3	118.10		

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DOUBLE ANGLE SHANK CUTTERS

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INCL. ANGLE	CUTTER DIA.	CUTTER WIDTH	NECK DIA.	NECK LENGTH	TYPE	FLUTES	SHANK DIA.	OAL	UNCOATED		AlTiN COATED		AlTiN NANO COATED	
B +1° −1°	D1 +.000″ −.002″	L2		L3 +.020″ −.000″			D2	L1	TOOL #	PRICE	TOOL #	PRICE	TOOL #	PRICE
60°	1/2	.109	5/16	**.500**	I	6	1/2	3	16210	113.40	16210-C3	127.60		
	1/2	.109	5/16	**.750**	I	6	1/2	3	773310	117.80	773310-C3	132.00		
	1/2	.109	5/16	**1.000**	I	6	1/2	3	984410	123.50	984410-C3	137.70		
NEW	1/2	.109	5/16	**1.250**	I	6	1/2	3-1/2	762310	134.00	762310-C3	148.20		
	1/2	.109	5/16	**1.500**	I	6	1/2	4	27510	144.50	27510-C3	158.70		
	1/2	.109	5/16	**2.000**	I	6	1/2	4	925510	148.20	925510-C3	162.40		
	1/2	.109	5/16	**2.625**	I	6	1/2	4	981010	152.10	981010-C3	166.30		
	5/8	.144	3/8	**.750**	I	6	5/8	3-1/2	16215	204.10	16215-C3	218.30		
70°	1/4	.088	1/8	**.312**	I	4	1/4	2	871903	69.40	871903-C3	76.60		
	3/8	.088	1/4	**1.500**	I	6	3/8	3-1/2	791005	109.50	791005-C3	119.00		
80°	1/4	.105	1/8	**.312**	I	4	1/4	2	29740	69.40	29740-C3	76.60		
	3/8	.105	1/4	**1.500**	I	6	3/8	3-1/2	792005	109.50	792005-C3	119.00		
82°	1/4	.109	1/8	**.312**	I	4	1/4	2	29741	69.40	29741-C3	76.60		
	3/8	.109	1/4	**1.500**	I	6	3/8	3-1/2	920805	109.50	920805-C3	119.00		
	1/2	.163	5/16	**1.500**	I	6	1/2	4	920810	152.50	920810-C3	166.70		
90°	1/32	.015	1/64	**.093**	I	2	1/8	1-1/2	45131	44.10	45131-C3	49.00		
	1/16	.031	1/32	**.062**	I	2	1/8	1-1/2	946862	44.10	946862-C3	49.00		
	1/16	.031	1/32	**.093**	I	2	1/8	1-1/2	19162	44.10	19162-C3	49.00		
	1/16	.031	1/32	**.093**	I	4	1/8	1-1/2	838804	44.10	838804-C3	49.00		
	1/16	.031	1/32	**.125**	I	2	1/8	1-1/2	807662	44.10	807662-C3	49.00		
	1/16	.031	1/32	**.156**	I	2	1/8	1-1/2	45162	49.00	45162-C3	53.90		
	1/16	.031	1/32	**.156**	I	4	1/8	1-1/2	832404	51.50	832404-C3	56.40		
	1/16	.031	1/32	**.187**	I	2	1/8	1-1/2	822104	53.70	822104-C3	58.60		
	1/16	.031	1/32	**.250**	I	2	1/8	1-1/2	71662	53.70	71662-C3	58.60		
	1/16	.031	1/32	**.312**	I	2	1/8	1-1/2	857862	53.70	857862-C3	58.60		
	1/16	.031	1/32	**.375**	I	2	1/8	1-1/2	963662	53.70	963662-C3	58.60		
	5/64	.039	.039	**.078**	I	2	1/8	1-1/2	946878	44.10	946878-C3	49.00		
	5/64	.039	.039	**.093**	I	2	1/8	1-1/2	807105	44.10	807105-C3	49.00		
	5/64	.039	.039	**.118**	I	2	1/8	1-1/2	19178	44.10	19178-C3	49.00		
	5/64	.039	.039	**.125**	I	2	1/8	1-1/2	807005	44.10	807005-C3	49.00		
	5/64	.039	.039	**.187**	I	2	1/8	1-1/2	45178	49.00	45178-C3	53.90		
	5/64	.039	.039	**.187**	I	4	1/8	1-1/2	832405	51.50	832405-C3	56.40		
	5/64	.039	.039	**.250**	I	2	1/8	1-1/2	822178	51.50	822178-C3	61.00		
	5/64	.039	.039	**.312**	I	2	1/8	1-1/2	71678	53.70	71678-C3	58.60		
	5/64	.039	.039	**.375**	I	2	1/8	1-1/2	771978	53.70	771978-C3	58.60		
	5/64	.039	.039	**.500**	I	2	1/8	1-1/2	963678	53.70	963678-C3	58.60		
	3/32	.047	3/64	**.093**	I	2	1/8	1-1/2	946893	44.10	946893-C3	49.00		
	3/32	.047	3/64	**.125**	I	2	1/8	1-1/2	807106	44.10	807106-C3	49.00		
	3/32	.047	3/64	**.141**	I	2	1/8	1-1/2	19193	44.10	19193-C3	49.00		
	3/32	.047	3/64	**.141**	I	4	1/8	1-1/2	838806	44.10	838806-C3	49.00		
	3/32	.047	3/64	**.187**	I	2	1/8	1-1/2	807693	44.10	807693-C3	49.00		
	3/32	.047	3/64	**.250**	I	2	1/8	1-1/2	45193	49.00	45193-C3	53.90		
	3/32	.047	3/64	**.250**	I	4	1/8	1-1/2	832406	51.50	832406-C3	56.40		
	3/32	.047	3/64	**.312**	I	2	1/8	1-1/2	807493	53.70	807493-C3	58.60		
	3/32	.047	3/64	**.375**	I	2	1/8	1-1/2	71693	53.70	71693-C3	58.60		
	3/32	.047	3/64	**.375**	I	4	1/8	1-1/2	792906	53.70	792906-C3	58.60		
	3/32	.047	3/64	**.500**	I	2	1/8	1-1/2	857893	53.70	857893-C3	58.60		
	3/32	.047	3/64	**.625**	I	2	1/8	2	963693	55.70	963693-C3	60.60		
	3/32	.047	3/64	**.750**	I	2	1/8	2	855793	58.00	855793-C3	62.90		

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NEW SIZES!

DOUBLE ANGLE SHANK CUTTERS

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INCL. ANGLE	CUTTER DIA.	CUTTER WIDTH	NECK DIA.	NECK LENGTH	TYPE	FLUTES	SHANK DIA.	OAL	UNCOATED		AlTiN COATED		AlTiN NANO COATED		
B $^{+1°}_{-1°}$	D_1 $^{+.000″}_{-.002″}$	L_2		L_3 $^{+.020″}_{-.000″}$			D_2	L_1	TOOL #	PRICE	TOOL #	PRICE	TOOL #	PRICE	
90°	3 mm	.059	.059	**.187**	I	2	1/8	1-1/2	1913M	44.80	1913M-C3	49.70			
	3 mm	.059	.059	**.312**	I	2	1/8	1-1/2	4513M	51.50	4513M-C3	56.40			
	1/8	.062	1/16	**.125**	I	4	1/8	1-1/2	946901	44.10	946901-C3	49.00			
	1/8	.062	1/16	**.125**	I	6	1/8	1-1/2	791908	44.10	791908-C3	49.00			
	1/8	.062	1/16	**.187**	I	4	1/8	1-1/2	19201	44.10	19201-C3	49.00	19201-C6	51.30	NEW
	1/8	.083	.042	**.187**	II	4	1/8	1-1/2	759908	48.00	759908-C3	52.90			NEW
	1/8	.062	1/16	**.187**	I	6	1/8	1-1/2	838808	46.20	838808-C3	51.10	838808-C6	53.40	NEW
	1/8	.062	1/16	**.250**	I	4	1/8	1-1/2	807308	46.80	807308-C3	51.70			
	1/8	.062	1/16	**.312**	I	4	1/8	1-1/2	72601	49.50	72601-C3	54.40			
	1/8	.062	1/16	**.312**	I	6	1/8	1-1/2	847408	52.00	847408-C3	56.90			
	1/8	.062	1/16	**.375**	I	4	1/8	1-1/2	806908	49.50	806908-C3	54.40			
	1/8	.062	1/16	**.500**	I	4	1/8	2	19501	57.20	19501-C3	62.10			
	1/8	.062	1/16	**.500**	I	6	1/8	2	807908	59.70	807908-C3	64.60			
	1/8	.062	1/16	**.625**	I	4	1/8	2	71701	59.20	71701-C3	64.10			
	1/8	.062	1/16	**.750**	I	4	1/8	2	821808	60.60	821808-C3	65.50			
	1/8	.062	1/16	**.875**	I	4	1/8	2	26801	62.30	26801-C3	67.20			
	1/8	.062	1/16	**1.000**	I	4	1/8	2	772301	64.00	772301-C3	68.90			
	1/8	.062	1/16	**1.125**	I	4	1/8	2-1/2	963701	68.40	963701-C3	73.30			
	5/32	.078	5/64	**.125**	I	4	3/16	2	771056	43.70	771056-C3	49.00			
	5/32	.078	5/64	**.156**	I	4	3/16	2	946956	44.60	946956-C3	49.90			
	5/32	.078	5/64	**.250**	I	4	3/16	2	19256	46.90	19256-C3	52.20			
	5/32	.078	5/64	**.250**	I	6	3/16	2	838810	48.30	838810-C3	53.60			
	5/32	.078	5/64	**.375**	I	4	3/16	2	807310	50.20	807310-C3	55.50			
	5/32	.078	5/64	**.437**	I	4	3/16	2	72656	53.70	72656-C3	59.00			
	5/32	.078	5/64	**.500**	I	4	3/16	2	807210	53.70	807210-C3	59.00			
	5/32	.078	5/64	**.625**	I	4	3/16	2-1/2	19556	57.80	19556-C3	63.10			
	5/32	.078	5/64	**1.125**	I	4	3/16	2-1/2	26856	64.60	26856-C3	69.90			
	3/16	.093	3/32	**.156**	I	4	3/16	2	771002	45.10	771002-C3	50.40			
	3/16	.093	3/32	**.187**	I	4	3/16	2	946902	45.10	946902-C3	50.40			
	3/16	.093	3/32	**.187**	I	6	3/16	2	807812	47.50	807812-C3	52.80			
	3/16	.093	3/32	**.250**	I	4	3/16	2	807112	45.90	807112-C3	51.20			
	3/16	.093	3/32	**.312**	I	4	3/16	2	19202	45.90	19202-C3	51.20	19202-C6	53.60	NEW
	3/16	.125	1/16	**.312**	II	4	3/16	2	759912	51.50	759912-C3	56.80			NEW
	3/16	.093	3/32	**.312**	I	6	3/16	2	838812	48.40	838812-C3	53.70	838812-C6	56.10	NEW
	3/16	.093	3/32	**.375**	I	4	3/16	2	807312	50.20	807312-C3	55.50			
	3/16	.093	3/32	**.500**	I	4	3/16	2	72602	54.70	72602-C3	60.00			
	3/16	.093	3/32	**.500**	I	6	3/16	2	847412	57.30	847412-C3	62.60			
	3/16	.093	3/32	**.625**	I	4	3/16	2	807212	58.00	807212-C3	63.30			
	3/16	.093	3/32	**.750**	I	4	3/16	2-1/2	19502	58.00	19502-C3	63.30			
	3/16	.093	3/32	**.750**	I	6	3/16	2-1/2	822612	59.40	822612-C3	64.70			
	3/16	.093	3/32	**1.000**	I	4	3/16	2-1/2	71702	63.40	71702-C3	68.70			
	3/16	.093	3/32	**1.312**	I	4	3/16	2-1/2	26802	64.90	26802-C3	70.20			
	3/16	.093	3/32	**1.625**	I	4	3/16	3	963702	72.10	963702-C3	77.40			
	6 mm	.118	.118	**.312**	I	4	1/4	2	19262	71.80	19262-C3	79.00			
	6 mm	.118	.118	**.625**	I	4	1/4	2	72662	74.20	72662-C3	81.40			
	6 mm	.118	.118	**1.000**	I	4	1/4	2-1/2	19562	76.60	19562-C3	83.80			

continued on next page

NEW SIZES!

DOUBLE ANGLE SHANK CUTTERS

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	INCL. ANGLE	CUTTER DIA.	CUTTER WIDTH	NECK DIA.	NECK LENGTH	TYPE	FLUTES	SHANK DIA.	OAL	UNCOATED		AlTiN COATED		AlTiN NANO COATED	
	B +1° −1°	D_1 +.000″ −.002″	L_2		L_3 +.020″ −.000″			D_2	L_1	TOOL #	PRICE	TOOL #	PRICE	TOOL #	PRICE
		1/4	.125	1/8	**.187**	I	4	1/4	2	946903	55.30	946903-C3	62.50		
		1/4	.125	1/8	**.250**	I	4	1/4	2	807116	56.30	807116-C3	63.50		
NEW		1/4	.125	1/8	**.312**	I	4	1/4	2	19203	56.30	19203-C3	63.50	19203-C6	66.90
NEW		1/4	.167	.083	**.312**	II	4	1/4	2	759916	57.30	759916-C3	64.50		
NEW		1/4	.125	1/8	**.312**	I	6	1/4	2	838816	59.20	838816-C3	66.40	838816-C6	69.80
		1/4	.125	1/8	**.375**	I	4	1/4	2-1/2	807016	62.30	807016-C3	69.50		
		1/4	.125	1/8	**.500**	I	4	1/4	2	807316	57.00	807316-C3	64.20		
		1/4	.125	1/8	**.625**	I	4	1/4	2-1/2	72603	62.50	72603-C3	69.70		
		1/4	.125	1/8	**.625**	I	6	1/4	2-1/2	847416	65.70	847416-C3	72.90		
		1/4	.125	1/8	**.750**	I	4	1/4	2-1/2	807216	62.50	807216-C3	69.70		
		1/4	.125	1/8	**1.000**	I	4	1/4	3	19503	68.40	19503-C3	75.60		
		1/4	.125	1/8	**1.000**	I	6	1/4	3	822616	71.60	822616-C3	76.40		
		1/4	.125	1/8	**1.250**	I	4	1/4	3	822216	73.10	822216-C3	80.30		
		1/4	.125	1/8	**1.312**	I	4	1/4	3	71703	73.10	71703-C3	80.30		
		1/4	.125	1/8	**1.500**	I	4	1/4	3	821816	75.30	821816-C3	82.50		
		1/4	.125	1/8	**1.750**	I	4	1/4	3	26803	75.30	26803-C3	82.50		
		1/4	.125	1/8	**2.125**	I	4	1/4	4	963703	81.50	963703-C3	89.90		
		5/16	.125	3/16	**.250**	I	6	5/16	2-1/2	946904	76.20	946904-C3	84.60		
		5/16	.125	3/16	**.375**	I	6	5/16	2-1/2	19272	78.70	19272-C3	87.10		
		5/16	.125	3/16	**.625**	I	6	5/16	2-1/2	833572	79.80	833572-C3	88.20		
		5/16	.125	3/16	**.875**	I	6	5/16	2-1/2	72672	79.80	72672-C3	88.20		
		5/16	.125	3/16	**1.000**	I	6	5/16	3	807220	85.40	807220-C3	93.80		
		5/16	.125	3/16	**1.250**	I	6	5/16	3	19572	85.40	19572-C3	93.80		
	90°	5/16	.125	3/16	**1.250**	I	8	5/16	3	822620	89.50	822620-C3	97.90		
		5/16	.125	3/16	**1.500**	I	6	5/16	3	772873	86.90	772873-C3	95.30		
		5/16	.125	3/16	**1.625**	I	6	5/16	3	71772	88.70	71772-C3	97.10		
		5/16	.125	3/16	**2.125**	I	6	5/16	3	26872	91.90	26872-C3	100.30		
		3/8	.125	1/4	**.312**	I	6	3/8	2-1/2	946905	76.50	946905-C3	86.00		
		3/8	.125	1/4	**.375**	I	6	3/8	2-1/2	807124	79.00	807124-C3	88.50		
NEW		3/8	.125	1/4	**.500**	I	6	3/8	2-1/2	19205	80.40	19205-C3	88.70	19205-C6	92.30
NEW		3/8	.250	1/8	**.500**	II	6	3/8	2-1/2	759924	85.70	759924-C3	95.20		
NEW		3/8	.125	1/4	**.500**	I	8	3/8	2-1/2	838824	84.50	838824-C3	94.00	838824-C6	96.40
		3/8	.125	1/4	**.750**	I	6	3/8	2-1/2	807324	85.00	807324-C3	94.50		
		3/8	.125	1/4	**1.000**	I	6	3/8	2-1/2	72605	89.50	72605-C3	99.00		
		3/8	.125	1/4	**1.000**	I	8	3/8	2-1/2	847424	98.80	847424-C3	108.30		
		3/8	.125	1/4	**1.250**	I	6	3/8	3	807224	100.00	807224-C3	109.50		
		3/8	.125	1/4	**1.500**	I	6	3/8	3-1/2	19505	101.20	19505-C3	110.70		
		3/8	.125	1/4	**1.500**	I	8	3/8	3-1/2	822624	105.20	822624-C3	110.00		
		3/8	.125	1/4	**1.750**	I	6	3/8	3-1/2	822224	106.10	822224-C3	115.60		
		3/8	.125	1/4	**2.000**	I	6	3/8	3-1/2	71705	106.10	71705-C3	115.60		
		3/8	.125	1/4	**2.312**	I	6	3/8	3-1/2	26805	108.90	26805-C3	118.40		
		3/8	.125	1/4	**2.625**	I	6	3/8	4	963705	115.30	963705-C3	128.30		
		.393	.133	.260	**.500**	I	6	7/16	2-3/4	19279	118.70	19279-C3	130.60		
		.393	.133	.260	**1.500**	I	6	7/16	3-1/2	19579	137.50	19579-C3	151.70		
		7/16	.157	9/32	**.500**	I	6	7/16	2-3/4	19208	118.70	19208-C3	130.60		
		7/16	.157	9/32	**1.500**	I	6	7/16	3-1/2	19508	137.50	19508-C3	151.70		

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NEW SIZES!

DOUBLE ANGLE SHANK CUTTERS

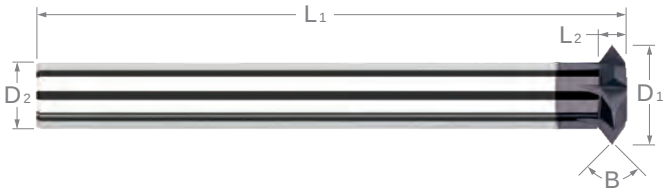
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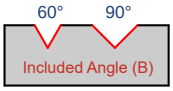
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INCL. ANGLE	CUTTER DIA.	CUTTER WIDTH	NECK DIA.	NECK LENGTH	TYPE	FLUTES	SHANK DIA.	OAL	UNCOATED		AlTiN COATED		AlTiN NANO COATED		
B +1° −1°	D_1 +.000″ −.002″	L_2		L_3 +.020″ −.000″			D_2	L_1	TOOL #	PRICE	TOOL #	PRICE	TOOL #	PRICE	
90°	1/2	.187	5/16	**.312**	I	6	1/2	3	946910	104.10	946910-C3	118.30			
	1/2	.187	5/16	**.500**	I	6	1/2	3	19210	107.50	19210-C3	121.70	19210-C6	122.90	NEW
	1/2	.333	.167	**.500**	II	6	1/2	3	759932	108.70	759932-C3	122.90			NEW
	1/2	.187	5/16	**.500**	I	8	1/2	3	838832	112.80	838832-C3	127.00	838832-C6	128.20	NEW
	1/2	.187	5/16	**.750**	I	6	1/2	3	807332	110.50	807332-C3	124.70			
	1/2	.187	5/16	**1.000**	I	6	1/2	3	72610	117.20	72610-C3	131.40			
	1/2	.187	5/16	**1.000**	I	8	1/2	3	847432	119.10	847432-C3	133.30			
	1/2	.187	5/16	**1.250**	I	6	1/2	3-1/2	822432	120.10	822432-C3	128.40			
	1/2	.187	5/16	**1.500**	I	6	1/2	4	19510	137.50	19510-C3	151.70			
	1/2	.187	5/16	**1.500**	I	8	1/2	4	807932	142.90	807932-C3	157.10			
	1/2	.187	5/16	**1.750**	I	6	1/2	4	822232	140.10	822232-C3	154.30			
	1/2	.187	5/16	**2.000**	I	6	1/2	4	71710	142.40	71710-C3	156.60			
	1/2	.187	5/16	**2.312**	I	6	1/2	4	821810	143.60	821810-C3	157.80			NEW
	1/2	.187	5/16	**2.625**	I	6	1/2	4	26810	146.20	26810-C3	160.40			
	1/2	.187	5/16	**3.125**	I	6	1/2	6	963710	152.90	963710-C3	167.10			
	5/8	.250	3/8	**.750**	I	6	5/8	3-1/2	19215	204.60	19215-C3	218.80			
	5/8	.250	3/8	**1.250**	I	6	5/8	3-1/2	72615	210.20	72615-C3	224.40			
100°	1/8	.075	1/16	**.187**	I	4	1/8	1-1/2	983401	47.70	983401-C3	52.60			
	1/8	.075	1/16	**.500**	I	4	1/8	1-1/2	969901	57.40	969901-C3	62.30			
	3/16	.113	3/32	**.312**	I	4	3/16	2	983402	50.10	983402-C3	55.40			
	3/16	.113	3/32	**.750**	I	4	3/16	2-1/2	969902	59.70	969902-C3	65.00			
	1/4	.149	1/8	**.312**	I	4	1/4	2	29750	69.90	29750-C3	77.10			
	1/4	.149	1/8	**1.000**	I	4	1/4	3	969903	80.00	969903-C3	87.20			
	3/8	.149	1/4	**.500**	I	6	3/8	2-1/2	983405	82.50	983405-C3	92.00			
	3/8	.149	1/4	**1.500**	I	6	3/8	3-1/2	969905	104.60	969905-C3	114.10			
	1/2	.224	5/16	**.500**	I	6	1/2	3	983410	109.80	983410-C3	124.00			
	1/2	.224	5/16	**1.500**	I	6	1/2	4	969910	142.10	969910-C3	156.30			
110°	1/4	.179	1/8	**.312**	I	4	1/4	2	830503	73.20	830503-C3	80.40			
120°	1/8	.109	1/16	**.125**	I	4	1/8	1-1/2	903608	45.20	903608-C3	50.10			
	1/8	.109	1/16	**.187**	I	4	1/8	1-1/2	39108	45.20	39108-C3	50.10			
	1/8	.109	1/16	**.500**	I	4	1/8	2	989401	53.70	989401-C3	58.60			
	3/16	.163	3/32	**.187**	I	4	3/16	2	903612	48.60	903612-C3	53.90			
	3/16	.163	3/32	**.312**	I	4	3/16	2	39112	49.30	39112-C3	54.60			
	3/16	.163	3/32	**.750**	I	4	3/16	2-1/2	989402	57.80	989402-C3	63.10			
	1/4	.216	1/8	**.187**	I	4	1/4	2	903616	64.20	903616-C3	71.40			
	1/4	.216	1/8	**.312**	I	4	1/4	2	39116	64.90	39116-C3	72.10			
	1/4	.216	1/8	**.625**	I	4	1/4	2-1/2	910716	62.50	910716-C3	69.70			
	1/4	.216	1/8	**1.000**	I	4	1/4	3	989403	73.70	989403-C3	80.90			
	3/8	.216	1/4	**.500**	I	6	3/8	2-1/2	39124	84.90	39124-C3	94.40			
	3/8	.216	1/4	**1.000**	I	6	3/8	2-1/2	910724	94.10	910724-C3	103.60			
	3/8	.216	1/4	**1.500**	I	6	3/8	3-1/2	989405	106.10	989405-C3	115.60			
	1/2	.325	5/16	**.500**	I	6	1/2	3	39132	112.80	39132-C3	127.00			
	1/2	.325	5/16	**1.000**	I	6	1/2	3	910732	122.50	910732-C3	136.70			
	1/2	.325	5/16	**1.500**	I	6	1/2	4	989410	144.00	989410-C3	158.20			
150°	1/4	.467	1/8	**.312**	I	4	1/4	2	826003	73.20	826003-C3	80.40			

DOUBLE ANGLE SHANK CUTTERS

Pointed - Reduced Shank





Stocked in *Two* Included Angles!

- Ideal for back chamfering, chamfering, deburring, and milling a "V-groove"
- Reduced straight shank allows any chucking depth
- Tip of included angle ground to a point
- 60° angle can also be used for thread milling
- Solid carbide head brazed onto steel shank
- CNC ground in the USA

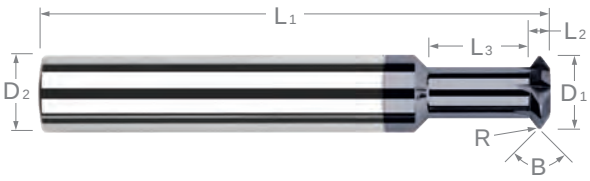
INCL. ANGLE	CUTTER DIAMETER	CUTTER WIDTH	FLUTES	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN COATED	
B $^{+1°}_{-1°}$	D_1 $^{+.000″}_{-.002″}$	L_2		D_2	L_1	TOOL #	PRICE	TOOL #	PRICE
60°	1/2	.144	8	1/4	3.144	866410	145.00	866410-C3	159.20
	3/4	.144	8	1/2	3.644	16220	153.10	16220-C3	168.50
	3/4	.144	8	1/2	6.144	27520	160.30	27520-C3	182.60
	1	.217	8	5/8	4.217	16230	168.50	16230-C3	191.90
90°	1/4	.125	6	1/8	2.625	875503	91.70	875503-C3	98.90
	3/8	.188	8	3/16	3.188	875505	128.70	875505-C3	144.10
	1/2	.250	8	1/4	3.250	875510	145.00	875510-C3	159.20
	1/2	.250	8	1/4	6.250	777910	152.00	777910-C3	179.30
	5/8	.313	8	5/16	3.313	875515	147.20	875515-C3	162.60
	3/4	.250	8	1/2	3.750	19220	152.60	19220-C3	168.00
	3/4	.250	8	1/2	6.250	19520	159.70	19520-C3	182.00
	1	.375	8	5/8	4.375	19230	168.80	19230-C3	192.20

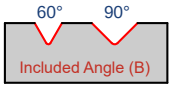
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DOUBLE ANGLE SHANK CUTTERS

Tip Radius





Stocked in *Two* Included Angles!

- Ideal for back chamfering, chamfering, deburring, and milling a "V-groove"
- Radius on tip for improved strength and wear resistance
- Reduced neck for long reach machining
- Solid carbide
- CNC ground in the USA

INCL. ANGLE	CUTTER DIA.	RADIUS	CUTTER WIDTH	NECK DIAMETER	NECK LENGTH	FLUTES	SHANK DIA.	OAL	UNCOATED		AlTiN COATED	
B +1° −1°	D1 +.000″ −.002″	R +.001″ −.001″	L2		L3 +.020″ −.000″		D2	L1	TOOL #	PRICE	TOOL #	PRICE
60°	1/8	.005	.042	1/16	.187	4	1/8	1-1/2	922508	57.10	922508-C3	62.00
	3/16	.005	.060	3/32	.312	4	3/16	2	922512	60.10	922512-C3	65.40
	1/4	.005	.078	1/8	.312	4	1/4	2	922516	77.00	922516-C3	84.20
	1/4	.010	.084	1/8	.312	4	1/4	2	934716	77.00	934716-C3	84.20
	1/4	.010	.084	1/8	1.000	4	1/4	3	930516	86.40	930516-C3	93.60
	3/8	.010	.084	1/4	.500	6	3/8	2-1/2	934724	103.30	934724-C3	112.80
	3/8	.015	.089	1/4	.500	6	3/8	2-1/2	911224	103.30	911224-C3	112.80
	1/2	.010	.120	5/16	.500	6	1/2	3	934732	125.80	934732-C3	140.00
	1/2	.015	.126	5/16	.500	6	1/2	3	911232	125.80	911232-C3	140.00
90°	1/16	.005	.035	1/32	.093	2	1/8	1-1/2	45804	58.20	45804-C3	63.10
	5/64	.005	.043	.039	.118	2	1/8	1-1/2	45805	58.20	45805-C3	63.10
	3/32	.005	.050	3/64	.141	2	1/8	1-1/2	45806	58.20	45806-C3	63.10
	1/8	.005	.067	1/16	.187	4	1/8	1-1/2	45808	58.20	45808-C3	63.10
	1/8	.005	.067	1/16	.500	4	1/8	1-1/2	928708	71.80	928708-C3	76.70
	1/8	.010	.071	1/16	.187	4	1/8	1-1/2	46608	58.20	46608-C3	63.10
	5/32	.005	.082	5/64	.250	4	3/16	2	45810	61.30	45810-C3	66.60
	5/32	.005	.082	5/64	.625	4	3/16	2-1/2	928710	68.60	928710-C3	73.90
	3/16	.005	.099	3/32	.312	4	3/16	2	45812	61.30	45812-C3	66.60
	3/16	.005	.099	3/32	.750	4	3/16	2-1/2	928712	68.60	928712-C3	73.90
	3/16	.010	.103	3/32	.312	4	3/16	2	46612	61.30	46612-C3	66.60
	1/4	.005	.129	1/8	.312	4	1/4	2	45816	70.60	45816-C3	77.80
	1/4	.005	.129	1/8	.625	4	1/4	2-1/2	898416	75.70	898416-C3	82.90
	1/4	.005	.129	1/8	1.000	4	1/4	3	928716	82.40	928716-C3	89.60
	1/4	.010	.133	1/8	.312	4	1/4	2	46616	70.60	46616-C3	77.80
	1/4	.010	.133	1/8	.625	4	1/4	2-1/2	890716	75.70	890716-C3	82.90
	1/4	.010	.133	1/8	1.000	4	1/4	3	931916	82.40	931916-C3	89.60
	1/4	.015	.137	1/8	.312	4	1/4	2	988616	70.60	988616-C3	77.80
	1/4	.020	.142	1/8	.312	4	1/4	2	831016	70.60	831016-C3	77.80
	5/16	.005	.130	3/16	1.250	6	5/16	3	928720	87.30	928720-C3	95.70
	5/16	.010	.134	3/16	.375	6	5/16	2-1/2	46620	88.80	46620-C3	97.20
	5/16	.010	.134	3/16	1.250	6	5/16	3	931920	89.70	931920-C3	98.10

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DOUBLE ANGLE SHANK CUTTERS

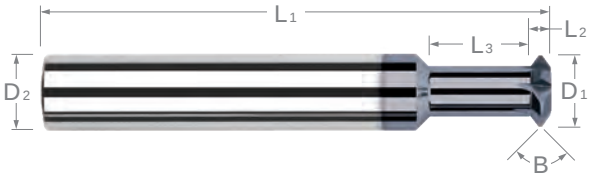
Tip Radius (cont.)

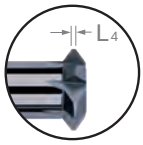
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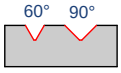
INCL. ANGLE	CUTTER DIA.	RADIUS	CUTTER WIDTH	NECK DIAMETER	NECK LENGTH	FLUTES	SHANK DIA.	OAL	UNCOATED		AlTiN COATED	
B $^{+1°}_{-1°}$	D_1 $^{+.000″}_{-.002″}$	R $^{+.001″}_{-.001″}$	L_2		L_3 $^{+.020″}_{-.000″}$		D_2	L_1	TOOL #	PRICE	TOOL #	PRICE
90°	3/8	**.010**	.133	1/4	**.500**	6	3/8	2-1/2	46624	94.70	46624-C3	104.20
	3/8	**.010**	.133	1/4	**1.000**	6	3/8	2-1/2	890724	97.20	890724-C3	106.70
	3/8	**.010**	.133	1/4	**1.500**	6	3/8	3-1/2	931924	115.30	931924-C3	124.80
	3/8	**.015**	.137	1/4	**.500**	6	3/8	2-1/2	988624	94.70	988624-C3	104.20
	3/8	**.015**	.137	1/4	**1.000**	6	3/8	2-1/2	894124	97.20	894124-C3	106.70
	3/8	**.015**	.137	1/4	**1.500**	6	3/8	3-1/2	923524	115.30	923524-C3	124.80
	3/8	**.020**	.142	1/4	**.500**	6	3/8	2-1/2	831024	94.70	831024-C3	104.20
	1/2	**.010**	.196	5/16	**.500**	6	1/2	3	46632	121.50	46632-C3	135.70
	1/2	**.010**	.196	5/16	**1.000**	6	1/2	3	890732	125.00	890732-C3	139.20
	1/2	**.010**	.196	5/16	**1.500**	6	1/2	4	931932	150.70	931932-C3	164.90
	1/2	**.015**	.200	5/16	**.500**	6	1/2	3	988632	121.50	988632-C3	135.70
	1/2	**.015**	.200	5/16	**1.000**	6	1/2	3	894132	125.00	894132-C3	139.20
	1/2	**.015**	.200	5/16	**1.500**	6	1/2	4	923532	150.70	923532-C3	164.90

DOUBLE ANGLE SHANK CUTTERS

Tip Flat







Included Angle (B)

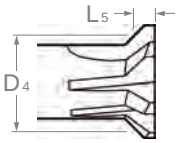
Stocked in *Two* Included Angles!

- Ideal for back chamfering, chamfering, deburring, and milling a “V-groove”
- Flat on tip for improved strength and wear resistance
- Reduced neck for long reach machining
- Solid carbide
- CNC ground in the USA

INCL. ANGLE	CUTTER DIA.	TIP FLAT	CUTTER WIDTH	NECK DIAMETER	NECK LENGTH	FLUTES	SHANK DIA.	OAL	UNCOATED		AlTiN COATED	
B $^{+1°}_{-1°}$	D_1 $^{+.000″}_{-.002″}$	L_4 $^{+.001″}_{-.001″}$	L_2		L_3 $^{+.020″}_{-.000″}$		D_2	L_1	TOOL #	PRICE	TOOL #	PRICE
60°	1/8	**.010**	.046	1/16	**.187**	4	1/8	1-1/2	778008	46.40	778008-C3	51.30
	3/16	**.010**	.065	3/32	**.312**	4	3/16	2	778012	49.30	778012-C3	54.60
	1/4	**.010**	.082	1/8	**.312**	4	1/4	2	778016	66.50	778016-C3	73.70
	3/8	**.010**	.082	1/4	**.500**	6	3/8	2-1/2	778024	84.90	778024-C3	94.40
	1/2	**.010**	.119	5/16	**.500**	6	1/2	3	778032	116.20	778032-C3	130.40
90°	1/8	**.010**	.073	1/16	**.187**	4	1/8	1-1/2	776608	45.10	776608-C3	50.00
	1/8	**.010**	.073	1/16	**.500**	4	1/8	1-1/2	775108	58.60	775108-C3	63.50
	3/16	**.010**	.105	3/32	**.312**	4	3/16	2	776612	47.10	776612-C3	52.40
	3/16	**.010**	.105	3/32	**.750**	4	3/16	2-1/2	775112	59.50	775112-C3	64.80
	1/4	**.010**	.135	1/8	**.312**	4	1/4	2	776616	57.70	776616-C3	64.90
	1/4	**.010**	.135	1/8	**1.000**	4	1/4	3	775116	70.10	775116-C3	77.30
	3/8	**.010**	.135	1/4	**.500**	6	3/8	2-1/2	776624	82.40	776624-C3	91.90
	3/8	**.010**	.135	1/4	**1.500**	6	3/8	3-1/2	775124	103.70	775124-C3	113.20
	1/2	**.010**	.198	5/16	**.500**	6	1/2	3	776632	110.20	776632-C3	124.40
	1/2	**.010**	.198	5/16	**1.500**	6	1/2	4	775132	141.00	775132-C3	155.20

BACK DEBURRING MILLS





- **Ideal for deburring on backside of small holes and tight pockets**
- Slightly undersized to fit in common hole sizes
- 90° included angle, cutting on angle only
- Design has smaller radial projection than double angle shank cutters and back chamfer cutters, which results in increased neck diameter and improved strength
- Left hand shear flute / right hand cut evacuates chip away from part
- Multiple flutes for improved finish
- Solid carbide
- CNC ground in the USA

Reach Through Miniature Holes and Slots to Remove Burr on Backside of Part



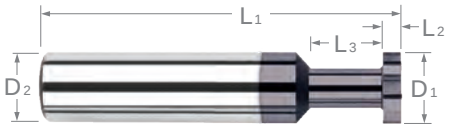
HEAD DIA.	AXIAL LOC	NECK DIA.	NECK LENGTH	CHAMFER CENTER LENGTH	CHAMFER CENTER DIAMETER	FLUTES	SHANK DIA.	OAL	UNCOATED		AlTiN COATED	
D_1 +.000″ −.001″	L_2	D_3	L_3 +.010″ −.000″	L_5 +.0005″ −.0005″	D_4 (Max.)		D_2	L_1	TOOL #	PRICE	TOOL #	PRICE
.028	.0029	.021	**.093**	.0215	.0261	3	1/8	2	846328	65.50	846328-C3	70.40
.028	.0029	.021	**.125**	.0215	.0261	3	1/8	2	65728	65.50	65728-C3	70.40
.028	.0029	.021	**.250**	.0215	.0261	3	1/8	2	57028	65.50	57028-C3	70.40
.040	.0048	.028	**.125**	.0324	.0362	4	1/8	2	846340	60.90	846340-C3	65.80
.040	.0048	.028	**.187**	.0324	.0362	4	1/8	2	65740	60.90	65740-C3	65.80
.040	.0048	.028	**.312**	.0324	.0362	4	1/8	2	57040	60.90	57040-C3	65.80
.055	.0045	.043	**.187**	.0423	.0515	4	1/8	2	846355	60.90	846355-C3	65.80
.055	.0045	.043	**.281**	.0423	.0515	4	1/8	2	65755	60.90	65755-C3	65.80
.055	.0045	.043	**.437**	.0423	.0515	4	1/8	2	57055	60.90	57055-C3	65.80
.080	.0077	.060	**.250**	.0638	.0733	5	1/8	2	846380	55.10	846380-C3	60.00
.080	.0077	.060	**.375**	.0638	.0733	5	1/8	2	65780	55.10	65780-C3	60.00
.080	.0077	.060	**.625**	.0638	.0733	5	1/8	2	57080	55.10	57080-C3	60.00
.115	.0111	.087	**.375**	.0655	.1049	5	1/8	2	846410	55.10	846410-C3	60.00
.115	.0111	.087	**.562**	.0655	.1049	5	1/8	2	65810	55.10	65810-C3	60.00
.115	.0111	.087	**1.000**	.0655	.1049	5	1/8	2	57110	55.10	57110-C3	60.00

D_1 +.000″ −.002″	L_2	D_3	L_3 +.010″ −.000″	L_5 +.0005″ −.0005″	D_4 (Max.)		D_2	L_1	TOOL #	PRICE	TOOL #	PRICE
.135	.0111	.107	**.437**	.0655	.1249	5	3/16	2	846420	55.90	846420-C3	61.20
.135	.0111	.107	**.625**	.0655	.1249	5	3/16	2-1/2	65820	56.70	65820-C3	62.00
.135	.0111	.107	**1.125**	.0655	.1249	5	3/16	2-1/2	57120	56.70	57120-C3	62.00
.165	.0191	.121	**.500**	.0695	.1469	6	3/16	2	846430	55.90	846430-C3	61.20
.165	.0191	.121	**.750**	.0695	.1469	6	3/16	2-1/2	65830	56.70	65830-C3	62.00
.165	.0191	.121	**1.375**	.0695	.1469	6	3/16	2-1/2	57130	56.70	57130-C3	62.00
.210	.0191	.166	**.625**	.0695	.1919	6	1/4	2-1/2	846440	59.70	846440-C3	66.90
.210	.0191	.166	**1.000**	.0695	.1919	6	1/4	3	65840	60.90	65840-C3	68.10
.210	.0191	.166	**1.750**	.0695	.1919	6	1/4	3	57140	60.90	57140-C3	68.10
.262	.0251	.206	**1.375**	.0925	.2379	8	5/16	3	65850	61.90	65850-C3	70.30
.262	.0251	.206	**2.125**	.0925	.2379	8	5/16	4	57150	70.60	57150-C3	80.70
.315	.0251	.259	**1.625**	.0925	.2909	8	3/8	3	65860	76.40	65860-C3	85.90
.315	.0251	.259	**2.500**	.0925	.2909	8	3/8	4	57160	85.20	57160-C3	98.20
.420	.0321	.350	**2.125**	.1160	.3889	10	7/16	4	65870	96.80	65870-C3	111.00
.420	.0321	.350	**3.375**	.1160	.3889	10	7/16	6	57170	111.30	57170-C3	127.20

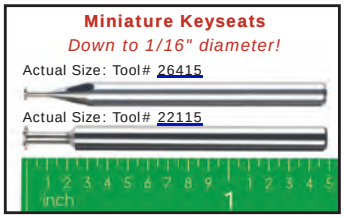
NEW SIZES!

KEYSEAT CUTTERS

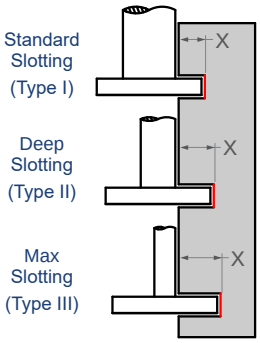
Square



- **Keyseat cutters down to 1/16″ diameter**
- Both sides of cutter are dished for clearance
- Solid carbide
- CNC ground in the USA



Stocked in Multiple Radial Depths of Cut!



CUTTER DIA.	CUTTER WIDTH	NECK DIA.	NECK LENGTH	RADIAL DOC*	TYPE	FLUTES	SHANK DIA.	OAL	UNCOATED		AlTiN COATED	
D_1 +.000″ −.002″	L_2 +.0005″ −.0005″		L_3 +.020″ −.000″	X			D_2	L_1	TOOL #	PRICE	TOOL #	PRICE
	.010	1/32	3/32 (1.5x)	.012	I	4	1/8	1-1/2	26410	49.30	26410-C3	54.20
	.015 (1/64)	1/32	3/32 (1.5x)	.012	I	4	1/8	1-1/2	26415	46.70	26415-C3	51.60
	.015 (1/64)	1/32	3/16 (3x)	.012	I	4	1/8	1-1/2	955115	54.70	955115-C3	59.60
	.020	1/32	3/32 (1.5x)	.012	I	4	1/8	1-1/2	26420	46.70	26420-C3	51.60
	.020	1/32	3/16 (3x)	.012	I	4	1/8	1-1/2	955120	46.70	955120-C3	51.60
	.025	1/32	3/32 (1.5x)	.012	I	4	1/8	1-1/2	26425	46.70	26425-C3	51.60
1/16	.030	1/32	3/32 (1.5x)	.012	I	4	1/8	1-1/2	26430	46.70	26430-C3	51.60
	.031 (1/32)	1/32	3/32 (1.5x)	.012	I	4	1/8	1-1/2	26431	46.70	26431-C3	51.60
	.031 (1/32)	1/32	3/16 (3x)	.012	I	4	1/8	1-1/2	955131	54.70	955131-C3	59.60
	.039 (1 mm)	1/32	3/32 (1.5x)	.012	I	4	1/8	1-1/2	26439	46.70	26439-C3	51.60
	.047 (3/64)	1/32	3/32 (1.5x)	.012	I	4	1/8	1-1/2	26447	46.70	26447-C3	51.60
	.062 (1/16)	1/32	3/32 (1.5x)	.012	I	4	1/8	1-1/2	26462	46.70	26462-C3	51.60
	.062 (1/16)	1/32	3/16 (3x)	.012	I	4	1/8	1-1/2	955162	54.70	955162-C3	59.60
	.010	1 mm	3 mm (1.5x)	.018	I	4	1/8	1-1/2	27310	48.60	27310-C3	53.50
	.015 (1/64)	1 mm	3 mm (1.5x)	.018	I	4	1/8	1-1/2	27315	45.90	27315-C3	50.80
	.020	1 mm	3 mm (1.5x)	.018	I	4	1/8	1-1/2	27320	45.90	27320-C3	50.80
	.025	1 mm	3 mm (1.5x)	.018	I	4	1/8	1-1/2	27325	45.90	27325-C3	50.80
5/64	.031 (1/32)	1 mm	3 mm (1.5x)	.018	I	4	1/8	1-1/2	27331	45.90	27331-C3	50.80
	.031 (1/32)	1 mm	6 mm (3x)	.018	I	4	1/8	1-1/2	922031	53.80	922031-C3	58.70
	.039 (1 mm)	1 mm	3 mm (1.5x)	.018	I	4	1/8	1-1/2	27339	45.90	27339-C3	50.80
	.047 (3/64)	1 mm	3 mm (1.5x)	.018	I	4	1/8	1-1/2	27347	45.90	27347-C3	50.80
	.062 (1/16)	1 mm	3 mm (1.5x)	.018	I	4	1/8	1-1/2	27362	45.90	27362-C3	50.80
	.010	3/64	9/64 (1.5x)	.021	I	4	1/8	1-1/2	28210	48.10	28210-C3	53.00
	.015 (1/64)	3/64	9/64 (1.5x)	.021	I	4	1/8	1-1/2	28215	45.20	28215-C3	50.10
	.020	3/64	9/64 (1.5x)	.021	I	4	1/8	1-1/2	28220	45.20	28220-C3	50.10
	.020	3/64	9/32 (3x)	.021	I	4	1/8	1-1/2	967720	45.20	967720-C3	50.10
	.025	3/64	9/64 (1.5x)	.021	I	4	1/8	1-1/2	28225	45.20	28225-C3	50.10
	.030	3/64	9/64 (1.5x)	.021	I	4	1/8	1-1/2	28230	45.20	28230-C3	50.10
	.031 (1/32)	1/32	3/64 (.5x)	**.031**	II	4	1/8	1-1/2	901131	47.70	901131-C3	52.60
	.031 (1/32)	3/64	9/64 (1.5x)	.021	I	4	1/8	1-1/2	28231	45.20	28231-C3	50.10
3/32	.031 (1/32)	3/64	9/32 (3x)	.021	I	4	1/8	1-1/2	967731	53.10	967731-C3	58.00
	.039 (1 mm)	3/64	9/64 (1.5x)	.021	I	4	1/8	1-1/2	28239	45.20	28239-C3	50.10
	.040	3/64	9/64 (1.5x)	.021	I	4	1/8	1-1/2	28240	45.20	28240-C3	50.10
	.047 (3/64)	3/64	9/64 (1.5x)	.021	I	4	1/8	1-1/2	28247	45.20	28247-C3	50.10
	.047 (3/64)	3/64	9/32 (3x)	.021	I	4	1/8	1-1/2	967747	53.10	967747-C3	58.00
	.062 (1/16)	1/32	3/64 (.5x)	**.031**	II	4	1/8	1-1/2	901162	47.70	901162-C3	52.60
	.062 (1/16)	3/64	9/64 (1.5x)	.021	I	4	1/8	1-1/2	28262	45.20	28262-C3	50.10
	.062 (1/16)	3/64	9/32 (3x)	.021	I	4	1/8	1-1/2	967762	53.10	967762-C3	58.00
	.093 (3/32)	3/64	9/64 (1.5x)	.021	I	4	1/8	1-1/2	28293	45.20	28293-C3	50.10

*Radial DOC accounts for max transition radius at neck

continued on next page

KEYSEAT CUTTERS

Square (cont.)

continued from previous page

CUTTER DIA.	CUTTER WIDTH	NECK DIA.	NECK LENGTH	RADIAL DOC*	TYPE	FLUTES	SHANK DIA.	OAL	UNCOATED		AlTiN COATED	
D_1 +.000″ −.002″	L_2 +.0005″ −.0005″		L_3 +.020″ −.000″	X			D_2	L_1	TOOL #	PRICE	TOOL #	PRICE
3 mm	.015 (1/64)	.059	3/16 (1.5x)	.019	I	4	1/8	1-1/2	777415	46.60	777415-C3	51.50
	.031 (1/32)	.059	3/16 (1.5x)	.019	I	4	1/8	1-1/2	777431	46.60	777431-C3	51.50
	.047 (3/64)	.059	3/16 (1.5x)	.019	I	4	1/8	1-1/2	777447	46.60	777447-C3	51.50
1/8	.010	1/16	3/16 (1.5x)	.022	I	6	1/8	1-1/2	22110	46.20	22110-C3	51.10
	.010	1/16	3/8 (3x)	.022	I	6	1/8	1-1/2	43510	53.80	43510-C3	58.70
	.015 (1/64)	.040	1/16 (.5x)	.032	II	6	1/8	1-1/2	982515	54.70	982515-C3	59.60
	.015 (1/64)	.040	1/8 (1x)	.032	II	6	1/8	1-1/2	893315	55.80	893315-C3	60.70
	.015 (1/64)	1/16	3/16 (1.5x)	.022	I	6	1/8	1-1/2	22115	43.70	22115-C3	48.60
	.015 (1/64)	1/16	3/8 (3x)	.022	I	6	1/8	1-1/2	43515	51.30	43515-C3	56.20
	.020	.040	1/16 (.5x)	.032	II	6	1/8	1-1/2	982520	54.70	982520-C3	59.60
	.020	.040	1/8 (1x)	.032	II	6	1/8	1-1/2	893320	55.80	893320-C3	60.70
	.020	1/16	3/16 (1.5x)	.022	I	6	1/8	1-1/2	22120	43.70	22120-C3	48.60
	.020	1/16	3/8 (3x)	.022	I	6	1/8	1-1/2	43520	51.30	43520-C3	56.20
	.025	.040	1/16 (.5x)	.032	II	6	1/8	1-1/2	982525	54.70	982525-C3	59.60
	.025	.040	1/8 (1x)	.032	II	6	1/8	1-1/2	893325	55.80	893325-C3	60.70
	.025	1/16	3/16 (1.5x)	.022	I	6	1/8	1-1/2	22125	43.70	22125-C3	48.60
	.025	1/16	3/8 (3x)	.022	I	6	1/8	1-1/2	43525	51.30	43525-C3	56.20
	.030	1/16	3/16 (1.5x)	.022	I	6	1/8	1-1/2	22130	43.70	22130-C3	48.60
	.030	1/16	3/8 (3x)	.022	I	6	1/8	1-1/2	43530	51.30	43530-C3	56.20
	.031 (1/32)	.040	1/16 (.5x)	.032	II	6	1/8	1-1/2	982531	54.70	982531-C3	59.60
	.031 (1/32)	.040	1/8 (1x)	.032	II	6	1/8	1-1/2	893331	55.80	893331-C3	60.70
	.031 (1/32)	1/16	3/16 (1.5x)	.022	I	6	1/8	1-1/2	22131	43.70	22131-C3	48.60
	.031 (1/32)	1/16	3/8 (3x)	.022	I	6	1/8	1-1/2	43531	51.30	43531-C3	56.20
	.035	1/16	3/16 (1.5x)	.022	I	6	1/8	1-1/2	22135	43.70	22135-C3	48.60
	.035	1/16	3/8 (3x)	.022	I	6	1/8	1-1/2	43535	51.30	43535-C3	56.20
	.039 (1 mm)	1/16	3/16 (1.5x)	.022	I	6	1/8	1-1/2	22139	43.70	22139-C3	48.60
	.039 (1 mm)	1/16	3/8 (3x)	.022	I	6	1/8	1-1/2	43539	51.30	43539-C3	56.20
	.040	.040	1/16 (.5x)	.032	II	6	1/8	1-1/2	982540	54.70	982540-C3	59.60
	.040	1/16	3/16 (1.5x)	.022	I	6	1/8	1-1/2	22140	43.70	22140-C3	48.60
	.040	1/16	3/8 (3x)	.022	I	6	1/8	1-1/2	43540	51.30	43540-C3	56.20
	.045	1/16	3/16 (1.5x)	.022	I	6	1/8	1-1/2	22145	43.70	22145-C3	48.60
	.047 (3/64)	.040	1/16 (.5x)	.032	II	6	1/8	1-1/2	982547	54.70	982547-C3	59.60
	.047 (3/64)	1/16	3/16 (1.5x)	.022	I	6	1/8	1-1/2	22147	43.70	22147-C3	48.60
	.047 (3/64)	1/16	3/8 (3x)	.022	I	6	1/8	1-1/2	43547	51.30	43547-C3	56.20
	.050	1/16	3/16 (1.5x)	.022	I	6	1/8	1-1/2	22150	43.70	22150-C3	48.60
	.055	1/16	3/16 (1.5x)	.022	I	6	1/8	1-1/2	22155	43.70	22155-C3	48.60
	.060	1/16	3/16 (1.5x)	.022	I	6	1/8	1-1/2	22160	43.70	22160-C3	48.60
	.062 (1/16)	.040	1/16 (.5x)	.032	II	6	1/8	1-1/2	982562	54.70	982562-C3	59.60
	.062 (1/16)	.040	1/8 (1x)	.032	II	6	1/8	1-1/2	893362	55.80	893362-C3	60.70
	.062 (1/16)	1/16	1/8 (1x)	.022	I	6	1/8	1-1/2	806662	43.70	806662-C3	48.60
	.062 (1/16)	1/16	3/16 (1.5x)	.022	I	6	1/8	1-1/2	22162	43.70	22162-C3	48.60
	.062 (1/16)	1/16	3/8 (3x)	.022	I	6	1/8	1-1/2	43562	51.30	43562-C3	56.20
	.078 (5/64)	1/16	3/16 (1.5x)	.022	I	6	1/8	1-1/2	22178	43.70	22178-C3	48.60
	.078 (5/64)	1/16	3/8 (3x)	.022	I	6	1/8	1-1/2	43578	51.30	43578-C3	56.20
	.093 (3/32)	.040	1/16 (.5x)	.032	II	6	1/8	1-1/2	982593	54.70	982593-C3	59.60
	.093 (3/32)	.040	1/8 (1x)	.032	II	6	1/8	1-1/2	893393	55.80	893393-C3	60.70
	.093 (3/32)	1/16	3/16 (1.5x)	.022	I	6	1/8	1-1/2	22193	43.70	22193-C3	48.60
	.093 (3/32)	1/16	3/8 (3x)	.022	I	6	1/8	1-1/2	43593	51.30	43593-C3	56.20
	.100	1/16	3/16 (1.5x)	.022	I	6	1/8	1-1/2	22182	43.70	22182-C3	48.60
	.125 (1/8)	1/16	3/16 (1.5x)	.022	I	6	1/8	1-1/2	22195	43.70	22195-C3	48.60
	.125 (1/8)	1/16	3/8 (3x)	.022	I	6	1/8	1-1/2	43595	51.30	43595-C3	56.20

*Radial DOC accounts for max transition radius at neck

continued on next page

NEW SIZES!

KEYSEAT CUTTERS

Square (cont.)

continued from previous page

CUTTER DIA.	CUTTER WIDTH	NECK DIA.	NECK LENGTH	RADIAL DOC*	TYPE	FLUTES	SHANK DIA.	OAL	UNCOATED		AlTiN COATED	
D_1 +.000″ −.002″	L_2 +.0005″ −.0005″		L_3 +.020″ −.000″	X			D_2	L_1	TOOL #	PRICE	TOOL #	PRICE
	.010	5/64	1/4 (1.5x)	.029	I	6	3/16	2	69410	48.30	69410-C3	53.60
	.015 (1/64)	5/64	1/4 (1.5x)	.029	I	6	3/16	2	69415	45.80	69415-C3	51.10
	.015 (1/64)	5/64	1/2 (3x)	.029	I	6	3/16	2	956215	53.30	956215-C3	58.60
	.020	5/64	1/4 (1.5x)	.029	I	6	3/16	2	69420	45.80	69420-C3	51.10
	.020	5/64	1/2 (3x)	.029	I	6	3/16	2	956220	53.30	956220-C3	58.60
	.025	5/64	1/4 (1.5x)	.029	I	6	3/16	2	69425	45.80	69425-C3	51.10
	.025	5/64	1/2 (3x)	.029	I	6	3/16	2	956225	53.30	956225-C3	58.60
	.031 (1/32)	.050	5/64 (.5x)	.043	II	6	3/16	2	900331	56.70	900331-C3	62.00
	.031 (1/32)	5/64	1/4 (1.5x)	.029	I	6	3/16	2	69431	45.80	69431-C3	51.10
	.031 (1/32)	5/64	1/2 (3x)	.029	I	6	3/16	2	956231	53.30	956231-C3	58.60
	.039 (1 mm)	5/64	1/4 (1.5x)	.029	I	6	3/16	2	69439	45.80	69439-C3	51.10
	.040	5/64	1/4 (1.5x)	.029	I	6	3/16	2	69440	45.80	69440-C3	51.10
5/32	.047 (3/64)	5/64	1/4 (1.5x)	.029	I	6	3/16	2	69447	45.80	69447-C3	51.10
	.047 (3/64)	5/64	1/2 (3x)	.029	I	6	3/16	2	956247	53.30	956247-C3	58.60
	.050	5/64	1/4 (1.5x)	.029	I	6	3/16	2	69450	45.80	69450-C3	51.10
	.060	5/64	1/4 (1.5x)	.029	I	6	3/16	2	69460	45.80	69460-C3	51.10
	.062 (1/16)	.050	5/64 (.5x)	.043	II	6	3/16	2	900362	56.70	900362-C3	62.00
	.062 (1/16)	5/64	1/4 (1.5x)	.029	I	6	3/16	2	69462	45.80	69462-C3	51.10
	.062 (1/16)	5/64	1/2 (3x)	.029	I	6	3/16	2	956262	53.30	956262-C3	58.60
	.078 (5/64)	5/64	1/4 (1.5x)	.029	I	6	3/16	2	69478	45.80	69478-C3	51.10
	.078 (5/64)	5/64	1/2 (3x)	.029	I	6	3/16	2	956278	53.30	956278-C3	58.60
	.093 (3/32)	5/64	1/4 (1.5x)	.029	I	6	3/16	2	69493	45.80	69493-C3	51.10
	.093 (3/32)	5/64	1/2 (3x)	.029	I	6	3/16	2	956293	53.30	956293-C3	58.60
	.125 (1/8)	5/64	1/4 (1.5x)	.029	I	6	3/16	2	69495	45.80	69495-C3	51.10
	.125 (1/8)	5/64	1/2 (3x)	.029	I	6	3/16	2	956295	53.30	956295-C3	58.60
	.010	3/32	9/32 (1.5x)	.037	I	6	3/16	2	22210	48.10	22210-C3	53.40
	.015 (1/64)	1/16	3/32 (.5x)	.052	II	6	3/16	2	980015	55.90	980015-C3	61.20
	.015 (1/64)	3/32	9/32 (1.5x)	.037	I	6	3/16	2	22215	45.10	22215-C3	50.40
	.015 (1/64)	3/32	9/16 (3x)	.037	I	6	3/16	2	43715	56.70	43715-C3	62.00
	.018	Please see page 352 for Retaining Ring sizes.										
	.020	1/16	3/32 (.5x)	.052	II	6	3/16	2	980020	55.90	980020-C3	61.20
	.020	3/32	9/32 (1.5x)	.037	I	6	3/16	2	22220	45.10	22220-C3	50.40
	.020	3/32	9/16 (3x)	.037	I	6	3/16	2	43720	56.70	43720-C3	62.00
	.025	1/16	3/32 (.5x)	.052	II	6	3/16	2	980025	55.90	980025-C3	61.20
	.025	3/32	9/32 (1.5x)	.037	I	6	3/16	2	22225	45.10	22225-C3	50.40
	.025	3/32	9/16 (3x)	.037	I	6	3/16	2	43725	56.70	43725-C3	62.00
3/16	.029	Please see page 352 for Retaining Ring sizes.										
	.030	3/32	9/32 (1.5x)	.037	I	6	3/16	2	22230	45.10	22230-C3	50.40
	.030	3/32	9/16 (3x)	.037	I	6	3/16	2	43730	56.70	43730-C3	62.00
	.031 (1/32)	1/16	3/32 (.5x)	.052	II	6	3/16	2	980031	55.90	980031-C3	61.20
	.031 (1/32)	1/16	3/16 (1x)	.052	II	6	3/16	2	928931	55.90	928931-C3	61.20
	.031 (1/32)	3/32	9/32 (1.5x)	.037	I	6	3/16	2	22231	45.10	22231-C3	50.40
	.031 (1/32)	3/32	9/16 (3x)	.037	I	6	3/16	2	43731	56.70	43731-C3	62.00
	.035	3/32	9/32 (1.5x)	.037	I	6	3/16	2	22235	45.10	22235-C3	50.40
	.035	3/32	9/16 (3x)	.037	I	6	3/16	2	43735	56.70	43735-C3	62.00
	.039 (1 mm)	3/32	9/32 (1.5x)	.037	I	6	3/16	2	22239	45.10	22239-C3	50.40
	.039 (1 mm)	3/32	9/16 (3x)	.037	I	6	3/16	2	43739	56.70	43739-C3	62.00

*Radial DOC accounts for max transition radius at neck

continued on next page

KEYSEAT CUTTERS

Square (cont.)

continued from previous page

CUTTER DIA.	CUTTER WIDTH	NECK DIA.	NECK LENGTH	RADIAL DOC*	TYPE	FLUTES	SHANK DIA.	OAL	UNCOATED		AlTiN COATED	
D_1 $^{+.000″}_{-.002″}$	L_2 $^{+.0005″}_{-.0005″}$		L_3 $^{+.020″}_{-.000″}$	X			D_2	L_1	TOOL #	PRICE	TOOL #	PRICE
	.040	1/16	3/32 (.5x)	.052	II	6	3/16	2	980040	55.90	980040-C3	61.20
	.040	1/16	3/16 (1x)	.052	II	6	3/16	2	928940	55.90	928940-C3	61.20
	.040	3/32	9/32 (1.5x)	.037	I	6	3/16	2	22240	45.10	22240-C3	50.40
	.040	3/32	9/16 (3x)	.037	I	6	3/16	2	43740	56.70	43740-C3	62.00
	.045	3/32	9/32 (1.5x)	.037	I	6	3/16	2	22246	45.10	22246-C3	50.40
	.045	3/32	9/16 (3x)	.037	I	6	3/16	2	43745	56.70	43745-C3	62.00
	.047 (3/64)	1/16	3/32 (.5x)	.052	II	6	3/16	2	980047	55.90	980047-C3	61.20
NEW	.047 (3/64)	1/16	3/16 (1x)	.052	II	6	3/16	2	928947	55.90	928947-C3	61.20
	.047 (3/64)	3/32	9/32 (1.5x)	.037	I	6	3/16	2	22247	45.10	22247-C3	50.40
	.047 (3/64)	3/32	9/16 (3x)	.037	I	6	3/16	2	43747	56.70	43747-C3	62.00
	.050	3/32	9/32 (1.5x)	.037	I	6	3/16	2	22250	45.10	22250-C3	50.40
	.050	3/32	9/16 (3x)	.037	I	6	3/16	2	43750	56.70	43750-C3	62.00
	.055	3/32	9/32 (1.5x)	.037	I	6	3/16	2	22255	45.10	22255-C3	50.40
	.055	3/32	9/16 (3x)	.037	I	6	3/16	2	43755	56.70	43755-C3	62.00
	.060	3/32	9/32 (1.5x)	.037	I	6	3/16	2	22261	45.10	22261-C3	50.40
	.060	3/32	9/16 (3x)	.037	I	6	3/16	2	43760	56.70	43760-C3	62.00
3/16	.062 (1/16)	1/16	3/32 (.5x)	.052	II	6	3/16	2	980062	55.90	980062-C3	61.20
	.062 (1/16)	1/16	3/16 (1x)	.052	II	6	3/16	2	928962	55.90	928962-C3	61.20
	.062 (1/16)	3/32	3/16 (1x)	.037	I	6	3/16	2	806562	45.10	806562-C3	50.40
	.062 (1/16)	3/32	9/32 (1.5x)	.037	I	6	3/16	2	22262	45.10	22262-C3	50.40
	.062 (1/16)	3/32	9/16 (3x)	.037	I	6	3/16	2	43762	56.70	43762-C3	62.00
	.078 (5/64)	1/16	3/32 (.5x)	.052	II	6	3/16	2	980078	55.90	980078-C3	61.20
	.078 (5/64)	1/16	3/16 (1x)	.052	II	6	3/16	2	928978	55.90	928978-C3	61.20
	.078 (5/64)	3/32	9/32 (1.5x)	.037	I	6	3/16	2	22278	45.10	22278-C3	50.40
	.078 (5/64)	3/32	9/16 (3x)	.037	I	6	3/16	2	43778	56.70	43778-C3	62.00
	.093 (3/32)	1/16	3/32 (.5x)	.052	II	6	3/16	2	980093	55.90	980093-C3	61.20
	.093 (3/32)	1/16	3/16 (1x)	.052	II	6	3/16	2	928993	55.90	928993-C3	61.20
	.093 (3/32)	3/32	9/32 (1.5x)	.037	I	6	3/16	2	22293	45.10	22293-C3	50.40
	.093 (3/32)	3/32	9/16 (3x)	.037	I	6	3/16	2	43793	56.70	43793-C3	62.00
	.125 (1/8)	1/16	3/32 (.5x)	.052	II	6	3/16	2	980095	55.90	980095-C3	61.20
	.125 (1/8)	3/32	9/32 (1.5x)	.037	I	6	3/16	2	22295	45.10	22295-C3	50.40
	.125 (1/8)	3/32	9/16 (3x)	.037	I	6	3/16	2	43795	56.70	43795-C3	62.00
	.156 (5/32)	3/32	9/32 (1.5x)	.037	I	6	3/16	2	22297	45.10	22297-C3	50.40
	.031 (1/32)	3 mm	9 mm (1.5x)	.049	I	6	1/4	2-1/2	947531	52.00	947531-C3	59.20
	.039 (1 mm)	3 mm	9 mm (1.5x)	.049	I	6	1/4	2-1/2	947539	52.00	947539-C3	59.20
6 mm	.062 (1/16)	3 mm	9 mm (1.5x)	.049	I	6	1/4	2-1/2	947562	52.00	947562-C3	59.20
	.093 (3/32)	3 mm	9 mm (1.5x)	.049	I	6	1/4	2-1/2	947593	52.00	947593-C3	59.20
	.118 (3 mm)	3 mm	9 mm (1.5x)	.049	I	6	1/4	2-1/2	947588	52.00	947588-C3	59.20
	.125 (1/8)	3 mm	9 mm (1.5x)	.049	I	6	1/4	2-1/2	947595	52.00	947595-C3	59.20
	.010	1/8	3/8 (1.5x)	.053	I	6	1/4	2-1/2	22310	54.20	22310-C3	61.40
	.010	1/8	3/4 (3x)	.053	I	6	1/4	2-1/2	43910	64.90	43910-C3	72.10
	.015 (1/64)	5/64	1/8 (.5x)	.076	II	6	1/4	2-1/2	70815	61.90	70815-C3	69.10
	.015 (1/64)	5/64	1/4 (1x)	.076	II	6	1/4	2-1/2	986115	63.30	986115-C3	70.50
	.015 (1/64)	1/8	3/8 (1.5x)	.053	I	6	1/4	2-1/2	22315	51.10	22315-C3	58.30
1/4	.015 (1/64)	1/8	3/4 (3x)	.053	I	6	1/4	2-1/2	43915	62.30	43915-C3	69.50
	.020	5/64	1/8 (.5x)	.076	II	6	1/4	2-1/2	70820	54.00	70820-C3	61.20
	.020	5/64	1/4 (1x)	.076	II	6	1/4	2-1/2	986120	55.30	986120-C3	62.50
	.020	1/8	3/8 (1.5x)	.053	I	6	1/4	2-1/2	22320	51.10	22320-C3	58.30
	.020	1/8	3/4 (3x)	.053	I	6	1/4	2-1/2	43920	62.30	43920-C3	69.50

*Radial DOC accounts for max transition radius at neck

continued on next page

NEW SIZES!

KEYSEAT CUTTERS

Square (cont.)

continued from previous page

CUTTER DIA.	CUTTER WIDTH	NECK DIA.	NECK LENGTH	RADIAL DOC*	TYPE	FLUTES	SHANK DIA.	OAL	UNCOATED		AlTiN COATED		
D_1 +.000″ −.002″	L_2 +.0005″ −.0005″		L_3 +.020″ −.000″	X			D_2	L_1	TOOL #	PRICE	TOOL #	PRICE	
	.025	5/64	1/8 (.5x)	**.076**	II	6	1/4	2-1/2	70825	54.00	70825-C3	61.20	
	.025	5/64	1/4 (1x)	**.076**	II	6	1/4	2-1/2	986125	55.30	986125-C3	62.50	
	.025	1/8	3/8 (1.5x)	.053	I	6	1/4	2-1/2	22325	51.10	22325-C3	58.30	
	.025	1/8	3/4 (3x)	.053	I	6	1/4	2-1/2	43925	62.30	43925-C3	69.50	
	.030	5/64	1/8 (.5x)	**.076**	II	6	1/4	2-1/2	70830	54.00	70830-C3	61.20	
	.030	1/8	3/8 (1.5x)	.053	I	6	1/4	2-1/2	22330	51.10	22330-C3	58.30	
	.030	1/8	3/4 (3x)	.053	I	6	1/4	2-1/2	43930	62.30	43930-C3	69.50	
	.031 (1/32)	.050	5/64 (.3x)	**.092**	III	8	1/4	2-1/2	964731	89.70	964731-C3	96.90	
	.031 (1/32)	5/64	1/8 (.5x)	**.076**	II	6	1/4	2-1/2	70831	54.00	70831-C3	61.20	
	.031 (1/32)	5/64	1/4 (1x)	**.076**	II	6	1/4	2-1/2	986131	70.60	986131-C3	77.80	
	.031 (1/32)	1/8	3/8 (1.5x)	.053	I	6	1/4	2-1/2	22331	51.10	22331-C3	58.30	
	.031 (1/32)	1/8	3/4 (3x)	.053	I	6	1/4	2-1/2	43931	62.30	43931-C3	69.50	
	.035	1/8	3/8 (1.5x)	.053	I	6	1/4	2-1/2	22335	51.10	22335-C3	58.30	
	.035	1/8	3/4 (3x)	.053	I	6	1/4	2-1/2	43935	62.30	43935-C3	69.50	
	.039 (1 mm)	Please see page 352 for Retaining Ring sizes.											
	.039 (1 mm)	1/8	3/8 (1.5x)	.053	I	6	1/4	2-1/2	22339	51.10	22339-C3	58.30	
	.040	5/64	1/8 (.5x)	**.076**	II	6	1/4	2-1/2	70840	54.00	70840-C3	61.20	
	.040	1/8	3/8 (1.5x)	.053	I	6	1/4	2-1/2	22340	51.10	22340-C3	58.30	
	.040	1/8	3/4 (3x)	.053	I	6	1/4	2-1/2	43940	62.30	43940-C3	69.50	
	.045	1/8	3/8 (1.5x)	.053	I	6	1/4	2-1/2	22346	51.10	22346-C3	58.30	
	.046	Please see page 352 for Retaining Ring sizes.											
	.047 (3/64)	.050	5/64 (.3x)	**.092**	III	8	1/4	2-1/2	964747	88.90	964747-C3	96.10	NEW
	.047 (3/64)	5/64	1/8 (.5x)	**.076**	II	6	1/4	2-1/2	70847	54.00	70847-C3	61.20	
1/4	.047 (3/64)	5/64	1/4 (1x)	**.076**	II	6	1/4	2-1/2	986147	70.60	986147-C3	77.80	
	.047 (3/64)	1/8	3/8 (1.5x)	.053	I	6	1/4	2-1/2	22347	51.10	22347-C3	58.30	
	.047 (3/64)	1/8	3/4 (3x)	.053	I	6	1/4	2-1/2	43947	62.30	43947-C3	69.50	
	.050	5/64	1/8 (.5x)	**.076**	II	6	1/4	2-1/2	70850	54.00	70850-C3	61.20	
	.050	1/8	3/8 (1.5x)	.053	I	6	1/4	2-1/2	22350	51.10	22350-C3	58.30	
	.050	1/8	3/4 (3x)	.053	I	6	1/4	2-1/2	43950	62.30	43950-C3	69.50	
	.055	1/8	3/8 (1.5x)	.053	I	6	1/4	2-1/2	22355	51.10	22355-C3	58.30	
	.055	1/8	3/4 (3x)	.053	I	6	1/4	2-1/2	43955	62.30	43955-C3	69.50	
	.060	5/64	1/8 (.5x)	**.076**	II	6	1/4	2-1/2	70860	54.00	70860-C3	61.20	
	.060	1/8	3/8 (1.5x)	.053	I	6	1/4	2-1/2	22361	51.10	22361-C3	58.30	
	.060	1/8	3/4 (3x)	.053	I	6	1/4	2-1/2	43961	62.30	43961-C3	69.50	
	.062 (1/16)	.050	5/64 (.3x)	**.092**	III	8	1/4	2-1/2	964762	89.70	964762-C3	96.90	
	.062 (1/16)	5/64	1/8 (.5x)	**.076**	II	6	1/4	2-1/2	70862	54.00	70862-C3	61.20	
	.062 (1/16)	5/64	1/4 (1x)	**.076**	II	6	1/4	2-1/2	986162	70.60	986162-C3	77.80	
	.062 (1/16)	1/8	1/4 (1x)	.053	I	6	1/4	2-1/2	806462	51.10	806462-C3	58.30	
	.062 (1/16)	1/8	3/8 (1.5x)	.053	I	6	1/4	2-1/2	22362	51.10	22362-C3	58.30	
	.062 (1/16)	1/8	3/4 (3x)	.053	I	6	1/4	2-1/2	43962	62.30	43962-C3	69.50	
	.062 (1/16)	1/8	1 (4x)	.053	I	6	1/4	2-1/2	984262	72.10	984262-C3	79.30	
	.078 (5/64)	5/64	1/8 (.5x)	**.076**	II	6	1/4	2-1/2	70878	54.00	70878-C3	61.20	
	.078 (5/64)	5/64	1/4 (1x)	**.076**	II	6	1/4	2-1/2	986178	70.60	986178-C3	77.80	
	.078 (5/64)	1/8	3/8 (1.5x)	.053	I	6	1/4	2-1/2	22378	51.10	22378-C3	58.30	
	.078 (5/64)	1/8	3/4 (3x)	.053	I	6	1/4	2-1/2	43978	62.30	43978-C3	69.50	
	.093 (3/32)	5/64	1/8 (.5x)	**.076**	II	6	1/4	2-1/2	70893	54.00	70893-C3	61.20	
	.093 (3/32)	5/64	1/4 (1x)	**.076**	II	6	1/4	2-1/2	986193	70.60	986193-C3	77.80	
	.093 (3/32)	1/8	3/8 (1.5x)	.053	I	6	1/4	2-1/2	22393	51.10	22393-C3	58.30	
	.093 (3/32)	1/8	3/4 (3x)	.053	I	6	1/4	2-1/2	43993	62.30	43993-C3	69.50	

*Radial DOC accounts for max transition radius at neck

continued on next page

KEYSEAT CUTTERS

Square (cont.)

continued from previous page

CUTTER DIA.	CUTTER WIDTH	NECK DIA.	NECK LENGTH	RADIAL DOC*	TYPE	FLUTES	SHANK DIA.	OAL	UNCOATED		AlTiN COATED	
D_1 +.000″ −.002″	L_2 +.0005″ −.0005″		L_3 +.020″ −.000″	X			D_2	L_1	TOOL #	PRICE	TOOL #	PRICE
1/4	.100	1/8	3/8 (1.5x)	.053	I	6	1/4	2-1/2	22382	51.10	22382-C3	58.30
	.100	1/8	3/4 (3x)	.053	I	6	1/4	2-1/2	43982	62.30	43982-C3	69.50
	.109 (7/64)	1/8	3/8 (1.5x)	.053	I	6	1/4	2-1/2	22384	51.10	22384-C3	58.30
	.118 (3 mm)	1/8	3/8 (1.5x)	.053	I	6	1/4	2-1/2	22388	51.10	22388-C3	58.30
	.125 (1/8)	5/64	1/8 (.5x)	.076	II	6	1/4	2-1/2	70895	54.00	70895-C3	61.20
	.125 (1/8)	5/64	1/4 (1x)	.076	II	6	1/4	2-1/2	986195	70.60	986195-C3	77.80
	.125 (1/8)	1/8	3/8 (1.5x)	.053	I	6	1/4	2-1/2	22395	51.10	22395-C3	58.30
	.125 (1/8)	1/8	3/4 (3x)	.053	I	6	1/4	2-1/2	43995	62.30	43995-C3	69.50
	.125 (1/8)	1/8	1 (4x)	.053	I	6	1/4	2-1/2	984295	72.10	984295-C3	79.30
	.156 (5/32)	1/8	3/8 (1.5x)	.053	I	6	1/4	2-1/2	22397	51.10	22397-C3	58.30
	.156 (5/32)	1/8	3/4 (3x)	.053	I	6	1/4	2-1/2	43997	62.30	43997-C3	69.50
	.187 (3/16)	1/8	3/8 (1.5x)	.053	I	6	1/4	2-1/2	22398	51.10	22398-C3	58.30
	.187 (3/16)	1/8	3/4 (3x)	.053	I	6	1/4	2-1/2	43998	62.30	43998-C3	69.50
	.250 (1/4)	1/8	3/8 (1.5x)	.053	I	6	1/4	2-1/2	22399	51.10	22399-C3	58.30
5/16	.010	5/32	15/32 (1.5x)	.068	I	6	5/16	2-1/2	22401	71.50	22401-C3	79.90
	.015 (1/64)	5/32	15/32 (1.5x)	.068	I	6	5/16	2-1/2	22403	67.50	22403-C3	75.90
	.020	5/32	15/32 (1.5x)	.068	I	6	5/16	2-1/2	22405	67.50	22405-C3	75.90
	.025	5/32	15/32 (1.5x)	.068	I	6	5/16	2-1/2	22407	67.50	22407-C3	75.90
	.030	5/32	15/32 (1.5x)	.068	I	6	5/16	2-1/2	22409	67.50	22409-C3	75.90
	.031 (1/32)	7/64	3/16 (.5x)	.091	II	6	5/16	2-1/2	973410	75.20	973410-C3	83.60
	.031 (1/32)	5/32	15/32 (1.5x)	.068	I	6	5/16	2-1/2	22410	67.50	22410-C3	75.90
	.031 (1/32)	5/32	1 (3x)	.068	I	6	5/16	2-1/2	69710	79.80	69710-C3	88.20
	.039 (1 mm)	5/32	15/32 (1.5x)	.068	I	6	5/16	2-1/2	22414	67.50	22414-C3	75.90
	.039 (1 mm)	5/32	1 (3x)	.068	I	6	5/16	2-1/2	69714	79.80	69714-C3	88.20
	.040	5/32	15/32 (1.5x)	.068	I	6	5/16	2-1/2	22415	67.50	22415-C3	75.90
	.047 (3/64)	7/64	3/16 (.5x)	.091	II	6	5/16	2-1/2	973420	75.20	973420-C3	83.60
	.047 (3/64)	5/32	15/32 (1.5x)	.068	I	6	5/16	2-1/2	22420	67.50	22420-C3	75.90
	.050	5/32	15/32 (1.5x)	.068	I	6	5/16	2-1/2	22422	67.50	22422-C3	75.90
	.056	Please see page 352 for Retaining Ring sizes.										
	.060	5/32	15/32 (1.5x)	.068	I	6	5/16	2-1/2	22428	67.50	22428-C3	75.90
	.062 (1/16)	.063	3/32 (.3x)	.116	III	10	5/16	2-1/2	959430	101.60	959430-C3	110.00
	.062 (1/16)	7/64	3/16 (.5x)	.091	II	6	5/16	2-1/2	973430	75.20	973430-C3	83.60
	.062 (1/16)	7/64	3/8 (1x)	.091	II	6	5/16	2-1/2	907930	91.50	907930-C3	99.90
	.062 (1/16)	5/32	15/32 (1.5x)	.068	I	6	5/16	2-1/2	22430	67.50	22430-C3	75.90
	.062 (1/16)	5/32	1 (3x)	.068	I	6	5/16	2-1/2	69730	79.80	69730-C3	88.20
	.078 (5/64)	7/64	3/16 (.5x)	.091	II	6	5/16	2-1/2	973440	75.20	973440-C3	83.60
	.078 (5/64)	5/32	15/32 (1.5x)	.068	I	6	5/16	2-1/2	22440	67.50	22440-C3	75.90
	.078 (5/64)	5/32	1 (3x)	.068	I	6	5/16	2-1/2	69740	79.80	69740-C3	88.20
	.093 (3/32)	.063	3/32 (.3x)	.116	III	10	5/16	2-1/2	959450	101.60	959450-C3	110.00
	.093 (3/32)	7/64	3/16 (.5x)	.091	II	6	5/16	2-1/2	973450	75.20	973450-C3	83.60
	.093 (3/32)	7/64	3/8 (1x)	.091	II	6	5/16	2-1/2	907950	91.50	907950-C3	99.90
	.093 (3/32)	5/32	15/32 (1.5x)	.068	I	6	5/16	2-1/2	22450	67.50	22450-C3	75.90
	.093 (3/32)	5/32	1 (3x)	.068	I	6	5/16	2-1/2	69750	79.80	69750-C3	88.20
	.100	5/32	15/32 (1.5x)	.068	I	6	5/16	2-1/2	22452	67.50	22452-C3	75.90
	.125 (1/8)	7/64	3/16 (.5x)	.091	II	6	5/16	2-1/2	973460	75.20	973460-C3	83.60
	.125 (1/8)	7/64	3/8 (1x)	.091	II	6	5/16	2-1/2	907960	91.50	907960-C3	99.90
	.125 (1/8)	5/32	15/32 (1.5x)	.068	I	6	5/16	2-1/2	22455	67.50	22455-C3	75.90
	.125 (1/8)	5/32	1 (3x)	.068	I	6	5/16	2-1/2	69760	79.80	69760-C3	88.20

*Radial DOC accounts for max transition radius at neck

continued on next page

NEW SIZES!

KEYSEAT CUTTERS

Square (cont.)

continued from previous page

CUTTER DIA.	CUTTER WIDTH	NECK DIA.	NECK LENGTH	RADIAL DOC*	TYPE	FLUTES	SHANK DIA.	OAL	UNCOATED		AlTiN COATED		
D_1 +.000″ −.002″	L_2 +.0005″ −.0005″		L_3 +.020″ −.000″	X			D_2	L_1	TOOL #	PRICE	TOOL #	PRICE	
5/16	.156 (5/32)	7/64	3/16 (.5x)	.091	II	6	5/16	2-1/2	973465	75.20	973465-C3	83.60	
	.156 (5/32)	5/32	15/32 (1.5x)	.068	I	6	5/16	2-1/2	22465	67.50	22465-C3	75.90	
	.156 (5/32)	5/32	1 (3x)	.068	I	6	5/16	2-1/2	69765	79.80	69765-C3	88.20	
	.187 (3/16)	5/32	15/32 (1.5x)	.068	I	6	5/16	2-1/2	22470	67.50	22470-C3	75.90	
	.187 (3/16)	5/32	1 (3x)	.068	I	6	5/16	2-1/2	69770	79.80	69770-C3	88.20	
	.250 (1/4)	5/32	15/32 (1.5x)	.068	I	6	5/16	2-1/2	22480	67.50	22480-C3	75.90	
3/8	.015 (1/64)	3/16	9/16 (1.5x)	.084	I	8	3/8	2-1/2	22503	78.80	22503-C3	88.30	
	.020	1/8	3/16 (.5x)	.115	II	8	3/8	2-1/2	71105	79.90	71105-C3	89.40	
	.020	3/16	9/16 (1.5x)	.084	I	8	3/8	2-1/2	22505	78.80	22505-C3	88.30	
	.020	3/16	1-1/8 (3x)	.084	I	8	3/8	2-1/2	70305	89.10	70305-C3	98.60	
	.025	3/16	9/16 (1.5x)	.084	I	8	3/8	2-1/2	22507	78.80	22507-C3	88.30	
	.025	3/16	1-1/8 (3x)	.084	I	8	3/8	2-1/2	70307	89.10	70307-C3	98.60	
	.030	3/16	9/16 (1.5x)	.084	I	8	3/8	2-1/2	22509	78.80	22509-C3	88.30	
	.031 (1/32)	.075	7/64 (.3x)	.142	III	10	3/8	2-1/2	991310	105.20	991310-C3	114.70	
	.031 (1/32)	1/8	3/16 (.5x)	.115	II	8	3/8	2-1/2	71110	79.90	71110-C3	89.40	
	.031 (1/32)	1/8	3/8 (1x)	.115	II	8	3/8	2-1/2	958910	96.30	958910-C3	105.80	
	.031 (1/32)	3/16	9/16 (1.5x)	.084	I	8	3/8	2-1/2	22510	76.10	22510-C3	85.60	
	.031 (1/32)	3/16	1-1/8 (3x)	.084	I	8	3/8	2-1/2	70310	89.10	70310-C3	98.60	
	.035	3/16	9/16 (1.5x)	.084	I	8	3/8	2-1/2	22512	76.10	22512-C3	85.60	
	.035	3/16	1-1/8 (3x)	.084	I	8	3/8	2-1/2	70312	89.10	70312-C3	98.60	
	.039 (1 mm)	1/8	3/16 (.5x)	.115	II	8	3/8	2-1/2	71114	79.90	71114-C3	89.40	
	.039 (1 mm)	3/16	9/16 (1.5x)	.084	I	8	3/8	2-1/2	22514	76.10	22514-C3	85.60	
	.039 (1 mm)	3/16	1-1/8 (3x)	.084	I	8	3/8	2-1/2	70314	89.10	70314-C3	98.60	
	.040	1/8	3/16 (.5x)	.115	II	8	3/8	2-1/2	71115	79.90	71115-C3	89.40	
	.040	3/16	9/16 (1.5x)	.084	I	8	3/8	2-1/2	22515	76.10	22515-C3	85.60	
	.040	3/16	1-1/8 (3x)	.084	I	8	3/8	2-1/2	70315	89.10	70315-C3	98.60	
	.045	3/16	9/16 (1.5x)	.084	I	8	3/8	2-1/2	22518	76.10	22518-C3	85.60	
	.047 (3/64)	1/8	3/16 (.5x)	.115	II	8	3/8	2-1/2	71120	79.90	71120-C3	89.40	
	.047 (3/64)	3/16	9/16 (1.5x)	.084	I	8	3/8	2-1/2	22520	76.10	22520-C3	85.60	
	.047 (3/64)	3/16	1-1/8 (3x)	.084	I	8	3/8	2-1/2	70320	89.10	70320-C3	98.60	
	.050	1/8	3/8 (1x)	.115	II	8	3/8	2-1/2	958922	79.90	958922-C3	89.40	NEW
	.050	3/16	9/16 (1.5x)	.084	I	8	3/8	2-1/2	22522	76.10	22522-C3	85.60	
	.055	1/8	3/8 (1x)	.115	II	8	3/8	2-1/2	958925	79.90	958925-C3	89.40	NEW
	.055	3/16	9/16 (1.5x)	.084	I	8	3/8	2-1/2	22525	76.10	22525-C3	85.60	
	.060	3/16	9/16 (1.5x)	.084	I	8	3/8	2-1/2	22528	76.10	22528-C3	85.60	
	.060	3/16	1-1/8 (3x)	.084	I	8	3/8	2-1/2	70328	89.10	70328-C3	98.60	
	.062 (1/16)	.075	7/64 (.3x)	.142	III	10	3/8	2-1/2	991330	105.20	991330-C3	114.70	
	.062 (1/16)	1/8	3/16 (.5x)	.115	II	8	3/8	2-1/2	71130	79.90	71130-C3	89.40	
	.062 (1/16)	1/8	3/8 (1x)	.115	II	8	3/8	2-1/2	958930	96.30	958930-C3	105.80	
	.062 (1/16)	3/16	3/8 (1x)	.084	I	8	3/8	2-1/2	806330	76.10	806330-C3	85.60	
	.062 (1/16)	3/16	9/16 (1.5x)	.084	I	8	3/8	2-1/2	22530	76.10	22530-C3	85.60	
	.062 (1/16)	3/16	1-1/8 (3x)	.084	I	8	3/8	2-1/2	70330	89.10	70330-C3	98.60	
	.068	Please see page 352 for Retaining Ring sizes.											
	.078 (5/64)	1/8	3/16 (.5x)	.115	II	8	3/8	2-1/2	71140	79.90	71140-C3	89.40	
	.078 (5/64)	3/16	9/16 (1.5x)	.084	I	8	3/8	2-1/2	22540	76.10	22540-C3	85.60	
	.078 (5/64)	3/16	1-1/8 (3x)	.084	I	8	3/8	2-1/2	70340	76.10	70340-C3	85.60	
	.086	Please see page 352 for Retaining Ring sizes.											

*Radial DOC accounts for max transition radius at neck

continued on next page

KEYSEAT CUTTERS

Square (cont.)

continued from previous page

CUTTER DIA.	CUTTER WIDTH	NECK DIA.	NECK LENGTH	RADIAL DOC*	TYPE	FLUTES	SHANK DIA.	OAL	UNCOATED		AlTiN COATED	
D_1 $^{+.000''}_{-.002''}$	L_2 $^{+.0005''}_{-.0005''}$		L_3 $^{+.020''}_{-.000''}$	X			D_2	L_1	TOOL #	PRICE	TOOL #	PRICE
3/8	.093 (3/32)	.075	7/64 (.3x)	.142	III	10	3/8	2-1/2	991350	105.20	991350-C3	114.70
	.093 (3/32)	1/8	3/16 (.5x)	.115	II	8	3/8	2-1/2	71150	79.90	71150-C3	89.40
	.093 (3/32)	1/8	3/8 (1x)	.115	II	8	3/8	2-1/2	958950	96.30	958950-C3	105.80
	.093 (3/32)	3/16	9/16 (1.5x)	.084	I	8	3/8	2-1/2	22550	76.10	22550-C3	85.60
	.093 (3/32)	3/16	1-1/8 (3x)	.084	I	8	3/8	2-1/2	70350	89.10	70350-C3	98.60
	.100	3/16	9/16 (1.5x)	.084	I	8	3/8	2-1/2	22552	76.10	22552-C3	85.60
	.125 (1/8)	1/8	3/16 (.5x)	.115	II	8	3/8	2-1/2	71160	79.90	71160-C3	89.40
	.125 (1/8)	1/8	3/8 (1x)	.115	II	8	3/8	2-1/2	958960	96.30	958960-C3	105.80
	.125 (1/8)	3/16	3/8 (1x)	.084	I	8	3/8	2-1/2	806360	76.10	806360-C3	85.60
	.125 (1/8)	3/16	9/16 (1.5x)	.084	I	8	3/8	2-1/2	22560	76.10	22560-C3	85.60
	.125 (1/8)	3/16	1-1/8 (3x)	.084	I	8	3/8	2-1/2	70360	89.10	70360-C3	98.60
	.156 (5/32)	1/8	3/16 (.5x)	.115	II	8	3/8	2-1/2	71165	79.90	71165-C3	89.40
	.156 (5/32)	3/16	9/16 (1.5x)	.084	I	8	3/8	2-1/2	22565	76.10	22565-C3	85.60
	.156 (5/32)	3/16	1-1/8 (3x)	.084	I	8	3/8	3	70365	89.10	70365-C3	98.60
	.187 (3/16)	1/8	3/16 (.5x)	.115	II	8	3/8	2-1/2	71170	79.90	71170-C3	89.40
	.187 (3/16)	3/16	9/16 (1.5x)	.084	I	8	3/8	2-1/2	22570	76.10	22570-C3	85.60
	.187 (3/16)	3/16	1-1/8 (3x)	.084	I	8	3/8	3	70370	89.10	70370-C3	98.60
	.250 (1/4)	1/8	3/16 (.5x)	.115	II	8	3/8	2-1/2	71180	79.90	71180-C3	89.40
	.250 (1/4)	3/16	9/16 (1.5x)	.084	I	8	3/8	2-1/2	22580	76.10	22580-C3	85.60
	.250 (1/4)	3/16	1-1/8 (3x)	.084	I	8	3/8	3	70380	89.10	70380-C3	98.60
	.312 (5/16)	3/16	9/16 (1.5x)	.084	I	8	3/8	2-1/2	22585	76.10	22585-C3	85.60
7/16	.031 (1/32)	7/32	5/8 (1.5x)	.099	I	8	7/16	2-3/4	71810	101.60	71810-C3	113.50
	.047 (3/64)	7/32	5/8 (1.5x)	.099	I	8	7/16	2-3/4	71820	101.60	71820-C3	113.50
	.062 (1/16)	7/32	5/8 (1.5x)	.099	I	8	7/16	2-3/4	71830	101.60	71830-C3	113.50
	.078 (5/64)	7/32	5/8 (1.5x)	.099	I	8	7/16	2-3/4	71840	101.60	71840-C3	113.50
	.093 (3/32)	7/32	5/8 (1.5x)	.099	I	8	7/16	2-3/4	71850	101.60	71850-C3	113.50
	.125 (1/8)	7/32	5/8 (1.5x)	.099	I	8	7/16	2-3/4	71860	101.60	71860-C3	113.50
	.125 (1/8)	7/32	1-5/16 (3x)	.099	I	8	7/16	2-3/4	892960	114.90	892960-C3	126.80
	.156 (5/32)	7/32	5/8 (1.5x)	.099	I	8	7/16	2-3/4	71865	101.60	71865-C3	113.50
	.187 (3/16)	7/32	5/8 (1.5x)	.099	I	8	7/16	2-3/4	71870	101.60	71870-C3	113.50
	.187 (3/16)	7/32	1-5/16 (3x)	.099	I	8	7/16	2-3/4	892970	114.90	892970-C3	126.80
	.250 (1/4)	7/32	5/8 (1.5x)	.099	I	8	7/16	2-3/4	71880	101.60	71880-C3	113.50
	.250 (1/4)	7/32	1-5/16 (3x)	.099	I	8	7/16	2-3/4	892980	114.90	892980-C3	126.80
1/2	.015 (1/64)	1/4	3/4 (1.5x)	.115	I	8	1/2	3	22603	103.40	22603-C3	117.60
	.020	5/32	1/4 (.5x)	.162	II	8	1/2	3	71205	107.40	71205-C3	121.60
	.020	1/4	3/4 (1.5x)	.115	I	8	1/2	3	22605	103.40	22605-C3	117.60
	.025	1/4	3/4 (1.5x)	.115	I	8	1/2	3	22607	103.40	22607-C3	117.60
	.025	1/4	1-1/2 (3x)	.115	I	8	1/2	3	71507	116.20	71507-C3	130.40
	.030	1/4	3/4 (1.5x)	.115	I	8	1/2	3	22609	103.40	22609-C3	117.60
	.031 (1/32)	5/32	1/4 (.5x)	.162	II	8	1/2	3	71210	104.10	71210-C3	118.30
	.031 (1/32)	5/32	1/2 (1x)	.162	II	8	1/2	3	975710	105.50	975710-C3	119.70
	.031 (1/32)	1/4	3/4 (1.5x)	.115	I	8	1/2	3	22610	100.00	22610-C3	114.20
	.031 (1/32)	1/4	1-1/2 (3x)	.115	I	8	1/2	3	71510	113.00	71510-C3	127.20
	.035	1/4	3/4 (1.5x)	.115	I	8	1/2	3	22612	100.00	22612-C3	114.20
	.039 (1 mm)	1/4	3/4 (1.5x)	.115	I	8	1/2	3	22614	100.00	22614-C3	114.20
	.040	5/32	1/4 (.5x)	.162	II	8	1/2	3	71215	104.10	71215-C3	118.30
	.040	1/4	3/4 (1.5x)	.115	I	8	1/2	3	22615	100.00	22615-C3	114.20
	.040	1/4	1-1/2 (3x)	.115	I	8	1/2	3	71515	113.00	71515-C3	127.20

*Radial DOC accounts for max transition radius at neck

continued on next page

NEW SIZES!

KEYSEAT CUTTERS

Square (cont.)

continued from previous page

CUTTER DIA.	CUTTER WIDTH	NECK DIA.	NECK LENGTH	RADIAL DOC*	TYPE	FLUTES	SHANK DIA.	OAL	UNCOATED		AlTiN COATED	
D_1 $^{+.000''}_{-.002''}$	L_2 $^{+.0005''}_{-.0005''}$		L_3 $^{+.020''}_{-.000''}$	X			D_2	L_1	TOOL #	PRICE	TOOL #	PRICE
	.045	1/4	3/4 (1.5x)	.115	I	8	1/2	3	22618	100.00	22618-C3	114.20
	.045	1/4	1-1/2 (3x)	.115	I	8	1/2	3	71518	113.00	71518-C3	127.20
	.047 (3/64)	5/32	1/4 (.5x)	.162	II	8	1/2	3	71220	104.10	71220-C3	118.30
	.047 (3/64)	1/4	3/4 (1.5x)	.115	I	8	1/2	3	22620	100.00	22620-C3	114.20
	.047 (3/64)	1/4	1-1/2 (3x)	.115	I	8	1/2	3	71520	113.00	71520-C3	127.20
	.050	1/4	3/4 (1.5x)	.115	I	8	1/2	3	22622	100.00	22622-C3	114.20
	.050	1/4	1-1/2 (3x)	.115	I	8	1/2	3	71522	113.00	71522-C3	127.20
	.055	1/4	3/4 (1.5x)	.115	I	8	1/2	3	22625	100.00	22625-C3	114.20
	.055	1/4	1-1/2 (3x)	.115	I	8	1/2	3	71525	113.00	71525-C3	127.20
	.060	5/32	1/4 (.5x)	.162	II	8	1/2	3	71228	104.10	71228-C3	118.30
	.060	1/4	3/4 (1.5x)	.115	I	8	1/2	3	22628	100.00	22628-C3	114.20
	.062 (1/16)	.100	5/32 (.3x)	.192	III	12	1/2	3	985230	131.50	985230-C3	145.70
	.062 (1/16)	5/32	1/4 (.5x)	.162	II	8	1/2	3	71230	104.10	71230-C3	118.30
	.062 (1/16)	5/32	1/2 (1x)	.162	II	8	1/2	3	975730	123.40	975730-C3	137.60
	.062 (1/16)	1/4	3/4 (1.5x)	.115	I	8	1/2	3	22630	100.00	22630-C3	114.20
	.062 (1/16)	1/4	1-1/2 (3x)	.115	I	8	1/2	3	71530	113.00	71530-C3	127.20
	.070	1/4	3/4 (1.5x)	.115	I	8	1/2	3	22635	100.00	22635-C3	114.20
	.078 (5/64)	5/32	1/4 (.5x)	.162	II	8	1/2	3	71240	104.10	71240-C3	118.30
	.078 (5/64)	1/4	3/4 (1.5x)	.115	I	8	1/2	3	22640	100.00	22640-C3	114.20
	.078 (5/64)	1/4	1-1/2 (3x)	.115	I	8	1/2	3	71540	113.00	71540-C3	127.20
	.080	1/4	3/4 (1.5x)	.115	I	8	1/2	3	22642	100.00	22642-C3	114.20
	.090	1/4	3/4 (1.5x)	.115	I	8	1/2	3	22647	100.00	22647-C3	114.20
	.093 (3/32)	.100	5/32 (.3x)	.192	III	12	1/2	3	985250	131.50	985250-C3	145.70
	.093 (3/32)	5/32	1/4 (.5x)	.162	II	8	1/2	3	71250	104.10	71250-C3	118.30
1/2	.093 (3/32)	5/32	1/2 (1x)	.162	II	8	1/2	3	975750	123.40	975750-C3	137.60
	.093 (3/32)	1/4	3/4 (1.5x)	.115	I	8	1/2	3	22650	100.00	22650-C3	114.20
	.093 (3/32)	1/4	1-1/2 (3x)	.115	I	8	1/2	3	71550	113.00	71550-C3	127.20
	.100	5/32	1/4 (.5x)	.162	II	8	1/2	3	71252	104.10	71252-C3	118.30
	.100	1/4	3/4 (1.5x)	.115	I	8	1/2	3	22652	100.00	22652-C3	114.20
	.100	1/4	1-1/2 (3x)	.115	I	8	1/2	3	71552	113.00	71552-C3	127.20
	.103	Please see page 352 for Retaining Ring sizes.										
	.109 (7/64)	1/4	3/4 (1.5x)	.115	I	8	1/2	3	22654	100.00	22654-C3	114.20
	.118 (3 mm)	1/4	3/4 (1.5x)	.115	I	8	1/2	3	22657	100.00	22657-C3	114.20
	.118 (3 mm)	1/4	1-1/2 (3x)	.115	I	8	1/2	3	71557	113.00	71557-C3	127.20
	.120	Please see page 352 for Retaining Ring sizes.										
	.125 (1/8)	.100	5/32 (.3x)	.192	III	12	1/2	3	985260	131.50	985260-C3	145.70
	.125 (1/8)	5/32	1/4 (.5x)	.162	II	8	1/2	3	71260	104.10	71260-C3	118.30
	.125 (1/8)	5/32	1/2 (1x)	.162	II	8	1/2	3	975760	123.40	975760-C3	137.60
	.125 (1/8)	1/4	1/2 (1x)	.115	I	8	1/2	3	806260	100.00	806260-C3	114.20
	.125 (1/8)	1/4	3/4 (1.5x)	.115	I	8	1/2	3	22660	100.00	22660-C3	114.20
	.125 (1/8)	1/4	1-1/2 (3x)	.115	I	8	1/2	3	71560	113.00	71560-C3	127.20
	.125 (1/8)	1/4	2 (4x)	.115	I	8	1/2	4	933160	168.80	933160-C3	183.00
	.140 (9/64)	1/4	3/4 (1.5x)	.115	I	8	1/2	3	22662	100.00	22662-C3	114.20
	.156 (5/32)	5/32	1/4 (.5x)	.162	II	8	1/2	3	71265	104.10	71265-C3	118.30
	.156 (5/32)	1/4	3/4 (1.5x)	.115	I	8	1/2	3	22665	100.00	22665-C3	114.20
	.156 (5/32)	1/4	1-1/2 (3x)	.115	I	8	1/2	3-1/2	71565	113.00	71565-C3	127.20
	.187 (3/16)	5/32	1/4 (.5x)	.162	II	8	1/2	3	71270	104.10	71270-C3	118.30
	.187 (3/16)	5/32	1/2 (1x)	.162	II	8	1/2	3	975770	123.40	975770-C3	137.60

*Radial DOC accounts for max transition radius at neck

continued on next page

KEYSEAT CUTTERS

Square (cont.)

continued from previous page

CUTTER DIA.	CUTTER WIDTH	NECK DIA.	NECK LENGTH	RADIAL DOC*	TYPE	FLUTES	SHANK DIA.	OAL	UNCOATED		AlTiN COATED	
D_1 $^{+.000''}_{-.002''}$	L_2 $^{+.0005''}_{-.0005''}$		L_3 $^{+.020''}_{-.000''}$	X			D_2	L_1	TOOL #	PRICE	TOOL #	PRICE
	.187 (3/16)	1/4	3/4 (1.5x)	.115	I	8	1/2	3	22670	100.00	22670-C3	114.20
	.187 (3/16)	1/4	1-1/2 (3x)	.115	I	8	1/2	3-1/2	71570	113.00	71570-C3	127.20
	.250 (1/4)	5/32	1/4 (.5x)	**.162**	II	8	1/2	3	71280	104.10	71280-C3	118.30
	.250 (1/4)	5/32	1/2 (1x)	**.162**	II	8	1/2	3	975780	123.40	975780-C3	137.60
1/2	.250 (1/4)	1/4	3/4 (1.5x)	.115	I	8	1/2	3	22680	100.00	22680-C3	114.20
	.250 (1/4)	1/4	1-1/2 (3x)	.115	I	8	1/2	3-1/2	71580	113.00	71580-C3	127.20
	.312 (5/16)	1/4	3/4 (1.5x)	.115	I	8	1/2	3	22685	100.00	22685-C3	114.20
	.312 (5/16)	1/4	1-1/2 (3x)	.115	I	8	1/2	3-1/2	71585	113.00	71585-C3	127.20
	.375 (3/8)	1/4	3/4 (1.5x)	.115	I	8	1/2	3	22687	100.00	22687-C3	114.20
	.031 (1/32)	5/16	1 (1.5x)	.146	I	8	5/8	3-1/2	70910	156.70	70910-C3	170.90
	.031 (1/32)	5/16	2 (3x)	.146	I	8	5/8	3-1/2	972910	202.70	972910-C3	216.90
	.047 (3/64)	5/16	1 (1.5x)	.146	I	8	5/8	3-1/2	70920	156.70	70920-C3	170.90
	.062 (1/16)	5/16	1 (1.5x)	.146	I	8	5/8	3-1/2	70930	156.70	70930-C3	170.90
	.078 (5/64)	5/16	1 (1.5x)	.146	I	8	5/8	3-1/2	70940	156.70	70940-C3	170.90
	.093 (3/32)	13/64	5/16 (.5x)	**.201**	II	8	5/8	3-1/2	950650	211.00	950650-C3	225.20
	.093 (3/32)	5/16	1 (1.5x)	.146	I	8	5/8	3-1/2	70950	156.70	70950-C3	170.90
	.093 (3/32)	5/16	2 (3x)	.146	I	8	5/8	4	972950	202.70	972950-C3	218.10
	.120	Please see page 352 for Retaining Ring sizes.										
	.125 (1/8)	13/64	5/16 (.5x)	**.201**	II	8	5/8	3-1/2	950660	211.00	950660-C3	225.20
	.125 (1/8)	5/16	1 (1.5x)	.146	I	8	5/8	3-1/2	70960	156.70	70960-C3	170.90
	.125 (1/8)	5/16	2 (3x)	.146	I	8	5/8	4	972960	202.70	972960-C3	218.10
5/8	.139	Please see page 352 for Retaining Ring sizes.										
	.156 (5/32)	13/64	5/16 (.5x)	**.201**	II	8	5/8	3-1/2	950665	211.00	950665-C3	225.20
	.156 (5/32)	5/16	1 (1.5x)	.146	I	8	5/8	3-1/2	70965	156.70	70965-C3	170.90
	.156 (5/32)	5/16	2 (3x)	.146	I	8	5/8	4	972965	202.70	972965-C3	218.10
	.187 (3/16)	13/64	5/16 (.5x)	**.201**	II	8	5/8	3-1/2	950670	211.00	950670-C3	225.20
	.187 (3/16)	5/16	1 (1.5x)	.146	I	8	5/8	3-1/2	70970	156.70	70970-C3	170.90
	.187 (3/16)	5/16	2 (3x)	.146	I	8	5/8	4	972970	202.70	972970-C3	218.10
	.250 (1/4)	13/64	5/16 (.5x)	**.201**	II	8	5/8	3-1/2	950680	211.00	950680-C3	225.20
	.250 (1/4)	5/16	1 (1.5x)	.146	I	8	5/8	3-1/2	70980	156.70	70980-C3	170.90
	.250 (1/4)	5/16	2 (3x)	.146	I	8	5/8	4	972980	202.70	972980-C3	218.10
	.312 (5/16)	5/16	1 (1.5x)	.146	I	8	5/8	3-1/2	70985	156.70	70985-C3	170.90
	.375 (3/8)	5/16	1 (1.5x)	.146	I	8	5/8	3-1/2	70987	156.70	70987-C3	170.90

*Radial DOC accounts for max transition radius at neck

For reduced shank and greater radial depths of cut, please see Reduced Shank Keyseat Cutters on pages 349, 357, 360, & 365.

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KEYSEAT CUTTERS

Square for Hardened Steels

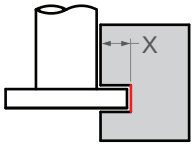


- Optimized for hardened steels 45-68Rc with high flute count and specialized internal geometry
- Latest generation AlTiN Nano coating offers superior hardness and heat resistance
- Both sides of cutter are dished for clearance
- Solid carbide
- CNC ground in the USA



High Flute Count and Specialized Internal Geometry

Standard Slotting (Type I)

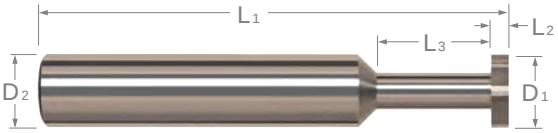


CUTTER DIA.	CUTTER WIDTH	NECK DIA.	NECK LENGTH	RADIAL DOC*	TYPE	FLUTES	SHANK DIA.	OAL	AlTiN NANO COATED	
D_1 +.000″ −.002″	L_2 +.0005″ −.0005″		L_3 +.020″ −.000″	X			D_2	L_1	TOOL #	PRICE
1/8	.015 (1/64)	1/16	3/16 (1.5x)	.022	I	8	1/8	1-1/2	867415-C6	55.10
	.020	1/16	3/16 (1.5x)	.022	I	8	1/8	1-1/2	867420-C6	55.10
	.031 (1/32)	1/16	3/16 (1.5x)	.022	I	8	1/8	1-1/2	867431-C6	55.10
	.062 (1/16)	1/16	3/16 (1.5x)	.022	I	8	1/8	1-1/2	867462-C6	55.10
	.093 (3/32)	1/16	3/16 (1.5x)	.022	I	8	1/8	1-1/2	867493-C6	55.10
3/16	.020	3/32	9/32 (1.5x)	.037	I	8	3/16	2	875920-C6	57.20
	.031 (1/32)	3/32	9/32 (1.5x)	.037	I	8	3/16	2	875931-C6	57.20
	.062 (1/16)	3/32	9/32 (1.5x)	.037	I	8	3/16	2	875962-C6	57.20
	.093 (3/32)	3/32	9/32 (1.5x)	.037	I	8	3/16	2	875993-C6	57.20
1/4	.015 (1/64)	1/8	3/8 (1.5x)	.048	I	8	1/4	2-1/2	860115-C6	64.60
	.020	1/8	3/8 (1.5x)	.048	I	8	1/4	2-1/2	860120-C6	64.60
	.031 (1/32)	1/8	3/8 (1.5x)	.048	I	8	1/4	2-1/2	860131-C6	64.60
	.047 (3/64)	1/8	3/8 (1.5x)	.048	I	8	1/4	2-1/2	860147-C6	64.60
	.062 (1/16)	1/8	3/8 (1.5x)	.048	I	8	1/4	2-1/2	860162-C6	64.60
	.078 (5/64)	1/8	3/8 (1.5x)	.048	I	8	1/4	2-1/2	860178-C6	64.60
	.093 (3/32)	1/8	3/8 (1.5x)	.048	I	8	1/4	2-1/2	860193-C6	64.60
	.125 (1/8)	1/8	3/8 (1.5x)	.048	I	8	1/4	2-1/2	860195-C6	64.60
5/16	.062 (1/16)	5/32	15/32 (1.5x)	.063	I	8	5/16	2-1/2	855630-C6	85.50
	.093 (3/32)	5/32	15/32 (1.5x)	.063	I	8	5/16	2-1/2	855650-C6	85.50
	.125 (1/8)	5/32	15/32 (1.5x)	.063	I	8	5/16	2-1/2	855660-C6	85.50
3/8	.031 (1/32)	3/16	9/16 (1.5x)	.074	I	10	3/8	3	894710-C6	96.30
	.062 (1/16)	3/16	9/16 (1.5x)	.074	I	10	3/8	3	894730-C6	96.30
	.093 (3/32)	3/16	9/16 (1.5x)	.074	I	10	3/8	3	894750-C6	96.30
	.125 (1/8)	3/16	9/16 (1.5x)	.074	I	10	3/8	3	894760-C6	96.30
	.187 (3/16)	3/16	9/16 (1.5x)	.074	I	10	3/8	3	894770-C6	96.30
	.250 (1/4)	3/16	9/16 (1.5x)	.074	I	10	3/8	3	894780-C6	96.30
1/2	.031 (1/32)	1/4	3/4 (1.5x)	.105	I	10	1/2	3	891310-C6	130.80
	.047 (3/64)	1/4	3/4 (1.5x)	.105	I	10	1/2	3	891320-C6	130.80
	.062 (1/16)	1/4	3/4 (1.5x)	.105	I	10	1/2	3	891330-C6	130.80
	.078 (5/64)	1/4	3/4 (1.5x)	.105	I	10	1/2	3	891340-C6	130.80
	.093 (3/32)	1/4	3/4 (1.5x)	.105	I	10	1/2	3	891350-C6	130.80
	.125 (1/8)	1/4	3/4 (1.5x)	.105	I	10	1/2	3	891360-C6	130.80
	.156 (5/32)	1/4	3/4 (1.5x)	.105	I	10	1/2	3	891365-C6	130.80
	.187 (3/16)	1/4	3/4 (1.5x)	.105	I	10	1/2	3	891370-C6	130.80
	.250 (1/4)	1/4	3/4 (1.5x)	.105	I	10	1/2	3	891380-C6	130.80

*Radial DOC accounts for max transition radius at neck

KEYSEAT CUTTERS

Square for Non-Ferrous Materials

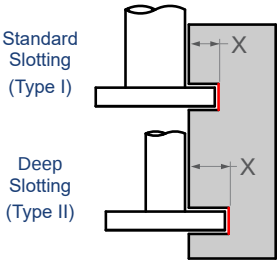


- Optimized for aluminum and aluminum alloys with excellent performance in copper, brass, and bronze alloys
- Large flute opening and sharper cutting edge
- Offered with TiB_2 coating to minimize galling
- Both sides of cutter are dished for clearance
- Solid carbide
- CNC ground in the USA



Large Flute Opening & Sharper Cutting Edge

Stocked in Multiple Radial Depths of Cut!



CUTTER DIA.	CUTTER WIDTH	NECK DIA.	NECK LENGTH	RADIAL DOC*	TYPE	FLUTES	SHANK DIA.	OAL	UNCOATED		TiB_2 COATED	
D_1 +.000″ −.002″	L_2 +.0005″ −.0005″		L_3 +.020″ −.000″	X			D_2	L_1	TOOL #	PRICE	TOOL #	PRICE
3/32	.015 (1/64)	3/64	9/64 (1.5x)	.021	I	3	1/8	1-1/2	849815	49.30	849815-C8	56.50
	.031 (1/32)	3/64	9/64 (1.5x)	.021	I	3	1/8	1-1/2	849831	49.30	849831-C8	56.50
	.062 (1/16)	3/64	9/64 (1.5x)	.021	I	3	1/8	1-1/2	849862	49.30	849862-C8	56.50
1/8	.015 (1/64)	1/16	3/16 (1.5x)	.022	I	4	1/8	1-1/2	962915	49.30	962915-C8	56.50
	.031 (1/32)	1/16	3/16 (1.5x)	.022	I	4	1/8	1-1/2	962931	49.30	962931-C8	56.50
	.062 (1/16)	1/16	3/16 (1.5x)	.022	I	4	1/8	1-1/2	962962	49.30	962962-C8	56.50
	.093 (3/32)	1/16	3/16 (1.5x)	.022	I	4	1/8	1-1/2	962993	49.30	962993-C8	56.50
3/16	.031 (1/32)	3/32	9/32 (1.5x)	.037	I	4	3/16	2	998031	51.10	998031-C8	58.30
	.047 (3/64)	3/32	9/32 (1.5x)	.037	I	4	3/16	2	998047	51.10	998047-C8	58.30
	.062 (1/16)	3/32	9/32 (1.5x)	.037	I	4	3/16	2	998062	51.10	998062-C8	58.30
	.125 (1/8)	3/32	9/32 (1.5x)	.037	I	4	3/16	2	998095	51.10	998095-C8	58.30
1/4	.015 (1/64)	1/8	3/8 (1.5x)	.053	I	4	1/4	2-1/2	970315	56.70	970315-C8	64.40
	.020	1/8	3/8 (1.5x)	.053	I	4	1/4	2-1/2	970320	56.70	970320-C8	64.40
	.025	1/8	3/8 (1.5x)	.053	I	4	1/4	2-1/2	970325	56.70	970325-C8	64.40
	.031 (1/32)	1/8	3/8 (1.5x)	.053	I	4	1/4	2-1/2	970331	56.70	970331-C8	64.40
	.040	1/8	3/8 (1.5x)	.053	I	4	1/4	2-1/2	970340	56.70	970340-C8	64.40
	.047 (3/64)	1/8	3/8 (1.5x)	.053	I	4	1/4	2-1/2	970347	56.70	970347-C8	64.40
	.060	1/8	3/8 (1.5x)	.053	I	4	1/4	2-1/2	970360	56.70	970360-C8	64.40
	.062 (1/16)	5/64	1/8 (.5x)	.076	II	4	1/4	2-1/2	909262	59.70	909262-C8	67.40
	.062 (1/16)	1/8	3/8 (1.5x)	.053	I	4	1/4	2-1/2	970362	56.70	970362-C8	64.40
	.078 (5/64)	1/8	3/8 (1.5x)	.053	I	4	1/4	2-1/2	970378	56.70	970378-C8	64.40
	.093 (3/32)	1/8	3/8 (1.5x)	.053	I	4	1/4	2-1/2	970393	56.70	970393-C8	64.40
	.125 (1/8)	5/64	1/8 (.5x)	.076	II	4	1/4	2-1/2	909295	59.70	909295-C8	67.40
	.125 (1/8)	1/8	3/8 (1.5x)	.053	I	4	1/4	2-1/2	970395	56.70	970395-C8	64.40
5/16	.031 (1/32)	5/32	15/32 (1.5x)	.068	I	4	5/16	2-1/2	984310	77.70	984310-C8	94.10
	.062 (1/16)	5/32	15/32 (1.5x)	.068	I	4	5/16	2-1/2	984330	77.70	984330-C8	94.10
	.093 (3/32)	5/32	15/32 (1.5x)	.068	I	4	5/16	2-1/2	984350	77.70	984350-C8	94.10
	.125 (1/8)	5/32	15/32 (1.5x)	.068	I	4	5/16	2-1/2	984360	77.70	984360-C8	94.10

*Radial DOC accounts for max transition radius at neck

continued on next page

KEYSEAT CUTTERS

Square for Non-Ferrous Materials (cont.)

continued from previous page

CUTTER DIA.	CUTTER WIDTH	NECK DIA.	NECK LENGTH	RADIAL DOC*	TYPE	FLUTES	SHANK DIA.	OAL	UNCOATED		TiB$_2$ COATED	
D_1 $^{+.000''}_{-.002''}$	L_2 $^{+.0005''}_{-.0005''}$		L_3 $^{+.020''}_{-.000''}$	X			D_2	L_1	TOOL #	PRICE	TOOL #	PRICE
	.031 (1/32)	3/16	9/16 (1.5x)	.084	I	6	3/8	2-1/2	975210	86.90	975210-C8	106.80
	.047 (3/64)	3/16	9/16 (1.5x)	.084	I	6	3/8	2-1/2	975220	86.90	975220-C8	106.80
	.062 (1/16)	3/16	9/16 (1.5x)	.084	I	6	3/8	2-1/2	975230	86.90	975230-C8	106.80
3/8	.078 (5/64)	3/16	9/16 (1.5x)	.084	I	6	3/8	2-1/2	975240	86.90	975240-C8	106.80
	.093 (3/32)	3/16	9/16 (1.5x)	.084	I	6	3/8	2-1/2	975250	86.90	975250-C8	106.80
	.125 (1/8)	3/16	9/16 (1.5x)	.084	I	6	3/8	2-1/2	975260	86.90	975260-C8	106.80
	.187 (3/16)	3/16	9/16 (1.5x)	.084	I	6	3/8	2-1/2	975270	86.90	975270-C8	106.80
	.031 (1/32)	1/4	3/4 (1.5x)	.115	I	6	1/2	3	988910	114.50	988910-C8	137.90
	.047 (3/64)	1/4	3/4 (1.5x)	.115	I	6	1/2	3	988920	114.50	988920-C8	137.90
	.062 (1/16)	5/32	1/4 (.5x)	.162	II	6	1/2	3	917530	118.80	917530-C8	142.20
	.062 (1/16)	1/4	3/4 (1.5x)	.115	I	6	1/2	3	988930	114.50	988930-C8	137.90
	.078 (5/64)	1/4	3/4 (1.5x)	.115	I	6	1/2	3	988940	114.50	988940-C8	137.90
1/2	.093 (3/32)	1/4	3/4 (1.5x)	.115	I	6	1/2	3	988950	114.50	988950-C8	137.90
	.125 (1/8)	5/32	1/4 (.5x)	.162	II	6	1/2	3	917560	118.80	917560-C8	142.20
	.125 (1/8)	1/4	3/4 (1.5x)	.115	I	6	1/2	3	988960	114.50	988960-C8	137.90
	.156 (5/32)	1/4	3/4 (1.5x)	.115	I	6	1/2	3	988965	114.50	988965-C8	137.90
	.187 (3/16)	1/4	3/4 (1.5x)	.115	I	6	1/2	3	988970	114.50	988970-C8	137.90
	.250 (1/4)	1/4	3/4 (1.5x)	.115	I	6	1/2	3	988980	114.50	988980-C8	137.90
	.062 (1/16)	5/16	1 (1.5x)	.146	I	6	5/8	3-1/2	891730	164.10	891730-C8	198.20
	.078 (5/64)	5/16	1 (1.5x)	.146	I	6	5/8	3-1/2	891740	164.10	891740-C8	198.20
	.093 (3/32)	5/16	1 (1.5x)	.146	I	6	5/8	3-1/2	891750	164.10	891750-C8	198.20
5/8	.125 (1/8)	5/16	1 (1.5x)	.146	I	6	5/8	3-1/2	891760	164.10	891760-C8	198.20
	.187 (3/16)	5/16	1 (1.5x)	.146	I	6	5/8	3-1/2	891770	164.10	891770-C8	198.20
	.250 (1/4)	5/16	1 (1.5x)	.146	I	6	5/8	3-1/2	891780	164.10	891780-C8	198.20

*Radial DOC accounts for max transition radius at neck



★★★★★

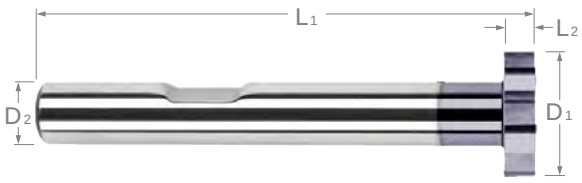
"We didn't have time to have a form tool ground for this job so we did a 3D under cut with a corner radius keyway cutter from @ harveytool. Harvey Tool makes some of the best odd size tools out there."

— @hdhmfg

Follow us on Instagram @harveytool!

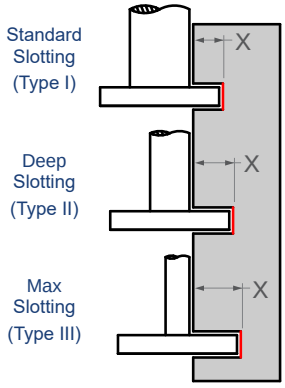
KEYSEAT CUTTERS

Square – Reduced Shank



- Solid carbide head brazed onto a steel shank
- Both sides of cutter are dished for clearance
- Weldon flat
- CNC ground in the USA

Stocked in Multiple Radial Depths of Cut!



CUTTER DIAMETER	CUTTER WIDTH	RADIAL DOC**	TYPE	FLUTES	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN COATED	
D_1 +.000″ −.002″	L_2 +.001″ −.001″	X			D_2	L_1	TOOL #	PRICE	TOOL #	PRICE
	.031 (1/32)	.115	I	8	1/4*	3-1/32	849305	89.00	849305-C3	103.10
	.062 (1/16)	.115	I	8	1/4*	3-1/16	849320	89.00	849320-C3	103.20
	.093 (3/32)	.115	I	8	1/4*	3-3/32	849340	89.00	849340-C3	103.20
1/2	.125 (1/8)	.115	I	8	1/4*	3-1/8	849350	89.00	849350-C3	103.20
	.187 (3/16)	.115	I	8	1/4*	3-3/16	849360	89.00	849360-C3	103.20
	.250 (1/4)	.115	I	8	1/4*	3-1/4	849370	89.00	849370-C3	103.20
	.031 (1/32)	.240	III	10	1/4*	3-1/32	899805	117.90	899805-C3	133.30
	.031 (1/32)	.177	II	10	3/8	3-1/32	984505	110.40	984505-C3	125.80
	.031 (1/32)	.115	I	10	1/2	3-1/32	52005	107.10	52005-C3	122.50
	.040	.177	II	10	3/8	3.040	984508	110.40	984508-C3	125.80
	.040	.115	I	10	1/2	3.040	52008	107.10	52008-C3	122.50
	.047 (3/64)	.240	III	10	1/4*	3-3/64	899810	117.90	899810-C3	133.30
	.047 (3/64)	.177	II	10	3/8	3-3/64	984510	110.40	984510-C3	125.80
	.047 (3/64)	.115	I	10	1/2	3-3/64	52010	107.10	52010-C3	122.50
	.050	.115	I	10	1/2	3.050	52011	107.10	52011-C3	122.50
	.060	.115	I	10	1/2	3.060	52019	107.10	52019-C3	122.50
	.062 (1/16)	.240	III	10	1/4*	3-1/16	899820	117.90	899820-C3	133.30
	.062 (1/16)	.177	II	10	3/8	3-1/16	984520	110.40	984520-C3	125.80
	.062 (1/16)	.115	I	10	1/2	3-1/16	52020	107.10	52020-C3	122.50
3/4	.078 (5/64)	.177	II	10	3/8	3-5/64	984530	110.40	984530-C3	125.80
	.078 (5/64)	.115	I	10	1/2	3-5/64	52030	107.10	52030-C3	122.50
	.093 (3/32)	.240	III	10	1/4*	3-3/32	899840	117.90	899840-C3	133.30
	.093 (3/32)	.177	II	10	3/8	3-3/32	984540	110.40	984540-C3	125.80
	.093 (3/32)	.115	I	10	1/2	3-3/32	52040	107.10	52040-C3	122.50
	.100	.115	I	10	1/2	3.100	52045	107.10	52045-C3	122.50
	.118 (3 mm)	.115	I	10	1/2	3.118	52048	107.10	52048-C3	122.50
	.125 (1/8)	.177	II	10	3/8	3-1/8	984550	110.40	984550-C3	125.80
	.125 (1/8)	.115	I	10	1/2	3-1/8	52050	107.10	52050-C3	122.50
	.156 (5/32)	.177	II	10	3/8	3-5/32	984555	110.40	984555-C3	125.80
	.156 (5/32)	.115	I	10	1/2	3-5/32	52055	107.10	52055-C3	122.50
	.174	Please see page 352 for Retaining Ring sizes.								
	.187 (3/16)	.177	II	10	3/8	3-3/16	984560	110.40	984560-C3	125.80
	.187 (3/16)	.115	I	10	1/2	3-3/16	52060	107.10	52060-C3	122.50

*No Weldon Flat **Radial DOC Accounts for max transition radius at neck

continued on next page

KEYSEAT CUTTERS

Square – Reduced Shank (cont.)

continued from previous page

CUTTER DIAMETER	CUTTER WIDTH	RADIAL DOC**	TYPE	FLUTES	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN COATED	
D_1 +.000″ −.002″	L_2 +.001″ −.001″	X			D_2	L_1	TOOL #	PRICE	TOOL #	PRICE
	.236 (6 mm)	.115	I	10	1/2	3.236	52066	116.20	52066-C3	131.60
	.250 (1/4)	**.177**	II	10	3/8	3-1/4	984570	123.90	984570-C3	139.30
3/4	.250 (1/4)	.115	I	10	1/2	3-1/4	52070	120.80	52070-C3	136.20
	.312 (5/16)	.115	I	10	1/2	3-5/16	52080	142.40	52080-C3	165.80
	.375 (3/8)	.115	I	10	1/2	3-3/8	52090	148.40	52090-C3	171.80
	.062 (1/16)	.177	I	12	1/2	3-1/16	961020	114.50	961020-C3	129.90
	.093 (3/32)	.177	I	12	1/2	3-3/32	961040	114.50	961040-C3	129.90
	.125 (1/8)	**.240**	II	12	3/8	3-1/8	890650	117.30	890650-C3	132.70
	.125 (1/8)	.177	I	12	1/2	3-1/8	961050	114.50	961050-C3	129.90
7/8	.187 (3/16)	**.240**	II	12	3/8	3-3/16	890660	117.30	890660-C3	132.70
	.187 (3/16)	.177	I	12	1/2	3-3/16	961060	114.50	961060-C3	129.90
	.250 (1/4)	**.240**	II	12	3/8	3-1/4	890670	130.50	890670-C3	145.90
	.250 (1/4)	.177	I	12	1/2	3-1/4	961070	127.40	961070-C3	142.80
	.312 (5/16)	.177	I	12	1/2	3-5/16	961080	142.40	961080-C3	157.80
	.375 (3/8)	.177	I	12	1/2	3-3/8	961090	148.40	961090-C3	163.80
	.031 (1/32)	**.365**	III	12	1/4*	3-1/32	914905	137.40	914905-C3	160.80
	.031 (1/32)	**.302**	II	12	3/8	3-1/32	982005	123.40	982005-C3	146.80
	.031 (1/32)	.240	I	12	1/2	3-1/32	55905	120.40	55905-C3	143.80
	.040	.240	I	12	1/2	3.040	55908	120.40	55908-C3	143.80
	.047 (3/64)	**.365**	III	12	1/4*	3-3/64	914910	137.40	914910-C3	160.80
	.047 (3/64)	**.302**	II	12	3/8	3-3/64	982010	123.40	982010-C3	146.80
	.047 (3/64)	.240	I	12	1/2	3-3/64	55910	120.40	55910-C3	143.80
	.062 (1/16)	**.365**	III	12	1/4*	3-1/16	914920	137.40	914920-C3	160.80
	.062 (1/16)	**.302**	II	12	3/8	3-1/16	982020	123.40	982020-C3	146.80
	.062 (1/16)	.240	I	12	1/2	3-1/16	55920	120.40	55920-C3	143.80
	.078 (5/64)	**.365**	III	12	1/4*	3-5/64	914930	137.40	914930-C3	160.80
	.078 (5/64)	**.302**	II	12	3/8	3-5/64	982030	123.40	982030-C3	146.80
	.078 (5/64)	.240	I	12	1/2	3-5/64	55930	120.40	55930-C3	143.80
	.093 (3/32)	**.365**	III	12	1/4*	3-3/32	914940	137.40	914940-C3	160.80
	.093 (3/32)	**.302**	II	12	3/8	3-3/32	982040	123.40	982040-C3	146.80
1	.093 (3/32)	.240	I	12	1/2	3-3/32	55940	120.40	55940-C3	143.80
	.125 (1/8)	**.365**	III	12	1/4*	3-1/8	914950	137.40	914950-C3	160.80
	.125 (1/8)	**.302**	II	12	3/8	3-1/8	982050	123.40	982050-C3	146.80
	.125 (1/8)	.240	I	12	1/2	3-1/8	55950	120.40	55950-C3	143.80
	.156 (5/32)	**.302**	II	12	3/8	3-5/32	982055	123.40	982055-C3	146.80
	.156 (5/32)	.240	I	12	1/2	3-5/32	55955	120.40	55955-C3	143.80
	.187 (3/16)	**.302**	II	12	3/8	3-3/16	982060	123.40	982060-C3	146.80
	.187 (3/16)	.240	I	12	1/2	3-3/16	55960	120.40	55960-C3	143.80
	.209	Please see page 352 for Retaining Ring sizes.								
	.250 (1/4)	**.302**	II	12	3/8	3-1/4	982070	136.90	982070-C3	160.30
	.250 (1/4)	.240	I	12	1/2	3-1/4	55970	133.60	55970-C3	157.00
	.312 (5/16)	**.302**	II	12	3/8	3-5/16	982080	146.00	982080-C3	169.40
	.312 (5/16)	.240	I	12	1/2	3-5/16	55980	142.40	55980-C3	165.80
	.375 (3/8)	**.302**	II	12	3/8	3-3/8	982090	138.20	982090-C3	161.60
	.375 (3/8)	.240	I	12	1/2	3-3/8	55990	148.40	55990-C3	171.80
	.500 (1/2)	.240	I	12	1/2	3-1/2	55995	154.40	55995-C3	177.80

*No Weldon Flat **Radial DOC Accounts for max transition raduis at neck

continued on next page

KEYSEAT CUTTERS

Square – Reduced Shank (cont.)

continued from previous page

CUTTER DIAMETER	CUTTER WIDTH	RADIAL DOC**	TYPE	FLUTES	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN COATED	
D_1 $^{+.000''}_{-.002''}$	L_2 $^{+.001''}_{-.001''}$	X			D_2	L_1	TOOL #	PRICE	TOOL #	PRICE
	.093 (3/32)	.240	I	14	3/4	3-11/32	973940	149.60	973940-C3	172.80
	.125 (1/8)	**.365**	II	14	1/2	3-1/8	879950	153.30	879950-C3	178.20
	.125 (1/8)	.240	I	14	3/4	3-3/8	973950	149.60	973950-C3	172.80
1-1/4	.250 (1/4)	**.365**	II	14	1/2	3-1/4	879970	154.70	879970-C3	178.20
	.250 (1/4)	.240	I	14	3/4	3-1/2	973970	166.40	973970-C3	181.70
	.375 (3/8)	.240	I	14	3/4	3-5/8	973990	179.40	973990-C3	208.70
	.500 (1/2)	.240	I	14	3/4	3-3/4	973995	179.40	973995-C3	208.70
	.062 (1/16)	**.490**	II	16	1/2	3-1/16	887020	163.10	887020-C3	192.40
	.062 (1/16)	.365	I	16	3/4	3-5/16	962020	159.30	962020-C3	188.60
	.093 (3/32)	.365	I	16	3/4	3-11/32	962040	159.30	962040-C3	188.60
	.125 (1/8)	**.552**	III	16	3/8	3-1/8	868750	169.60	868750-C3	198.90
	.125 (1/8)	**.490**	II	16	1/2	3-1/8	887050	163.10	887050-C3	192.40
	.125 (1/8)	.365	I	16	3/4	3-3/8	962050	159.30	962050-C3	188.60
	.187 (3/16)	**.552**	III	16	3/8	3-3/16	868760	169.60	868760-C3	198.90
1-1/2	.187 (3/16)	**.490**	II	16	1/2	3-3/16	887060	163.10	887060-C3	192.40
	.187 (3/16)	.365	I	16	3/4	3-7/16	962060	159.30	962060-C3	188.60
	.250 (1/4)	**.490**	II	16	1/2	3-1/4	887070	175.50	887070-C3	204.80
	.250 (1/4)	.365	I	16	3/4	3-1/2	962070	171.30	962070-C3	200.60
	.312 (5/16)	.365	I	16	3/4	3-9/16	962080	193.30	962080-C3	222.60
	.375 (3/8)	.365	I	16	3/4	3-5/8	962090	221.20	962090-C3	250.50
	.437 (7/16)	.365	I	16	3/4	3-11/16	962093	239.40	962093-C3	268.70
	.500 (1/2)	.365	I	16	3/4	3-3/4	962095	257.20	962095-C3	286.50

*No Weldon Flat **Radial DOC Accounts for max transition raduis at neck



★★★★★

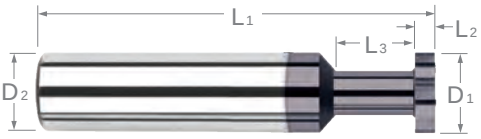
"Best Tool ever! [Back Corner Rounding End Mill] No more second ops! (making iPad/tablet display frames for kiosks)."

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KEYSEAT CUTTERS

Retaining Ring Keyseats



Designed for Milling ◀ Retaining / Snap Ring Grooves

- Designed to mill proper slot widths for common retaining ring sizes
- Cutter diameter, neck length, radial, and axial depths of cut optimized for internal retaining ring grooves per ANSI standards
- Both sides of cutter are dished for clearance
- Solid carbide
- CNC ground in the USA

CUTTER DIA.	CUTTER WIDTH	NECK DIA.	NECK LENGTH	RADIAL DOC**	FLUTES	SHANK DIA.	OAL	UNCOATED		AlTiN COATED	
D_1 +.000″ −.002″	L_2 +.002″ −.000″		L_3 +.020″ −.000″			D_2	L_1	TOOL #	PRICE	TOOL #	PRICE
3/16	.018	1/8	1/8	.021	6	3/16	2	23504	48.30	23504-C3	53.60
	.029	1/8	1/8	.021	6	3/16	2	23508	48.30	23508-C3	53.60
1/4	.039	5/32	5/32	.037	6	1/4	2-1/2	23512	57.20	23512-C3	64.40
	.046	5/32	5/32	.037	6	1/4	2-1/2	23516	57.20	23516-C3	64.40
5/16	.056	3/16	3/16	.052	6	5/16	2-1/2	23520	68.40	23520-C3	76.80
3/8	.068	3/16	1/4	.084	8	3/8	2-1/2	23524	79.80	23524-C3	89.30
	.086	3/16	1/4	.084	8	3/8	2-1/2	23528	79.80	23528-C3	89.30
1/2	.103	1/4	5/16	.115	8	1/2	3	23532	87.80	23532-C3	102.00
	.120	1/4	3/8	.115	8	1/2	3	23536	87.80	23536-C3	102.00
5/8	.120	5/16	1/2	.146	8	5/8	3-1/2	23540	163.40	23540-C3	177.60
	.139	5/16	1/2	.146	8	5/8	3-1/2	23544	163.40	23544-C3	177.60
3/4	.174	-	-	.177	10	3/8	3.174	23548*	118.00	23548-C3*	133.40
1	.209	-	-	.240	12	1/2	3.209	23564*	141.30	23564-C3*	164.70

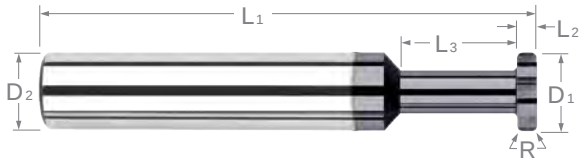
*Carbide head with reduced steel shank **Radial DOC accounts for max transition at neck

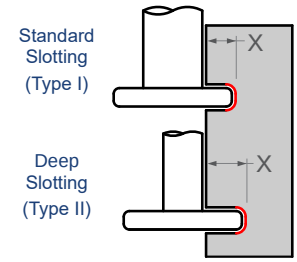
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KEYSEAT CUTTERS

Corner Radius





- Both sides of cutter are dished for clearance
- Corner radius for improved strength
- Solid carbide
- CNC ground in the USA

CUTTER DIA.	CUTTER WIDTH	CORNER RADIUS	NECK DIA.	NECK LENGTH	RADIAL DOC*	TYPE	FLUTES	SHANK DIA.	OAL	UNCOATED		AlTiN COATED	
D_1 +.000″ −.002″	L_2 +.0005″ −.0005″	R +.001″ −.001″		L_3 +.020″ −.000″	X			D_2	L_1	TOOL #	PRICE	TOOL #	PRICE
1/16	.015 (1/64)	.005	1/32	3/32 (1.5x)	.012	I	4	1/8	1-1/2	910615	57.20	910615-C3	62.10
	.020	.005	1/32	3/32 (1.5x)	.012	I	4	1/8	1-1/2	910620	57.20	910620-C3	62.10
	.031 (1/32)	.005	1/32	3/32 (1.5x)	.012	I	4	1/8	1-1/2	910631	57.20	910631-C3	62.10
3/32	.031 (1/32)	.005	3/64	9/64 (1.5x)	.021	I	4	1/8	1-1/2	902531	55.70	902531-C3	60.60
	.031 (1/32)	.010	3/64	9/64 (1.5x)	.021	I	4	1/8	1-1/2	909131	55.70	909131-C3	60.60
	.062 (1/16)	.005	3/64	9/64 (1.5x)	.021	I	4	1/8	1-1/2	902562	55.70	902562-C3	60.60
	.062 (1/16)	.010	3/64	9/64 (1.5x)	.021	I	4	1/8	1-1/2	909162	55.70	909162-C3	60.60
1/8	.015 (1/64)	.005	1/16	3/16 (1.5x)	.022	I	6	1/8	1-1/2	965115	54.20	965115-C3	59.10
	.020	.005	1/16	3/16 (1.5x)	.022	I	6	1/8	1-1/2	965120	54.20	965120-C3	59.10
	.025	.005	1/16	3/16 (1.5x)	.022	I	6	1/8	1-1/2	965125	54.20	965125-C3	59.10
	.031 (1/32)	.005	1/16	3/16 (1.5x)	.022	I	6	1/8	1-1/2	965131	54.20	965131-C3	59.10
	.031 (1/32)	.010	.040	1/16 (.5x)	.032	II	6	1/8	1-1/2	837631	63.80	837631-C3	68.70
	.040	.005	1/16	3/16 (1.5x)	.022	I	6	1/8	1-1/2	965140	54.20	965140-C3	59.10
	.047 (3/64)	.005	1/16	3/16 (1.5x)	.022	I	6	1/8	1-1/2	965147	54.20	965147-C3	59.10
	.062 (1/16)	.005	1/16	3/16 (1.5x)	.022	I	6	1/8	1-1/2	965162	54.20	965162-C3	59.10
	.062 (1/16)	.010	.040	1/16 (.5x)	.032	II	6	1/8	1-1/2	837662	63.80	837662-C3	68.70
	.062 (1/16)	.010	1/16	3/16 (1.5x)	.022	I	6	1/8	1-1/2	985962	54.20	985962-C3	59.10
	.078 (5/64)	.010	1/16	3/16 (1.5x)	.022	I	6	1/8	1-1/2	985978	54.20	985978-C3	59.10
	.093 (3/32)	.010	1/16	3/16 (1.5x)	.022	I	6	1/8	1-1/2	985993	54.20	985993-C3	59.10
	.093 (3/32)	.015	1/16	3/16 (1.5x)	.022	I	6	1/8	1-1/2	960793	54.20	960793-C3	59.10
3/16	.015 (1/64)	.005	3/32	9/32 (1.5x)	.037	I	6	3/16	2	954715	56.00	954715-C3	61.30
	.020	.005	3/32	9/32 (1.5x)	.037	I	6	3/16	2	954720	56.00	954720-C3	61.30
	.025	.005	3/32	9/32 (1.5x)	.037	I	6	3/16	2	954725	56.00	954725-C3	61.30
	.031 (1/32)	.005	3/32	9/32 (1.5x)	.037	I	6	3/16	2	954731	56.00	954731-C3	61.30
	.040	.005	3/32	9/32 (1.5x)	.037	I	6	3/16	2	954740	56.00	954740-C3	61.30
	.047 (3/64)	.005	3/32	9/32 (1.5x)	.037	I	6	3/16	2	954747	56.00	954747-C3	61.30
	.062 (1/16)	.005	3/32	9/32 (1.5x)	.037	I	6	3/16	2	954762	56.00	954762-C3	61.30
	.062 (1/16)	.010	1/16	3/32 (.5x)	.052	II	6	3/16	2	837262	66.10	837262-C3	71.40
	.062 (1/16)	.010	3/32	9/32 (1.5x)	.037	I	6	3/16	2	949962	56.00	949962-C3	61.30
	.062 (1/16)	.015	3/32	9/32 (1.5x)	.037	I	6	3/16	2	937762	56.00	937762-C3	61.30
	.078 (5/64)	.010	3/32	9/32 (1.5x)	.037	I	6	3/16	2	949978	56.00	949978-C3	61.30
	.093 (3/32)	.010	3/32	9/32 (1.5x)	.037	I	6	3/16	2	949993	56.00	949993-C3	61.30
	.093 (3/32)	.015	3/32	9/32 (1.5x)	.037	I	6	3/16	2	937793	56.00	937793-C3	61.30
	.125 (1/8)	.010	3/32	9/32 (1.5x)	.037	I	6	3/16	2	949995	56.00	949995-C3	61.30
	.125 (1/8)	.015	3/32	9/32 (1.5x)	.037	I	6	3/16	2	937795	56.00	937795-C3	61.30

*Radial DOC accounts for max transition radius at neck

continued on next page

KEYSEAT CUTTERS

Corner Radius (cont.)

continued from previous page

CUTTER DIA.	CUTTER WIDTH	CORNER RADIUS	NECK DIA.	NECK LENGTH	RADIAL DOC*	TYPE	FLUTES	SHANK DIA.	OAL	UNCOATED		AlTiN COATED	
D_1 +.000″ −.002″	L_2 +.0005″ −.0005″	R +.001″ −.001″		L_3 +.020″ −.000″	X			D_2	L_1	TOOL #	PRICE	TOOL #	PRICE
1/4	.015 (1/64)	.005	1/8	3/8 (1.5x)	.053	I	6	1/4	2-1/2	981115	61.90	981115-C3	69.10
	.020	.005	1/8	3/8 (1.5x)	.053	I	6	1/4	2-1/2	981120	61.90	981120-C3	69.10
	.025	.005	1/8	3/8 (1.5x)	.053	I	6	1/4	2-1/2	981125	61.90	981125-C3	69.10
	.031 (1/32)	.005	1/8	3/8 (1.5x)	.053	I	6	1/4	2-1/2	981131	61.90	981131-C3	69.10
	.031 (1/32)	.005	1/8	3/4 (3x)	.053	I	6	1/4	2-1/2	916631	73.10	916631-C3	80.30
	.031 (1/32)	.010	1/8	3/8 (1.5x)	.053	I	6	1/4	2-1/2	972631	61.90	972631-C3	69.10
	.040	.005	1/8	3/8 (1.5x)	.053	I	6	1/4	2-1/2	981140	61.90	981140-C3	69.10
	.047 (3/64)	.005	5/64	1/8 (.5x)	.076	II	6	1/4	2-1/2	777147	71.80	777147-C3	79.00
	.047 (3/64)	.005	1/8	3/8 (1.5x)	.053	I	6	1/4	2-1/2	981147	61.90	981147-C3	69.10
	.047 (3/64)	.010	1/8	3/8 (1.5x)	.053	I	6	1/4	2-1/2	972647	61.90	972647-C3	69.10
	.047 (3/64)	.015	1/8	3/8 (1.5x)	.053	I	6	1/4	2-1/2	968447	61.90	968447-C3	69.10
	.050	.005	1/8	3/8 (1.5x)	.053	I	6	1/4	2-1/2	981150	61.90	981150-C3	69.10
	.060	.010	1/8	3/8 (1.5x)	.053	I	6	1/4	2-1/2	972660	61.90	972660-C3	69.10
	.062 (1/16)	.005	1/8	3/8 (1.5x)	.053	I	6	1/4	2-1/2	981162	60.70	981162-C3	67.90
	.062 (1/16)	.010	5/64	1/8 (.5x)	.076	II	6	1/4	2-1/2	911762	71.80	911762-C3	79.00
	.062 (1/16)	.010	1/8	3/8 (1.5x)	.053	I	6	1/4	2-1/2	972662	60.70	972662-C3	67.90
	.062 (1/16)	.010	1/8	3/4 (3x)	.053	I	6	1/4	2-1/2	900062	72.00	900062-C3	79.20
	.062 (1/16)	.015	1/8	3/8 (1.5x)	.053	I	6	1/4	2-1/2	968462	60.70	968462-C3	67.90
	.078 (5/64)	.010	1/8	3/8 (1.5x)	.053	I	6	1/4	2-1/2	972678	61.90	972678-C3	69.10
	.093 (3/32)	.005	1/8	3/8 (1.5x)	.053	I	6	1/4	2-1/2	981193	60.70	981193-C3	67.90
	.093 (3/32)	.010	5/64	1/8 (.5x)	.076	II	6	1/4	2-1/2	911793	71.80	911793-C3	79.00
	.093 (3/32)	.010	1/8	3/8 (1.5x)	.053	I	6	1/4	2-1/2	972693	60.70	972693-C3	67.90
	.093 (3/32)	.010	1/8	3/4 (3x)	.053	I	6	1/4	2-1/2	900093	72.00	900093-C3	79.20
	.093 (3/32)	.015	1/8	3/8 (1.5x)	.053	I	6	1/4	2-1/2	968493	60.70	968493-C3	67.90
	.093 (3/32)	.030	1/8	3/8 (1.5x)	.053	I	6	1/4	2-1/2	904593	60.70	904593-C3	67.90
	.125 (1/8)	.005	1/8	3/8 (1.5x)	.053	I	6	1/4	2-1/2	981195	60.70	981195-C3	67.90
	.125 (1/8)	.010	5/64	1/8 (.5x)	.076	II	6	1/4	2-1/2	911795	71.80	911795-C3	79.00
	.125 (1/8)	.010	1/8	3/8 (1.5x)	.053	I	6	1/4	2-1/2	972695	60.70	972695-C3	67.90
	.125 (1/8)	.010	1/8	3/4 (3x)	.053	I	6	1/4	2-1/2	900095	72.00	900095-C3	79.20
	.125 (1/8)	.015	1/8	3/8 (1.5x)	.053	I	6	1/4	2-1/2	968495	60.70	968495-C3	67.90
	.125 (1/8)	.020	1/8	3/8 (1.5x)	.053	I	6	1/4	2-1/2	776795	60.70	776795-C3	67.90
	.125 (1/8)	.030	1/8	3/8 (1.5x)	.053	I	6	1/4	2-1/2	904595	60.70	904595-C3	67.90
	.187 (3/16)	.010	1/8	3/8 (1.5x)	.053	I	6	1/4	2-1/2	972697	60.70	972697-C3	67.90
	.187 (3/16)	.015	1/8	3/8 (1.5x)	.053	I	6	1/4	2-1/2	968497	60.70	968497-C3	67.90
5/16	.031 (1/32)	.005	5/32	15/32 (1.5x)	.068	I	6	5/16	2-1/2	931610	89.10	931610-C3	97.50
	.031 (1/32)	.010	5/32	15/32 (1.5x)	.068	I	6	5/16	2-1/2	921110	89.10	921110-C3	97.50
	.062 (1/16)	.005	5/32	15/32 (1.5x)	.068	I	6	5/16	2-1/2	931630	89.10	931630-C3	97.50
	.062 (1/16)	.010	5/32	15/32 (1.5x)	.068	I	6	5/16	2-1/2	921130	89.10	921130-C3	97.50
	.093 (3/32)	.010	7/64	3/16 (.5x)	.091	II	6	5/16	2-1/2	776850	91.40	776850-C3	99.80
	.093 (3/32)	.010	5/32	15/32 (1.5x)	.068	I	6	5/16	2-1/2	921150	89.10	921150-C3	97.50
	.093 (3/32)	.015	5/32	15/32 (1.5x)	.068	I	6	5/16	2-1/2	927750	89.10	927750-C3	97.50
	.093 (3/32)	.020	5/32	15/32 (1.5x)	.068	I	6	5/16	2-1/2	776550	89.10	776550-C3	97.50

*Radial DOC accounts for max transition radius at neck

continued on next page

KEYSEAT CUTTERS

Corner Radius (cont.)

continued from previous page

CUTTER DIA.	CUTTER WIDTH	CORNER RADIUS	NECK DIA.	NECK LENGTH	RADIAL DOC*	TYPE	FLUTES	SHANK DIA.	OAL	UNCOATED		AlTiN COATED	
D_1 $^{+.000''}_{-.002''}$	L_2 $^{+.0005''}_{-.0005''}$	R $^{+.001''}_{-.001''}$		L_3 $^{+.020''}_{-.000''}$	X			D_2	L_1	TOOL #	PRICE	TOOL #	PRICE
3/8	.031 (1/32)	**.005**	3/16	9/16 (1.5x)	.084	I	8	3/8	2-1/2	987210	91.60	987210-C3	101.10
	.047 (3/64)	**.005**	3/16	9/16 (1.5x)	.084	I	8	3/8	2-1/2	987220	91.60	987220-C3	101.10
	.062 (1/16)	**.005**	1/8	3/16 (.5x)	**.115**	II	8	3/8	2-1/2	836830	94.00	836830-C3	103.50
	.062 (1/16)	**.005**	3/16	9/16 (1.5x)	.084	I	8	3/8	2-1/2	987230	89.80	987230-C3	99.30
	.062 (1/16)	**.010**	1/8	3/16 (.5x)	**.115**	II	8	3/8	2-1/2	916830	94.00	916830-C3	103.50
	.062 (1/16)	**.010**	3/16	9/16 (1.5x)	.084	I	8	3/8	2-1/2	981630	89.80	981630-C3	99.30
	.062 (1/16)	**.010**	3/16	1-1/8 (3x)	.084	I	8	3/8	2-1/2	793730	91.10	793730-C3	100.60
	.062 (1/16)	**.015**	1/8	3/16 (.5x)	**.115**	II	8	3/8	2-1/2	903330	94.00	903330-C3	103.50
	.062 (1/16)	**.015**	3/16	9/16 (1.5x)	.084	I	8	3/8	2-1/2	970030	89.80	970030-C3	99.30
	.078 (5/64)	**.010**	3/16	9/16 (1.5x)	.084	I	8	3/8	2-1/2	981640	91.60	981640-C3	101.10
	.093 (3/32)	**.005**	3/16	9/16 (1.5x)	.084	I	8	3/8	2-1/2	987250	89.80	987250-C3	99.30
	.093 (3/32)	**.010**	1/8	3/16 (.5x)	**.115**	II	8	3/8	2-1/2	916850	94.00	916850-C3	103.50
	.093 (3/32)	**.010**	3/16	9/16 (1.5x)	.084	I	8	3/8	2-1/2	981650	89.80	981650-C3	99.30
	.093 (3/32)	**.010**	3/16	1-1/8 (3x)	.084	I	8	3/8	2-1/2	793750	91.10	793750-C3	100.60
	.093 (3/32)	**.015**	1/8	3/16 (.5x)	**.115**	II	8	3/8	2-1/2	903350	94.00	903350-C3	103.50
	.093 (3/32)	**.015**	3/16	9/16 (1.5x)	.084	I	8	3/8	2-1/2	970050	89.80	970050-C3	99.30
	.093 (3/32)	**.030**	3/16	9/16 (1.5x)	.084	I	8	3/8	2-1/2	905950	89.80	905950-C3	99.30
	.125 (1/8)	**.005**	3/16	9/16 (1.5x)	.084	I	8	3/8	2-1/2	987260	89.80	987260-C3	99.30
	.125 (1/8)	**.010**	1/8	3/16 (.5x)	**.115**	II	8	3/8	2-1/2	916860	94.00	916860-C3	103.50
	.125 (1/8)	**.010**	3/16	9/16 (1.5x)	.084	I	8	3/8	2-1/2	981660	89.80	981660-C3	99.30
	.125 (1/8)	**.015**	1/8	3/16 (.5x)	**.115**	II	8	3/8	2-1/2	903360	94.00	903360-C3	103.50
	.125 (1/8)	**.015**	3/16	9/16 (1.5x)	.084	I	8	3/8	2-1/2	970060	89.80	970060-C3	99.30
	.125 (1/8)	**.020**	3/16	9/16 (1.5x)	**.084**	I	8	3/8	2-1/2	776460	89.80	776460-C3	99.30
	.125 (1/8)	**.030**	1/8	3/16 (.5x)	.115	II	8	3/8	2-1/2	857960	94.00	857960-C3	103.50
	.125 (1/8)	**.030**	3/16	9/16 (1.5x)	.084	I	8	3/8	2-1/2	905960	89.80	905960-C3	99.30
	.156 (5/32)	**.015**	3/16	9/16 (1.5x)	.084	I	8	3/8	2-1/2	970065	93.30	970065-C3	102.80
	.156 (5/32)	**.030**	3/16	9/16 (1.5x)	.084	I	8	3/8	2-1/2	905965	93.30	905965-C3	102.80
	.187 (3/16)	**.010**	3/16	9/16 (1.5x)	.084	I	8	3/8	2-1/2	981670	91.60	981670-C3	101.10
	.187 (3/16)	**.015**	3/16	9/16 (1.5x)	.084	I	8	3/8	2-1/2	970070	91.60	970070-C3	101.10
	.187 (3/16)	**.030**	3/16	9/16 (1.5x)	.084	I	8	3/8	2-1/2	905970	91.60	905970-C3	101.10
	.250 (1/4)	**.015**	3/16	9/16 (1.5x)	.084	I	8	3/8	2-1/2	970080	91.60	970080-C3	101.10
	.250 (1/4)	**.030**	3/16	9/16 (1.5x)	.084	I	8	3/8	2-1/2	905980	91.60	905980-C3	101.10
1/2	.020	**.005**	1/4	3/4 (1.5x)	.115	I	8	1/2	3	976005	116.00	976005-C3	130.20
	.025	**.005**	1/4	3/4 (1.5x)	.115	I	8	1/2	3	976007	116.00	976007-C3	130.20
	.031 (1/32)	**.005**	1/4	3/4 (1.5x)	.115	I	8	1/2	3	976010	116.00	976010-C3	130.20
	.031 (1/32)	**.010**	1/4	3/4 (1.5x)	.115	I	8	1/2	3	987710	116.00	987710-C3	130.20
	.040	**.005**	1/4	3/4 (1.5x)	.115	I	8	1/2	3	976015	116.00	976015-C3	130.20
	.047 (3/64)	**.005**	1/4	3/4 (1.5x)	.115	I	8	1/2	3	976020	116.00	976020-C3	130.20
	.047 (3/64)	**.010**	1/4	3/4 (1.5x)	.115	I	8	1/2	3	987720	116.00	987720-C3	130.20
	.062 (1/16)	**.005**	1/4	3/4 (1.5x)	.115	I	8	1/2	3	976030	114.00	976030-C3	128.20
	.062 (1/16)	**.010**	5/32	1/4 (.5x)	**.162**	II	8	1/2	3	901030	118.30	901030-C3	132.50
	.062 (1/16)	**.010**	1/4	3/4 (1.5x)	.115	I	8	1/2	3	987730	114.00	987730-C3	128.20
	.062 (1/16)	**.015**	5/32	1/4 (.5x)	**.162**	II	8	1/2	3	913430	118.30	913430-C3	132.50
	.062 (1/16)	**.015**	1/4	3/4 (1.5x)	.115	I	8	1/2	3	990330	114.00	990330-C3	128.20
	.062 (1/16)	**.020**	1/4	3/4 (1.5x)	.115	I	8	1/2	3	933730	114.00	933730-C3	128.20
	.078 (5/64)	**.010**	5/32	1/4 (.5x)	**.162**	II	8	1/2	3	901040	120.50	901040-C3	134.70
	.078 (5/64)	**.010**	1/4	3/4 (1.5x)	.115	I	8	1/2	3	987740	116.00	987740-C3	130.20

*Radial DOC accounts for max transition radius at neck

continued on next page

KEYSEAT CUTTERS

Corner Radius (cont.)

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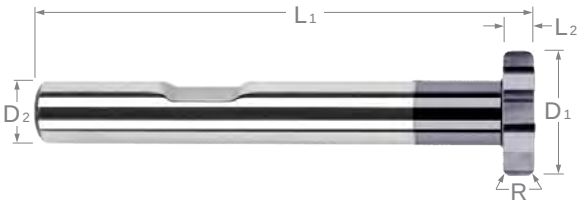
CUTTER DIA.	CUTTER WIDTH	CORNER RADIUS	NECK DIA.	NECK LENGTH	RADIAL DOC*	TYPE	FLUTES	SHANK DIA.	OAL	UNCOATED		AlTiN COATED	
D_1 +.000″ −.002″	L_2 +.0005″ −.0005″	R +.001″ −.001″		L_3 +.020″ −.000″	X			D_2	L_1	TOOL #	PRICE	TOOL #	PRICE
	.078 (5/64)	**.015**	1/4	3/4 (1.5x)	.115	I	8	1/2	3	990340	116.00	990340-C3	130.20
	.093 (3/32)	**.005**	1/4	3/4 (1.5x)	.115	I	8	1/2	3	976050	114.00	976050-C3	128.20
	.093 (3/32)	**.010**	5/32	1/4 (.5x)	**.162**	II	8	1/2	3	901050	118.30	901050-C3	132.50
	.093 (3/32)	**.010**	1/4	3/4 (1.5x)	.115	I	8	1/2	3	987750	114.00	987750-C3	128.20
	.093 (3/32)	**.015**	1/4	3/4 (1.5x)	.115	I	8	1/2	3	990350	114.00	990350-C3	128.20
	.093 (3/32)	**.020**	1/4	3/4 (1.5x)	.115	I	8	1/2	3	933750	114.00	933750-C3	128.20
	.093 (3/32)	**.030**	1/4	3/4 (1.5x)	.115	I	8	1/2	3	969150	116.00	969150-C3	130.20
1/2	.125 (1/8)	**.005**	1/4	3/4 (1.5x)	.115	I	8	1/2	3	976060	114.00	976060-C3	128.20
	.125 (1/8)	**.010**	5/32	1/4 (.5x)	**.162**	II	8	1/2	3	901060	118.30	901060-C3	132.50
	.125 (1/8)	**.010**	1/4	3/4 (1.5x)	.115	I	8	1/2	3	987760	114.00	987760-C3	128.20
	.125 (1/8)	**.010**	1/4	1-1/2 (3x)	.115	I	8	1/2	3	793960	115.20	793960-C3	129.40
	.125 (1/8)	**.015**	5/32	1/4 (.5x)	**.162**	II	8	1/2	3	913460	118.30	913460-C3	132.50
	.125 (1/8)	**.015**	1/4	3/4 (1.5x)	.115	I	8	1/2	3	990360	114.00	990360-C3	128.20
	.125 (1/8)	**.020**	5/32	1/4 (.5x)	.162	II	8	1/2	3	777060	118.30	777060-C3	132.50
	.125 (1/8)	**.020**	1/4	3/4 (1.5x)	.115	I	8	1/2	3	933760	114.00	933760-C3	128.20
	.125 (1/8)	**.030**	5/32	1/4 (.5x)	**.162**	II	8	1/2	3	926660	118.30	926660-C3	132.50
	.125 (1/8)	**.030**	1/4	3/4 (1.5x)	.115	I	8	1/2	3	969160	116.00	969160-C3	130.20
	.125 (1/8)	**.040**	1/4	3/4 (1.5x)	.115	I	8	1/2	3	838060	116.00	838060-C3	130.20
	.156 (5/32)	**.010**	1/4	3/4 (1.5x)	.115	I	8	1/2	3	987765	119.00	987765-C3	133.20
	.156 (5/32)	**.015**	1/4	3/4 (1.5x)	.115	I	8	1/2	3	990365	119.00	990365-C3	133.20
	.187 (3/16)	**.010**	1/4	3/4 (1.5x)	.115	I	8	1/2	3	987770	116.00	987770-C3	130.20
	.187 (3/16)	**.015**	1/4	3/4 (1.5x)	.115	I	8	1/2	3	990370	116.00	990370-C3	130.20
	.187 (3/16)	**.015**	1/4	1-1/2 (3x)	.115	I	8	1/2	3	792870	117.20	792870-C3	131.40
	.187 (3/16)	**.020**	1/4	3/4 (1.5x)	.115	I	8	1/2	3	933770	116.00	933770-C3	130.20
	.187 (3/16)	**.030**	5/32	1/4 (.5x)	**.162**	II	8	1/2	3	926670	137.00	926670-C3	151.20
	.187 (3/16)	**.030**	1/4	3/4 (1.5x)	.115	I	8	1/2	3	969170	116.00	969170-C3	130.20
	.187 (3/16)	**.060**	1/4	3/4 (1.5x)	.115	I	8	1/2	3	926170	118.10	926170-C3	132.30
	.250 (1/4)	**.010**	1/4	3/4 (1.5x)	.115	I	8	1/2	3	987780	114.00	987780-C3	128.20
	.250 (1/4)	**.015**	1/4	3/4 (1.5x)	.115	I	8	1/2	3	990380	114.00	990380-C3	128.20
	.250 (1/4)	**.020**	1/4	3/4 (1.5x)	.115	I	8	1/2	3	933780	114.00	933780-C3	128.20
	.250 (1/4)	**.030**	5/32	1/4 (.5x)	**.162**	II	8	1/2	3	926680	118.30	926680-C3	132.50
	.250 (1/4)	**.030**	1/4	3/4 (1.5x)	.115	I	8	1/2	3	969180	114.00	969180-C3	128.20
	.250 (1/4)	**.045**	1/4	3/4 (1.5x)	.115	I	8	1/2	3	929580	114.00	929580-C3	128.20
	.250 (1/4)	**.060**	1/4	3/4 (1.5x)	.115	I	8	1/2	3	926180	114.00	926180-C3	128.20
	.125 (1/8)	**.010**	5/16	1 (1.5x)	.146	I	8	5/8	3-1/2	903960	170.60	903960-C3	184.80
	.125 (1/8)	**.015**	5/16	1 (1.5x)	.146	I	8	5/8	3-1/2	911160	170.60	911160-C3	184.80
	.125 (1/8)	**.030**	5/16	1 (1.5x)	.146	I	8	5/8	3-1/2	908560	170.60	908560-C3	184.80
	.187 (3/16)	**.010**	5/16	1 (1.5x)	.146	I	8	5/8	3-1/2	903970	170.60	903970-C3	184.80
5/8	.187 (3/16)	**.015**	5/16	1 (1.5x)	.146	I	8	5/8	3-1/2	911170	170.60	911170-C3	184.80
	.187 (3/16)	**.030**	5/16	1 (1.5x)	.146	I	8	5/8	3-1/2	908570	170.60	908570-C3	184.80
	.250 (1/4)	**.010**	5/16	1 (1.5x)	.146	I	8	5/8	3-1/2	903980	170.60	903980-C3	184.80
	.250 (1/4)	**.015**	5/16	1 (1.5x)	.146	I	8	5/8	3-1/2	911180	170.60	911180-C3	184.80
	.250 (1/4)	**.030**	5/16	1 (1.5x)	.146	I	8	5/8	3-1/2	908580	170.60	908580-C3	184.80

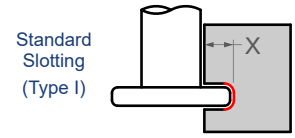
*Radial DOC accounts for max transition radius at neck

For reduced shank and greater radial depths of cut, please see Reduced Shank Keyseat Cutters on pages 349, 357, 360, & 365.

KEYSEAT CUTTERS

Corner Radius – Reduced Shank





- Solid carbide head brazed onto a steel shank
- Both sides of cutter are dished for clearance
- Corner radius for improved strength
- Weldon flat
- CNC ground in the USA

CUTTER DIAMETER	CUTTER WIDTH	CORNER RADIUS	RADIAL DOC*	TYPE	FLUTES	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN COATED	
D_1 +.000″ −.002″	L_2 +.001″ −.001″	R +.001″ −.001″	X			D_2	L_1	TOOL #	PRICE	TOOL #	PRICE
	.031 (1/32)	**.005**	.177	I	10	3/8	3-1/32	841505	121.30	841505-C3	136.70
	.062 (1/16)	**.005**	.177	I	10	3/8	3-1/16	841520	121.30	841520-C3	136.70
	.062 (1/16)	**.010**	.177	I	10	3/8	3-1/16	923820	121.30	923820-C3	136.70
	.078 (5/64)	**.005**	.177	I	10	3/8	3-5/64	841530	121.30	841530-C3	136.70
	.078 (5/64)	**.010**	.177	I	10	3/8	3-5/64	923830	121.30	923830-C3	136.70
	.093 (3/32)	**.005**	.177	I	10	3/8	3-3/32	841540	121.30	841540-C3	136.70
	.093 (3/32)	**.010**	.177	I	10	3/8	3-3/32	923840	121.30	923840-C3	136.70
	.093 (3/32)	**.030**	.177	I	10	3/8	3-3/32	905240	121.30	905240-C3	136.70
	.125 (1/8)	**.005**	.177	I	10	3/8	3-1/8	841550	121.30	841550-C3	136.70
3/4	.125 (1/8)	**.010**	.177	I	10	3/8	3-1/8	923850	121.30	923850-C3	136.70
	.125 (1/8)	**.015**	.177	I	10	3/8	3-1/8	840950	121.30	840950-C3	136.70
	.125 (1/8)	**.030**	.177	I	10	3/8	3-1/8	905250	121.30	905250-C3	136.70
	.187 (3/16)	**.010**	.177	I	10	3/8	3-3/16	923860	128.50	923860-C3	143.90
	.187 (3/16)	**.015**	.177	I	10	3/8	3-3/16	840960	128.50	840960-C3	143.90
	.187 (3/16)	**.030**	.177	I	10	3/8	3-3/16	905260	128.50	905260-C3	143.90
	.250 (1/4)	**.010**	.177	I	10	3/8	3-1/4	923870	135.20	923870-C3	150.60
	.250 (1/4)	**.015**	.177	I	10	3/8	3-1/4	840970	135.20	840970-C3	150.60
	.250 (1/4)	**.030**	.177	I	10	3/8	3-1/4	905270	135.20	905270-C3	150.60
	.250 (1/4)	**.060**	.177	I	10	3/8	3-1/4	894070	138.40	894070-C3	153.80
	.031 (1/32)	**.005**	.240	I	12	1/2	3-1/32	840305	134.50	840305-C3	157.90
	.062 (1/16)	**.005**	.240	I	12	1/2	3-1/16	840320	134.50	840320-C3	157.90
	.062 (1/16)	**.010**	.240	I	12	1/2	3-1/16	918520	134.50	918520-C3	157.90
	.078 (5/64)	**.005**	.240	I	12	1/2	3-5/64	840330	134.50	840330-C3	157.90
	.078 (5/64)	**.010**	.240	I	12	1/2	3-5/64	918530	134.50	918530-C3	157.90
	.093 (3/32)	**.005**	.240	I	12	1/2	3-3/32	840340	134.50	840340-C3	157.90
	.093 (3/32)	**.010**	.240	I	12	1/2	3-3/32	918540	134.50	918540-C3	157.90
1	.093 (3/32)	**.030**	.240	I	12	1/2	3-3/32	910040	134.50	910040-C3	157.90
	.125 (1/8)	**.005**	.240	I	12	1/2	3-1/8	840350	134.50	840350-C3	157.90
	.125 (1/8)	**.010**	.240	I	12	1/2	3-1/8	918550	134.50	918550-C3	157.90
	.125 (1/8)	**.015**	.240	I	12	1/2	3-1/8	839750	134.50	839750-C3	157.90
	.125 (1/8)	**.030**	.240	I	12	1/2	3-1/8	910050	134.50	910050-C3	157.90
	.187 (3/16)	**.010**	.240	I	12	1/2	3-3/16	918560	141.90	918560-C3	165.30
	.187 (3/16)	**.015**	.240	I	12	1/2	3-3/16	839760	141.90	839760-C3	165.30
	.187 (3/16)	**.030**	.240	I	12	1/2	3-3/16	910060	141.90	910060-C3	165.30

*Radial DOC accounts for max transition radius at neck

continued on next page

KEYSEAT CUTTERS

Corner Radius – Reduced Shank (cont.)

continued from previous page

CUTTER DIAMETER	CUTTER WIDTH	CORNER RADIUS	RADIAL DOC*	TYPE	FLUTES	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN COATED	
D_1 +.000″ −.002″	L_2 +.001″ −.001″	R +.001″ −.001″	X			D_2	L_1	TOOL #	PRICE	TOOL #	PRICE
1	.250 (1/4)	**.010**	.240	I	12	1/2	3-1/4	918570	147.60	918570-C3	171.00
	.250 (1/4)	**.015**	.240	I	12	1/2	3-1/4	839770	147.60	839770-C3	171.00
	.250 (1/4)	**.030**	.240	I	12	1/2	3-1/4	910070	147.60	910070-C3	171.00
	.250 (1/4)	**.060**	.240	I	12	1/2	3-1/4	897570	147.60	897570-C3	171.00
	.375 (3/8)	**.010**	.240	I	12	1/2	3-3/8	918590	154.80	918590-C3	178.20
	.375 (3/8)	**.015**	.240	I	12	1/2	3-3/8	839790	154.80	839790-C3	178.20
	.375 (3/8)	**.030**	.240	I	12	1/2	3-3/8	910090	154.80	910090-C3	178.20
1-1/2	.125 (1/8)	**.010**	.365	I	16	3/4	3-3/8	839150	173.50	839150-C3	202.80
	.125 (1/8)	**.030**	.365	I	16	3/4	3-3/8	838550	173.50	838550-C3	202.80
	.187 (3/16)	**.010**	.365	I	16	3/4	3-7/16	839160	173.50	839160-C3	202.80
	.187 (3/16)	**.030**	.365	I	16	3/4	3-7/16	838560	173.50	838560-C3	202.80
	.250 (1/4)	**.010**	.365	I	16	3/4	3-1/2	839170	185.80	839170-C3	215.10
	.250 (1/4)	**.030**	.365	I	16	3/4	3-1/2	838570	185.80	838570-C3	215.10
	.375 (3/8)	**.010**	.365	I	16	3/4	3-5/8	839190	235.50	839190-C3	264.80
	.375 (3/8)	**.030**	.365	I	16	3/4	3-5/8	838590	235.50	838590-C3	264.80
	.500 (1/2)	**.010**	.365	I	16	3/4	3-3/4	839195	271.60	839195-C3	300.90
	.500 (1/2)	**.030**	.365	I	16	3/4	3-3/4	838595	271.60	838595-C3	300.90

*Radial DOC accounts for max transition radius at neck

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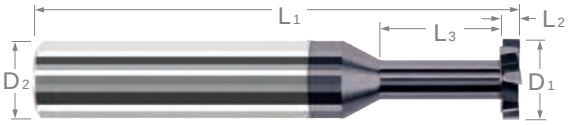
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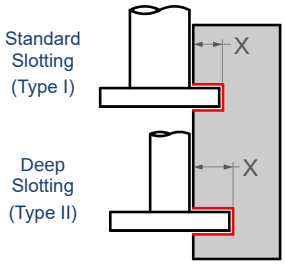
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KEYSEAT CUTTERS

Staggered Tooth – Square



Stocked in Multiple Radial Depths of Cut!



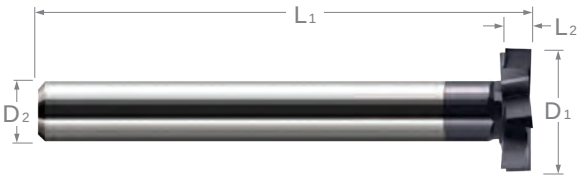
- Staggered tooth design with alternating RH / LH shear flutes, RH cut
- Relieved to allow cutting on both sides of head
- Design improves shearing action and finish while minimizing chip dragging and recutting and decreasing vibration
- Tool can be offset to increase width of groove
- Solid carbide
- CNC ground in the USA

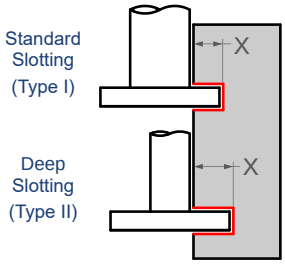
	CUTTER DIA.	CUTTER WIDTH	NECK DIA.	NECK LENGTH	RADIAL DOC*	TYPE	FLUTES	SHANK DIA.	OAL	UNCOATED		AlTiN COATED	
	D_1 +.000″ −.002″	L_2 +.0005″ −.0005″		L_3 +.020″ −.000″	X			D_2	L_1	TOOL #	PRICE	TOOL #	PRICE
	1/8	.015 (1/64)	1/16	3/16 (1.5x)	.022	I	6	1/8	1-1/2	969815	61.60	969815-C3	66.50
		.031 (1/32)	1/16	3/16 (1.5x)	.022	I	6	1/8	1-1/2	969831	61.60	969831-C3	66.50
		.047 (3/64)	1/16	3/16 (1.5x)	.022	I	6	1/8	1-1/2	969847	61.60	969847-C3	66.50
		.062 (1/16)	1/16	3/16 (1.5x)	.022	I	6	1/8	1-1/2	969862	61.60	969862-C3	66.50
	3/16	.062 (1/16)	3/32	9/32 (1.5x)	.037	I	6	3/16	2	907062	73.10	907062-C3	78.40
		.093 (3/32)	3/32	9/32 (1.5x)	.037	I	6	3/16	2	907093	73.10	907093-C3	78.40
		.125 (1/8)	3/32	9/32 (1.5x)	.037	I	6	3/16	2	907095	73.10	907095-C3	78.40
	1/4	.031 (1/32)	1/8	3/8 (1.5x)	.053	I	6	1/4	2-1/2	972131	85.20	972131-C3	92.40
		.047 (3/64)	1/8	3/8 (1.5x)	.053	I	6	1/4	2-1/2	972147	85.20	972147-C3	92.40
		.062 (1/16)	5/64	1/8 (0.5x)	.076	II	6	1/4	2-1/2	878962	92.70	878962-C3	98.90
		.062 (1/16)	1/8	3/8 (1.5x)	.053	I	6	1/4	2-1/2	972162	85.20	972162-C3	92.40
		.093 (3/32)	1/8	3/8 (1.5x)	.053	I	6	1/4	2-1/2	972193	85.20	972193-C3	92.40
		.125 (1/8)	5/64	1/8 (0.5x)	.076	II	6	1/4	2-1/2	878995	94.70	878995-C3	101.90
		.125 (1/8)	1/8	3/8 (1.5x)	.053	I	6	1/4	2-1/2	972195	85.20	972195-C3	92.40
NEW	5/16	.062 (1/16)	5/32	15/32 (1.5x)	.068	I	6	5/16	2-1/2	759530	105.20	759530-C3	113.60
NEW		.093 (3/32)	5/32	15/32 (1.5x)	.068	I	6	5/16	2-1/2	759550	105.20	759550-C3	113.60
NEW		.156 (5/32)	5/32	15/32 (1.5x)	.068	I	6	5/16	2-1/2	759565	105.20	759565-C3	113.60
	3/8	.062 (1/16)	1/8	3/16 (0.5x)	.115	II	8	3/8	2-1/2	867330	113.00	867330-C3	122.50
		.062 (1/16)	3/16	9/16 (1.5x)	.084	I	8	3/8	2-1/2	915830	105.20	915830-C3	114.70
		.093 (3/32)	3/16	9/16 (1.5x)	.084	I	8	3/8	2-1/2	915850	105.20	915850-C3	114.70
		.125 (1/8)	3/16	9/16 (1.5x)	.084	I	8	3/8	2-1/2	915860	105.20	915860-C3	114.70
		.187 (3/16)	3/16	9/16 (1.5x)	.084	I	8	3/8	2-1/2	915870	105.20	915870-C3	114.70
		.250 (1/4)	3/16	9/16 (1.5x)	.084	I	8	3/8	2-1/2	915880	105.20	915880-C3	114.70
	1/2	.062 (1/16)	5/32	1/4 (0.5x)	.162	II	8	1/2	3	895030	147.50	895030-C3	161.70
		.062 (1/16)	1/4	3/4 (1.5x)	.115	I	8	1/2	3	955630	137.00	955630-C3	151.20
		.078 (5/64)	1/4	3/4 (1.5x)	.115	I	8	1/2	3	955640	137.00	955640-C3	151.20
		.093 (3/32)	1/4	3/4 (1.5x)	.115	I	8	1/2	3	955650	137.00	955650-C3	151.20
		.125 (1/8)	5/32	1/4 (0.5x)	.162	II	8	1/2	3	895060	147.50	895060-C3	161.70
		.125 (1/8)	1/4	3/4 (1.5x)	.115	I	8	1/2	3	955660	137.00	955660-C3	151.20
		.187 (3/16)	1/4	3/4 (1.5x)	.115	I	8	1/2	3	955670	137.00	955670-C3	151.20
		.250 (1/4)	5/32	1/4 (0.5x)	.162	II	8	1/2	3	895080	147.50	895080-C3	161.70
		.250 (1/4)	1/4	3/4 (1.5x)	.115	I	8	1/2	3	955680	137.00	955680-C3	151.20
	5/8	.125 (1/8)	5/16	15/16 (1.5x)	.146	I	8	5/8	3-1/2	904960	193.70	904960-C3	207.90
		.187 (3/16)	5/16	15/16 (1.5x)	.146	I	8	5/8	3-1/2	904970	193.70	904970-C3	207.90
		.250 (1/4)	5/16	15/16 (1.5x)	.146	I	8	5/8	3-1/2	904980	193.70	904980-C3	207.90

*Radial DOC accounts for max transition radius at neck

KEYSEAT CUTTERS

Staggered Tooth – Square – Reduced Shank





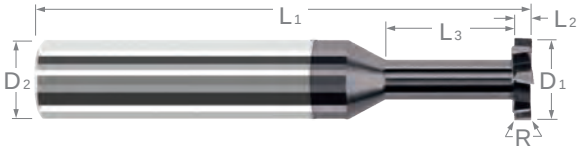
- Staggered tooth design with alternating right-hand/left-hand shear flutes, right-hand cut
- Relieved to allow cutting on both sides of head
- Tool can be offset to increase width of groove
- Solid carbide construction for maximum rigidity
- CNC ground in the USA

CUTTER DIAMETER	CUTTER WIDTH	RADIAL DOC*	TYPE	FLUTES	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN COATED	
D_1 $^{+.000''}_{-.002''}$	L_2 $^{+.001''}_{-.001''}$	X			D_2	L_1	TOOL #	PRICE	TOOL #	PRICE
3/4	.062 (1/16)	.178	II	10	3/8	3	773530	307.60	773530-C3	323.00
	.078 (5/64)	.178	II	10	3/8	3	773540	307.60	773540-C3	323.00
	.093 (3/32)	.178	II	10	3/8	3	773550	307.60	773550-C3	323.00
	.125 (1/8)	.178	II	10	3/8	3	773560	307.60	773560-C3	323.00
	.187 (3/16)	.178	II	10	3/8	3	773570	307.60	773570-C3	323.00
	.250 (1/4)	.178	II	10	3/8	3	773580	307.60	773580-C3	323.00
1	.062 (1/16)	.240	I	12	1/2	3-1/2	772430	350.30	772430-C3	373.70
	.078 (5/64)	.240	I	12	1/2	3-1/2	772440	350.30	772440-C3	373.70
	.093 (3/32)	.240	I	12	1/2	3-1/2	772450	350.30	772450-C3	373.70
	.125 (1/8)	.240	I	12	1/2	3-1/2	772460	350.30	772460-C3	373.70
	.187 (3/16)	.240	I	12	1/2	3-1/2	772470	350.30	772470-C3	373.70
	.250 (1/4)	.240	I	12	1/2	3-1/2	772480	350.30	772480-C3	373.70
1-1/2	.062 (1/16)	.365	I	16	3/4	3-1/2	771130	446.10	771130-C3	475.40
	.078 (5/64)	.365	I	16	3/4	3-1/2	771140	446.10	771140-C3	475.40
	.093 (3/32)	.365	I	16	3/4	3-1/2	771150	446.10	771150-C3	475.40
	.125 (1/8)	.365	I	16	3/4	3-1/2	771160	446.10	771160-C3	475.40
	.187 (3/16)	.365	I	16	3/4	3-1/2	771170	446.10	771170-C3	475.40
	.250 (1/4)	.365	I	16	3/4	3-1/2	771180	446.10	771180-C3	475.40

*Radial DOC Accounts for max transition radius at neck

KEYSEAT CUTTERS

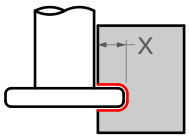
Staggered Tooth – Corner Radius

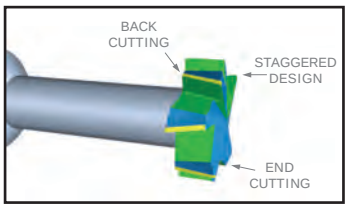


Staggered Tooth Design for Optimal Performance

- Staggered tooth design with alternating RH / LH shear flutes, RH cut
- Design improves shearing action, minimizes chip dragging and recutting, decreases vibration, and improves side wall finish
- Relieved to allow cutting on both sides of head
- Tool can be offset to increase width of groove
- Corner radius for improved strength
- Solid carbide
- CNC ground in the USA

Standard Slotting (Type I)





CUTTER DIA.	CUTTER WIDTH	CORNER RADIUS	NECK DIA.	NECK LENGTH		RADIAL DOC*	TYPE	FLUTES	SHANK DIA.	OAL	UNCOATED		AlTiN COATED	
D_1 +.000″ −.002″	L_2 +.0005″ −.0005″	R +.001″ −.001″		L_3 +.020″ −.000″		X			D_2	L_1	TOOL #	PRICE	TOOL #	PRICE
1/8	.031 (1/32)	.005	1/16	3/16	(1.5x)	.022	I	6	1/8	1-1/2	43631	63.20	43631-C3	68.10
	.031 (1/32)	.005	1/16	3/8	(3x)	.022	I	6	1/8	1-1/2	989931	76.00	989931-C3	80.90
	.047 (3/64)	.005	1/16	3/16	(1.5x)	.022	I	6	1/8	1-1/2	43647	63.20	43647-C3	68.10
	.062 (1/16)	.005	1/16	3/16	(1.5x)	.022	I	6	1/8	1-1/2	43662	63.20	43662-C3	68.10
	.062 (1/16)	.005	1/16	3/8	(3x)	.022	I	6	1/8	1-1/2	989962	76.00	989962-C3	80.90
	.062 (1/16)	.010	1/16	3/16	(1.5x)	.022	I	6	1/8	1-1/2	44462	63.20	44462-C3	68.10
3/16	.031 (1/32)	.005	3/32	9/32	(1.5x)	.037	I	6	3/16	2	943531	70.00	943531-C3	75.30
	.047 (3/64)	.005	3/32	9/32	(1.5x)	.037	I	6	3/16	2	943547	70.00	943547-C3	75.30
	.062 (1/16)	.005	3/32	9/32	(1.5x)	.037	I	6	3/16	2	943562	70.00	943562-C3	75.30
	.062 (1/16)	.010	3/32	9/32	(1.5x)	.037	I	6	3/16	2	951762	70.00	951762-C3	75.30
1/4	.031 (1/32)	.005	1/8	3/8	(1.5x)	.053	I	6	1/4	2-1/2	43831	87.30	43831-C3	94.50
	.031 (1/32)	.010	1/8	3/8	(1.5x)	.053	I	6	1/4	2-1/2	44531	87.30	44531-C3	94.50
	.047 (3/64)	.005	1/8	3/8	(1.5x)	.053	I	6	1/4	2-1/2	43847	87.30	43847-C3	94.50
	.047 (3/64)	.005	1/8	3/4	(3x)	.053	I	6	1/4	2-1/2	958047	101.00	958047-C3	108.20
	.062 (1/16)	.005	1/8	3/8	(1.5x)	.053	I	6	1/4	2-1/2	43862	87.30	43862-C3	94.50
	.062 (1/16)	.005	1/8	3/4	(3x)	.053	I	6	1/4	2-1/2	958062	101.00	958062-C3	108.20
	.062 (1/16)	.010	1/8	3/8	(1.5x)	.053	I	6	1/4	2-1/2	44562	87.30	44562-C3	94.50
	.093 (3/32)	.005	1/8	3/8	(1.5x)	.053	I	6	1/4	2-1/2	43893	87.30	43893-C3	94.50
	.093 (3/32)	.010	1/8	3/8	(1.5x)	.053	I	6	1/4	2-1/2	44593	87.30	44593-C3	94.50
	.125 (1/8)	.005	1/8	3/8	(1.5x)	.053	I	6	1/4	2-1/2	43895	87.30	43895-C3	94.50
	.125 (1/8)	.010	1/8	3/8	(1.5x)	.053	I	6	1/4	2-1/2	44595	87.30	44595-C3	94.50
3/8	.031 (1/32)	.005	3/16	9/16	(1.5x)	.084	I	8	3/8	2-1/2	967210	113.20	967210-C3	122.70
	.062 (1/16)	.005	3/16	9/16	(1.5x)	.084	I	8	3/8	2-1/2	967230	113.20	967230-C3	122.70
	.062 (1/16)	.010	3/16	9/16	(1.5x)	.084	I	8	3/8	2-1/2	970930	113.20	970930-C3	122.70
	.093 (3/32)	.005	3/16	9/16	(1.5x)	.084	I	8	3/8	2-1/2	967250	113.20	967250-C3	122.70
	.093 (3/32)	.010	3/16	9/16	(1.5x)	.084	I	8	3/8	2-1/2	970950	113.20	970950-C3	122.70
	.125 (1/8)	005	3/16	9/16	(1.5x)	.084	I	8	3/8	2-1/2	967260	113.20	967260-C3	122.70
	.125 (1/8)	.010	3/16	9/16	(1.5x)	.084	I	8	3/8	2-1/2	970960	113.20	970960-C3	122.70

*Radial DOC accounts for max transition radius at neck

continued on next page

KEYSEAT CUTTERS

Staggered Tooth – Corner Radius (cont.)

continued from previous page

CUTTER DIA.	CUTTER WIDTH	CORNER RADIUS	NECK DIA.	NECK LENGTH	RADIAL DOC*	TYPE	FLUTES	SHANK DIA.	OAL	UNCOATED		AlTiN COATED	
D_1 +.000″ −.002″	L_2 +.0005″ −.0005″	R +.001″ −.001″		L_3 +.020″ −.000″	X			D_2	L_1	TOOL #	PRICE	TOOL #	PRICE
1/2	.062 (1/16)	.005	1/4	3/4 (1.5x)	.115	I	8	1/2	3	44330	140.20	44330-C3	154.40
	.062 (1/16)	.005	1/4	1-1/2 (3x)	.115	I	8	1/2	3	976730	155.20	976730-C3	169.40
	.062 (1/16)	.010	1/4	3/4 (1.5x)	.115	I	8	1/2	3	44630	140.20	44630-C3	154.40
	.062 (1/16)	.015	1/4	3/4 (1.5x)	.115	I	8	1/2	3	921330	140.20	921330-C3	154.40
	.093 (3/32)	.005	1/4	3/4 (1.5x)	.115	I	8	1/2	3	44350	140.20	44350-C3	154.40
	.093 (3/32)	.005	1/4	1-1/2 (3x)	.115	I	8	1/2	3	976750	155.20	976750-C3	169.40
	.093 (3/32)	.010	1/4	3/4 (1.5x)	.115	I	8	1/2	3	44650	140.20	44650-C3	154.40
	.093 (3/32)	.015	1/4	3/4 (1.5x)	.115	I	8	1/2	3	921350	140.20	921350-C3	154.40
	.125 (1/8)	.005	1/4	3/4 (1.5x)	.115	I	8	1/2	3	44360	140.20	44360-C3	154.40
	.125 (1/8)	.005	1/4	1-1/2 (3x)	.115	I	8	1/2	3	976760	155.20	976760-C3	169.40
	.125 (1/8)	.010	1/4	3/4 (1.5x)	.115	I	8	1/2	3	44660	140.20	44660-C3	154.40
	.125 (1/8)	.015	1/4	3/4 (1.5x)	.115	I	8	1/2	3	921360	140.20	921360-C3	154.40
	.187 (3/16)	.005	1/4	3/4 (1.5x)	.115	I	8	1/2	3	44370	140.20	44370-C3	154.40
	.187 (3/16)	.010	1/4	3/4 (1.5x)	.115	I	8	1/2	3	44670	140.20	44670-C3	154.40
	.250 (1/4)	.005	1/4	3/4 (1.5x)	.115	I	8	1/2	3	44380	140.20	44380-C3	154.40
	.250 (1/4)	.010	1/4	3/4 (1.5x)	.115	I	8	1/2	3	44680	140.20	44680-C3	154.40
	.250 (1/4)	.015	1/4	3/4 (1.5x)	.115	I	8	1/2	3	921380	140.20	921380-C3	154.40
5/8	.125 (1/8)	.005	5/16	15/16 (1.5x)	.146	I	8	5/8	3-1/2	860460	198.10	860460-C3	212.30
	.125 (1/8)	.010	5/16	15/16 (1.5x)	.146	I	8	5/8	3-1/2	872960	198.10	872960-C3	212.30
	.187 (3/16)	.005	5/16	15/16 (1.5x)	.146	I	8	5/8	3-1/2	860470	198.10	860470-C3	212.30
	.187 (3/16)	.010	5/16	15/16 (1.5x)	.146	I	8	5/8	3-1/2	872970	198.10	872970-C3	212.30
	.250 (1/4)	.005	5/16	15/16 (1.5x)	.146	I	8	5/8	3-1/2	860480	198.10	860480-C3	212.30
	.250 (1/4)	.010	5/16	15/16 (1.5x)	.146	I	8	5/8	3-1/2	872980	198.10	872980-C3	212.30

*Radial DOC accounts for max transition radius at neck



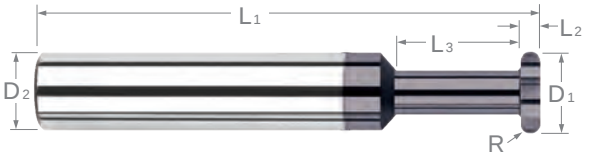
Keyseat Cutter Considerations

With more than 1,800 individual keyseat cutter in the Harvey Tool catalog, there are certainly many different options to choose from. Learn which style is best for your machining operation in our "In the Loupe" blog post **Keyseat Cutter Considerations**.

Read more on harveyperformance.com/in-the-loupe/

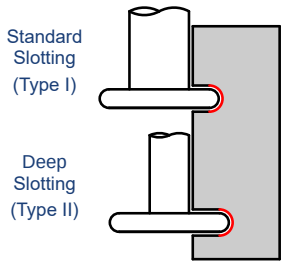
KEYSEAT CUTTERS

Full Radius





Full Radius



- Ground form relieved (can be reground without losing radius)
- Both sides of cutter are dished for clearance
- Solid carbide
- CNC ground in the USA

RADIUS	CUTTER DIA.	CUTTER WIDTH	NECK DIA.	NECK LENGTH	RADIAL DOC*	TYPE	FLUTES	SHANK DIA.	OAL	UNCOATED		AlTiN COATED	
R +.001″ −.001″	D1 +.000″ −.002″	L2		L3 +.020″ −.000″	X			D2	L1	TOOL #	PRICE	TOOL #	PRICE
.0075	3/32	.015 (1/64)	3/64	9/64 (1.5x)	.020	I	4	1/8	1-1/2	976907	77.50	976907-C3	82.40
.0075	1/8	.015 (1/64)	1/16	3/16 (1.5x)	.022	I	6	1/8	1-1/2	67507	80.40	67507-C3	85.30
.0075	1/4	.015 (1/64)	1/8	3/8 (1.5x)	.053	I	6	1/4	2-1/2	67707	99.50	67707-C3	106.70
.0100	3/32	.020	3/64	9/64 (1.5x)	.020	I	4	1/8	1-1/2	976910	75.30	976910-C3	80.20
.0100	1/8	.020	1/16	3/16 (1.5x)	.022	I	6	1/8	1-1/2	67510	78.20	67510-C3	83.10
.0100	5/32	.020	5/64	15/64 (1.5x)	.029	I	6	3/16	2	965310	82.20	965310-C3	87.50
.0100	3/16	.020	3/32	9/32 (1.5x)	.037	I	6	3/16	2	68310	90.30	68310-C3	95.60
.0100	1/4	.020	1/8	3/8 (1.5x)	.053	I	6	1/4	2-1/2	67710	97.20	67710-C3	104.40
.0100	5/16	.020	5/32	1/2 (1.5x)	.068	I	6	5/16	2-1/2	944410	107.50	944410-C3	115.90
.0100	3/8	.020	3/16	9/16 (1.5x)	.084	I	6	3/8	2-1/2	68410	115.50	68410-C3	125.00
.0156 (1/64)	3/32	.031 (1/32)	3/64	9/64 (1.5x)	.020	I	4	1/8	1-1/2	976915	67.20	976915-C3	72.10
.0156 (1/64)	1/8	.031 (1/32)	1/16	3/16 (1.5x)	.022	I	6	1/8	1-1/2	67515	69.60	67515-C3	74.50
.0156 (1/64)	1/8	.031 (1/32)	1/16	3/8 (3x)	.022	I	6	1/8	1-1/2	895215	74.20	895215-C3	79.10
.0156 (1/64)	5/32	.031 (1/32)	5/64	15/64 (1.5x)	.029	I	6	3/16	2	965315	82.20	965315-C3	87.50
.0156 (1/64)	3/16	.031 (1/32)	3/32	9/32 (1.5x)	.037	I	6	3/16	2	68315	82.40	68315-C3	87.70
.0156 (1/64)	3/16	.031 (1/32)	3/32	9/16 (3x)	.037	I	6	3/16	2	924415	96.30	924415-C3	101.60
.0156 (1/64)	1/4	.031 (1/32)	5/64	1/8 (.5x)	.076	II	6	1/4	2-1/2	953915	92.00	953915-C3	99.20
.0156 (1/64)	1/4	.031 (1/32)	1/8	3/8 (1.5x)	.053	I	6	1/4	2-1/2	43315	88.60	43315-C3	95.80
.0156 (1/64)	1/4	.031 (1/32)	1/8	3/4 (3x)	.053	I	6	1/4	2-1/2	971415	102.60	971415-C3	109.80
.0156 (1/64)	5/16	.031 (1/32)	5/32	1/2 (1.5x)	.068	I	6	5/16	2-1/2	944415	98.50	944415-C3	106.90
.0156 (1/64)	3/8	.031 (1/32)	3/16	9/16 (1.5x)	.084	I	6	3/8	2-1/2	68415	106.80	68415-C3	116.30
.0156 (1/64)	1/2	.031 (1/32)	1/4	3/4 (1.5x)	.115	I	6	1/2	3	67915	110.10	67915-C3	124.30
.0200	1/8	.040	1/16	3/16 (1.5x)	.022	I	6	1/8	1-1/2	67520	69.60	67520-C3	74.50
.0200	5/32	.040	5/64	15/64 (1.5x)	.029	I	6	3/16	2	965320	82.20	965320-C3	87.50
.0200	3/16	.040	3/32	9/32 (1.5x)	.037	I	6	3/16	2	68320	82.40	68320-C3	87.70
.0200	3/16	.040	3/32	9/16 (3x)	.037	I	6	3/16	2	924420	96.30	924420-C3	101.60
.0200	1/4	.040	5/64	1/8 (.5x)	.076	II	6	1/4	2-1/2	953920	92.00	953920-C3	99.20
.0200	1/4	.040	1/8	3/8 (1.5x)	.053	I	6	1/4	2-1/2	67720	89.50	67720-C3	96.70
.0200	1/4	.040	1/8	3/4 (3x)	.053	I	6	1/4	2-1/2	971420	102.60	971420-C3	109.80
.0200	5/16	.040	5/32	1/2 (1.5x)	.068	I	6	5/16	2-1/2	944420	98.50	944420-C3	106.90
.0200	3/8	.040	3/16	9/16 (1.5x)	.084	I	6	3/8	2-1/2	68420	107.80	68420-C3	117.30
.0200	3/8	.040	3/16	1-1/8 (3x)	.084	I	6	3/8	3	968520	121.30	968520-C3	130.80
.0200	1/2	.040	1/4	3/4 (1.5x)	.115	I	6	1/2	3	67920	110.60	67920-C3	124.80
.0250	3/16	.050	3/32	9/32 (1.5x)	.037	I	6	3/16	2	68325	82.40	68325-C3	87.70
.0250	1/4	.050	1/8	3/8 (1.5x)	.053	I	6	1/4	2-1/2	67725	89.50	67725-C3	96.70
.0250	3/8	.050	3/16	9/16 (1.5x)	.084	I	6	3/8	2-1/2	68425	107.80	68425-C3	117.30
.0300	5/32	.060	5/64	15/64 (1.5x)	.029	I	6	3/16	2	965330	82.20	965330-C3	87.50
.0300	3/16	.060	3/32	9/32 (1.5x)	.037	I	6	3/16	2	68330	82.40	68330-C3	87.70
.0300	1/4	.060	1/8	3/8 (1.5x)	.053	I	6	1/4	2-1/2	67730	89.50	67730-C3	96.70

*Radial DOC accounts for max transition radius at neck

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KEYSEAT CUTTERS

Full Radius (cont.)

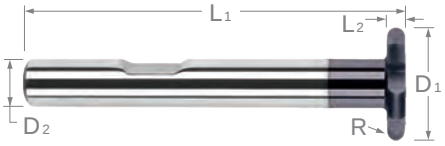
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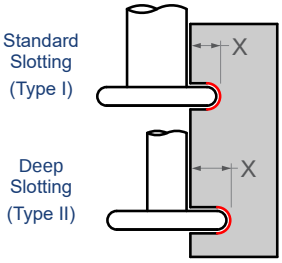
RADIUS	CUTTER DIA.	CUTTER WIDTH	NECK DIA.	NECK LENGTH	RADIAL DOC*	TYPE	FLUTES	SHANK DIA.	OAL	UNCOATED		AlTiN COATED	
R +.001″ −.001″	D_1 +.000″ −.002″	L_2		L_3 +.020″ −.000″	X			D_2	L_1	TOOL #	PRICE	TOOL #	PRICE
.0312 (1/32)	**3/16**	.062 (1/16)	3/32	9/32 (1.5x)	.037	I	6	3/16	2	68331	82.40	68331-C3	87.70
.0312 (1/32)	**3/16**	.062 (1/16)	3/32	9/16 (3x)	.037	I	6	3/16	2	924431	96.30	924431-C3	101.60
.0312 (1/32)	**1/4**	.062 (1/16)	5/64	1/8 (.5x)	**.076**	II	6	1/4	2-1/2	953931	92.00	953931-C3	99.20
.0312 (1/32)	**1/4**	.062 (1/16)	1/8	3/8 (1.5x)	.053	I	6	1/4	2-1/2	43331	88.60	43331-C3	95.80
.0312 (1/32)	**1/4**	.062 (1/16)	1/8	3/4 (3x)	.053	I	6	1/4	2-1/2	971431	102.60	971431-C3	109.80
.0312 (1/32)	**5/16**	.062 (1/16)	5/32	1/2 (1.5x)	.068	I	6	5/16	2-1/2	944431	98.50	944431-C3	106.90
.0312 (1/32)	**3/8**	.062 (1/16)	3/16	9/16 (1.5x)	.084	I	6	3/8	2-1/2	68431	106.80	68431-C3	116.30
.0312 (1/32)	**1/2**	.062 (1/16)	5/32	1/4 (.5x)	**.162**	II	6	1/2	3	898531	114.70	898531-C3	128.90
.0312 (1/32)	**1/2**	.062 (1/16)	1/4	3/4 (1.5x)	.115	I	6	1/2	3	67931	110.10	67931-C3	124.30
.0312 (1/32)	**1/2**	.062 (1/16)	1/4	1-1/2 (3x)	.115	I	6	1/2	3-1/2	942731	120.10	942731-C3	134.30
.0312 (1/32)	**5/8**	.062 (1/16)	.300	1 (1.5x)	.152	I	6	5/8	3-1/2	43431	180.30	43431-C3	194.50
.0394 (1 mm)	**1/4**	.078 (2 mm)	1/8	3/8 (1.5x)	.053	I	6	1/4	2-1/2	67739	89.50	67739-C3	96.70
.0394 (1 mm)	**5/16**	.078 (2 mm)	5/32	1/2 (1.5x)	.068	I	6	5/16	2-1/2	944439	99.80	944439-C3	108.20
.0394 (1 mm)	**3/8**	.078 (2 mm)	3/16	9/16 (1.5x)	.084	I	6	3/8	2-1/2	43339	107.80	43339-C3	117.30
.0394 (1 mm)	**3/8**	.078 (2 mm)	3/16	1-1/8 (3x)	.084	I	6	3/8	3	968539	121.30	968539-C3	130.80
.0394 (1 mm)	**1/2**	.078 (2 mm)	1/4	3/4 (1.5x)	.115	I	6	1/2	3	67939	110.60	67939-C3	124.80
.0469 (3/64)	**1/4**	.093 (3/32)	1/8	3/8 (1.5x)	.053	I	6	1/4	2-1/2	67747	88.60	67747-C3	95.80
.0469 (3/64)	**5/16**	.093 (3/32)	5/32	1/2 (1.5x)	.068	I	6	5/16	2-1/2	944447	98.50	944447-C3	106.90
.0469 (3/64)	**3/8**	.093 (3/32)	3/16	9/16 (1.5x)	.084	I	6	3/8	2-1/2	43347	106.80	43347-C3	116.30
.0469 (3/64)	**3/8**	.093 (3/32)	3/16	1-1/8 (3x)	.084	I	6	3/8	3	968547	121.30	968547-C3	130.80
.0469 (3/64)	**1/2**	.093 (3/32)	1/4	3/4 (1.5x)	.115	I	6	1/2	3	67947	110.10	67947-C3	124.30
.0469 (3/64)	**5/8**	.093 (3/32)	.300	1 (1.5x)	.152	I	6	5/8	3-1/2	43447	180.30	43447-C3	194.50
.0500	**3/8**	.100	3/16	9/16 (1.5x)	.084	I	6	3/8	2-1/2	68450	110.40	68450-C3	119.90
.0500	**1/2**	.100	1/4	3/4 (1.5x)	.115	I	6	1/2	3	67950	124.90	67950-C3	139.10
.0590 (1.5 mm)	**5/16**	.118 (3 mm)	5/32	1/2 (1.5x)	.068	I	6	5/16	2-1/2	944459	99.80	944459-C3	108.20
.0590 (1.5 mm)	**3/8**	.118 (3 mm)	3/16	9/16 (1.5x)	.084	I	6	3/8	2-1/2	68459	107.80	68459-C3	117.30
.0590 (1.5 mm)	**1/2**	.118 (3 mm)	1/4	3/4 (1.5x)	.115	I	6	1/2	3	67959	110.60	67959-C3	124.80
.0625 (1/16)	**5/16**	.125 (1/8)	5/32	1/2 (1.5x)	.068	I	6	5/16	2-1/2	944462	98.50	944462-C3	106.90
.0625 (1/16)	**3/8**	.125 (1/8)	1/8	3/16 (.5x)	**.115**	II	6	3/8	2-1/2	949262	110.90	949262-C3	120.40
.0625 (1/16)	**3/8**	.125 (1/8)	3/16	9/16 (1.5x)	.084	I	6	3/8	2-1/2	43362	106.80	43362-C3	116.30
.0625 (1/16)	**3/8**	.125 (1/8)	3/16	1-1/8 (3x)	.084	I	6	3/8	3	968562	121.30	968562-C3	130.80
.0625 (1/16)	**1/2**	.125 (1/8)	5/32	1/4 (.5x)	**.162**	II	6	1/2	3	898562	114.70	898562-C3	128.90
.0625 (1/16)	**1/2**	.125 (1/8)	1/4	3/4 (1.5x)	.115	I	6	1/2	3	67962	110.10	67962-C3	124.30
.0625 (1/16)	**1/2**	.125 (1/8)	1/4	1-1/2 (3x)	.115	I	6	1/2	3-1/2	942762	153.10	942762-C3	167.30
.0625 (1/16)	**5/8**	.125 (1/8)	.300	1 (1.5x)	.152	I	6	5/8	3-1/2	43462	180.30	43462-C3	194.50
.0781 (5/64)	**3/8**	.156 (5/32)	3/16	9/16 (1.5x)	.084	I	6	3/8	2-1/2	68478	106.80	68478-C3	116.30
.0781 (5/64)	**1/2**	.156 (5/32)	5/32	1/4 (.5x)	**.162**	II	6	1/2	3	898578	115.30	898578-C3	129.50
.0781 (5/64)	**1/2**	.156 (5/32)	1/4	3/4 (1.5x)	.115	I	6	1/2	3	43378	110.60	43378-C3	124.80
.0781 (5/64)	**5/8**	.156 (5/32)	.300	1 (1.5x)	.152	I	6	5/8	3-1/2	43478	180.30	43478-C3	194.50
.0937 (3/32)	**1/2**	.187 (3/16)	5/32	1/4 (.5x)	**.162**	II	6	1/2	3	898593	115.30	898593-C3	129.50
.0937 (3/32)	**1/2**	.187 (3/16)	1/4	3/4 (1.5x)	.115	I	6	1/2	3	43393	110.60	43393-C3	124.80
.0937 (3/32)	**1/2**	.187 (3/16)	1/4	1-1/2 (3x)	.115	I	6	1/2	3-1/2	942793	129.20	942793-C3	143.40
.0937 (3/32)	**5/8**	.187 (3/16)	.300	1 (1.5x)	.152	I	6	5/8	3-1/2	43493	180.30	43493-C3	194.50
.1181 (3 mm)	**5/8**	.236 (6 mm)	.300	1 (1.5x)	.152	I	6	5/8	3-1/2	4343M	180.30	4343M-C3	194.50
.1250 (1/8)	**5/8**	.250 (1/4)	.300	1 (1.5x)	.152	I	6	5/8	3-1/2	43408	180.30	43408-C3	194.50
.1250 (1/8)	**5/8**	.250 (1/4)	.300	2 (3x)	.152	I	6	5/8	4	983008	203.50	983008-C3	218.90

*Radial DOC accounts for max transition radius at neck

KEYSEAT CUTTERS

Full Radius – Reduced Shank



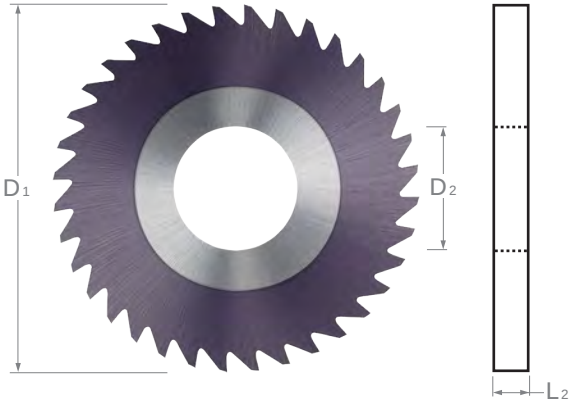


- Ground form relieved (can be reground without losing radius)
- 6 flutes
- Both sides of cutter are dished for clearance
- Solid carbide head with steel shank
- Weldon flat
- CNC ground in the USA

RADIUS	CUTTER DIAMETER	CUTTER WIDTH	RADIAL DOC*	TYPE	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN COATED	
R +.001″ −.001″	D1 +.010″ −.000″	L2	X		D2	L1	6 FL	PRICE	6 FL	PRICE
.0156 (1/64)	3/4	.031 (1/32)	.177	II	3/8	3-1/32	965415	152.20	965415-C3	167.60
.0156 (1/64)	3/4	.031 (1/32)	.115	I	1/2	3-1/32	32901	137.70	32901-C3	153.10
.0156 (1/64)	1	.031 (1/32)	.240	I	1/2	3-1/32	942615	151.20	942615-C3	174.60
.0200	3/4	.040	.115	I	1/2	3.040	959720	137.70	959720-C3	153.10
.0200	1	.040	.240	I	1/2	3.040	942620	151.20	942620-C3	174.60
.0300	3/4	.060	.177	II	3/8	3.060	965430	152.20	965430-C3	167.60
.0312 (1/32)	3/4	.062 (1/16)	.177	II	3/8	3-1/16	965431	152.20	965431-C3	167.60
.0312 (1/32)	3/4	.062 (1/16)	.115	I	1/2	3-1/16	32902	137.70	32902-C3	153.10
.0312 (1/32)	1	.062 (1/16)	.240	I	1/2	3-1/16	942631	151.20	942631-C3	174.60
.0394 (1 mm)	3/4	.078 (2 mm)	.115	I	1/2	3.078	3291M	137.70	3291M-C3	153.10
.0394 (1 mm)	1	.078 (2 mm)	.240	I	1/2	3.078	94261M	151.20	94261M-C3	174.60
.0469 (3/64)	3/4	.093 (3/32)	.177	II	3/8	3-3/32	965447	152.20	965447-C3	167.60
.0469 (3/64)	3/4	.093 (3/32)	.115	I	1/2	3-3/32	32903	137.70	32903-C3	153.10
.0469 (3/64)	1	.093 (3/32)	.240	I	1/2	3-3/32	942647	151.20	942647-C3	174.60
.0590 (1.5 mm)	3/4	.118 (3 mm)	.177	II	3/8	3.118	965459	152.20	965459-C3	167.60
.0625 (1/16)	3/4	.125 (1/8)	.177	II	3/8	3-1/8	965462	152.20	965462-C3	167.60
.0625 (1/16)	3/4	.125 (1/8)	.115	I	1/2	3-1/8	32904	137.70	32904-C3	153.10
.0625 (1/16)	1	.125 (1/8)	.302	II	3/8	3-1/8	937362	152.20	937362-C3	175.60
.0625 (1/16)	1	.125 (1/8)	.240	I	1/2	3-1/8	942662	151.20	942662-C3	174.60
.0781 (5/64)	3/4	.156 (5/32)	.115	I	1/2	3-5/32	959778	137.70	959778-C3	153.10
.0781 (5/64)	1	.156 (5/32)	.302	II	3/8	3-5/32	937378	154.80	937378-C3	178.20
.0781 (5/64)	1	.156 (5/32)	.240	I	1/2	3-5/32	32905	161.50	32905-C3	184.90
.0787 (2 mm)	3/4	.157 (4 mm)	.177	II	3/8	3.157	96542M	152.20	96542M-C3	167.60
.0787 (2 mm)	1	.157 (4 mm)	.240	I	1/2	3.157	3292M	161.50	3292M-C3	184.90
.0937 (3/32)	3/4	.187 (3/16)	.115	I	1/2	3-3/16	959793	137.70	959793-C3	153.10
.0937 (3/32)	1	.187 (3/16)	.302	II	3/8	3-3/16	937393	152.20	937393-C3	175.60
.0937 (3/32)	1	.187 (3/16)	.240	I	1/2	3-3/16	32906	161.50	32906-C3	184.90
.0937 (3/32)	1-1/2	.187 (3/16)	.365	I	3/4	3-11/16	850493	172.70	850493-C3	202.00
.1181 (3 mm)	1	.236 (6 mm)	.240	I	1/2	3.236	942694	161.50	942694-C3	181.40
.1250 (1/8)	1	.250 (1/4)	.302	II	3/8	3-1/4	937395	152.20	937395-C3	175.60
.1250 (1/8)	1	.250 (1/4)	.240	I	1/2	3-1/4	942695	161.50	942695-C3	184.90
.1250 (1/8)	1-1/4	.250 (1/4)	.365	II	1/2	3-1/4	848695	178.50	848695-C3	207.80
.1250 (1/8)	1-1/4	.250 (1/4)	.240	I	3/4	3-1/2	32908	181.40	32908-C3	210.70
.1250 (1/8)	1-1/2	.250 (1/4)	.365	I	3/4	3-3/4	850495	183.90	850495-C3	213.20
.1562 (5/32)	1-1/2	.312 (5/16)	.365	I	3/4	3-13/16	32910	222.30	32910-C3	251.60
.1875 (3/16)	1-3/8	.375 (3/8)	.302	I	3/4	3-5/8	32912	222.30	32912-C3	251.60
.2500 (1/4)	1-1/2	.500 (1/2)	.365	I	3/4	4	32916	246.10	32916-C3	275.40

*Radial DOC accounts for max transition radius at neck

SLITTING SAWS



Fully stocked uncoated or AlTiN coated

- Sides of saw are dished for clearance
- Cutting on OD only
- No keyway or hub
- For use with standard saw arbors
- Solid carbide
- CNC ground in the USA

CUTTER DIAMETER	THICKNESS	INSIDE DIAMETER	NUMBER OF TEETH	UNCOATED		AlTiN COATED	
D_1 $^{+.005''}_{-.000''}$	L_2 $^{+.00025''}_{-.00025''}$	D_2 $^{+.0005''}_{+.0001''}$		TOOL #	PRICE	TOOL #	PRICE
1	.0100	3/8	20	SAA0100	63.50	SAA0100-C3	84.00
	.0120	3/8	20	SAA0120	63.50	SAA0120-C3	84.00
	.0156 (1/64)	3/8	20	SAA0156	63.50	SAA0156-C3	84.00
	.0180	3/8	20	SAA0180	63.50	SAA0180-C3	84.00
	.0200	3/8	20	SAA0200	63.90	SAA0200-C3	84.40
	.0250	3/8	20	SAA0250	63.90	SAA0250-C3	84.40
	.0312 (1/32)	3/8	20	SAA0312	63.90	SAA0312-C3	84.40
	.0400	3/8	20	SAA0400	63.90	SAA0400-C3	84.40
	.0468 (3/64)	3/8	20	SAA0468	56.80	SAA0468-C3	77.30
	.0625 (1/16)	3/8	20	SAA0625	56.80	SAA0625-C3	77.30
1-1/4	.0100	3/8	24	SAB0100	75.60	SAB0100-C3	107.30
	.0156 (1/64)	3/8	24	SAB0156	75.60	SAB0156-C3	107.30
	.0200	3/8	24	SAB0200	70.80	SAB0200-C3	102.50
	.0312 (1/32)	3/8	24	SAB0312	70.80	SAB0312-C3	102.50
	.0625 (1/16)	3/8	24	SAB0625	70.80	SAB0625-C3	102.50
1-1/2	.0100	1/2	36	SAC0100	81.20	SAC0100-C3	112.90
	.0120	1/2	36	SAC0120	81.20	SAC0120-C3	112.90
	.0156 (1/64)	1/2	36	SAC0156	81.20	SAC0156-C3	112.90
	.0180	1/2	36	SAC0180	81.20	SAC0180-C3	112.90
	.0200	1/2	36	SAC0200	73.10	SAC0200-C3	104.80
	.0250	1/2	36	SAC0250	73.10	SAC0250-C3	104.80
	.0312 (1/32)	1/2	36	SAC0312	73.10	SAC0312-C3	104.80
	.0400	1/2	36	SAC0400	73.10	SAC0400-C3	104.80
	.0468 (3/64)	1/2	36	SAC0468	71.20	SAC0468-C3	102.90
	.0625 (1/16)	1/2	36	SAC0625	71.20	SAC0625-C3	102.90
1-3/4	.0100	1/2	38	SAD0100	97.10	SAD0100-C3	128.80
	.0156 (1/64)	1/2	38	SAD0156	97.10	SAD0156-C3	128.80
	.0200	1/2	38	SAD0200	87.00	SAD0200-C3	118.70
	.0312 (1/32)	1/2	38	SAD0312	87.00	SAD0312-C3	118.70
	.0625 (1/16)	1/2	38	SAD0625	94.80	SAD0625-C3	126.50

continued on next page

SLITTING SAWS

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CUTTER DIAMETER	THICKNESS	INSIDE DIAMETER	NUMBER OF TEETH	UNCOATED		AlTiN COATED	
D_1 $^{+.005''}_{-.000''}$	L_2 $^{+.00025''}_{-.00025''}$	D_2 $^{+.0005''}_{+.0001''}$		TOOL #	PRICE	TOOL #	PRICE
2	.0100	1/2	40	SAW0100	114.50	SAW0100-C3	146.20
	.0120	1/2	40	SAW0120	114.50	SAW0120-C3	146.20
	.0156 (1/64)	1/2	40	SAW0156	114.50	SAW0156-C3	146.20
	.0180	1/2	40	SAW0180	114.50	SAW0180-C3	146.20
	.0200	1/2	40	SAW0200	114.50	SAW0200-C3	146.20
	.0250	1/2	40	SAW0250	114.50	SAW0250-C3	146.20
	.0312 (1/32)	1/2	40	SAW0312	114.50	SAW0312-C3	146.20
	.0400	1/2	40	SAW0400	114.50	SAW0400-C3	146.20
	.0468 (3/64)	1/2	40	SAW0468	114.50	SAW0468-C3	146.20
	.0625 (1/16)	1/2	40	SAW0625	114.50	SAW0625-C3	146.20
	.0937 (3/32)	1/2	40	SAW0937	114.50	SAW0937-C3	146.20
	.1250 (1/8)	1/2	40	SAW1250	143.90	SAW1250-C3	175.60
3	.0200	1	72	SAE0200	177.70	SAE0200-C3	220.70
	.0312 (1/32)	1	72	SAE0312	177.70	SAE0312-C3	220.70
	.0625 (1/16)	1	72	SAE0625	200.10	SAE0625-C3	243.10
	.0937 (3/32)	1	72	SAE0937	256.00	SAE0937-C3	299.00
	.1250 (1/8)	1	72	SAE1250	291.90	SAE1250-C3	334.90
	.1875 (3/16)	1	72	SAE1875	364.40	SAE1875-C3	407.40
	.2500 (1/4)	1	72	SAE2500	430.30	SAE2500-C3	473.30
4	.0312 (1/32)	1	80	SAF0312	254.40	SAF0312-C3	309.80
	.0625 (1/16)	1	80	SAF0625	260.20	SAF0625-C3	315.60
	.0937 (3/32)	1	80	SAF0937	300.60	SAF0937-C3	356.00
	.1250 (1/8)	1	80	SAF1250	363.00	SAF1250-C3	418.40
	.1875 (3/16)	1	80	SAF1875	461.70	SAF1875-C3	517.10
	.2500 (1/4)	1	80	SAF2500	573.50	SAF2500-C3	628.90

For Saw Arbors, see page 486.

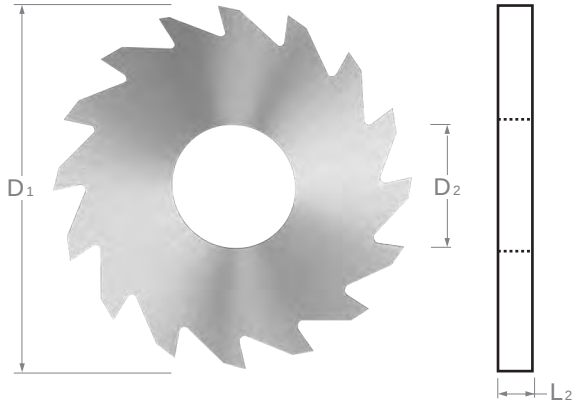


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SLITTING SAWS

For Non-Ferrous Materials

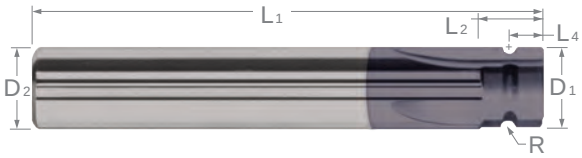


- Sides of saw have increased dish to minimize part contact
- Polished sides lessen saw binding in cut
- Cutting on OD only
- No keyway or hub
- For use with standard saw arbors
- Solid carbide
- CNC ground in the USA

CUTTER DIAMETER	THICKNESS	INSIDE DIAMETER	NUMBER OF TEETH	UNCOATED	
D_1 $^{+.005''}_{-.000''}$	L_2 $^{+.00025''}_{-.00025''}$	D_2 $^{+.0005''}_{+.0001''}$		TOOL #	PRICE
1	.0100	3/8	12	SNA0100	63.50
	.0156 (1/64)	3/8	12	SNA0156	63.50
	.0200	3/8	12	SNA0200	63.50
	.0312 (1/32)	3/8	12	SNA0312	63.50
	.0625 (1/16)	3/8	12	SNA0625	56.80
1-1/4	.0156 (1/64)	1/2	16	SNB0156	75.60
	.0200	1/2	16	SNB0200	70.80
	.0312 (1/32)	1/2	16	SNB0312	70.80
	.0625 (1/16)	1/2	16	SNB0625	70.80
1-1/2	.0120	1/2	16	SNC0120	81.20
	.0156 (1/64)	1/2	16	SNC0156	81.20
	.0200	1/2	16	SNC0200	73.10
	.0312 (1/32)	1/2	16	SNC0312	73.10
	.0400	1/2	16	SNC0400	73.10
	.0625 (1/16)	1/2	16	SNC0625	73.10
1-3/4	.0200	1/2	24	SND0200	87.00
	.0312 (1/32)	1/2	24	SND0312	87.00
	.0625 (1/16)	1/2	24	SND0625	94.80
2	.0200	1/2	24	SNE0200	114.50
	.0312 (1/32)	1/2	24	SNE0312	114.50
	.0400	1/2	24	SNE0400	114.50
	.0625 (1/16)	1/2	24	SNE0625	114.50
	.0937 (3/32)	1/2	24	SNE0937	114.50
	.1250 (1/8)	1/2	24	SNE1250	143.90
3	.0312 (1/32)	1	30	SNF0312	177.70
	.0625 (1/16)	1	30	SNF0625	200.10
	.0937 (3/32)	1	30	SNF0937	256.00
	.1250 (1/8)	1	30	SNF1250	291.90
4	.0312 (1/32)	1	36	SNG0312	254.40
	.0625 (1/16)	1	36	SNG0625	260.20
	.0937 (3/32)	1	36	SNG0937	300.60
	.1250 (1/8)	1	36	SNG1250	363.00

For Saw Arbors, see page 486.

CONCAVE RADIUS END MILLS



- Ground form relieved (can be re-ground without losing radius)
- 4 flutes
- Cutting on OD and radius only (non-end cutting)
- Solid carbide
- CNC ground in the USA

RADIUS	CUTTER DIAMETER	LENGTH OF CUT	RADIUS CENTER	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN COATED	
R +.001″ −.001″	D_1 +.000″ −.002″	L_2 +.060″ −.000″	L_4 +.001″ −.001″	D_2	L_1	4 FL	PRICE	4 FL	PRICE
1/64	1/4	.281	.1406	1/4	2-1/2	45915	59.40	45915-C3	66.60
1/64	1/2	.281	.1406	1/2	3	32801	114.20		
.020	1/4	.281	.1450	1/4	2-1/2	45920	58.30	45920-C3	65.50
1/32	1/4	.312	.1562	1/4	2-1/2	45931	59.40	45931-C3	66.60
1/32	1/2	.312	.1562	1/2	3	32802	114.20		
1 mm	1/4	.329	.1644	1/4	2-1/2	4591M	59.60	4591M-C3	66.80
1 mm	1/2	.329	.1644	1/2	3	3281M	119.00		
3/64	1/4	.344	.1719	1/4	2-1/2	45947	59.40	45947-C3	66.60
3/64	1/2	.344	.1719	1/2	3	32803	116.20		
1/16	3/8	.375	.1875	3/8	2-1/2	45962	73.90	45962-C3	83.40
1/16	1/2	.375	.1875	1/2	3	32804	114.20		
5/64	1/2	.407	.2034	1/2	3	32805	114.20	32805-C3	128.40
2 mm	1/2	.407	.2044	1/2	3	3282M	119.00	3282M-C3	133.20
3/32	1/2	.437	.2187	1/2	3	32806	116.20	32806-C3	130.40
7/64	5/8	.469	.2344	5/8	3-1/2	32807	148.80	32807-C3	163.00
1/8	5/8	.500	.2500	5/8	3-1/2	32808	146.20	32808-C3	160.40
5/32	3/4	.562	.2812	3/4	4	32810	246.30	32810-C3	261.70
3/16	1	.624	.3120	3/4	3-1/2	32812*	199.70	32812-C3*	215.10
1/4	1-1/4	.750	.3750	3/4	4	32816*	234.60	32816-C3*	249.90

*Solid carbide head with steel shank



★★★★★

"I don't know how they do it, but thanks @harveytool for making amazing tools. The feeds and speeds from the website were spot on!"

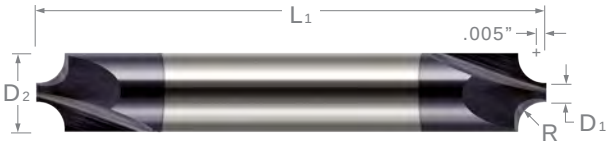
— @cameronbabineaux

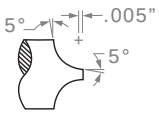
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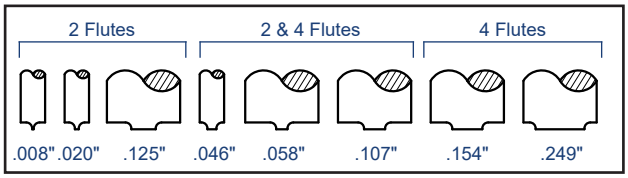
CORNER ROUNDING END MILLS

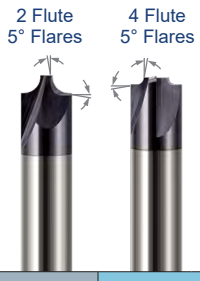
2 & 4 Flute – Flared





- Flares are tangent to radius (flare is blended to radius to ensure smooth form)
- Double-ended
- Axial depth of cut ≈ radius plus .005″
- End cutting
- Solid carbide
- CNC ground in the USA





RADIUS	PILOT DIAMETER	FLUTES	SHANK DIAMETER	OVERALL LENGTH		UNCOATED		AlTiN COATED	
R +.0005″ −.0005″	D1		D2	L1		TOOL #	PRICE	TOOL #	PRICE
.003	**.046**	2	1/8	1-1/2		17003	42.00	17003-C3	48.00
.004	**.046**	2	1/8	1-1/2		17004	42.00	17004-C3	48.00
.005	**.008**	2	1/8	1-1/2		67405	52.80	67405-C3	58.80
.005	**.020**	2	1/8	1-1/2		45305	45.40	45305-C3	51.40
.005	**.046**	2	1/8	1-1/2		17005	42.00	17005-C3	48.00
.005	**.046**	2	3/16	4	***LONG!***	31605	73.80	31605-C3	82.20
.005	**.046**	4	1/8	1-1/2		806105	57.10	806105-C3	63.10
.005	**.058**	4	1/8	1-1/2		67605	57.10	67605-C3	63.10
.005	**.107**	4	1/8	1-1/2		68005	57.10	68005-C3	63.10
.005	**.249**	4	3/8	2-1/2		21005	66.60	21005-C3	80.80
.006	**.020**	2	1/8	1-1/2		45306	45.40	45306-C3	51.40
.006	**.046**	2	1/8	1-1/2		17006	42.00	17006-C3	48.00
.006	**.058**	4	1/8	1-1/2		67606	57.10	67606-C3	63.10
.006	**.107**	4	1/8	1-1/2		68006	57.10	68006-C3	63.10
.007	**.020**	2	1/8	1-1/2		45307	45.40	45307-C3	51.40
.007	**.046**	2	1/8	1-1/2		17007	42.00	17007-C3	48.00
.007	**.058**	4	1/8	1-1/2		67607	57.10	67607-C3	63.10
.007	**.107**	4	1/8	1-1/2		68007	57.10	68007-C3	63.10
.008	**.008**	2	1/8	1-1/2		67408	52.80	67408-C3	58.80
.008	**.020**	2	1/8	1-1/2		45308	45.40	45308-C3	51.40
.008	**.046**	2	1/8	1-1/2		17008	42.00	17008-C3	48.00
.008	**.046**	2	3/16	4	***LONG!***	31608	73.80	31608-C3	82.20
.008	**.058**	4	1/8	1-1/2		67608	57.10	67608-C3	63.10
.008	**.249**	4	3/8	2-1/2		21008	66.60	21008-C3	80.80
.009	**.020**	2	1/8	1-1/2		45309	45.40	45309-C3	51.40
.009	**.046**	2	1/8	1-1/2		17009	42.00	17009-C3	48.00
.010	**.008**	2	1/8	1-1/2		67410	52.80	67410-C3	58.80
.010	**.020**	2	1/8	1-1/2		45310	45.40	45310-C3	51.40
.010	**.046**	2	1/8	1-1/2		17010	42.00	17010-C3	48.00
.010	**.046**	2	3/16	4	***LONG!***	31610	73.80	31610-C3	82.20
.010	**.046**	4	1/8	1-1/2		806110	57.20	806110-C3	63.20

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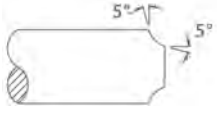
CORNER ROUNDING END MILLS

2 & 4 Flute – Flared (cont.)

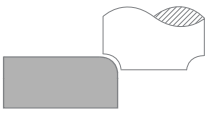
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	RADIUS	PILOT DIAMETER	FLUTES	SHANK DIAMETER	OVERALL LENGTH		UNCOATED		AlTiN COATED	
	R +.0005″ −.0005″	D_1		D_2	L_1		TOOL #	PRICE	TOOL #	PRICE
	.010	**.058**	4	1/8	1-1/2		67610	57.10	67610-C3	63.10
	.010	**.107**	4	3/16	2		68010	61.90	68010-C3	69.10
	.010	**.125**	2	3/16	2		941510	61.90	941510-C3	69.10
	.010	**.249**	4	3/8	2-1/2		21010	66.60	21010-C3	80.80
	.011	**.020**	2	1/8	1-1/2		45311	45.40	45311-C3	51.40
	.011	**.046**	2	1/8	1-1/2		17011	42.00	17011-C3	48.00
	.012	**.020**	2	1/8	1-1/2		45312	45.40	45312-C3	51.40
	.012	**.046**	2	1/8	1-1/2		17012	42.00	17012-C3	48.00
	.012	**.107**	4	3/16	2		68012	61.90	68012-C3	69.10
	.013	**.020**	2	1/8	1-1/2		45313	45.40	45313-C3	51.40
	.013	**.046**	2	1/8	1-1/2		17013	42.00	17013-C3	48.00
	.014	**.020**	2	1/8	1-1/2		45314	45.40	45314-C3	51.40
	.014	**.046**	2	1/8	1-1/2		17014	42.00	17014-C3	48.00
	.015 (1/64)	**.008**	2	1/8	1-1/2		67415	52.80	67415-C3	58.80
	.015 (1/64)	**.020**	2	1/8	1-1/2		45315	45.40	45315-C3	51.40
	.015 (1/64)	**.046**	2	1/8	1-1/2		17015	42.00	17015-C3	48.00
	.015 (1/64)	**.046**	2	3/16	4	***LONG!***	31615	73.80	31615-C3	82.20
	.015 (1/64)	**.046**	4	1/8	1-1/2		806115	57.10	806115-C3	63.10
NEW	.015 (1/64)	**.058**	2	1/8	1-1/2		770515	42.00	770515-C3	48.00
	.015 (1/64)	**.058**	4	1/8	1-1/2		67615	57.10	67615-C3	63.10
	.015 (1/64)	**.107**	4	3/16	2		68015	61.90	68015-C3	69.10
	.015 (1/64)	**.125**	2	3/16	2		941515	61.90	941515-C3	69.10
	.015 (1/64)	**.249**	4	3/8	2-1/2		21015	66.60	21015-C3	80.80
	.018	**.020**	2	1/8	1-1/2		45318	45.40	45318-C3	51.40
	.018	**.046**	2	1/8	1-1/2		17018	42.00	17018-C3	48.00
	.018	**.107**	4	3/16	2		68018	61.90	68018-C3	69.10
	.020	**.008**	2	1/8	1-1/2		67420	52.80	67420-C3	58.80
	.020	**.020**	2	1/8	1-1/2		45320	45.40	45320-C3	51.40
	.020	**.046**	2	1/8	1-1/2		17020	42.00	17020-C3	48.00
	.020	**.046**	2	3/16	4	***LONG!***	31620	73.80	31620-C3	82.20
	.020	**.046**	4	1/8	1-1/2		806120	57.10	806120-C3	63.10
NEW	.020	**.058**	2	1/8	1-1/2		770520	42.00	770520-C3	48.00
	.020	**.058**	4	1/8	1-1/2		67620	57.10	67620-C3	63.10
	.020	**.107**	4	3/16	2		68020	61.90	68020-C3	67.90
	.020	**.125**	2	3/16	2		941520	61.90	941520-C3	69.10
	.020	**.249**	4	3/8	2-1/2		21020	66.60	21020-C3	80.80
	.022	**.020**	2	1/8	1-1/2		45322	45.40	45322-C3	51.40
	.022	**.046**	2	1/8	1-1/2		17022	42.00	17022-C3	48.00
	.022	**.107**	4	3/16	2		68022	61.90	68022-C3	69.10

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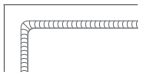
5° Flares at Shoulder and Pilot to Avoid Steps in Workpiece



Large Pilots for Profiling, Increasing Strength and Requiring Less Speed



Small Pilots for Narrow Slots and Holes



Small Pilots Allow Milling of Tight Inside Corners

NEW SIZES!

CORNER ROUNDING END MILLS

2 & 4 Flute – Flared (cont.)

continued from previous page

RADIUS	PILOT DIAMETER	FLUTES	SHANK DIAMETER	OVERALL LENGTH		UNCOATED		AlTiN COATED	
R +.0005″ −.0005″	D_1		D_2	L_1		TOOL #	PRICE	TOOL #	PRICE
.025	**.008**	2	1/8	1-1/2		67425	52.80	67425-C3	58.80
.025	**.020**	2	1/8	1-1/2		45325	45.40	45325-C3	51.40
.025	**.046**	2	1/8	1-1/2		17025	42.00	17025-C3	48.00
.025	**.046**	2	3/16	4	***LONG!***	31625	73.80	31625-C3	82.20
.025	**.058**	4	1/8	1-1/2		67625	57.10	67625-C3	63.10
.025	**.107**	4	3/16	2		68025	61.90	68025-C3	67.90
.025	**.125**	2	3/16	2		941525	61.90	941525-C3	69.10
.025	**.249**	4	3/8	2-1/2		21025	66.60	21025-C3	80.80
.027	**.046**	2	1/8	1-1/2		17027	42.00	17027-C3	48.00
.027	**.107**	4	3/16	2		68027	61.90	68027-C3	69.10
.030	**.008**	2	1/8	1-1/2		67430	52.80	67430-C3	58.80
.030	**.020**	2	1/8	1-1/2		45330	45.40	45330-C3	51.40
.030	**.046**	2	1/8	1-1/2		17030	42.00	17030-C3	48.00
.030	**.046**	2	3/16	4	***LONG!***	31630	73.80	31630-C3	82.20
.030	**.046**	4	1/8	1-1/2		806130	57.10	806130-C3	63.10
.030	**.058**	4	1/8	1-1/2		67630	57.10	67630-C3	63.10
.030	**.107**	4	3/16	2		68030	61.90	68030-C3	67.90
.030	**.125**	2	3/16	2		941530	61.90	941530-C3	69.10
.030	**.249**	4	3/8	2-1/2		21030	73.30	21030-C3	87.50
.031 (1/32)	**.008**	2	1/8	1-1/2		67431	52.80	67431-C3	58.80
.031 (1/32)	**.020**	2	1/8	1-1/2		45331	45.40	45331-C3	51.40
.031 (1/32)	**.046**	2	1/8	1-1/2		17031	42.00	17031-C3	48.00
.031 (1/32)	**.046**	2	3/16	4	***LONG!***	31631	73.80	31631-C3	82.20
.031 (1/32)	**.046**	4	1/8	1-1/2		806131	57.10	806131-C3	63.10
.031 (1/32)	**.058**	4	1/8	1-1/2		67631	57.10	67631-C3	63.10
.031 (1/32)	**.107**	4	3/16	2		68031	61.90	68031-C3	69.10
.031 (1/32)	**.125**	2	3/16	2		941531	69.10	941531-C3	76.30
.031 (1/32)	**.154**	4	1/4	2		946631	81.10	946631-C3	90.90
.031 (1/32)	**.249**	4	3/8	2-1/2		21031	73.30	21031-C3	87.50
.032	**.046**	2	1/8	1-1/2		17032	42.00	17032-C3	48.00
.032	**.249**	4	3/8	2-1/2		21032	73.30	21032-C3	87.50
.035	**.020**	2	1/8	1-1/2		67835	45.40	67835-C3	51.40
.035	**.046**	2	1/8	1-1/2		17035	42.00	17035-C3	48.00
.035	**.046**	2	3/16	4	***LONG!***	31635	73.80	31635-C3	82.20
.035	**.058**	4	3/16	2		67635	64.00	67635-C3	71.20
.035	**.125**	2	1/4	2		941535	63.50	941535-C3	70.70
.035	**.249**	4	3/8	2-1/2		21035	73.30	21035-C3	87.50
.037	**.107**	4	3/16	2		68037	61.90	68037-C3	69.10
.039 (1 mm)	**.020**	2	1/8	1-1/2		67839	45.40	67839-C3	51.40
.039 (1 mm)	**.046**	2	1/8	1-1/2		17039	42.00	17039-C3	48.00
.039 (1 mm)	**.046**	2	3/16	4	***LONG!***	31639	73.80	31639-C3	82.20
.039 (1 mm)	**.046**	4	1/8	1-1/2		806139	57.10	806139-C3	63.10
.039 (1 mm)	**.058**	4	3/16	2		67639	64.00	67639-C3	71.20
.039 (1 mm)	**.100**	2	3/16	2		45339	55.20	45339-C3	62.40
.039 (1 mm)	**.107**	4	3/16	2		68039	55.20	68039-C3	62.40
.039 (1 mm)	**.154**	4	1/4	2		946639	81.10	946639-C3	90.90
.039 (1 mm)	**.249**	4	3/8	2-1/2		21039	73.30	21039-C3	87.50

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NEW SIZES!

CORNER ROUNDING END MILLS

2 & 4 Flute – Flared (cont.)

continued from previous page

	RADIUS	PILOT DIAMETER	FLUTES	SHANK DIAMETER	OVERALL LENGTH		UNCOATED		AlTiN COATED	
	R +.0005" −.0005"	D_1		D_2	L_1		TOOL #	PRICE	TOOL #	PRICE
	.040	**.020**	2	1/8	1-1/2		45340	45.40	45340-C3	51.40
	.040	**.046**	2	3/16	2		17040	53.60	17040-C3	60.80
	.040	**.107**	4	1/4	2		68040	81.10	68040-C3	90.90
	.040	**.249**	4	3/8	2-1/2		21040	88.80	21040-C3	103.00
	.043	**.046**	2	3/16	2		17043	53.60	17043-C3	60.80
	.043	**.058**	4	3/16	2		67643	64.00	67643-C3	71.20
	.043	**.249**	4	3/8	2-1/2		21043	88.80	21043-C3	103.00
	.045	**.046**	2	3/16	2		17045	53.60	17045-C3	60.80
	.045	**.058**	4	3/16	2		67645	64.00	67645-C3	71.20
	.047 (3/64)	**.020**	2	1/8	1-1/2		67847	45.40	67847-C3	51.40
	.047 (3/64)	**.046**	2	3/16	2		17047	53.60	17047-C3	60.80
	.047 (3/64)	**.046**	2	3/16	4	***LONG!***	31647	73.80	31647-C3	82.20
	.047 (3/64)	**.058**	4	3/16	2		67647	64.00	67647-C3	71.20
	.047 (3/64)	**.107**	4	1/4	2		68047	81.10	68047-C3	90.90
	.047 (3/64)	**.125**	2	1/4	2		45347	63.50	45347-C3	73.30
	.047 (3/64)	**.249**	4	3/8	2-1/2		21047	88.80	21047-C3	103.00
	.050	**.020**	2	1/8	1-1/2		67850	45.40	67850-C3	51.40
	.050	**.046**	2	3/16	2		17050	53.60	17050-C3	60.80
	.050	**.046**	2	1/4	4	***LONG!***	31650	87.70	31650-C3	95.90
	.050	**.058**	4	3/16	2		67650	64.00	67650-C3	71.20
	.050	**.107**	4	1/4	2		68050	81.10	68050-C3	90.90
	.050	**.125**	2	1/4	2		45350	63.50	45350-C3	73.30
	.050	**.249**	4	3/8	2-1/2		21050	88.80	21050-C3	103.00
	.052	**.107**	4	1/4	2		68052	81.10	68052-C3	90.90
	.055	**.046**	2	3/16	2		17055	53.60	17055-C3	60.80
	.055	**.058**	4	3/16	2		67655	64.00	67655-C3	71.20
	.055	**.107**	4	1/4	2		68055	81.10	68055-C3	90.90
	.058	**.107**	4	1/4	2		68058	81.10	68058-C3	90.90
	.060	**.020**	2	3/16	2		67860	55.70	67860-C3	62.90
	.060	**.046**	2	3/16	2		17060	53.60	17060-C3	60.80
	.060	**.046**	2	1/4	4	***LONG!***	31660	87.70	31660-C3	95.90
	.060	**.046**	4	3/16	2		806060	61.10	806060-C3	68.30
	.060	**.058**	4	3/16	2		67660	64.00	67660-C3	71.20
	.060	**.107**	4	1/4	2		68060	81.10	68060-C3	90.90
	.060	**.125**	2	1/4	2		45360	63.50	45360-C3	73.30
	.060	**.154**	4	5/16	2-1/2		946660	93.60	946660-C3	105.50
	.060	**.249**	4	1/2	3		21060	99.00	21060-C3	113.80
	.062 (1/16)	**.020**	2	3/16	2		67862	55.70	67862-C3	62.90
	.062 (1/16)	**.046**	2	3/16	2		17062	53.60	17062-C3	60.80
	.062 (1/16)	**.046**	2	1/4	4	***LONG!***	31662	87.70	31662-C3	95.90
	.062 (1/16)	**.046**	4	3/16	2		806062	64.00	806062-C3	69.30
NEW	.062 (1/16)	**.058**	2	3/16	2		770562	53.60	770562-C3	60.80
	.062 (1/16)	**.058**	4	3/16	2		67662	64.00	67662-C3	71.20
	.062 (1/16)	**.107**	4	1/4	2		68062	81.10	68062-C3	90.90
	.062 (1/16)	**.125**	2	1/4	2		45362	63.50	45362-C3	73.30
	.062 (1/16)	**.154**	4	5/16	2-1/2		946662	93.60	946662-C3	105.50
	.062 (1/16)	**.249**	4	1/2	3		21062	99.00	21062-C3	118.50

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NEW SIZES!

CORNER ROUNDING END MILLS

2 & 4 Flute – Flared (cont.)

continued from previous page

RADIUS	PILOT DIAMETER	FLUTES	SHANK DIAMETER	OVERALL LENGTH		UNCOATED		AlTiN COATED		
R +.0005″ −.0005″	D_1		D_2	L_1		TOOL #	PRICE	TOOL #	PRICE	
.065	**.046**	2	3/16	2		17065	53.60	17065-C3	60.80	
.070	**.046**	2	3/16	2		17070	53.60	17070-C3	60.80	
.070	**.058**	4	1/4	2		67670	81.10	67670-C3	90.90	
.070	**.107**	4	1/4	2		68070	81.10	68070-C3	90.90	
.072	**.046**	2	1/4	2		17072	61.50	17072-C3	71.30	
.072	**.249**	4	1/2	3		21072	103.70	21072-C3	123.20	
.075	**.046**	2	1/4	2		17075	61.50	17075-C3	71.30	
.078 (5/64)	**.020**	2	3/16	2		67878	61.90	67878-C3	69.10	
.078 (5/64)	**.046**	2	1/4	2		17078	61.50	17078-C3	71.30	
.078 (5/64)	**.046**	2	1/4	4	***LONG!***	31678	87.70	31678-C3	95.90	
.078 (5/64)	**.046**	4	1/4	2		806078	81.10	806078-C3	90.90	NEW
.078 (5/64)	**.058**	4	1/4	2		67678	81.10	67678-C3	90.90	
.078 (5/64)	**.107**	4	5/16	2-1/2		68078	93.60	68078-C3	105.50	
.078 (5/64)	**.125**	2	5/16	2-1/2		941578	93.60	941578-C3	105.50	
.078 (5/64)	**.154**	4	5/16	2-1/2		946678	93.60	946678-C3	105.50	
.078 (5/64)	**.249**	4	1/2	3		21078	103.70	21078-C3	123.20	
.080	**.046**	2	1/4	2		17080	61.50	17080-C3	71.30	
.080	**.058**	4	1/4	2		67680	81.10	67680-C3	90.90	
.080	**.107**	4	5/16	2-1/2		68080	93.60	68080-C3	105.50	
.085	**.046**	2	1/4	2		17085	61.50	17085-C3	71.30	
.089	**.045**	2	1/4	2		17089	61.50	17089-C3	71.30	
.089	**.107**	4	5/16	2-1/2		68089	93.60	68089-C3	105.50	
.089	**.248**	4	1/2	3		21089	103.70	21089-C3	123.20	
.090	**.045**	2	1/4	2		17090	61.50	17090-C3	71.30	
.090	**.058**	4	1/4	2		67690	81.10	67690-C3	90.90	
.090	**.107**	4	5/16	2-1/2		68090	93.60	68090-C3	105.50	
.093 (3/32)	**.045**	2	1/4	2		17093	61.50	17093-C3	71.30	
.093 (3/32)	**.045**	2	5/16	4	***LONG!***	31693	115.50	31693-C3	128.80	
.093 (3/32)	**.046**	4	1/4	2		806093	81.10	806093-C3	90.90	NEW
.093 (3/32)	**.058**	4	1/4	2		67693	81.10	67693-C3	90.90	
.093 (3/32)	**.107**	4	5/16	2-1/2		68093	93.60	68093-C3	105.50	
.093 (3/32)	**.125**	2	5/16	2-1/2		941593	93.60	941593-C3	105.50	
.093 (3/32)	**.154**	4	3/8	2-1/2		946693	114.70	946693-C3	128.90	
.093 (3/32)	**.248**	4	1/2	3		21093	105.60	21093-C3	125.10	
.095	**.045**	2	1/4	2		17095	61.50	17095-C3	71.30	
.100	**.045**	2	1/4	2		17100	61.50	17100-C3	71.30	
.100	**.045**	2	5/16	4	***LONG!***	31700	115.50	31700-C3	128.80	
.100	**.058**	4	5/16	2-1/2		77800	94.00	77800-C3	105.90	
.100	**.107**	4	5/16	2-1/2		68100	94.00	68100-C3	105.90	
.100	**.125**	2	3/8	2-1/2		941600	112.80	941600-C3	122.30	
.100	**.248**	4	1/2	3		21100	105.60	21100-C3	125.10	
.109 (7/64)	**.058**	2	5/16	2-1/2		17109	94.00	17109-C3	105.90	
.109 (7/64)	**.107**	4	3/8	2-1/2		68109	114.70	68109-C3	128.90	

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NEW SIZES!

CORNER ROUNDING END MILLS

2 & 4 Flute – Flared (cont.)

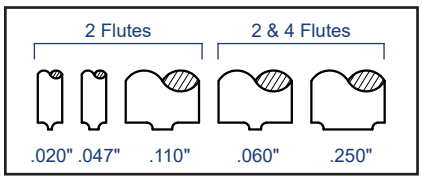
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	RADIUS	PILOT DIAMETER	FLUTES	SHANK DIAMETER	OVERALL LENGTH		UNCOATED		AlTiN COATED	
	R +.0005″ −.0005″	D_1		D_2	L_1		TOOL #	PRICE	TOOL #	PRICE
	.118 (3 mm)	**.058**	2	5/16	2-1/2		17118	94.00	17118-C3	105.90
	.118 (3 mm)	**.107**	4	3/8	2-1/2		68118	114.70	68118-C3	128.90
	.118 (3 mm)	**.125**	2	3/8	2-1/2		941618	112.80	941618-C3	122.30
	.118 (3 mm)	**.248**	4	1/2	3		21118	133.90	21118-C3	153.40
	.125 (1/8)	**.046**	2	5/16	2-1/2		948425	91.30	948425-C3	103.20
	.125 (1/8)	**.046**	4	5/16	2-1/2		805908	94.00	805908-C3	102.40
	.125 (1/8)	**.058**	2	5/16	2-1/2		17125	94.00	17125-C3	105.90
	.125 (1/8)	**.058**	2	3/8	4	***LONG!***	31725	138.00	31725-C3	145.50
NEW	.125 (1/8)	**.058**	4	5/16	2-1/2		67708	94.00	67708-C3	105.90
	.125 (1/8)	**.107**	4	3/8	2-1/2		68125	114.70	68125-C3	128.90
	.125 (1/8)	**.125**	2	7/16	2-1/2		941608	152.90	941608-C3	170.90
	.125 (1/8)	**.154**	4	7/16	2-1/2		946725	152.90	946725-C3	170.90
	.125 (1/8)	**.248**	4	5/8	3-1/2		21125	170.10	21125-C3	191.30
	.140 (9/64)	**.058**	2	3/8	2-1/2		17140	112.80	17140-C3	127.00
	.140 (9/64)	**.107**	4	7/16	2-1/2		68140	152.90	68140-C3	170.90
	.156 (5/32)	**.058**	2	3/8	2-1/2		17156	112.80	17156-C3	127.00
	.156 (5/32)	**.107**	4	7/16	2-1/2		68156	152.90	68156-C3	170.90
	.156 (5/32)	**.248**	4	5/8	3-1/2		21156	187.30	21156-C3	208.50
	.172 (11/64)	**.058**	2	7/16	2-1/2		17172	170.10	17172-C3	188.10
	.187 (3/16)	**.058**	2	7/16	2-1/2		17187	170.10	17187-C3	188.10
	.187 (3/16)	**.107**	4	1/2	3		68187	178.50	68187-C3	198.00
	.187 (3/16)	**.125**	2	5/8	3-1/2		941612	203.40	941612-C3	217.60
	.187 (3/16)	**.248**	4	5/8	3-1/2		21187	200.70	21187-C3	221.90
	.197 (5 mm)	**.058**	2	1/2	3		17197	178.50	17197-C3	198.00
	.197 (5 mm)	**.107**	4	5/8	3-1/2		68197	267.90	68197-C3	289.10
	.219 (7/32)	**.058**	2	1/2	3		17219	180.10	17219-C3	199.60
	.219 (7/32)	**.107**	4	5/8	3-1/2		68219	267.90	68219-C3	289.10
	.236 (6 mm)	**.107**	2	5/8	3-1/2		17236	270.60	17236-C3	291.80
	.236 (6 mm)	**.107**	4	5/8	3-1/2		68236	267.90	68236-C3	289.10
	.250 (1/4)	**.058**	2	5/8	3-1/2		17199	270.60	17199-C3	291.80
	.250 (1/4)	**.107**	2	5/8	3-1/2		17250	267.90	17250-C3	289.10
	.250 (1/4)	**.107**	4	5/8	3-1/2		68250	267.90	68250-C3	289.10
	.250 (1/4)	**.154**	4	3/4	4		946750	298.20	946750-C3	322.70
	.250 (1/4)	**.247**	4	3/4	4		21250	298.20	21250-C3	322.70
	.312 (5/16)	**.247**	4	1	4		21312	421.20	21312-C3	456.30
	.375 (3/8)	**.246**	4	1	4		21375	459.90	21375-C3	495.00

CORNER ROUNDING END MILLS

2 & 4 Flute – Unflared





- Unflared shoulder and pilot for full radius form
- Double-ended
- Axial depth of cut = radius plus .005″
- End cutting
- Solid carbide
- CNC ground in the USA



RADIUS	PILOT DIA.	FLUTES	SHANK DIA.	OAL		UNCOATED		TiN COATED		AlTiN COATED		AMORPHOUS DIAMOND	
R +.0005″ −.0005″	D1		D2	L1		TOOL #	PRICE	TOOL #	PRICE	TOOL #	PRICE	TOOL #	PRICE
.005	**.020**	2	1/8	1-1/2		932205	43.70			932205-C3	49.70		
.005	**.047**	2	1/8	1-1/2		46005	33.70	46005-C1	39.70	46005-C3	39.70	46005-C4	51.90
.008	**.047**	2	1/8	1-1/2		46008	33.70	46008-C1	39.70	46008-C3	39.70		
.010	**.020**	2	1/8	1-1/2		932210	43.70			932210-C3	49.70		
.010	**.047**	2	1/8	1-1/2		46010	33.10	46010-C1	39.10	46010-C3	39.10	46010-C4	51.30
.010	**.250**	4	3/8	2-1/2		44010	58.00			44010-C3	72.20		
.012	**.047**	2	1/8	1-1/2		46012	33.70	46012-C1	39.70	46012-C3	39.70		
.015 (1/64)	**.020**	2	1/8	1-1/2		932215	43.70			932215-C3	49.70		
.015 (1/64)	**.047**	2	1/8	1-1/2		46015	33.10	46015-C1	39.10	46015-C3	39.10	46015-C4	51.30
.015 (1/64)	**.047**	2	3/16	4	***LONG!***	928015	67.20			928015-C3	75.60		
.015 (1/64)	**.060**	4	1/8	1-1/2		929915	52.80			929915-C3	58.80		
.015 (1/64)	**.250**	4	3/8	2-1/2		44015	58.00			44015-C3	72.20		
.018	**.047**	2	1/8	1-1/2		46018	33.70	46018-C1	39.70	46018-C3	39.70		
.020	**.020**	2	1/8	1-1/2		932220	43.70			932220-C3	49.70		
.020	**.047**	2	1/8	1-1/2		46020	33.10	46020-C1	39.10	46020-C3	39.10	46020-C4	51.30
.020	**.047**	2	3/16	4	***LONG!***	928020	67.20			928020-C3	75.60		
.020	**.250**	4	3/8	2-1/2		44020	58.00			44020-C3	72.20		
.022	**.047**	2	1/8	1-1/2		46022	33.70	46022-C1	39.70	46022-C3	39.70		
.025	**.020**	2	1/8	1-1/2		932225	43.70			932225-C3	49.70		
.025	**.047**	2	1/8	1-1/2		46025	33.10	46025-C1	39.10	46025-C3	39.10	46025-C4	51.30
.025	**.250**	4	3/8	2-1/2		44025	58.00			44025-C3	72.20		
.027	**.047**	2	1/8	1-1/2		46027	33.70	46027-C1	39.70	46027-C3	39.70		
.030	**.047**	2	1/8	1-1/2		46030	33.70	46030-C1	39.70	46030-C3	39.70	46030-C4	51.90
.030	**.250**	4	3/8	2-1/2		44030	63.60			44030-C3	77.80		
.031 (1/32)	**.020**	2	1/8	1-1/2		932231	43.70			932231-C3	49.70		
.031 (1/32)	**.047**	2	1/8	1-1/2		46031	33.10	46031-C1	39.10	46031-C3	39.10	46031-C4	51.30
.031 (1/32)	**.047**	2	3/16	4	***LONG!***	928031	67.20			928031-C3	75.60		
.031 (1/32)	**.060**	4	1/8	1-1/2		929931	52.80			929931-C3	58.80		
.031 (1/32)	**.250**	4	3/8	2-1/2		44031	63.60			44031-C3	77.80		
.032	**.047**	2	1/8	1-1/2		46032	37.40	46032-C1	43.40	46032-C3	43.40		
.035	**.047**	2	1/8	1-1/2		46035	37.40	46035-C1	43.40	46035-C3	43.40		
.039 (1 mm)	**.047**	2	1/8	1-1/2		46039	37.40	46039-C1	43.40	46039-C3	43.40	46039-C4	55.60
.039 (1 mm)	**.250**	4	3/8	2-1/2		44039	63.60			44039-C3	77.80		

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CORNER ROUNDING END MILLS

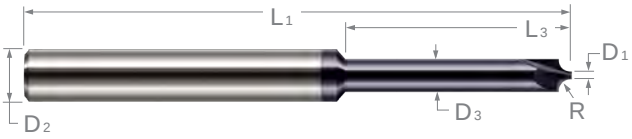
2 & 4 Flute – Unflared (cont.)

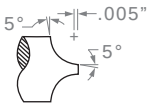
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RADIUS	PILOT DIA.	FLUTES	SHANK DIA.	OAL		UNCOATED		TiN COATED		AlTiN COATED		AMORPHOUS DIAMOND	
R +.0005" −.0005"	D_1		D_2	L_1		TOOL #	PRICE	TOOL #	PRICE	TOOL #	PRICE	TOOL #	PRICE
.043	**.047**	2	3/16	2		46043	44.40	46043-C1	51.60	46043-C3	51.60		
.047 (3/64)	**.047**	2	3/16	2		46047	43.70	46047-C1	50.90	46047-C3	50.90	46047-C4	68.90
.047 (3/64)	**.250**	4	3/8	2-1/2		44047	63.60			44047-C3	77.80		
.050	**.047**	2	3/16	2		46050	43.70	46050-C1	50.90	46050-C3	50.90	46050-C4	68.90
.050	**.250**	4	3/8	2-1/2		44050	63.60			44050-C3	77.80		
.055	**.047**	2	3/16	2		46055	43.70	46055-C1	50.90	46055-C3	50.90		
.060	**.047**	2	3/16	2		46060	45.10	46060-C1	52.30	46060-C3	52.30	46060-C4	70.30
.060	**.250**	4	1/2	3		44060	89.80			44060-C3	109.30		
.062 (1/16)	**.047**	2	3/16	2		46062	44.40	46062-C1	51.60	46062-C3	51.60	46062-C4	69.60
.062 (1/16)	**.047**	2	1/4	4	***LONG!***	928062	80.20			928062-C3	89.80		
.062 (1/16)	**.060**	4	3/16	2		929962	59.40			929962-C3	66.60		
.062 (1/16)	**.110**	2	1/4	2		793462	51.10			793462-C3	60.90		
.062 (1/16)	**.250**	4	1/2	3		44062	89.80			44062-C3	109.30		
.067	**.047**	2	3/16	2		46067	45.10	46067-C1	52.30	46067-C3	52.30		
.072	**.047**	2	1/4	2		46072	51.90	46072-C1	61.40	46072-C3	61.70		
.078 (5/64)	**.047**	2	1/4	2		46078	51.10	46078-C1	60.60	46078-C3	60.90	46078-C4	79.80
.078 (5/64)	**.250**	4	1/2	3		44078	89.80			44078-C3	109.30		
.089	**.047**	2	1/4	2		46089	51.90	46089-C1	61.40	46089-C3	61.70		
.093 (3/32)	**.047**	2	1/4	2		46093	51.90	46093-C1	61.40	46093-C3	61.70	46093-C4	80.60
.093 (3/32)	**.047**	2	5/16	4	***LONG!***	928093	94.00			928093-C3	107.30		
.093 (3/32)	**.060**	4	1/4	2		929993	73.70			929993-C3	83.50		
.093 (3/32)	**.250**	4	1/2	3		44093	101.10			44093-C3	120.60		
.100	**.047**	2	1/4	2		46100	51.10	46100-C1	60.60	46100-C3	60.90	46100-C4	79.80
.104	**.060**	2	5/16	2-1/2		46104	72.10	46104-C1	84.00	46104-C3	84.00		
.109 (7/64)	**.060**	2	5/16	2-1/2		46109	70.90	46109-C1	82.80	46109-C3	82.80		
.118 (3 mm)	**.060**	2	5/16	2-1/2		46118	72.10	46118-C1	84.00	46118-C3	84.00	46118-C4	100.80
.118 (3 mm)	**.250**	4	1/2	3		44118	101.10			44118-C3	120.60		
.125 (1/8)	**.060**	2	5/16	2-1/2		46125	72.10	46125-C1	84.00	46125-C3	84.00	46125-C4	100.80
.125 (1/8)	**.060**	2	3/8	4	***LONG!***	928125	142.90			928125-C3	158.30		
.125 (1/8)	**.110**	2	3/8	3		793508	118.20			793508-C3	130.10		
.125 (1/8)	**.250**	4	5/8	3-1/2		44125	148.20			44125-C3	169.40		
.140 (9/64)	**.060**	2	3/8	2-1/2		46140	82.80	46140-C1	97.00	46140-C3	97.00		
.156 (5/32)	**.060**	2	3/8	2-1/2		46156	89.50	46156-C1	103.70	46156-C3	103.70		
.156 (5/32)	**.250**	4	5/8	3-1/2		44156	159.30			44156-C3	180.50		
.172 (11/64)	**.060**	2	7/16	2-1/2		46172	147.10	46172-C1	164.80	46172-C3	165.10		
.187 (3/16)	**.060**	2	7/16	2-1/2		46187	151.60	46187-C1	169.30	46187-C3	169.60		
.187 (3/16)	**.250**	4	5/8	3-1/2		44187	174.30			44187-C3	195.50		
.197 (5 mm)	**.060**	2	1/2	3		46197	210.40	46197-C1	229.30	46197-C3	229.90		
.219 (7/32)	**.060**	2	1/2	3		46219	202.00	46219-C1	220.90	46219-C3	221.50		
.236 (6 mm)	**.110**	2	5/8	3-1/2		46236	269.70	46236-C1	290.90	46236-C3	290.90		
.250 (1/4)	**.110**	2	5/8	3-1/2		46250	269.70	46250-C1	290.90	46250-C3	290.90		
.250 (1/4)	**.250**	4	3/4	4		44250	282.80			44250-C3	307.30		
.312 (5/16)	**.250**	2	1	4		46312	418.90	46312-C1	454.00	46312-C3	454.00		
.375 (3/8)	**.250**	2	1	4		46375	456.50	46375-C1	491.60	46375-C3	491.60		

CORNER ROUNDING END MILLS

Long Reach – Flared





- **Reduced diameter for clearance along walls and in small features**
- Small pilot design for miniature holes, narrow slots and small inside corners
- Flares are tangent to radius (flare is blended to radius to ensure smooth form)
- Axial depth of cut = radius plus .005" • 2 flutes • Solid carbide
- CNC ground in the USA

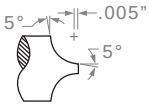
RADIUS	PILOT DIAMETER	NECK DIAMETER	OVERALL REACH	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN COATED	
R +.0005" −.0005"	D1 +.000" −.001"	D3	L3 +.010" −.000"	D2	L1	2 FL	PRICE	2 FL	PRICE
.005	.010	.031	.156	1/8	1-1/2	994605	39.30		
	.010	.031	.250	1/8	1-1/2	56905	39.30		
	.010	.031	.375	1/8	1-1/2	57305	40.50		
	.020	.031	.156	1/8	1-1/2	992205	39.30	992205-C3	44.20
	.020	.031	.250	1/8	1-1/2	55705	39.30	55705-C3	44.20
	.020	.031	.375	1/8	1-1/2	56005	40.50		
	.020	.062	.312	1/8	1-1/2	990905	39.30		
	.020	.062	.500	1/8	1-1/2	57505	39.30		
	.020	.062	.750	1/8	2	55305	40.50		
	.020	.093	.750	1/8	2	57405	45.10		
	.020	.093	1.125	1/8	2	54305	45.10		
.008	.010	.031	.156	1/8	1-1/2	994608	39.30	994608-C3	44.20
	.010	.031	.250	1/8	1-1/2	56908	39.30		
	.010	.031	.375	1/8	1-1/2	57308	40.50		
.010	.010	.031	.156	1/8	1-1/2	994610	39.30	994610-C3	44.20
	.010	.031	.250	1/8	1-1/2	56910	39.30	56910-C3	44.20
	.010	.031	.375	1/8	1-1/2	57310	40.50		
	.020	.062	.312	1/8	1-1/2	990910	39.30	990910-C3	44.20
	.020	.062	.500	1/8	1-1/2	57510	39.30	57510-C3	44.20
	.020	.062	.750	1/8	2	55310	40.50		
	.020	.093	.750	1/8	2	57410	45.10		
	.020	.093	1.125	1/8	2	54310	45.10		
.015	.020	.062	.312	1/8	1-1/2	990915	39.30	990915-C3	44.20
	.020	.062	.500	1/8	1-1/2	57515	39.30	57515-C3	44.20
	.020	.062	.750	1/8	2	55315	40.50		
	.020	.093	.750	1/8	2	57415	45.10		
	.020	.093	1.125	1/8	2	54315	45.10		
.020	.020	.062	.312	1/8	1-1/2	990920	39.30	990920-C3	44.20
	.020	.062	.500	1/8	1-1/2	57520	39.30	57520-C3	44.20
	.020	.062	.750	1/8	2	55320	40.50		
	.020	.093	.750	1/8	2	57420	45.10		
	.020	.093	1.125	1/8	2	54320	45.10		
.025	.020	.093	.750	1/8	2	57425	45.10		
	.020	.093	1.125	1/8	2	54325	45.10		
.030	.020	.093	.750	1/8	2	57430	45.10	57430-C3	50.00
	.020	.093	1.125	1/8	2	54330	45.10		
.031	.020	.093	.750	1/8	2	57431	45.10	57431-C3	50.00
	.020	.093	1.125	1/8	2	54331	45.10		

NEW SIZES!

CORNER ROUNDING END MILLS

3 Flute – Flared



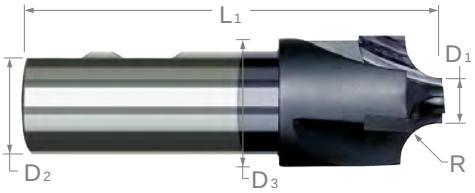


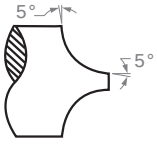
- Single end
- Cutting on radius, flares, and end only (not center cutting)
- 5° flares tangent at pilot and shoulder to avoid steps
- Axial depth of cut ≈ radius plus .005″
- 3 flutes
- Solid carbide
- CNC ground in the USA

	RADIUS	PILOT DIAMETER	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN COATED	
	R +.0005″ −.0005″	D1	D2	L1	3 FL	PRICE	3 FL	PRICE
NEW	.015 (1/64)	.046	1/8	1-1/2	760215	32.40	760215-C3	37.30
	.015 (1/64)	.058	1/8	1-1/2	933415	32.40	933415-C3	37.30
NEW	.020	.046	1/8	1-1/2	760220	32.40	760220-C3	37.30
NEW	.020	.058	1/8	1-1/2	933420	32.40	933420-C3	37.30
NEW	.031 (1/32)	.046	1/8	1-1/2	760231	32.40	760231-C3	37.30
	.031 (1/32)	.058	1/8	1-1/2	933431	32.40	933431-C3	37.30
	.062 (1/16)	.058	3/16	2	933462	41.40	933462-C3	46.70
	.062 (1/16)	.154	5/16	2-1/2	928262	70.90	928262-C3	79.30
	.093 (3/32)	.058	1/4	2	933493	60.90	933493-C3	68.10
	.093 (3/32)	.154	3/8	2-1/2	928293	80.90	928293-C3	90.40
	.125 (1/8)	.058	5/16	2-1/2	933508	70.90	933508-C3	79.30
	.125 (1/8)	.248	5/8	3-1/2	973008	118.50	973008-C3	132.70
	.187 (3/16)	.058	7/16	2-1/2	933512	116.20	933512-C3	128.10
	.187 (3/16)	.248	5/8	3-1/2	973012	134.40	973012-C3	148.60

CORNER ROUNDING END MILLS

3 Flute – Flared – Carbide Tipped



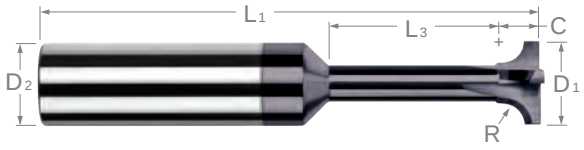


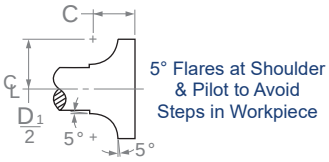
- Carbide tipped - cutting on radius and flares only
- 5° flares tangent to radius at pilot and shoulder to avoid steps
- 3 flutes
- Weldon flat
- CNC ground in the USA

RADIUS	PILOT DIAMETER	HEAD DIAMETER	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN COATED	
R	D1	D3	D2	L1	3 FL	PRICE	3 FL	PRICE
1/4	13/32	1	3/4	3-1/4	45016	217.70	45016-C3	241.10
5/16	13/32	1-1/8	7/8	3-1/2	45020	223.10	45020-C3	241.90
3/8	13/32	1-1/4	7/8	3-3/4	45024	231.00	45024-C3	250.80
7/16	13/32	1-3/8	1	4	45028	258.80	45028-C3	282.20
1/2	13/32	1-1/2	1	4	45032	286.30	45032-C3	309.70
5/8	21/32	2	1-1/4	4-1/4	45040	355.10	45040-C3	384.40

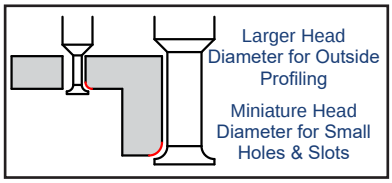
CORNER ROUNDING END MILLS

Back Corner Rounding End Mills – Flared





- Designed to mill radius on backside of workpiece
- 5° flares at neck and shoulder to avoid steps
- Flares are tangent to radius (flare is blended to radius to ensure smooth form)
- Cutting on radius and flares only
- Solid carbide
- CNC ground in the USA



RADIUS	HEAD DIAMETER	NECK DIAMETER	NECK LENGTH	RADIUS CENTER	FLUTES	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN COATED	
R +.0005″ −.0005″	D1 +.000″ −.002″		L3	C +.003″ −.001″ *		D2	L1	TOOL #	PRICE	TOOL #	PRICE
.005	.030	.017	.062	.025	3	1/8	1-1/2	57705	63.50	57705-C3	68.40
.005	.060	.047	.250	.025	3	1/8	1-1/2	58005	63.50	58005-C3	68.40
.005	.115	.102	.875	.025	3	1/8	2	59805	66.10	59805-C3	71.00
.008	.075	.056	.312	.028	3	1/8	1-1/2	58708	63.50	58708-C3	68.40
.008	.187	.144	.500	.070	3	3/16	2	16008	67.40	16008-C3	72.70
.010	.045	.022	.078	.030	3	1/8	1-1/2	60910	63.50	60910-C3	68.40
.010	.075	.052	.281	.030	3	1/8	1-1/2	58710	63.50	58710-C3	68.40
.010	.187	.140	.500	.072	3	3/16	2	16010	67.40	16010-C3	72.70
.012	.075	.048	.250	.032	3	1/8	1-1/2	58712	63.50	58712-C3	68.40
.015 (1/64)	.060	.027	.093	.035	3	1/8	1-1/2	58515	63.50	58515-C3	68.40
.015 (1/64)	.090	.057	.312	.035	3	1/8	1-1/2	59715	63.50	59715-C3	68.40
.015 (1/64)	.187	.130	.500	.077	3	3/16	2	16015	67.40	16015-C3	72.70
.015 (1/64)	.187	.130	1.000	.077	3	3/16	2-1/2	992815	68.40	992815-C3	73.70
.020	.075	.032	.109	.040	3	1/8	1-1/2	59220	63.50	59220-C3	68.40
.020	.115	.072	.375	.040	3	1/8	1-1/2	60420	63.50	60420-C3	68.40
.020	.187	.120	.500	.082	3	3/16	2	16020	67.40	16020-C3	72.70
.022	.187	.116	.500	.084	3	3/16	2	16022	67.40	16022-C3	72.70
.025	.090	.037	.125	.055	3	1/8	1-1/2	60125	63.50	60125-C3	68.40
.025	.187	.110	.500	.087	3	3/16	2	16025	67.40	16025-C3	72.70
.027	.187	.106	.500	.089	3	3/16	2	16027	67.40	16027-C3	72.70
.030	.115	.052	.187	.060	3	1/8	1-1/2	60630	63.50	60630-C3	68.40
.030	.187	.100	.500	.092	3	3/16	2	16030	67.40	16030-C3	72.70
.030	.187	.100	1.000	.092	3	3/16	2-1/2	992830	68.40	992830-C3	73.70
.031 (1/32)	.115	.050	.156	.061	3	1/8	1-1/2	60631	63.50	60631-C3	68.40
.031 (1/32)	.187	.098	.500	.093	3	3/16	2	16031	67.40	16031-C3	72.70
.031 (1/32)	.187	.098	1.000	.093	3	3/16	2-1/2	992831	68.40	992831-C3	73.70
.035	.250	.153	.500	.097	3	1/4	2-1/2	16035	73.30	16035-C3	80.50
.039 (1 mm)	.250	.145	.500	.101	3	1/4	2-1/2	16039	73.30	16039-C3	80.50
.039 (1 mm)	.250	.145	1.000	.101	3	1/4	2-1/2	992839	73.30	992839-C3	80.50
.040	.250	.143	.500	.102	3	1/4	2-1/2	16040	73.30	16040-C3	80.50
.045	.250	.133	.500	.107	3	1/4	2-1/2	16045	73.30	16045-C3	80.50

*Radius center is in the same plane as cutter OD (radial component of radius center = D1/2, see above drawing).

continued on next page

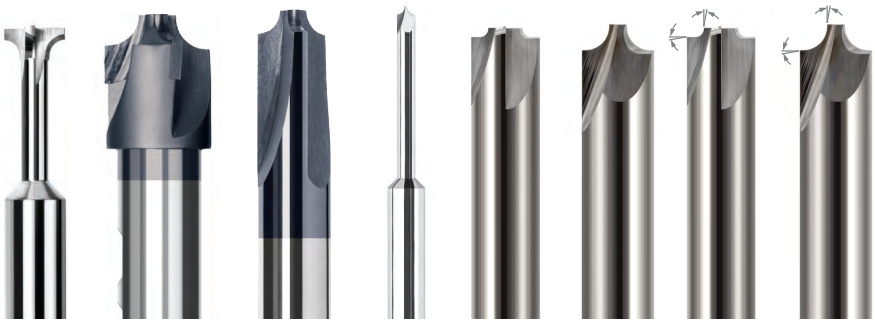
CORNER ROUNDING END MILLS

Back Corner Rounding End Mills – Flared (cont.)

continued from previous page

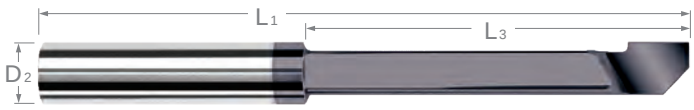
RADIUS	HEAD DIAMETER	NECK DIAMETER	NECK LENGTH	RADIUS CENTER	FLUTES	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN COATED	
R +.0005″ −.0005″	D_1 +.000″ −.002″		L_3	C +.003″ −.001″ *		D_2	L_1	TOOL #	PRICE	TOOL #	PRICE
.047 (3/64)	.250	.128	.625	.109	3	1/4	2-1/2	16047	73.30	16047-C3	80.50
.047 (3/64)	.250	.128	1.250	.109	3	1/4	3	992847	80.10	992847-C3	87.30
.050	.250	.122	.375	.112	3	1/4	2-1/2	985050	73.30	985050-C3	80.50
.050	.250	.122	.625	.112	3	1/4	2-1/2	16050	73.30	16050-C3	80.50
.050	.250	.122	1.250	.112	3	1/4	3	992850	80.10	992850-C3	87.30
.055	.250	.113	.625	.117	3	1/4	2-1/2	16055	73.30	16055-C3	80.50
.060	.312	.164	.437	.122	3	5/16	2-1/2	985060	100.40	985060-C3	108.80
.060	.312	.165	.875	.122	3	5/16	2-1/2	16060	100.40	16060-C3	108.80
.062 (1/16)	.312	.160	.437	.124	3	5/16	2-1/2	985062	100.40	985062-C3	108.80
.062 (1/16)	.312	.161	.875	.124	3	5/16	2-1/2	16062	100.40	16062-C3	108.80
.062 (1/16)	.312	.160	1.250	.124	3	5/16	3	992862	106.10	992862-C3	114.50
.070	.375	.207	.875	.132	3	3/8	2-1/2	16070	115.00	16070-C3	124.50
.078 (5/64)	.375	.191	.500	.171	3	3/8	2-1/2	985078	115.00	985078-C3	124.50
.078 (5/64)	.375	.191	1.000	.171	3	3/8	2-1/2	16078	115.00	16078-C3	124.50
.078 (5/64)	.375	.191	1.500	.171	3	3/8	3	992878	123.60	992878-C3	133.10
.080	.375	.187	1.000	.173	3	3/8	2-1/2	16080	115.00	16080-C3	124.50
.090	.375	.167	1.000	.183	3	3/8	2-1/2	16090	115.00	16090-C3	124.50
.093 (3/32)	.375	.161	.500	.186	3	3/8	2-1/2	985093	115.00	985093-C3	124.50
.093 (3/32)	.375	.161	1.000	.186	3	3/8	2-1/2	16093	115.00	16093-C3	124.50
.093 (3/32)	.375	.161	1.500	.186	3	3/8	3	992893	123.60	992893-C3	133.10
.100	.500	.272	.500	.193	4	1/2	3	985100	165.70	985100-C3	179.90
.100	.500	.272	1.000	.193	4	1/2	3	16100	165.70	16100-C3	179.90
.118 (3 mm)	.500	.236	1.000	.211	4	1/2	3	1613M	165.70	1613M-C3	179.90
.125 (1/8)	.500	.222	.500	.218	4	1/2	3	985108	165.70	985108-C3	179.90
.125 (1/8)	.500	.222	1.000	.218	4	1/2	3	16108	165.70	16108-C3	179.90
.125 (1/8)	.500	.222	1.500	.218	4	1/2	3-1/2	992908	172.00	992908-C3	186.20
.156 (5/32)	.625	.284	1.000	.250	4	5/8	3-1/2	16110	224.50	16110-C3	238.70
.187 (3/16)	.625	.222	1.000	.281	4	5/8	3-1/2	16112	224.50	16112-C3	238.70
.250 (1/4)	1.000	.471	1.500	.376	4	1	4	16116	337.10	16116-C3	360.50

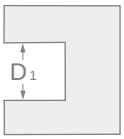
*Radius center is in the same plane as cutter OD (radial component of radius center = D1/2, see above drawing).



Check Out All of Our Corner Rounding Solutions!

BORING BARS





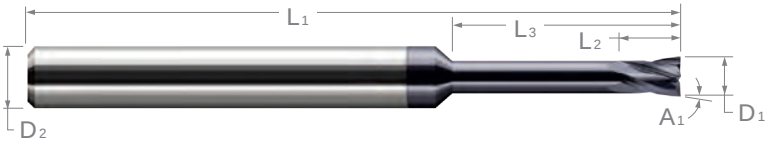
- Helical back rake flute improves accuracy and chip flow
- Square neck improves rigidity and has less deflection
- Tip is ground to sharp corner
- 70% stronger than round neck design
- Solid carbide
- CNC ground in the USA

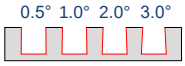
Helical Back Rake Design!

MIN. BORE DIAMETER	MAX BORE DEPTH	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN COATED	
D_1	L_3	D_2	L_1	TOOL #	PRICE	TOOL #	PRICE
.031	**5/32**	1/8	1-1/2	29030	34.80	29030-C3	39.70
.036	**5/32**	1/8	1-1/2	29035	34.80		
.042	**1/4**	1/8	1-1/2	29040	31.80	29040-C3	36.70
.052	**5/16**	1/8	1-1/2	29050	30.80	29050-C3	35.70
.057	**5/16**	1/8	1-1/2	29055	30.80		
.062	**3/8**	1/8	1-1/2	29060	30.80	29060-C3	35.70
.062	**1/2**	1/8	1-1/2	29060L	32.50	29060L-C3	37.40
.072	**7/16**	1/8	1-1/2	29070	30.80	29070-C3	35.70
.082	**1/2**	1/8	1-1/2	29080	30.80		
.087	**1/2**	1/8	1-1/2	29085	30.80		
.087	**5/8**	1/8	2	29085L	36.30		
.092	**1/2**	1/8	1-1/2	29090	30.80	29090-C3	35.70
.092	**5/8**	1/8	2	29090L	36.30	29090L-C3	41.20
.102	**9/16**	1/8	1-1/2	29100	30.80	29100-C3	35.70
.102	**5/8**	1/8	2	29100L	36.30	29100L-C3	41.20
.112	**9/16**	1/8	1-1/2	29110	30.80	29110-C3	35.70
.112	**5/8**	1/8	2	29110L	36.30	29110L-C3	41.20
.120	**5/8**	1/8	1-1/2	29120	30.80	29120-C3	35.70
.120	**3/4**	1/8	2	29120L	36.30	29120L-C3	41.20
.135	**3/4**	5/32	2	29135	34.50	29135-C3	39.80
.150	**3/4**	3/16	2	29150	35.40	29150-C3	40.70
.150	**1**	3/16	2	29150L	42.30	29150L-C3	47.60
.150	**1-1/2**	3/16	2-1/2	29150XL	45.10	29150XL-C3	50.40
.180	**1**	3/16	2	29180	35.40	29180-C3	40.70
.180	**1-1/2**	3/16	2-1/2	29180L	42.90	29180L-C3	48.20
.180	**2**	3/16	3	29180XL	56.00	29180XL-C3	61.30
.210	**1**	1/4	2	29210	36.90	29210-C3	44.10
.210	**1-1/2**	1/4	2-1/2	29210L	43.50	29210L-C3	50.70
.210	**2**	1/4	3	29210XL	53.50	29210XL-C3	60.70
.240	**1**	1/4	2	29240	36.90	29240-C3	44.10
.240	**1-1/2**	1/4	2-1/2	29240L	43.50	29240L-C3	50.70
.240	**2**	1/4	3	29240XL	64.20	29240XL-C3	71.40
.300	**1**	5/16	2-1/2	29300	89.30	29300-C3	97.70
.360	**2**	3/8	3	29360	117.20	29360-C3	126.70

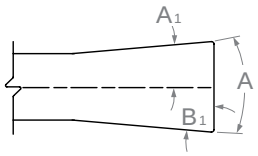
BACKDRAFT CUTTERS

Square





- Designed to clean up bottom corner of pockets while backdraft angle minimizes rubbing
- 4 helical flutes (20° helix)
- Center cutting
- Solid carbide
- CNC ground in the USA



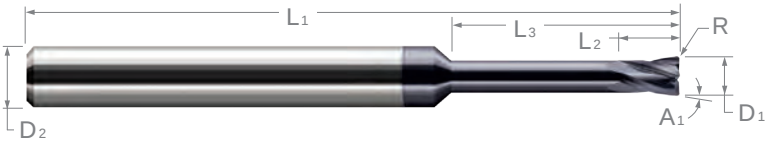
A = 180 - 2B1
B1 = 90 - (A/2)
B1= 90 - A1
A1= 90 - B1
A1= A/2
A= 2A1

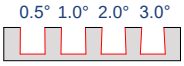
ANGLES PER SIDE	CUTTER DIA.	LOC	NECK DIA.	OVERALL REACH	SHANK DIA.	OAL	UNCOATED		AlTiN COATED	
A_1 $^{+0°15'}_{-0°15'}$	D_1 $^{+.0005''}_{-.0005''}$	L_2 $^{+.010''}_{-.000''}$		L_3 $^{+.010''}_{-.000''}$	D_2 (h6)	L_1	4 FL	PRICE	4 FL	PRICE
0.5°	**.062**	.093	.058	.312 (5x)	1/8	2-1/2	781362	51.00	781362-C3	55.90
	.093	.139	.088	.500 (5x)	1/8	2-1/2	781393	51.00	781393-C3	55.90
1°	**.062**	.093	.056	.312 (5x)	1/8	2-1/2	780762	51.00	780762-C3	55.90
	.093	.139	.086	.500 (5x)	1/8	2-1/2	780793	51.00	780793-C3	55.90
2°	**.062**	.093	.053	.312 (5x)	1/8	2-1/2	780162	51.00	780162-C3	55.90
	.093	.139	.081	.500 (5x)	1/8	2-1/2	780193	51.00	780193-C3	55.90
3°	**.062**	.093	.049	.312 (5x)	1/8	2-1/2	779562	51.00	779562-C3	55.90
	.093	.139	.075	.500 (5x)	1/8	2-1/2	779593	51.00	779593-C3	55.90

A_1 $^{+0°15'}_{-0°15'}$	D_1 $^{+.000''}_{-.002''}$	L_2 $^{+.030''}_{-.000''}$		L_3 $^{+.030''}_{-.000''}$	D_2 (h6)	L_1	4 FL	PRICE	4 FL	PRICE
0.5°	**.125**	.187	.117	.625 (5x)	1/8	2-1/2	781408	51.00	781408-C3	55.90
	.187	.285	.177	1.000 (5x)	3/16	2-1/2	781412	55.10	781412-C3	60.40
	.250	.375	.238	1.250 (5x)	1/4	2-1/2	781416	61.90	781416-C3	69.10
1°	**.125**	.187	.113	.625 (5x)	1/8	2-1/2	780808	51.00	780808-C3	55.90
	.187	.285	.172	1.000 (5x)	3/16	2-1/2	780812	55.10	780812-C3	60.40
	.250	.375	.231	1.250 (5x)	1/4	2-1/2	780816	61.90	780816-C3	69.10
2°	**.125**	.187	.105	.625 (5x)	1/8	2-1/2	780208	51.00	780208-C3	55.90
	.187	.285	.160	1.000 (5x)	3/16	2-1/2	780212	55.10	780212-C3	60.40
	.250	.375	.217	1.250 (5x)	1/4	2-1/2	780216	61.90	780216-C3	69.10
3°	**.125**	.187	.098	.625 (5x)	1/8	2-1/2	779608	51.00	779608-C3	55.90
	.187	.285	.149	1.000 (5x)	3/16	2-1/2	779612	55.10	779612-C3	60.40
	.250	.375	.203	1.250 (5x)	1/4	2-1/2	779616	61.90	779616-C3	69.10

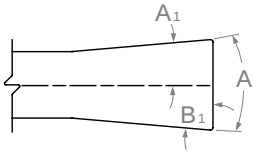
BACKDRAFT CUTTERS

Corner Radius





- Designed to clean up bottom corner of pockets while backdraft angle minimizes rubbing
- Corner radius for improved strength and wear resistance
- 4 helical flutes (20° helix)
- Center cutting
- Solid carbide
- CNC ground in the USA

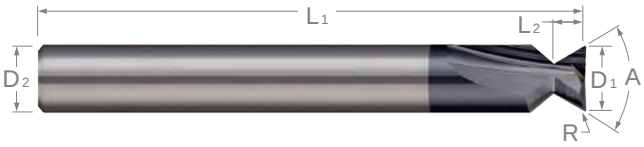


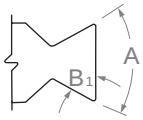
A = 180 - 2B1
B1 = 90 - (A/2)
B1= 90 - A1
A1= 90 - B1
A1= A/2
A= 2A1

ANGLES PER SIDE	CUTTER DIA.	CORNER RADIUS	LOC	NECK DIA.	OVERALL REACH	SHANK DIA.	OAL	UNCOATED		AlTiN COATED	
A_1 $^{+0°15'}_{-0°15'}$	D_1 $^{+.0005''}_{-.0005''}$	R $^{+001''}_{-001''}$	L_2 $^{+.010''}_{-.000''}$		L_3 $^{+.010''}_{-.000''}$	D_2 (h6)	L_1	4 FL	PRICE	4 FL	PRICE
0.5°	**.062**	.005	.093	.058	.312 (5x)	1/8	2-1/2	780962	52.20	780962-C3	57.10
	.093	.005	.139	.088	.500 (5x)	1/8	2-1/2	780993	51.50	780993-C3	56.40
1°	**.062**	.005	.093	.056	.312 (5x)	1/8	2-1/2	780362	52.20	780362-C3	57.10
	.093	.005	.139	.086	.500 (5x)	1/8	2-1/2	780393	52.20	780393-C3	57.10
2°	**.062**	.005	.093	.053	.312 (5x)	1/8	2-1/2	779762	52.20	779762-C3	57.10
	.093	.005	.139	.081	.500 (5x)	1/8	2-1/2	779793	52.20	779793-C3	57.10
3°	**.062**	.005	.093	.049	.312 (5x)	1/8	2-1/2	779162	52.20	779162-C3	57.10
	.093	.005	.139	.075	.500 (5x)	1/8	2-1/2	779193	52.20	779193-C3	57.10

A_1 $^{+0°15'}_{-0°15'}$	D_1 $^{+.000''}_{-.002''}$	R $^{+001''}_{-001''}$	L_2 $^{+.030''}_{-.000''}$		L_3 $^{+.030''}_{-.000''}$	D_2 (h6)	L_1	4 FL	PRICE	4 FL	PRICE
0.5°	**.125**	.010	.187	.117	.625 (5x)	1/8	2-1/2	781208	52.20	781208-C3	57.10
	.187	.010	.285	.177	1.000 (5x)	3/16	2-1/2	781212	56.40	781212-C3	61.70
	.250	.010	.375	.238	1.250 (5x)	1/4	2-1/2	781216	63.50	781216-C3	70.70
1°	**.125**	.010	.187	.113	.625 (5x)	1/8	2-1/2	780608	52.20	780608-C3	57.10
	.187	.010	.285	.172	1.000 (5x)	3/16	2-1/2	780612	56.40	780612-C3	61.70
	.250	.010	.375	.231	1.250 (5x)	1/4	2-1/2	780616	63.50	780616-C3	70.70
2°	**.125**	.010	.187	.105	.625 (5x)	1/8	2-1/2	780008	52.20	780008-C3	57.10
	.187	.010	.285	.160	1.000 (5x)	3/16	2-1/2	780012	56.40	780012-C3	61.70
	.250	.010	.375	.217	1.250 (5x)	1/4	2-1/2	780016	63.50	780016-C3	70.70
3°	**.125**	.010	.187	.098	.625 (5x)	1/8	2-1/2	779408	52.20	779408-C3	57.10
	.187	.010	.285	.149	1.000 (5x)	3/16	2-1/2	779412	56.40	779412-C3	61.70
	.250	.010	.375	.203	1.250 (5x)	1/4	2-1/2	779416	63.50	779416-C3	70.70

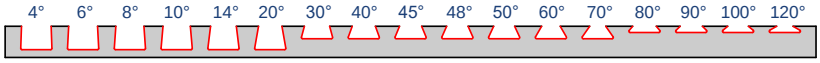
DOVETAIL CUTTERS





$B_1 = 90 - (A / 2)$
$A = 180 - 2B_1$

- Offered with sharp corner, .003", .005", or .010" Corner Radius
- Solid carbide
- CNC ground in the USA



Stocked in *Seventeen* Included Angles!

INCLUDED ANGLE	CUTTER DIA.*	LENGTH OF CUT	NECK DIA.	CORNER RADIUS	FLUTES	SHANK DIA.	OVERALL LENGTH	UNCOATED		AlTiN COATED	
A $^{+1°}_{-1°}$	D_1 $^{+.000″}_{-.002″}$	L_2 $^{+.020″}_{-.000″}$		R		D_2	L_1	TOOL #	PRICE	TOOL #	PRICE
4°	1/16	.125	.054	.005	2	1/8	1-1/2	930004	95.80	930004-C3	100.70
	3/32	.187	.081	.010	2	1/8	1-1/2	991406	92.90	991406-C3	97.80
	1/8	.250	.108	***SHARP!***	2	1/8	1-1/2	883608	95.80	883608-C3	100.70
	1/8	.250	.108	.010	2	1/8	1-1/2	991408	97.40	991408-C3	102.30
	3/16	.375	.161	***SHARP!***	2	3/16	2	883612	98.60	883612-C3	103.90
	3/16	.375	.162	.010	2	3/16	2	991412	100.20	991412-C3	105.50
	1/4	.500	.215	***SHARP!***	2	1/4	2	883616	123.40	883616-C3	130.60
	1/4	.500	.216	.010	2	1/4	2	991416	125.60	991416-C3	132.80
	3/8	.750	.323	***SHARP!***	3	3/8	2-1/2	883624	142.90	883624-C3	152.40
	3/8	.750	.323	.010	3	3/8	2-1/2	991424	145.10	991424-C3	154.60
	1/2	1.000	.431	.010	3	1/2	3	991432	196.70	991432-C3	210.90
6°	1/16	.125	.049	.005	2	1/8	1-1/2	932304	95.80	932304-C3	100.70
	3/32	.187	.074	.010	2	1/8	1-1/2	989206	92.90	989206-C3	97.80
	1/8	.250	.099	***SHARP!***	2	1/8	1-1/2	891208	94.20	891208-C3	99.10
	1/8	.250	.100	.010	2	1/8	1-1/2	989208	95.80	989208-C3	100.70
	3/16	.375	.148	***SHARP!***	2	3/16	2	891212	96.80	891212-C3	102.10
	3/16	.375	.149	.010	2	3/16	2	989212	98.40	989212-C3	103.70
	1/4	.500	.198	***SHARP!***	2	1/4	2	891216	122.20	891216-C3	129.40
	1/4	.500	.199	.010	2	1/4	2	989216	124.20	989216-C3	131.40
	3/8	.750	.296	***SHARP!***	3	3/8	2-1/2	891224	141.00	891224-C3	150.50
	3/8	.750	.297	.010	3	3/8	2-1/2	989224	143.30	989224-C3	152.80
	1/2	1.000	.396	.010	3	1/2	3	989232	194.10	989232-C3	208.30
8°	1/8	.218	.096	.010	2	1/8	1-1/2	984808	92.90	984808-C3	97.80
	3/16	.281	.150	.010	2	3/16	2	984812	95.70	984812-C3	101.00
	1/4	.375	.199	.010	2	1/4	2	984816	121.40	984816-C3	128.60
10°	1/32	.047	.023	***SHARP!***	2	1/8	1-1/2	990102	89.80	990102-C3	94.70
	1/16	.093	.046	***SHARP!***	2	1/8	1-1/2	990104	89.80	990104-C3	94.70
	1/16	.093	.047	.005	2	1/8	1-1/2	61504	91.50	61504-C3	96.40
	5/64	.109	.060	.005	2	1/8	1-1/2	61505	91.50	61505-C3	96.40
	3/32	.125	.071	***SHARP!***	2	1/8	1-1/2	990106	86.90	990106-C3	91.80
	3/32	.125	.073	.010	2	1/8	1-1/2	27006	88.50	27006-C3	93.40

*Diameter measured over radii (not to theoretical sharp corner).

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DOVETAIL CUTTERS

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INCLUDED ANGLE	CUTTER DIA.*	LENGTH OF CUT	NECK DIA.	CORNER RADIUS	FLUTES	SHANK DIA.	OVERALL LENGTH	UNCOATED		AlTiN COATED	
A $^{+1°}_{-1°}$	D_1 $^{+.000″}_{-.002″}$	L_2 $^{+.020″}_{-.000″}$		R		D_2	L_1	TOOL #	PRICE	TOOL #	PRICE
10°	1/8	.187	.092	SHARP!	2	1/8	1-1/2	990108	86.90	990108-C3	91.80
	1/8	.187	.094	.010	2	1/8	1-1/2	27008	88.50	27008-C3	93.40
	3/16	.250	.144	SHARP!	2	3/16	2	990112	89.50	990112-C3	94.80
	3/16	.250	.146	.010	2	3/16	2	27012	91.30	27012-C3	96.60
	1/4	.312	.195	SHARP!	2	1/4	2	990116	113.60	990116-C3	120.80
	1/4	.312	.197	.010	2	1/4	2	27016	115.90	27016-C3	123.10
	5/16	.375	.247	SHARP!	3	5/16	2-1/2	990120	120.20	990120-C3	128.60
	5/16	.375	.249	.010	3	5/16	2-1/2	27020	122.20	27020-C3	130.60
	3/8	.500	.288	SHARP!	3	3/8	2-1/2	990124	129.30	990124-C3	138.80
	3/8	.500	.289	.010	3	3/8	2-1/2	27024	131.60	27024-C3	141.10
	1/2	.625	.391	SHARP!	3	1/2	3	990132	179.30	990132-C3	193.50
	1/2	.625	.392	.010	3	1/2	3	27032	182.30	27032-C3	196.50
14°	1/16	.093	.040	.005	2	1/8	1-1/2	873404	91.50	873404-C3	96.40
	3/32	.125	.065	.010	2	1/8	1-1/2	979406	88.50	979406-C3	93.40
	1/8	.187	.082	.010	2	1/8	1-1/2	979408	88.50	979408-C3	93.40
	3/16	.250	.129	.010	2	3/16	2	979412	91.30	979412-C3	96.60
	1/4	.312	.176	.010	2	1/4	2	979416	115.90	979416-C3	123.10
	5/16	.375	.223	.010	3	5/16	2-1/2	979420	122.20	979420-C3	130.60
	3/8	.500	.255	.010	3	3/8	2-1/2	979424	131.60	979424-C3	141.10
	1/2	.625	.349	.010	3	1/2	3	979432	182.30	979432-C3	196.50
20°	1/32	.031	.020	SHARP!	2	1/8	1-1/2	986002	75.70	986002-C3	80.60
	1/16	.062	.040	SHARP!	2	1/8	1-1/2	986004	75.70	986004-C3	80.60
	1/16	.062	.042	.005	2	1/8	1-1/2	62304	77.20	62304-C3	82.10
	5/64	.078	.052	.005	2	1/8	1-1/2	62305	77.20	62305-C3	82.10
	3/32	.093	.060	SHARP!	2	1/8	1-1/2	986006	72.50	986006-C3	77.40
	3/32	.093	.064	.010	2	1/8	1-1/2	16406	74.20	16406-C3	79.10
	1/8	.125	.081	SHARP!	2	1/8	1-1/2	986008	72.80	986008-C3	77.70
	1/8	.125	.085	.010	2	1/8	1-1/2	16408	74.20	16408-C3	79.10
	3/16	.187	.122	SHARP!	2	3/16	2	986012	75.60	986012-C3	80.90
	3/16	.187	.125	.010	2	3/16	2	16412	76.80	16412-C3	82.10
	1/4	.250	.162	SHARP!	2	1/4	2	986016	95.20	986016-C3	102.40
	1/4	.250	.163	.005	2	1/4	2	62316	97.00	62316-C3	104.20
	1/4	.250	.166	.010	2	1/4	2	16416	97.00	16416-C3	104.20
	5/16	.312	.202	SHARP!	3	5/16	2-1/2	986020	104.10	986020-C3	112.50
	5/16	.312	.206	.010	3	5/16	2-1/2	16420	106.10	16420-C3	114.50
	3/8	.375	.243	SHARP!	3	3/8	2-1/2	986024	109.70	986024-C3	119.20
	3/8	.375	.247	.010	3	3/8	2-1/2	16424	111.50	16424-C3	121.00
	1/2	.500	.324	SHARP!	3	1/2	3	986032	150.80	986032-C3	165.00
	1/2	.500	.328	.010	3	1/2	3	16432	153.70	16432-C3	167.90
	5/8	.625	.409	.010	4	5/8	3	16440	176.00	16440-C3	190.20
	3/4	.750	.489	.010	4	3/4	3	16448	185.80	16448-C3	201.20

*Diameter measured over radii (not to theoretical sharp corner).

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DOVETAIL CUTTERS

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INCLUDED ANGLE	CUTTER DIA.*	LENGTH OF CUT	NECK DIA.	CORNER RADIUS	FLUTES	SHANK DIA.	OVERALL LENGTH	UNCOATED		AlTiN COATED	
A +1° −1°	D_1 +.000″ −.002″	L_2 +.020″ −.000″		R		D_2	L_1	TOOL #	PRICE	TOOL #	PRICE
30°	1/32	.020	.020	SHARP!	2	1/8	1-1/2	983302	75.70	983302-C3	80.60
	1/16	.040	.041	SHARP!	2	1/8	1-1/2	983304	75.70	983304-C3	80.60
	1/16	.045	.041	.005	2	1/8	1-1/2	63404	77.20	63404-C3	82.10
	5/64	.055	.052	.005	2	1/8	1-1/2	63405	77.20	63405-C3	82.10
	3/32	.062	.060	SHARP!	2	1/8	1-1/2	983306	72.50	983306-C3	77.40
	3/32	.078	.057	.010	2	1/8	1-1/2	16506	74.20	16506-C3	79.10
	1/8	.082	.081	SHARP!	2	1/8	1-1/2	983308	72.80	983308-C3	77.70
	1/8	.093	.081	.010	2	1/8	1-1/2	16508	74.20	16508-C3	79.10
	3/16	.125	.121	SHARP!	2	3/16	2	983312	73.90	983312-C3	79.20
	3/16	.125	.127	.010	2	3/16	2	16512	75.30	16512-C3	80.60
	1/4	.156	.166	SHARP!	2	1/4	2	983316	93.60	983316-C3	100.80
	1/4	.156	.172	.010	2	1/4	2	16516	95.20	16516-C3	102.40
	5/16	.218	.196	SHARP!	3	5/16	2-1/2	983320	102.20	983320-C3	110.60
	5/16	.187	.218	.010	3	5/16	2-1/2	16520	104.20	16520-C3	112.60
	3/8	.250	.241	SHARP!	3	3/8	2-1/2	983324	107.60	983324-C3	117.10
	3/8	.250	.243	.005	3	3/8	2-1/2	63424	109.70	63424-C3	119.20
	3/8	.250	.247	.010	3	3/8	2-1/2	16524	109.70	16524-C3	119.20
	1/2	.312	.333	SHARP!	3	1/2	3	983332	148.20	983332-C3	162.40
	1/2	.312	.339	.010	3	1/2	3	16532	150.80	16532-C3	165.00
	5/8	.375	.430	.010	4	5/8	3	16540	173.20	16540-C3	187.40
	3/4	.500	.488	.010	4	3/4	3	16548	183.20	16548-C3	198.60
40°	1/16	.035	.037	SHARP!	2	1/8	1-1/2	977804	75.70	977804-C3	80.60
	1/16	.040	.037	.005	2	1/8	1-1/2	64604	77.20	64604-C3	82.10
	5/64	.050	.046	.005	2	1/8	1-1/2	64605	77.20	64605-C3	82.10
	3/32	.062	.056	.010	2	1/8	1-1/2	28506	74.20	28506-C3	79.10
	1/8	.078	.068	SHARP!	2	1/8	1-1/2	977808	72.80	977808-C3	77.70
	1/8	.093	.066	.010	2	1/8	1-1/2	28508	74.20	28508-C3	79.10
	3/16	.109	.108	SHARP!	2	3/16	2	977812	75.60	977812-C3	80.90
	3/16	.125	.105	.010	2	3/16	2	28512	76.80	28512-C3	82.10
	1/4	.156	.136	SHARP!	2	1/4	2	977816	95.20	977816-C3	102.40
	1/4	.156	.145	.010	2	1/4	2	28516	97.00	28516-C3	104.20
	5/16	.187	.176	SHARP!	3	5/16	2-1/2	977820	104.10	977820-C3	112.50
	5/16	.187	.185	.010	3	5/16	2-1/2	28520	106.10	28520-C3	114.50
	3/8	.218	.216	SHARP!	3	3/8	2-1/2	977824	109.70	977824-C3	119.20
	3/8	.250	.202	.010	3	3/8	2-1/2	28524	111.50	28524-C3	121.00
	1/2	.312	.273	SHARP!	3	1/2	3	977832	150.80	977832-C3	165.00
	1/2	.312	.281	.010	3	1/2	3	28532	153.70	28532-C3	167.90
	5/8	.375	.361	.010	4	5/8	3	28540	176.00	28540-C3	190.20
	3/4	.500	.395	.010	4	3/4	3	28548	185.80	28548-C3	201.20
45°	1/8	.093	.058	.010	2	1/8	1-1/2	928408	80.70	928408-C3	85.60
	3/16	.125	.094	.010	2	3/16	2	928412	83.40	928412-C3	88.70
	1/4	.156	.121	SHARP!	2	1/4	2	874516	102.50	874516-C3	109.70
	1/4	.156	.131	.010	2	1/4	2	928416	104.10	928416-C3	111.30
	3/8	.250	.168	SHARP!	3	3/8	2-1/2	874524	118.60	874524-C3	128.10
	3/8	.250	.178	.010	3	3/8	2-1/2	928424	120.20	928424-C3	129.70
	1/2	.312	.242	SHARP!	3	1/2	3	874532	162.60	874532-C3	176.80
	1/2	.312	.251	.010	3	1/2	3	928432	165.20	928432-C3	179.40

*Diameter measured over radii (not to theoretical sharp corner).

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DOVETAIL CUTTERS

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INCLUDED ANGLE	CUTTER DIA.*	LENGTH OF CUT	NECK DIA.	CORNER RADIUS	FLUTES	SHANK DIA.	OVERALL LENGTH	UNCOATED		AlTiN COATED	
A $^{+1°}_{-1°}$	D_1 $^{+.000″}_{-.002″}$	L_2 $^{+.020″}_{-.000″}$		R		D_2	L_1	TOOL #	PRICE	TOOL #	PRICE
48°	1/16	.035	.036	.005	2	1/8	1-1/2	896504	75.30	896504-C3	80.20
	5/64	.045	.043	.005	2	1/8	1-1/2	896505	75.30	896505-C3	80.20
	3/32	.050	.059	.010	2	1/8	1-1/2	16606	71.70	16606-C3	76.60
	1/8	.070	.063	SHARP!	2	1/8	1-1/2	973108	70.10	973108-C3	75.00
	1/8	.093	.053	.010	2	1/8	1-1/2	16608	71.70	16608-C3	76.60
	3/16	.109	.090	SHARP!	2	3/16	2	973112	73.70	973112-C3	79.00
	3/16	.125	.087	.010	2	3/16	2	16612	75.10	16612-C3	80.40
	1/4	.156	.111	SHARP!	2	1/4	2	973116	92.70	973116-C3	99.90
	1/4	.156	.122	.010	2	1/4	2	16616	94.50	16616-C3	101.70
	5/16	.187	.157	.010	3	5/16	2-1/2	16620	103.70	16620-C3	112.10
48°	3/8	.250	.152	SHARP!	3	3/8	2-1/2	973124	107.10	973124-C3	116.60
	3/8	.250	.163	.010	3	3/8	2-1/2	16624	108.90	16624-C3	118.40
	1/2	.312	.222	SHARP!	3	1/2	3	973132	147.60	973132-C3	161.80
	1/2	.312	.233	.010	3	1/2	3	16632	150.10	16632-C3	164.30
50°	1/8	.093	.050	.010	2	1/8	1-1/2	926208	73.30	926208-C3	78.20
	3/16	.125	.082	.010	2	3/16	2	926212	77.00	926212-C3	82.30
	1/4	.156	.116	.010	2	1/4	2	926216	99.80	926216-C3	107.00
	3/8	.250	.153	.010	3	3/8	2-1/2	926224	114.20	926224-C3	123.70
	1/2	.312	.220	.010	3	1/2	3	926232	158.60	926232-C3	172.80
60°	1/32	.014	.015	SHARP!	2	1/8	1-1/2	995202	72.30	995202-C3	77.20
	1/16	.028	.030	SHARP!	2	1/8	1-1/2	995204	73.90	995204-C3	78.80
	1/16	.032	.028	.003	2	1/8	1-1/2	811404	75.30	811404-C3	80.20
	1/16	.032	.032	.005	2	1/8	1-1/2	65104	75.30	65104-C3	80.20
	5/64	.035	.038	SHARP!	2	1/8	1-1/2	995205	73.90	995205-C3	78.80
	5/64	.040	.039	.005	2	1/8	1-1/2	65105	75.30	65105-C3	80.20
	3/32	.040	.047	SHARP!	2	1/8	1-1/2	995206	70.10	995206-C3	75.00
	3/32	.045	.056	.010	2	1/8	1-1/2	16706	71.70	16706-C3	76.60
	1/8	.056	.060	SHARP!	2	1/8	1-1/2	995208	70.10	995208-C3	75.00
	1/8	.062	.056	.003	2	1/8	1-1/2	811408	71.70	811408-C3	76.60
	1/8	.062	.061	.005	2	1/8	1-1/2	65108	71.70	65108-C3	75.50
	1/8	.062	.068	.010	2	1/8	1-1/2	16708	71.70	16708-C3	76.60
	5/32	.070	.075	SHARP!	2	3/16	2	995210	73.70	995210-C3	79.00
	5/32	.078	.081	.010	2	3/16	2	16710	75.10	16710-C3	80.40
	3/16	.085	.089	SHARP!	2	3/16	2	995212	73.70	995212-C3	79.00
	3/16	.093	.083	.003	2	3/16	2	811412	75.10	811412-C3	80.40
	3/16	.093	.087	.005	2	3/16	2	65112	75.10	65112-C3	80.40
	3/16	.093	.095	.010	2	3/16	2	16712	75.10	16712-C3	80.40
	3/16	.109	.104	.030	2	3/16	2	845112	75.10	845112-C3	80.40
	1/4	.118	.114	SHARP!	2	1/4	2	995216	91.10	995216-C3	98.30
	1/4	.125	.109	.003	2	1/4	2	811416	92.70	811416-C3	99.90
	1/4	.125	.113	.005	2	1/4	2	65116	92.70	65116-C3	98.70
	1/4	.125	.120	.010	2	1/4	2	16716	92.70	16716-C3	99.90
	1/4	.140	.131	.030	2	1/4	2	845116	92.70	845116-C3	99.90
	5/16	.141	.150	SHARP!	3	5/16	2-1/2	995220	99.80	995220-C3	108.20
	5/16	.156	.138	.005	3	5/16	2-1/2	65120	101.60	65120-C3	110.00
	5/16	.156	.147	.010	3	5/16	2-1/2	16720	101.60	16720-C3	110.00

*Diameter measured over radii (not to theoretical sharp corner).

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DOVETAIL CUTTERS

(cont.)

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INCLUDED ANGLE	CUTTER DIA.*	LENGTH OF CUT	NECK DIA.	CORNER RADIUS	FLUTES	SHANK DIA.	OVERALL LENGTH	UNCOATED		AlTiN COATED	
A $^{+1°}_{-1°}$	D_1 $^{+.000″}_{-.002″}$	L_2 $^{+.020″}_{-.000″}$		R		D_2	L_1	TOOL #	PRICE	TOOL #	PRICE
60°	3/8	.156	.195	SHARP!	3	3/8	2-1/2	995224	104.20	995224-C3	113.70
	3/8	.187	.166	.005	3	3/8	2-1/2	65124	106.40	65124-C3	114.50
	3/8	.187	.174	.010	3	3/8	2-1/2	16724	106.40	16724-C3	115.90
	7/16	.187	.222	SHARP!	3	7/16	2-3/4	995228	112.60	995228-C3	124.50
	7/16	.218	.200	.010	3	7/16	2-3/4	16728	115.30	16728-C3	127.20
	1/2	.218	.248	SHARP!	3	1/2	3	995232	144.90	995232-C3	159.10
	1/2	.250	.219	.005	3	1/2	3	65132	147.60	65132-C3	159.60
	1/2	.250	.226	.010	3	1/2	3	16732	147.60	16732-C3	161.80
	1/2	.250	.255	.030	3	1/2	3	845132	145.40	845132-C3	157.40
	5/8	.281	.301	SHARP!	4	5/8	3	995240	216.50	995240-C3	230.70
	5/8	.312	.279	.010	4	5/8	3	16740	219.20	16740-C3	233.40
	3/4	.343	.354	SHARP!	4	3/4	3	995248	260.10	995248-C3	275.50
	3/4	.375	.332	.010	4	3/4	3	16748	262.80	16748-C3	278.20
	1	.500	.437	.010	4	1	4	16764	466.00	16764-C3	489.40
70°	1/4	.109	.116	.010	2	1/4	2	832316	99.80	832316-C3	107.00
	1/2	.218	.213	.010	3	1/2	3	832332	158.60	832332-C3	172.80
80°	1/4	.093	.117	.010	2	1/4	2	827916	99.80	827916-C3	107.00
	1/2	.187	.209	.010	3	1/2	3	827932	158.60	827932-C3	172.80
90°	1/32	.008	.015	SHARP!	2	1/8	1-1/2	992002	73.90	992002-C3	78.80
	1/16	.023	.030	.005	2	1/8	1-1/2	66304	75.30	66304-C3	80.20
	5/64	.027	.038	.005	2	1/8	1-1/2	66305	75.30	66305-C3	80.20
	3/32	.025	.043	SHARP!	2	1/8	1-1/2	992006	70.10	992006-C3	75.00
	3/32	.031	.059	.010	2	1/8	1-1/2	16806	71.70	16806-C3	76.60
	1/8	.034	.057	SHARP!	2	1/8	1-1/2	992008	69.00	992008-C3	73.90
	1/8	.040	.059	.005	2	1/8	1-1/2	66308	70.50	66308-C3	74.40
	1/8	.040	.073	.010	2	1/8	1-1/2	16808	70.50	16808-C3	75.40
	5/32	.047	.090	.010	2	3/16	2	16810	75.10	16810-C3	80.40
	3/16	.052	.084	SHARP!	2	3/16	2	992012	73.70	992012-C3	79.00
	3/16	.047	.122	.010	2	3/16	2	16812	75.10	16812-C3	80.40
	1/4	.068	.114	SHARP!	2	1/4	2	992016	91.10	992016-C3	98.30
	1/4	.062	.140	.005	2	1/4	2	66316	92.70	66316-C3	98.70
	1/4	.063	.154	.010	2	1/4	2	16816	92.70	16816-C3	99.90
	5/16	.085	.143	SHARP!	3	5/16	2-1/2	992020	99.80	992020-C3	108.20
	5/16	.093	.155	.010	3	5/16	2-1/2	16820	101.60	16820-C3	110.00
	3/8	.105	.165	SHARP!	3	3/8	2-1/2	992024	104.20	992024-C3	113.70
	3/8	.109	.171	.005	3	3/8	2-1/2	66324	106.40	66324-C3	114.50
	3/8	.125	.153	.010	3	3/8	2-1/2	16824	106.40	16824-C3	115.90
	7/16	.141	.185	.010	3	7/16	2-3/4	16828	115.30	16828-C3	127.20
	1/2	.141	.218	SHARP!	3	1/2	3	992032	144.90	992032-C3	159.10
	1/2	.156	.202	.005	3	1/2	3	66332	147.60	66332-C3	159.60
	1/2	.156	.216	.010	3	1/2	3	16832	147.60	16832-C3	161.80
	1/2	.172	.241	.030	3	1/2	3	833932	147.60	833932-C3	159.60
	5/8	.187	.279	.010	4	5/8	3	16840	219.20	16840-C3	233.40
	3/4	.218	.342	.010	4	3/4	3	16848	262.80	16848-C3	278.20

*Diameter measured over radii (not to theoretical sharp corner).

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DOVETAIL CUTTERS

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INCLUDED ANGLE	CUTTER DIA.*	LENGTH OF CUT	NECK DIA.	CORNER RADIUS	FLUTES	SHANK DIA.	OVERALL LENGTH	UNCOATED		AlTiN COATED	
A $^{+1°}_{-1°}$	D_1 $^{+.000″}_{-.002″}$	L_2 $^{+.020″}_{-.000″}$		R		D_2	L_1	TOOL #	PRICE	TOOL #	PRICE
100°	1/8	.040	.065	.010	2	1/8	1-1/2	964408	75.40	964408-C3	80.30
	3/16	.047	.110	.010	2	3/16	2	964412	79.20	964412-C3	84.50
	1/4	.062	.137	.010	2	1/4	2	964416	99.80	964416-C3	107.00
	3/8	.093	.188	.010	3	3/8	2-1/2	964424	114.00	964424-C3	123.50
	1/2	.125	.237	.010	3	1/2	3	964432	158.40	964432-C3	172.60
120°	1/8	.039	.045	.010	2	1/8	1-1/2	959908	75.40	959908-C3	80.30
	3/16	.047	.079	.010	2	3/16	2	959912	79.20	959912-C3	84.50
	1/4	.062	.090	.010	2	1/4	2	959916	99.80	959916-C3	107.00
	3/8	.093	.107	.010	3	3/8	2-1/2	959924	114.00	959924-C3	123.50
	1/2	.109	.177	.010	3	1/2	3	959932	158.40	959932-C3	172.60

*Diameter measured over radii (not to theoretical sharp corner).

View a comprehensive library of **Speeds & Feeds** charts for every Harvey Tool End Mill on the new Harveytool.com.

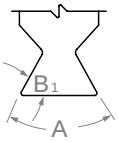
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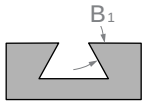
DOVETAIL CUTTERS

Sight Groove Dovetail Cutters

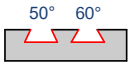


- Designed for milling dovetail grooves for Sight Attachments
- Diameters match common brand standards
- Offered with sharp corner
- Solid carbide
- CNC ground in the USA





Off the Shoulder Angle
$B_1 = 90 - (A / 2)$
$A = 180 - 2B_1$

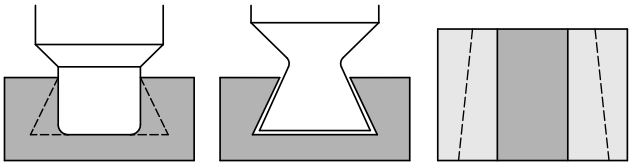


Stocked in *Two* Included Angles!

INCL. ANGLE	CUTTER DIA.*	LENGTH OF CUT	NECK DIA.	FLUTES	SHANK DIA.	OAL	UNCOATED		AlTiN COATED	
$A^{+1°}_{-1°}$	$D_1{}^{+.000″}_{-.002″}$	$L_2{}^{+.020″}_{-.000″}$			D_2	L_1	TOOL #	PRICE	TOOL #	PRICE
50°	.330	.093	.242	3	3/8	2-1/2	806833	112.00	806833-C3	121.50
	.344	.125	.226	3	3/8	2-1/2	806834	112.00	806834-C3	121.50
	.495	.250	.261	3	1/2	3	806849	156.40	806849-C3	170.60
60°	.300	.093	.191	3	5/16	2-1/2	806730	99.80	806730-C3	108.20
	.359	.125	.213	3	3/8	2-1/2	806735	104.20	806735-C3	113.70

RECOMMENDED SIGHT GROOVE DOVETAIL MILLING TECHNIQUES

- Use an endmill that is smaller than the top of the groove width to slot.
- With required dovetail, mill groove down the centerline of slot to shape the rest of the dovetail groove
- Since most sights are press fitted, filing or additional adjustments may be required to ensure proper sight fit.
  - Angle the dovetail cutter slightly to create a slightly larger width on one side of the groove.
  - Dovetail should finish on same location on other side of the groove to create a trapezoidal shaped slot.
  - The sight itself can be adjusted by using an appropriate file to shape male dovetail until desired fitting.



Mill Slot | Mill on Center | Angle Dovetail to Widen One Side

DOVETAIL CUTTERS

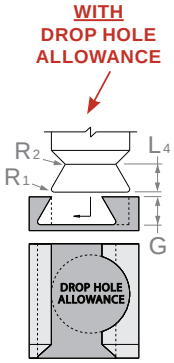
Parker Hannifin O-Ring Dovetail Cutters

Designed to Parker Hannifin O-Ring Standards

With Drop Hole Allowance



- **Designed for milling full dovetail grooves with drop hole allowance**
- Designed to the standards suggested by the O-Ring Division of Parker Hannifin Corporation (ORD 5700/USA, ORD 5700)
- Undersized cutter design allows climb milling on both faces of groove for improved finish
- Mills both top and bottom radii
- 24° per side, 48° included
- 2 straight flutes
- Center cutting
- Solid carbide
- CNC ground in the USA



O-RING X-SECTION	CUTTER DIA.*	GLAND DEPTH	CORNER RADIUS	NECK DIA.*	NECK RADIUS	RADIUS CENTER	SHANK DIA.	OAL	UNCOATED		AlTiN COATED		TiB_2 COATED	
	D_1 +.000″ −.002″	G	R_1 +.001″ −.001″		R_2 +.001″ −.001″	L_4 +.001″ −.001″	D_2	L_1	TOOL #	PRICE	TOOL #	PRICE	TOOL #	PRICE
.070	.079	.051	.015	.054	.005	.047	1/8	1-1/2	23807†	73.50	23807-C3†	78.40	23807-C8†	80.70
.070	.084	.054	.015	.056	.005	.050	1/8	1-1/2	56307Δ	73.50	56307-C3Δ	78.40	56307-C8Δ	80.70
.103	.135	.082	.015	.088	.010	.073	3/16	2	23814	76.50	23814-C3	81.80	23814-C8	83.70
.139	.172	.112	.031	.116	.010	.103	3/16	2	23821	76.50	23821-C3	81.80	23821-C8	83.70
.210	.284	.172	.031	.179	.015	.158	5/16	2-1/2	23828	101.20	23828-C3	109.60	23828-C8	117.60
.275	.362	.232	.062	.237	.015	.219	3/8	2-1/2	23835	117.20	23835-C3	126.70	23835-C8	137.10
.375	.488	.317	.093	.327	.020	.299	1/2	3	23842	150.10	23842-C3	164.30	23842-C8	173.50

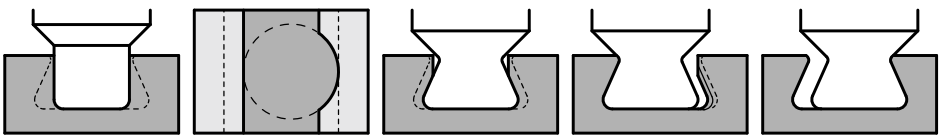
*Diameter measured over radii (not to theoretical sharp corner). †Meets ORD 5700/USA spec. ΔMeets ORD 5700 spec. All other tools meet BOTH specifications.

RECOMMENDED O-RING DOVETAIL MILLING TECHNIQUES

With Drop Hole Allowance

- Rough out slot with appropriate O-Ring Slotting End Mill (see series 565xx) or with other comparable end mill.
- Mill off-center drop hole.
- Insert O-Ring Cutter through drop hole at full axial depth and mill single pass down center of groove. Please note that cutter is contacting both sides of part and it may be necessary to reduce the feed rate (up to 40%).
- Mill multiple passes with descending radial stepover on one side of part.
- Mill multiple passes with descending radial stepover on other side of part.

For radial calculations, search for keyword ORINGGUIDE on www.harveytool.com



O-Ring Slotting End Mills



◀ *See page 394*

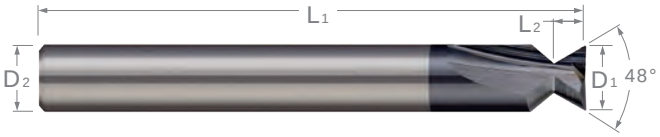
- ***Ideal for slotting o-ring dovetail grooves!***
- ***Achieve the right slot width and shape without radial stepovers!***

Designed to Parker Hannifin O-Ring Standards

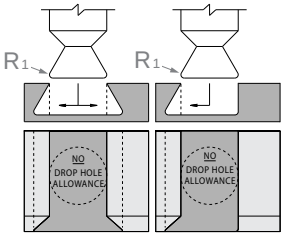
DOVETAIL CUTTERS

Parker Hannifin O-Ring Dovetail Cutters

Without Drop Hole Allowance



WITHOUT DROP HOLE ALLOWANCE



- **Designed for milling half dovetails or full dovetails with no drop hole allowance**
- Designed to the standards suggested by the O-Ring Division of Parker Hannifin Corporation (tools meet both specs: ORD 5700/USA, ORD 5700)
- Mills bottom radius only
- 24° per side, 48° included
- 2 straight flutes
- Center cutting
- Solid carbide
- CNC ground in the USA

O-RING X-SECTION	CUTTER DIA.*	LOC	CORNER RADIUS	NECK DIA.**	SHANK DIA.	OAL	UNCOATED		AlTiN COATED		TiB_2 COATED	
	D_1 +.000″ −.002″	L_2 +.020″ −.000″	R_1 +.001″ −.001″		D_2	L_1	TOOL #	PRICE	TOOL #	PRICE	TOOL #	PRICE
.070	.055	.054	.015	.023	1/8	1-1/2	23907	71.80	23907-C3	76.70	23907-C8	79.00
.103	.083	.085	.015	.024	1/8	1-1/2	23914	71.80	23914-C3	76.70	23914-C8	79.00
.139	.113	.115	.031	.044	1/8	1-1/2	23921	71.80	23921-C3	76.70	23921-C8	79.00
.210	.171	.176	.031	.048	3/16	2	23928	74.80	23928-C3	80.10	23928-C8	82.00
.275	.231	.238	.062	.086	1/4	2	23935	98.00	23935-C3	105.20	23935-C8	105.70
.375	.315	.323	.093	.128	3/8	2-1/2	23942	114.50	23942-C3	124.00	23942-C8	134.40

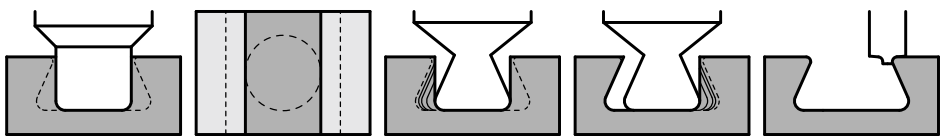
*Diameter measured over radii (not to theoretical sharp corner). **Diameter at length of cut.

RECOMMENDED O-RING DOVETAIL MILLING TECHNIQUES

Without Drop Hole Allowance

- Tools are very fragile. Reduced neck profile and small o-ring groove size result in weakened tool for this difficult application. Always reconsider the potential to use the WITH drop hole allowance.
- Rough out slot with appropriate O-Ring Slotting End Mill (see series 565xx) or with other comparable end mill.
- Insert O-Ring Cutter into slot at full axial depth.
- Mill multiple passes with descending radial stepover on one side of part.
- Mill multiple passes with descending radial stepover on other side of part.
- These tools are able to mill both Full and Half O-Ring grooves. As such, a corner radius at the top of the part must be machined for final groove form (see series 170xx).

For radial calculations, search for keyword ORINGGUIDE on www.harveytool.com



O-Ring Corner Rounding End Mills

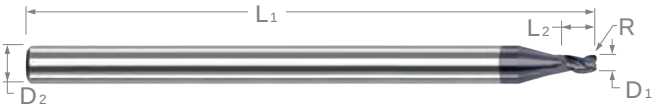


◀ *See page 394*

- ***Ideal for creating radius on top part of o-ring dovetail groove!***
- ***Design ensures smooth, blended form on part!***

DOVETAIL CUTTERS

O-Ring Slotting End Mills



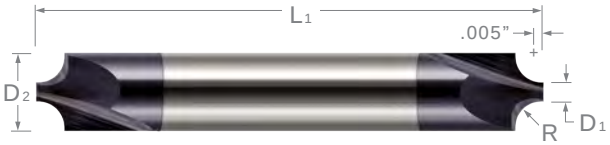
Ideal for Slotting O-Ring Dovetail Grooves!

- Optimized for O-Ring grooves
- Diameters designed to gland width opening
- Stub flute length for improved strength
- Corner radius to match Parker Hannifin standards
- High helix and optimized geometry for improved performance
- 3 Flutes
- Center cutting
- Solid carbide
- CNC ground in the USA

CUTTER DIAMETER	CORNER RADIUS	LENGTH OF CUT	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN COATED		TiB_2 COATED	
D_1 $^{+.000''}_{-.001''}$	R $^{+.001''}_{-.001''}$	L_2 $^{+.010''}_{-.000''}$	D_2	L_1	3 FL	PRICE	3 FL	PRICE	3 FL	PRICE
.055	.015	.065	1/8	1-1/2	56510	26.20	56510-C3	31.10	56510-C8	35.50
.085	.015	.100	1/8	1-1/2	56520	26.20	56520-C3	31.10	56520-C8	35.50
.115	.031	.140	1/8	1-1/2	56530	26.20	56530-C3	31.10	56530-C8	35.50
D_1 $^{+.000''}_{-.002''}$	R $^{+.001''}_{-.001''}$	L_2 $^{+.030''}_{-.000''}$	D_2	L_1	3 FL	PRICE	3 FL	PRICE	3 FL	PRICE
.176	.031	.210	3/16	2	56540	29.20	56540-C3	34.50	56540-C8	38.60
.236	.062	.280	1/4	2-1/2	56550	38.60	56550-C3	45.80	56550-C8	52.80
.323	.093	.380	3/8	2-1/2	56560	55.00	56560-C3	64.50	56560-C8	74.90

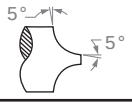
DOVETAIL CUTTERS

O-Ring Corner Rounding End Mills



For Creating Radius on Top Part of O-Ring Dovetail Groove

- Radius matches Parker Hannifin standards
- Double-ended
- Flares are tangent to radius
- Design ensures smooth, blended form on part
- Depth of cut = radius plus .005"
- 2 flutes
- Solid carbide
- CNC ground in the USA



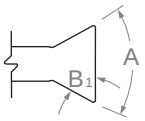
5° Flares At Shoulder and Pilot to Avoid Steps in Workpiece

O-RING X-SECTION	RADIUS	PILOT DIAMETER	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN COATED	
	R $^{+.0005''}_{-.0005''}$	D_1	D_2	L_1	2 FL	PRICE	2 FL	PRICE
.070	.005	.046	1/8	1-1/2	17005	42.00	17005-C3	48.00
.103	.010	.046	1/8	1-1/2	17010	42.00	17010-C3	48.00
.139	.010	.046	1/8	1-1/2	17010	42.00	17010-C3	48.00
.210	.015	.046	1/8	1-1/2	17015	42.00	17015-C3	48.00
.275	.015	.046	1/8	1-1/2	17015	42.00	17015-C3	48.00
.375	.020	.046	1/8	1-1/2	17020	42.00	17020-C3	48.00

NEW SIZES!

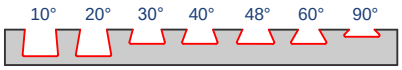
DOVETAIL CUTTERS
Long Reach





$B_1 = 90 - (A / 2)$
$A = 180 - 2B_1$

- Reduced neck for long reach machining
- Corner radius for improved strength
- Solid carbide
- CNC ground in the USA



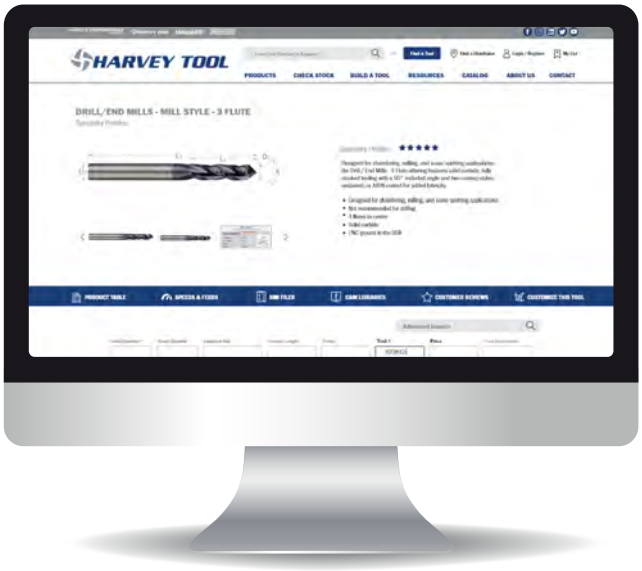
Stocked in *Seven* Included Angles!

	INCL. ANGLE	CUTTER DIA.*	LENGTH OF CUT	NECK DIA.	NECK LENGTH	CORNER RADIUS	FLUTES	SHANK DIA.	OAL	UNCOATED		AlTiN COATED	
	A +1° −1°	D1 +.000″ −.002″	L2 +.020″ −.000″		L3 +.030″ −.000″	R		D2	L1	TOOL #	PRICE	TOOL #	PRICE
	10°	1/8	.187	.094	.125	.010	2	1/8	1-1/2	899108	101.00	899108-C3	105.90
		1/4	.312	.197	.250	.010	2	1/4	2	899116	128.50	899116-C3	135.70
		1/2	.625	.392	.250	.010	3	1/2	3	899132	195.00	899132-C3	209.20
	20°	1/8	.125	.085	.125	.010	2	1/8	1-1/2	877408	88.40	877408-C3	93.30
		1/4	.250	.166	.250	.010	2	1/4	2	877416	112.00	877416-C3	119.20
		1/2	.500	.328	.250	.010	3	1/2	3	877432	170.10	877432-C3	184.30
	30°	1/16	.045	.041	.062	.005	2	1/8	1-1/2	849904	91.50	849904-C3	96.40
		3/32	.078	.057	.093	.010	2	1/8	1-1/2	914806	88.40	914806-C3	93.30
		1/8	.093	.081	.125	.010	2	1/8	1-1/2	914808	88.40	914808-C3	93.30
		3/16	.125	.127	.187	.010	2	3/16	2	914812	91.70	914812-C3	97.00
		1/4	.156	.172	.250	.010	2	1/4	2	914816	110.10	914816-C3	117.30
		3/8	.250	.247	.250	.010	3	3/8	2-1/2	914824	164.70	914824-C3	174.20
		1/2	.312	.339	.250	.010	3	1/2	3	914832	167.40	914832-C3	181.60
	40°	1/8	.093	.066	.125	.010	2	1/8	1-1/2	864008	91.50	864008-C3	96.40
		1/4	.156	.145	.250	.010	2	1/4	2	864016	110.10	864016-C3	117.30
		1/2	.312	.281	.250	.010	3	1/2	3	864032	167.40	864032-C3	181.60
NEW	48°	1/8	.093	.053	.125	.010	2	1/8	1-1/2	760108	91.50	760108-C3	96.40
	60°	1/16	.032	.032	.062	.005	2	1/8	1-1/2	865504	88.80	865504-C3	93.70
		3/32	.045	.056	.093	.010	2	1/8	1-1/2	925306	85.70	925306-C3	90.60
		1/8	.056	.060	.125	SHARP!	2	1/8	1-1/2	865908	84.20	865908-C3	89.10
		1/8	.062	.068	.125	.010	2	1/8	1-1/2	925308	85.70	925308-C3	90.60
		3/16	.093	.095	.187	.010	2	3/16	2	925312	89.40	925312-C3	94.70
		1/4	.118	.114	.250	SHARP!	2	1/4	2	865916	106.10	865916-C3	113.30
		1/4	.125	.120	.250	.010	2	1/4	2	925316	107.80	925316-C3	115.00
		3/8	.187	.174	.250	.010	3	3/8	2-1/2	925324	120.20	925324-C3	129.70
		1/2	.218	.248	.250	SHARP!	3	1/2	3	865932	160.80	865932-C3	175.00
		1/2	.250	.226	.250	.010	3	1/2	3	925332	163.40	925332-C3	177.60
	90°	1/16	.023	.030	.062	.005	2	1/8	1-1/2	885704	88.80	885704-C3	93.70
		3/32	.031	.059	.093	.010	2	1/8	1-1/2	931006	85.70	931006-C3	90.60
		1/8	.034	.057	.125	SHARP!	2	1/8	1-1/2	884608	84.20	884608-C3	89.10
		1/8	.040	.073	.125	.010	2	1/8	1-1/2	931008	84.40	931008-C3	89.30
NEW		3/16	.052	.084	.187	SHARP!	2	3/16	2	884612	87.80	884612-C3	93.10
		3/16	.047	.122	.187	.010	2	3/16	2	931012	89.40	931012-C3	94.70
		1/4	.068	.114	.250	SHARP!	2	1/4	2	884616	106.10	884616-C3	113.30
		1/4	.062	.154	.250	.010	2	1/4	2	931016	107.80	931016-C3	115.00
NEW		3/8	.105	.165	.250	SHARP!	3	3/8	2-1/2	884624	118.60	884624-C3	128.10
		3/8	.125	.153	.250	.010	3	3/8	2-1/2	931024	120.20	931024-C3	129.70
		1/2	.141	.218	.250	SHARP!	3	1/2	3	884632	160.80	884632-C3	175.00
		1/2	.156	.216	.250	.010	3	1/2	3	931032	163.40	931032-C3	177.60

*Diameter measured over radii (not to theoretical sharp corner).

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Combination Drill / Thread Mill 465

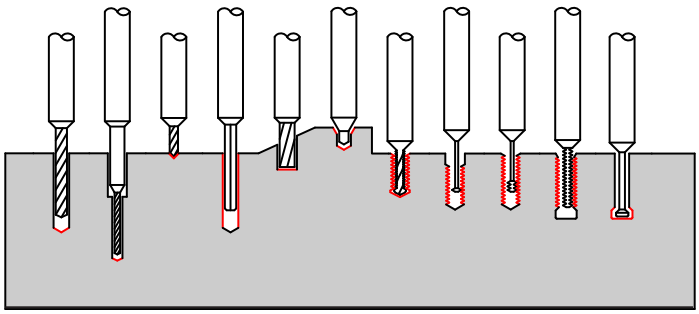
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NEW SIZES!

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- Select carbide grade for improved tool life
- CNC ground in the USA



Double Margin Design for Exceptional Hole Accuracy

DRILL DIAMETER			FLUTE LENGTH			SHANK DIAMETER	OVERALL LENGTH	AlTiN NANO COATED	
inch	wire	metric	inch	metric	hole depth				
		D_1 +.000mm −.013mm		L_2 +.25mm −.00mm		D_2 (h6)	L_1	2 FL	PRICE
.0100	#87	.254 mm	.047	**1.20 mm**	(3x)	3 mm	50 mm	CSG0100-C6	41.00
.0110	#85	.279 mm	.053	**1.35 mm**	(3x)	3 mm	50 mm	CSG0110-C6	41.00
.0120	#83	.304 mm	.057	**1.45 mm**	(3x)	3 mm	50 mm	CSG0120-C6	41.00
.0130	#81	.330 mm	.061	**1.55 mm**	(3x)	3 mm	50 mm	CSG0130-C6	41.00
.0144	#79	.368 mm	.069	**1.75 mm**	(3x)	3 mm	50 mm	CSG0144-C6	41.00
.0150		.381 mm	.071	**1.80 mm**	(3x)	3 mm	50 mm	CSG0150-C6	41.00
.0150		.381 mm	.102	**2.60 mm**	(5x)	3 mm	50 mm	BGN0150-C6	42.40
.0150		.381 mm	.146	**3.70 mm**	(8x)	3 mm	50 mm	ARY0150-C6	43.00
.0156 (1/64)		.396 mm	.075	**1.90 mm**	(3x)	3 mm	50 mm	CSG0156-C6	41.00
.0156 (1/64)		.396 mm	.106	**2.70 mm**	(5x)	3 mm	50 mm	BGN0156-C6	42.40
.0156 (1/64)		.396 mm	.154	**3.90 mm**	(8x)	3 mm	50 mm	ARY0156-C6	43.00
.0156 (1/64)		.396 mm	.185	**4.70 mm**	(10x)	3 mm	50 mm	DXT0156-C6	44.20
.0156 (1/64)		.396 mm	.213	**5.40 mm**	(12x)	3 mm	50 mm	EFG0156-C6	45.60
.0160	#78	.406 mm	.079	**2.00 mm**	(3x)	3 mm	50 mm	CSG0160-C6	41.00
.0160	#78	.406 mm	.106	**2.70 mm**	(5x)	3 mm	50 mm	BGN0160-C6	42.40
.0160	#78	.406 mm	.157	**4.00 mm**	(8x)	3 mm	50 mm	ARY0160-C6	43.00
.0160	#78	.406 mm	.220	**5.60 mm**	(12x)	3 mm	50 mm	EFG0160-C6	45.60
.0170		.431 mm	.083	**2.10 mm**	(3x)	3 mm	50 mm	CSG0170-C6	41.00
.0170		.431 mm	.165	**4.20 mm**	(8x)	3 mm	50 mm	ARY0170-C6	43.00
.0180	#77	.457 mm	.087	**2.20 mm**	(3x)	3 mm	50 mm	CSG0180-C6	41.00
.0180	#77	.457 mm	.122	**3.10 mm**	(5x)	3 mm	50 mm	BGN0180-C6	42.40
.0180	#77	.457 mm	.177	**4.50 mm**	(8x)	3 mm	50 mm	ARY0180-C6	43.00
.0180	#77	.457 mm	.244	**6.20 mm**	(12x)	3 mm	50 mm	EFG0180-C6	45.60
.0190		.482 mm	.091	**2.30 mm**	(3x)	3 mm	50 mm	CSG0190-C6	39.70
.0190		.482 mm	.185	**4.70 mm**	(8x)	3 mm	50 mm	ARY0190-C6	41.60
.0196		.500 mm	.094	**2.40 mm**	(3x)	3 mm	50 mm	CSG0196-C6	39.70
.0196		.500 mm	.134	**3.40 mm**	(5x)	3 mm	50 mm	BGN0196-C6	40.50
.0196		.500 mm	.193	**4.90 mm**	(8x)	3 mm	50 mm	ARY0196-C6	41.60
.0196		.500 mm	.228	**5.80 mm**	(10x)	3 mm	50 mm	DXT0196-C6	42.90
.0196		.500 mm	.268	**6.80 mm**	(12x)	3 mm	50 mm	EFG0196-C6	44.20
.0200	#76	.508 mm	.094	**2.40 mm**	(3x)	3 mm	50 mm	CSG0200-C6	39.70
.0200	#76	.508 mm	.134	**3.40 mm**	(5x)	3 mm	50 mm	BGN0200-C6	40.50
.0200	#76	.508 mm	.197	**5.00 mm**	(8x)	3 mm	50 mm	ARY0200-C6	41.60
.0200	#76	.508 mm	.236	**6.00 mm**	(10x)	3 mm	50 mm	DXT0200-C6	42.90 NEW
.0200	#76	.508 mm	.276	**7.00 mm**	(12x)	3 mm	50 mm	EFG0200-C6	44.20

continued on next page

NEW SIZES!

MINIATURE HIGH PERFORMANCE DRILLS

Hardened Steels (cont.)

continued from previous page

DRILL DIAMETER			FLUTE LENGTH			SHANK DIAMETER	OVERALL LENGTH	AlTiN NANO COATED	
inch	wire	metric	inch	metric	hole depth				
		D_1 +.000mm −.013mm		L_2 +.25mm −.00mm		D_2 (h6)	L_1	2 FL	PRICE
.0210	#75	.533 mm	.098	**2.50 mm**	(3x)	3 mm	50 mm	CSG0210-C6	39.70
.0210	#75	.533 mm	.142	**3.60 mm**	(5x)	3 mm	50 mm	BGN0210-C6	40.50
.0210	#75	.533 mm	.205	**5.20 mm**	(8x)	3 mm	50 mm	ARY0210-C6	41.60
.0210	#75	.533 mm	.291	**7.40 mm**	(12x)	3 mm	50 mm	EFG0210-C6	44.20
.0220		.558 mm	.106	**2.70 mm**	(3x)	3 mm	50 mm	CSG0220-C6	39.70
.0220		.558 mm	.213	**5.40 mm**	(8x)	3 mm	50 mm	ARY0220-C6	41.60
.0225	#74	.571 mm	.106	**2.70 mm**	(3x)	3 mm	50 mm	CSG0225-C6	39.70
.0225	#74	.571 mm	.154	**3.90 mm**	(5x)	3 mm	50 mm	BGN0225-C6	40.50
.0225	#74	.571 mm	.220	**5.60 mm**	(8x)	3 mm	50 mm	ARY0225-C6	41.60
.0225	#74	.571 mm	.307	**7.80 mm**	(12x)	3 mm	50 mm	EFG0225-C6	44.20
.0230		.584 mm	.110	**2.80 mm**	(3x)	3 mm	50 mm	CSG0230-C6	39.70
.0230		.584 mm	.220	**5.60 mm**	(8x)	3 mm	50 mm	ARY0230-C6	41.60
.0236		.600 mm	.114	**2.90 mm**	(3x)	3 mm	50 mm	CSG0236-C6	39.70
.0236		.600 mm	.228	**5.80 mm**	(8x)	3 mm	50 mm	ARY0236-C6	41.60
.0240	#73	.609 mm	.114	**2.90 mm**	(3x)	3 mm	50 mm	CSG0240-C6	39.70
.0240	#73	.609 mm	.165	**4.20 mm**	(5x)	3 mm	50 mm	BGN0240-C6	40.50
.0240	#73	.609 mm	.236	**6.00 mm**	(8x)	3 mm	50 mm	ARY0240-C6	41.60
.0240	#73	.609 mm	.331	**8.40 mm**	(12x)	3 mm	50 mm	EFG0240-C6	44.20
.0250	#72	.635 mm	.118	**3.00 mm**	(3x)	3 mm	50 mm	CSG0250-C6	39.70
.0250	#72	.635 mm	.165	**4.20 mm**	(5x)	3 mm	50 mm	BGN0250-C6	40.50
.0250	#72	.635 mm	.244	**6.20 mm**	(8x)	3 mm	50 mm	ARY0250-C6	41.60
.0250	#72	.635 mm	.346	**8.80 mm**	(12x)	3 mm	50 mm	EFG0250-C6	44.20
.0260	#71	.660 mm	.122	**3.10 mm**	(3x)	3 mm	50 mm	CSG0260-C6	39.70
.0260	#71	.660 mm	.173	**4.40 mm**	(5x)	3 mm	50 mm	BGN0260-C6	40.50
.0260	#71	.660 mm	.252	**6.40 mm**	(8x)	3 mm	50 mm	ARY0260-C6	41.60
.0260	#71	.660 mm	.354	**9.00 mm**	(12x)	3 mm	50 mm	EFG0260-C6	44.20
.0270		.685 mm	.130	**3.30 mm**	(3x)	3 mm	50 mm	CSG0270-C6	39.70
.0270		.685 mm	.260	**6.60 mm**	(8x)	3 mm	50 mm	ARY0270-C6	41.60
.0275		.700 mm	.130	**3.30 mm**	(3x)	3 mm	50 mm	CSG0275-C6	39.70
.0275		.700 mm	.268	**6.80 mm**	(8x)	3 mm	50 mm	ARY0275-C6	41.60
.0280	#70	.711 mm	.134	**3.40 mm**	(3x)	3 mm	50 mm	CSG0280-C6	39.70
.0280	#70	.711 mm	.189	**4.80 mm**	(5x)	3 mm	50 mm	BGN0280-C6	40.50
.0280	#70	.711 mm	.276	**7.00 mm**	(8x)	3 mm	50 mm	ARY0280-C6	41.60
.0280	#70	.711 mm	.386	**9.80 mm**	(12x)	3 mm	50 mm	EFG0280-C6	44.20
.0292	#69	.741 mm	.138	**3.50 mm**	(3x)	3 mm	50 mm	CSG0292-C6	39.70
.0292	#69	.741 mm	.197	**5.00 mm**	(5x)	3 mm	50 mm	BGN0292-C6	40.50
.0292	#69	.741 mm	.283	**7.20 mm**	(8x)	3 mm	50 mm	ARY0292-C6	41.60
.0292	#69	.741 mm	.394	**10.00 mm**	(12x)	3 mm	50 mm	EFG0292-C6	44.20
.0300		.762 mm	.142	**3.60 mm**	(3x)	3 mm	50mm	CSG0300-C6	40.20
.0300		.762 mm	.205	**5.20 mm**	(5x)	3 mm	50 mm	BGN0300-C6	41.20
.0300		.762 mm	.291	**7.40 mm**	(8x)	3 mm	50 mm	ARY0300-C6	41.60
NEW .0300		.762 mm	.354	**9.00 mm**	(10x)	3 mm	50 mm	DXT0300-C6	42.90
.0310	#68	.787 mm	.146	**3.70 mm**	(3x)	3 mm	50 mm	CSG0310-C6	40.20
.0310	#68	.787 mm	.213	**5.40 mm**	(5x)	3 mm	50 mm	BGN0310-C6	41.20
.0310	#68	.787 mm	.299	**7.60 mm**	(8x)	3 mm	50 mm	ARY0310-C6	41.60
.0310	#68	.787 mm	.433	**11.00 mm**	(12x)	3 mm	50 mm	EFG0310-C6	45.10

continued on next page

NEW SIZES!

MINIATURE HIGH PERFORMANCE DRILLS

Hardened Steels (cont.)

continued from previous page

DRILL DIAMETER			FLUTE LENGTH			SHANK DIAMETER	OVERALL LENGTH	AlTiN NANO COATED		
inch	wire	metric	inch	metric	hole depth					
		D_1 $^{+.000mm}_{-.013mm}$		L_2 $^{+.25mm}_{-.00mm}$		D_2 (h6)	L_1	2 FL	PRICE	
.0312 (1/32)		.793 mm	.150	**3.80 mm**	(3x)	3 mm	50 mm	CSG0312-C6	40.20	
.0312 (1/32)		.793 mm	.213	**5.40 mm**	(5x)	3 mm	50 mm	BGN0312-C6	41.20	
.0312 (1/32)		.793 mm	.307	**7.80 mm**	(8x)	3 mm	50 mm	ARY0312-C6	42.40	
.0312 (1/32)		.793 mm	.370	**9.40 mm**	(10x)	3 mm	50 mm	DXT0312-C6	43.70	
.0312 (1/32)		.793 mm	.433	**11.00 mm**	(12x)	3 mm	50 mm	EFG0312-C6	45.10	
.0315		.800 mm	.150	**3.80 mm**	(3x)	3 mm	50 mm	CSG0315-C6	40.20	
.0315		.800 mm	.307	**7.80 mm**	(8x)	3 mm	50 mm	ARY0315-C6	42.40	
.0320	#67	.812 mm	.154	**3.90 mm**	(3x)	3 mm	50 mm	CSG0320-C6	40.20	
.0320	#67	.812 mm	.213	**5.40 mm**	(5x)	3 mm	50 mm	BGN0320-C6	41.20	
.0320	#67	.812 mm	.315	**8.00 mm**	(8x)	3 mm	50 mm	ARY0320-C6	42.40	
.0320	#67	.812 mm	.433	**11.00 mm**	(12x)	3 mm	50 mm	EFG0320-C6	45.10	
.0330	#66	.838 mm	.157	**4.00 mm**	(3x)	3 mm	50 mm	CSG0330-C6	40.20	
.0330	#66	.838 mm	.220	**5.60 mm**	(5x)	3 mm	50 mm	BGN0330-C6	41.20	
.0330	#66	.838 mm	.323	**8.20 mm**	(8x)	3 mm	50 mm	ARY0330-C6	42.40	
.0330	#66	.838 mm	.453	**11.50 mm**	(12x)	3 mm	50 mm	EFG0330-C6	45.10	
.0350	#65	.889 mm	.165	**4.20 mm**	(3x)	3 mm	50 mm	CSG0350-C6	40.20	
.0350	#65	.889 mm	.236	**6.00 mm**	(5x)	3 mm	50 mm	BGN0350-C6	41.20	
.0350	#65	.889 mm	.339	**8.60 mm**	(8x)	3 mm	50 mm	ARY0350-C6	42.40	
.0350	#65	.889 mm	.413	**10.50 mm**	(10x)	3 mm	50 mm	DXT0350-C6	43.70	NEW
.0350	#65	.889 mm	.472	**12.00 mm**	(12x)	3 mm	50 mm	EFG0350-C6	45.10	
.0354		.900 mm	.165	**4.20 mm**	(3x)	3 mm	50 mm	CSG0354-C6	40.20	
.0354		.900 mm	.236	**6.00 mm**	(5x)	3 mm	50 mm	BGN0354-C6	41.20	NEW
.0354		.900 mm	.346	**8.80 mm**	(8x)	3 mm	50 mm	ARY0354-C6	42.40	
.0360	#64	.914 mm	.173	**4.40 mm**	(3x)	3 mm	50 mm	CSG0360-C6	40.20	
.0360	#64	.914 mm	.244	**6.20 mm**	(5x)	3 mm	50 mm	BGN0360-C6	41.20	
.0360	#64	.914 mm	.354	**9.00 mm**	(8x)	3 mm	50 mm	ARY0360-C6	42.40	
.0360	#64	.914 mm	.492	**12.50 mm**	(12x)	3 mm	50 mm	EFG0360-C6	45.10	
.0370	#63	.939 mm	.173	**4.40 mm**	(3x)	3 mm	50 mm	CSG0370-C6	40.20	
.0370	#63	.939 mm	.252	**6.40 mm**	(5x)	3 mm	50 mm	BGN0370-C6	41.20	
.0370	#63	.939 mm	.362	**9.20 mm**	(8x)	3 mm	50 mm	ARY0370-C6	42.40	
.0370	#63	.939 mm	.512	**13.00 mm**	(12x)	3 mm	50 mm	EFG0370-C6	45.10	
.0380	#62	.965 mm	.181	**4.60 mm**	(3x)	3 mm	50 mm	CSG0380-C6	40.20	
.0380	#62	.965 mm	.260	**6.60 mm**	(5x)	3 mm	50 mm	BGN0380-C6	41.20	
.0380	#62	.965 mm	.370	**9.40 mm**	(8x)	3 mm	50 mm	ARY0380-C6	42.40	
.0380	#62	.965 mm	.531	**13.50 mm**	(12x)	3 mm	50 mm	EFG0380-C6	45.10	
.0390	#61	.990 mm	.189	**4.80 mm**	(3x)	3 mm	50 mm	CSG0390-C6	40.20	
.0390	#61	.990 mm	.260	**6.60 mm**	(5x)	3 mm	50 mm	BGN0390-C6	41.20	
.0390	#61	.990 mm	.378	**9.60 mm**	(8x)	3 mm	50 mm	ARY0390-C6	42.40	
.0390	#61	.990 mm	.531	**13.50 mm**	(12x)	3 mm	50 mm	EFG0390-C6	45.10	
.0393		1.000 mm	.189	**4.80 mm**	(3x)	3 mm	50 mm	CSG0393-C6	43.70	
.0393		1.000 mm	.268	**6.80 mm**	(5x)	3 mm	50 mm	BGN0393-C6	44.80	
.0393		1.000 mm	.386	**9.80 mm**	(8x)	3 mm	50 mm	ARY0393-C6	45.40	
.0393		1.000 mm	.472	**12.00 mm**	(10x)	3 mm	50 mm	DXT0393-C6	47.00	
.0393		1.000 mm	.551	**14.00 mm**	(12x)	3 mm	50 mm	EFG0393-C6	48.40	
.0400	#60	1.016 mm	.189	**4.80 mm**	(3x)	3 mm	50 mm	CSG0400-C6	43.70	
.0400	#60	1.016 mm	.268	**6.80 mm**	(5x)	3 mm	50 mm	BGN0400-C6	44.80	
.0400	#60	1.016 mm	.394	**10.00 mm**	(8x)	3 mm	50 mm	ARY0400-C6	45.40	
.0400	#60	1.016 mm	.551	**14.00 mm**	(12x)	3 mm	50 mm	EFG0400-C6	48.40	

continued on next page

NEW SIZES!

MINIATURE HIGH PERFORMANCE DRILLS

Hardened Steels (cont.)

continued from previous page

DRILL DIAMETER			FLUTE LENGTH			SHANK DIAMETER	OVERALL LENGTH	AlTiN NANO COATED	
inch	wire	metric	inch	metric	hole depth				
		D_1 $^{+.000mm}_{-.013mm}$		L_2 $^{+.25mm}_{-.00mm}$		D_2 (h6)	L_1	2 FL	PRICE
.0410	#59	1.041 mm	.197	**5.00 mm**	(3x)	3 mm	50 mm	CSG0410-C6	43.70
.0410	#59	1.041 mm	.276	**7.00 mm**	(5x)	3 mm	50 mm	BGN0410-C6	44.80
.0410	#59	1.041 mm	.394	**10.00 mm**	(8x)	3 mm	50 mm	ARY0410-C6	45.40
.0410	#59	1.041 mm	.571	**14.50 mm**	(12x)	3 mm	50 mm	EFG0410-C6	48.40
.0420	#58	1.066 mm	.197	**5.00 mm**	(3x)	3 mm	50 mm	CSG0420-C6	43.70
.0420	#58	1.066 mm	.283	**7.20 mm**	(5x)	3 mm	50 mm	BGN0420-C6	44.80
.0420	#58	1.066 mm	.413	**10.50 mm**	(8x)	3 mm	50 mm	ARY0420-C6	45.40
.0420	#58	1.066 mm	.571	**14.50 mm**	(12x)	3 mm	50 mm	EFG0420-C6	48.40
.0430	#57	1.092 mm	.205	**5.20 mm**	(3x)	3 mm	50 mm	CSG0430-C6	43.70
.0430	#57	1.092 mm	.291	**7.40 mm**	(5x)	3 mm	50 mm	BGN0430-C6	44.80
.0430	#57	1.092 mm	.413	**10.50 mm**	(8x)	3 mm	50 mm	ARY0430-C6	45.40
.0430	#57	1.092 mm	.591	**15.00 mm**	(12x)	3 mm	50 mm	EFG0430-C6	48.40
.0450		1.143 mm	.213	**5.40 mm**	(3x)	3 mm	50 mm	CSG0450-C6	43.70
.0450		1.143 mm	.307	**7.80 mm**	(5x)	3 mm	50 mm	BGN0450-C6	44.80
.0450		1.143 mm	.433	**11.00 mm**	(8x)	3 mm	50 mm	ARY0450-C6	45.40
.0465	#56	1.181 mm	.220	**5.60 mm**	(3x)	3 mm	50 mm	CSG0465-C6	43.70
.0465	#56	1.181 mm	.315	**8.00 mm**	(5x)	3 mm	50 mm	BGN0465-C6	44.80
.0465	#56	1.181 mm	.453	**11.50 mm**	(8x)	3 mm	50 mm	ARY0465-C6	45.40
NEW .0465	#56	1.181 mm	.551	**14.00 mm**	(10x)	3 mm	50 mm	DXT0465-C6	47.00
.0465	#56	1.181 mm	.630	**16.00 mm**	(12x)	3 mm	63 mm	EFG0465-C6	48.40
.0468 (3/64)		1.190 mm	.220	**5.60 mm**	(3x)	3 mm	50 mm	CSG0468-C6	43.70
.0468 (3/64)		1.190 mm	.315	**8.00 mm**	(5x)	3 mm	50 mm	BGN0468-C6	44.80
.0468 (3/64)		1.190 mm	.453	**11.50 mm**	(8x)	3 mm	50 mm	ARY0468-C6	45.40
.0468 (3/64)		1.190 mm	.551	**14.00 mm**	(10x)	3 mm	50 mm	DXT0468-C6	47.00
.0468 (3/64)		1.190 mm	.650	**16.50 mm**	(12x)	3 mm	63 mm	EFG0468-C6	48.40
.0492		1.250 mm	.236	**6.00 mm**	(3x)	3 mm	50 mm	CSG0492-C6	43.70
.0492		1.250 mm	.472	**12.00 mm**	(8x)	3 mm	50 mm	ARY0492-C6	48.70
.0500		1.270 mm	.236	**6.00 mm**	(3x)	3 mm	50 mm	CSG0500-C6	43.70
.0500		1.270 mm	.335	**8.50 mm**	(5x)	3 mm	50 mm	BGN0500-C6	44.80
.0500		1.270 mm	.492	**12.50 mm**	(8x)	3 mm	50 mm	ARY0500-C6	45.40
.0500		1.270 mm	.689	**17.50 mm**	(12x)	3 mm	63 mm	EFG0500-C6	48.40
.0520	#55	1.320 mm	.244	**6.20 mm**	(3x)	3 mm	50 mm	CSG0520-C6	43.70
.0520	#55	1.320 mm	.354	**9.00 mm**	(5x)	3 mm	50 mm	BGN0520-C6	44.80
.0520	#55	1.320 mm	.512	**13.00 mm**	(8x)	3 mm	50 mm	ARY0520-C6	45.40
.0520	#55	1.320 mm	.709	**18.00 mm**	(12x)	3 mm	63 mm	EFG0520-C6	48.40
.0550	#54	1.397 mm	.260	**6.60 mm**	(3x)	3 mm	50 mm	CSG0550-C6	43.70
.0550	#54	1.397 mm	.374	**9.50 mm**	(5x)	3 mm	50 mm	BGN0550-C6	44.80
.0550	#54	1.397 mm	.531	**13.50 mm**	(8x)	3 mm	50 mm	ARY0550-C6	45.40
.0550	#54	1.397 mm	.748	**19.00 mm**	(12x)	3 mm	63 mm	EFG0550-C6	48.40
.0590		1.500 mm	.283	**7.20 mm**	(3x)	3 mm	50 mm	CSG0590-C6	47.10
.0590		1.500 mm	.394	**10.00 mm**	(5x)	3 mm	50 mm	BGN0590-C6	48.10
.0590		1.500 mm	.571	**14.50 mm**	(8x)	3 mm	50 mm	ARY0590-C6	48.70
.0590		1.500 mm	.689	**17.50 mm**	(10x)	3 mm	63 mm	DXT0590-C6	50.00
.0590		1.500 mm	.827	**21.00 mm**	(12x)	3 mm	63 mm	EFG0590-C6	51.50
.0595	#53	1.511 mm	.283	**7.20 mm**	(3x)	3 mm	50 mm	CSG0595-C6	47.10
.0595	#53	1.511 mm	.394	**10.00 mm**	(5x)	3 mm	50 mm	BGN0595-C6	48.10

continued on next page

NEW SIZES!

MINIATURE HIGH PERFORMANCE DRILLS

Hardened Steels (cont.)

continued from previous page

DRILL DIAMETER			FLUTE LENGTH			SHANK DIAMETER	OVERALL LENGTH	AlTiN NANO COATED	
inch	wire	metric	inch	metric	hole depth				
		D_1 $^{+.000mm}_{-.013mm}$		L_2 $^{+.25mm}_{-.00mm}$		D_2 (h6)	L_1	2 FL	PRICE
.0595	#53	1.511 mm	.571	**14.50 mm**	(8x)	3 mm	50 mm	ARY0595-C6	48.70
.0595	#53	1.511 mm	.827	**21.00 mm**	(12x)	3 mm	63 mm	EFG0595-C6	51.50
.0600		1.524 mm	.283	**7.20 mm**	(3x)	3 mm	50 mm	CSG0600-C6	47.10
.0600		1.524 mm	.591	**15.00 mm**	(8x)	3 mm	50 mm	ARY0600-C6	48.70
.0625 (1/16)		1.587 mm	.299	**7.60 mm**	(3x)	3 mm	50 mm	CSG0625-C6	47.10
.0625 (1/16)		1.587 mm	.413	**10.50 mm**	(5x)	3 mm	50 mm	BGN0625-C6	48.10
.0625 (1/16)		1.587 mm	.610	**15.50 mm**	(8x)	3 mm	50 mm	ARY0625-C6	48.70
.0625 (1/16)		1.587 mm	.728	**18.50 mm**	(10x)	3 mm	63 mm	DXT0625-C6	50.00
.0625 (1/16)		1.587 mm	.866	**22.00 mm**	(12x)	3 mm	63 mm	EFG0625-C6	51.50
.0635	#52	1.612 mm	.299	**7.60 mm**	(3x)	3 mm	50 mm	CSG0635-C6	47.10
.0635	#52	1.612 mm	.433	**11.00 mm**	(5x)	3 mm	50 mm	BGN0635-C6	48.10
.0635	#52	1.612 mm	.610	**15.50 mm**	(8x)	3 mm	50 mm	ARY0635-C6	48.70
.0635	#52	1.612 mm	.866	**22.00 mm**	(12x)	3 mm	63 mm	EFG0635-C6	51.50
.0670	#51	1.701 mm	.315	**8.00 mm**	(3x)	3 mm	50 mm	CSG0670-C6	47.10
.0670	#51	1.701 mm	.453	**11.50 mm**	(5x)	3 mm	50 mm	BGN0670-C6	48.10
.0670	#51	1.701 mm	.650	**16.50 mm**	(8x)	3 mm	63 mm	ARY0670-C6	48.70
.0670	#51	1.701 mm	.906	**23.00 mm**	(12x)	3 mm	63 mm	EFG0670-C6	51.50
.0700	#50	1.778 mm	.335	**8.50 mm**	(3x)	3 mm	50 mm	CSG0700-C6	47.10
.0700	#50	1.778 mm	.472	**12.00 mm**	(5x)	3 mm	50 mm	BGN0700-C6	48.10
.0700	#50	1.778 mm	.689	**17.50 mm**	(8x)	3 mm	63 mm	ARY0700-C6	48.70
.0700	#50	1.778 mm	.827	**21.00 mm**	(10x)	3 mm	63 mm	DXT0700-C6	50.10 NEW
.0700	#50	1.778 mm	.945	**24.00 mm**	(12x)	3 mm	63 mm	EFG0700-C6	51.50
.0730	#49	1.854 mm	.354	**9.00 mm**	(3x)	3 mm	50 mm	CSG0730-C6	47.10
.0730	#49	1.854 mm	.492	**12.50 mm**	(5x)	3 mm	50 mm	BGN0730-C6	48.10
.0730	#49	1.854 mm	.709	**18.00 mm**	(8x)	3 mm	63 mm	ARY0730-C6	48.70
.0730	#49	1.854 mm	.984	**25.00 mm**	(12x)	3 mm	63 mm	EFG0730-C6	51.50
.0760	#48	1.930 mm	.354	**9.00 mm**	(3x)	3 mm	50 mm	CSG0760-C6	47.10
.0760	#48	1.930 mm	.512	**13.00 mm**	(5x)	3 mm	50 mm	BGN0760-C6	48.10
.0760	#48	1.930 mm	.748	**19.00 mm**	(8x)	3 mm	63 mm	ARY0760-C6	48.70
.0760	#48	1.930 mm	1.063	**27.00 mm**	(12x)	3 mm	63 mm	EFG0760-C6	51.50
.0781 (5/64)		1.984 mm	.374	**9.50 mm**	(3x)	3 mm	50 mm	CSG0781-C6	47.10
.0781 (5/64)		1.984 mm	.531	**13.50 mm**	(5x)	3 mm	50 mm	BGN0781-C6	48.10
.0781 (5/64)		1.984 mm	.768	**19.50 mm**	(8x)	3 mm	63 mm	ARY0781-C6	48.70
.0781 (5/64)		1.984 mm	.906	**23.00 mm**	(10x)	3 mm	63 mm	DXT0781-C6	50.00
.0781 (5/64)		1.984 mm	1.063	**27.00 mm**	(12x)	3 mm	63 mm	EFG0781-C6	51.50
.0785	#47	1.993 mm	.374	**9.50 mm**	(3x)	3 mm	50 mm	CSG0785-C6	50.40
.0785	#47	1.993 mm	.531	**13.50 mm**	(5x)	3 mm	50 mm	BGN0785-C6	51.80
.0785	#47	1.993 mm	.768	**19.50 mm**	(8x)	3 mm	63 mm	ARY0785-C6	48.70
.0785	#47	1.993 mm	1.063	**27.00 mm**	(12x)	3 mm	63 mm	EFG0785-C6	55.80
.0787		2.000 mm	.374	**9.50 mm**	(3x)	4 mm	50 mm	CSG0787-C6	50.40
.0787		2.000 mm	.531	**13.50 mm**	(5x)	4 mm	50 mm	BGN0787-C6	51.80
.0787		2.000 mm	.768	**19.50 mm**	(8x)	4 mm	63 mm	ARY0787-C6	53.00
.0787		2.000 mm	.945	**24.00 mm**	(10x)	4 mm	63 mm	DXT0787-C6	54.40
.0787		2.000 mm	1.102	**28.00 mm**	(12x)	4 mm	63 mm	EFG0787-C6	55.80
.0800		2.032 mm	.374	**9.50 mm**	(3x)	4 mm	50 mm	CSG0800-C6	50.40
.0800		2.032 mm	.787	**20.00 mm**	(8x)	4 mm	63 mm	ARY0800-C6	53.00

continued on next page

NEW SIZES!

MINIATURE HIGH PERFORMANCE DRILLS

Hardened Steels (cont.)

continued from previous page

DRILL DIAMETER			FLUTE LENGTH			SHANK DIAMETER	OVERALL LENGTH	AlTiN NANO COATED	
inch	wire	metric	inch	metric	hole depth				
		D_1 $^{+.000mm}_{-.013mm}$		L_2 $^{+.25mm}_{-.00mm}$		D_2 (h6)	L_1	2 FL	PRICE
.0810	#46	2.057 mm	.394	**10.00 mm**	(3x)	4 mm	50 mm	CSG0810-C6	50.40
.0810	#46	2.057 mm	.551	**14.00 mm**	(5x)	4 mm	50 mm	BGN0810-C6	51.80
.0810	#46	2.057 mm	.787	**20.00 mm**	(8x)	4 mm	63 mm	ARY0810-C6	53.00
.0810	#46	2.057 mm	1.102	**28.00 mm**	(12x)	4 mm	63 mm	EFG0810-C6	55.80
.0820	#45	2.082 mm	.394	**10.00 mm**	(3x)	4 mm	50 mm	CSG0820-C6	50.40
.0820	#45	2.082 mm	.551	**14.00 mm**	(5x)	4 mm	50 mm	BGN0820-C6	51.80
.0820	#45	2.082 mm	.787	**20.00 mm**	(8x)	4 mm	63 mm	ARY0820-C6	53.00
.0820	#45	2.082 mm	1.142	**29.00 mm**	(12x)	4 mm	75 mm	EFG0820-C6	55.80
.0860	#44	2.184 mm	.413	**10.50 mm**	(3x)	4 mm	50 mm	CSG0860-C6	50.40
.0860	#44	2.184 mm	.571	**14.50 mm**	(5x)	4 mm	50 mm	BGN0860-C6	51.80
.0860	#44	2.184 mm	.827	**21.00 mm**	(8x)	4 mm	63 mm	ARY0860-C6	53.00
.0860	#44	2.184 mm	1.181	**30.00 mm**	(12x)	4 mm	75 mm	EFG0860-C6	55.80
.0890	#43	2.260 mm	.413	**10.50 mm**	(3x)	4 mm	50 mm	CSG0890-C6	50.40
.0890	#43	2.260 mm	.591	**15.00 mm**	(5x)	4 mm	50 mm	BGN0890-C6	51.80
.0890	#43	2.260 mm	.866	**22.00 mm**	(8x)	4 mm	63 mm	ARY0890-C6	53.00
.0890	#43	2.260 mm	1.220	**31.00 mm**	(12x)	4 mm	75 mm	EFG0890-C6	55.80
.0900		2.286 mm	.433	**11.00 mm**	(3x)	4 mm	50 mm	CSG0900-C6	50.40
.0900		2.286 mm	.866	**22.00 mm**	(8x)	4 mm	63 mm	ARY0900-C6	53.00
.0935	#42	2.374 mm	.453	**11.50 mm**	(3x)	4 mm	50 mm	CSG0935-C6	50.40
.0935	#42	2.374 mm	.630	**16.00 mm**	(5x)	4 mm	63 mm	BGN0935-C6	51.80
.0935	#42	2.374 mm	.906	**23.00 mm**	(8x)	4 mm	63 mm	ARY0935-C6	53.00
.0935	#42	2.374 mm	1.299	**33.00 mm**	(12x)	4 mm	75 mm	EFG0935-C6	55.80
.0937 (3/32)		2.381 mm	.453	**11.50 mm**	(3x)	4 mm	50 mm	CSG0937-C6	50.40
.0937 (3/32)		2.381 mm	.630	**16.00 mm**	(5x)	4 mm	63 mm	BGN0937-C6	51.80
.0937 (3/32)		2.381 mm	.906	**23.00 mm**	(8x)	4 mm	63 mm	ARY0937-C6	53.00
.0937 (3/32)		2.381 mm	1.102	**28.00 mm**	(10x)	4 mm	63 mm	DXT0937-C6	54.40
.0937 (3/32)		2.381 mm	1.299	**33.00 mm**	(12x)	4 mm	75 mm	EFG0937-C6	55.80
.0960	#41	2.438 mm	.453	**11.50 mm**	(3x)	4 mm	50 mm	CSG0960-C6	50.40
.0960	#41	2.438 mm	.630	**16.00 mm**	(5x)	4 mm	63 mm	BGN0960-C6	51.80
.0960	#41	2.438 mm	.945	**24.00 mm**	(8x)	4 mm	63 mm	ARY0960-C6	53.00
.0960	#41	2.438 mm	1.339	**34.00 mm**	(12x)	4 mm	75 mm	EFG0960-C6	55.80
.0980	#40	2.489 mm	.472	**12.00 mm**	(3x)	4 mm	50 mm	CSG0980-C6	50.40
.0980	#40	2.489 mm	.669	**17.00 mm**	(5x)	4 mm	63 mm	BGN0980-C6	51.80
.0980	#40	2.489 mm	.945	**24.00 mm**	(8x)	4 mm	63 mm	ARY0980-C6	53.00
.0980	#40	2.489 mm	1.339	**34.00 mm**	(12x)	4 mm	75 mm	EFG0980-C6	55.80
.0984		2.500 mm	.472	**12.00 mm**	(3x)	4 mm	50 mm	CSG0984-C6	53.40
.0984		2.500 mm	.669	**17.00 mm**	(5x)	4 mm	63 mm	BGN0984-C6	55.00
.0984		2.500 mm	.945	**24.00 mm**	(8x)	4 mm	63 mm	ARY0984-C6	56.40
.0984		2.500 mm	1.339	**34.00 mm**	(12x)	4 mm	75 mm	EFG0984-C6	57.70
.0995	#39	2.527 mm	.472	**12.00 mm**	(3x)	4 mm	50 mm	CSG0995-C6	53.40
.0995	#39	2.527 mm	.669	**17.00 mm**	(5x)	4 mm	63 mm	BGN0995-C6	55.00
.0995	#39	2.527 mm	.984	**25.00 mm**	(8x)	4 mm	63 mm	ARY0995-C6	56.40
.0995	#39	2.527 mm	1.378	**35.00 mm**	(12x)	4 mm	75 mm	EFG0995-C6	59.20
.1000		2.540 mm	.472	**12.00 mm**	(3x)	4 mm	50 mm	CSG1000-C6	53.40
.1000		2.540 mm	.669	**17.00 mm**	(5x)	4 mm	63 mm	BGN1000-C6	55.00
.1000		2.540 mm	.984	**25.00 mm**	(8x)	4 mm	63 mm	ARY1000-C6	56.40

continued on next page

NEW SIZES!

MINIATURE HIGH PERFORMANCE DRILLS

Hardened Steels (cont.)

continued from previous page

DRILL DIAMETER			FLUTE LENGTH			SHANK DIAMETER	OVERALL LENGTH	AlTiN NANO COATED	
inch	wire	metric	inch	metric	hole depth				
		D_1 +.000mm −.013mm		L_2 +.25mm −.00mm		D_2 (h6)	L_1	2 FL	PRICE
.1015	#38	2.578 mm	.472	**12.00 mm**	(3x)	4 mm	50 mm	CSG1015-C6	53.40
.1015	#38	2.578 mm	.669	**17.00 mm**	(5x)	4 mm	63 mm	BGN1015-C6	55.00
.1015	#38	2.578 mm	.984	**25.00 mm**	(8x)	4 mm	63 mm	ARY1015-C6	56.40
.1015	#38	2.578 mm	1.378	**35.00 mm**	(12x)	4 mm	75 mm	EFG1015-C6	59.20
.1040	#37	2.641 mm	.492	**12.50 mm**	(3x)	4 mm	50 mm	CSG1040-C6	53.40
.1040	#37	2.641 mm	.709	**18.00 mm**	(5x)	4 mm	63 mm	BGN1040-C6	55.00
.1040	#37	2.641 mm	1.024	**26.00 mm**	(8x)	4 mm	63 mm	ARY1040-C6	56.40
.1040	#37	2.641 mm	1.417	**36.00 mm**	(12x)	4 mm	75 mm	EFG1040-C6	59.20
.1065	#36	2.705 mm	.512	**13.00 mm**	(3x)	4 mm	50 mm	CSG1065-C6	53.40
.1065	#36	2.705 mm	.709	**18.00 mm**	(5x)	4 mm	63 mm	BGN1065-C6	55.00
.1065	#36	2.705 mm	1.024	**26.00 mm**	(8x)	4 mm	63 mm	ARY1065-C6	56.40
.1065	#36	2.705 mm	1.457	**37.00 mm**	(12x)	4 mm	75 mm	EFG1065-C6	59.20
.1093 (7/64)		2.778 mm	.512	**13.00 mm**	(3x)	4 mm	50 mm	CSG1093-C6	53.40
.1093 (7/64)		2.778 mm	.748	**19.00 mm**	(5x)	4 mm	63 mm	BGN1093-C6	55.00
.1093 (7/64)		2.778 mm	1.063	**27.00 mm**	(8x)	4 mm	63 mm	ARY1093-C6	56.40
.1093 (7/64)		2.778 mm	1.299	**33.00 mm**	(10x)	4 mm	75 mm	DXT1093-C6	57.70
.1093 (7/64)		2.778 mm	1.496	**38.00 mm**	(12x)	4 mm	75 mm	EFG1093-C6	59.20
.1100	#35	2.794 mm	.531	**13.50 mm**	(3x)	4 mm	50 mm	CSG1100-C6	53.40
.1100	#35	2.794 mm	.748	**19.00 mm**	(5x)	4 mm	63 mm	BGN1100-C6	55.00
.1100	#35	2.794 mm	1.063	**27.00 mm**	(8x)	4 mm	63 mm	ARY1100-C6	56.40
.1100	#35	2.794 mm	1.496	**38.00 mm**	(12x)	4 mm	75 mm	EFG1100-C6	59.20
.1110	#34	2.819 mm	.531	**13.50 mm**	(3x)	4 mm	50 mm	CSG1110-C6	53.40
.1110	#34	2.819 mm	.748	**19.00 mm**	(5x)	4 mm	63 mm	BGN1110-C6	55.00
.1110	#34	2.819 mm	1.063	**27.00 mm**	(8x)	4 mm	63 mm	ARY1110-C6	56.40
.1110	#34	2.819 mm	1.535	**39.00 mm**	(12x)	4 mm	75 mm	EFG1110-C6	59.20
.1130	#33	2.870 mm	.531	**13.50 mm**	(3x)	4 mm	50 mm	CSG1130-C6	53.40
.1130	#33	2.870 mm	.748	**19.00 mm**	(5x)	4 mm	63 mm	BGN1130-C6	55.00
.1130	#33	2.870 mm	1.102	**28.00 mm**	(8x)	4 mm	63 mm	ARY1130-C6	56.40
.1130	#33	2.870 mm	1.535	**39.00 mm**	(12x)	4 mm	75 mm	EFG1130-C6	59.20
.1160	#32	2.946 mm	.551	**14.00 mm**	(3x)	4 mm	50 mm	CSG1160-C6	53.40
.1160	#32	2.946 mm	.787	**20.00 mm**	(5x)	4 mm	63 mm	BGN1160-C6	55.00
.1160	#32	2.946 mm	1.142	**29.00 mm**	(8x)	4 mm	63 mm	ARY1160-C6	56.40
.1160	#32	2.946 mm	1.575	**40.00 mm**	(12x)	4 mm	75 mm	EFG1160-C6	59.20
.1181		3.000 mm	.571	**14.50 mm**	(3x)	4 mm	50 mm	CSG1181-C6	54.70
.1181		3.000 mm	.787	**20.00 mm**	(5x)	4 mm	63 mm	BGN1181-C6	56.00
.1181		3.000 mm	1.142	**29.00 mm**	(8x)	4 mm	63 mm	ARY1181-C6	57.50
.1181		3.000 mm	1.378	**35.00 mm**	(10x)	4 mm	75 mm	DXT1181-C6	58.70
.1181		3.000 mm	1.654	**42.00 mm**	(12x)	4 mm	100 mm	EFG1181-C6	60.20
		D_1 +.000mm −.013mm		L_2 +.75mm −.00mm		D_2 (h6)	L_1	2 FL	PRICE
.1200	#31	3.048 mm	.571	**14.50 mm**	(3x)	6 mm	63 mm	CSG1200-C6	61.30
.1200	#31	3.048 mm	.827	**21.00 mm**	(5x)	6 mm	63 mm	BGN1200-C6	51.70
.1200	#31	3.048 mm	1.181	**30.00 mm**	(8x)	6 mm	75 mm	ARY1200-C6	64.50
.1200	#31	3.048 mm	1.654	**42.00 mm**	(12x)	6 mm	100 mm	EFG1200-C6	67.10
.1250 (1/8)		3.175 mm	.591	**15.00 mm**	(3x)	6 mm	63 mm	CSG1250-C6	61.30
.1250 (1/8)		3.175 mm	.827	**21.00 mm**	(5x)	6 mm	63 mm	BGN1250-C6	62.60

continued on next page

NEW SIZES!

MINIATURE HIGH PERFORMANCE DRILLS

Hardened Steels (cont.)

continued from previous page

DRILL DIAMETER			FLUTE LENGTH			SHANK DIAMETER	OVERALL LENGTH	AlTiN NANO COATED	
inch	wire	metric	inch	metric	hole depth				
		D_1 +.000mm −.013mm		L_2 +.75mm −.00mm		D_2 (h6)	L_1	2 FL	PRICE
.1250 (1/8)		3.175 mm	1.220	**31.00 mm**	(8x)	6 mm	75 mm	ARY1250-C6	64.50
.1250 (1/8)		3.175 mm	1.457	**37.00 mm**	(10x)	6 mm	100 mm	DXT1250-C6	65.80
.1250 (1/8)		3.175 mm	1.732	**44.00 mm**	(12x)	6 mm	100 mm	EFG1250-C6	67.10
.1285	#30	3.263 mm	.630	**16.00 mm**	(3x)	6 mm	63 mm	CSG1285-C6	61.30
.1285	#30	3.263 mm	1.220	**32.00 mm**	(8x)	6 mm	75 mm	ARY1285-C6	64.50
.1360	#29	3.454 mm	.630	**16.00 mm**	(3x)	6 mm	63 mm	CSG1360-C6	61.30
.1360	#29	3.454 mm	.906	**23.00 mm**	(5x)	6 mm	63 mm	BGN1360-C6	62.60
.1360	#29	3.454 mm	1.339	**34.00 mm**	(8x)	6 mm	75 mm	ARY1360-C6	64.50
.1360	#29	3.454 mm	1.890	**48.00 mm**	(12x)	6 mm	100 mm	EFG1360-C6	67.10
.1405	#28	3.568 mm	.669	**17.00 mm**	(3x)	6 mm	63 mm	CSG1405-C6	61.30
.1405	#28	3.568 mm	1.378	**35.00 mm**	(8x)	6 mm	75 mm	ARY1405-C6	64.50
.1406 (9/64)		3.571 mm	.669	**17.00 mm**	(3x)	6 mm	63 mm	CSG1406-C6	61.30
.1406 (9/64)		3.571 mm	.945	**24.00 mm**	(5x)	6 mm	75 mm	BGN1406-C6	62.60
.1406 (9/64)		3.571 mm	1.378	**35.00 mm**	(8x)	6 mm	75 mm	ARY1406-C6	64.50
.1406 (9/64)		3.571 mm	1.969	**50.00 mm**	(12x)	6 mm	100 mm	EFG1406-C6	67.10
.1440	#27	3.657 mm	.669	**17.00 mm**	(3x)	6 mm	63 mm	CSG1440-C6	61.30
.1440	#27	3.657 mm	1.417	**36.00 mm**	(8x)	6 mm	100 mm	ARY1440-C6	64.50
.1470	#26	3.733 mm	.709	**18.00 mm**	(3x)	6 mm	63 mm	CSG1470-C6	61.30
.1470	#26	3.733 mm	1.024	**26.00 mm**	(5x)	6 mm	75 mm	BGN1470-C6	62.60
.1470	#26	3.733 mm	1.417	**36.00 mm**	(8x)	6 mm	100 mm	ARY1470-C6	64.50
.1470	#26	3.733 mm	2.047	**52.00 mm**	(12x)	6 mm	100 mm	EFG1470-C6	67.10
.1495	#25	3.797 mm	.709	**18.00 mm**	(3x)	6 mm	63 mm	CSG1495-C6	61.30
.1495	#25	3.797 mm	1.457	**37.00 mm**	(8x)	6 mm	100 mm	ARY1495-C6	64.50
.1520	#24	3.860 mm	.709	**18.00 mm**	(3x)	6 mm	63 mm	CSG1520-C6	61.30
.1520	#24	3.860 mm	1.496	**38.00 mm**	(8x)	6 mm	100 mm	ARY1520-C6	64.50
.1540	#23	3.911 mm	.748	**19.00 mm**	(3x)	6 mm	63 mm	CSG1540-C6	61.30
.1540	#23	3.911 mm	1.496	**38.00 mm**	(8x)	6 mm	100 mm	ARY1540-C6	64.50
.1562 (5/32)		3.968 mm	.748	**19.00 mm**	(3x)	6 mm	63 mm	CSG1562-C6	61.30
.1562 (5/32)		3.968 mm	1.024	**26.00 mm**	(5x)	6 mm	75 mm	BGN1562-C6	62.60
.1562 (5/32)		3.968 mm	1.535	**39.00 mm**	(8x)	6 mm	100 mm	ARY1562-C6	64.50
.1562 (5/32)		3.968 mm	2.126	**54.00 mm**	(12x)	6 mm	100 mm	EFG1562-C6	67.10
.1570	#22	3.987 mm	.748	**19.00 mm**	(3x)	6 mm	63 mm	CSG1570-C6	61.30
.1570	#22	3.987 mm	1.535	**39.00 mm**	(8x)	6 mm	100 mm	ARY1570-C6	64.50
.1574		4.000 mm	.748	**19.00 mm**	(3x)	6 mm	63 mm	CSG1574-C6	61.30
.1574		4.000 mm	1.102	**28.00 mm**	(5x)	6 mm	75 mm	BGN1574-C6	62.60
.1574		4.000 mm	1.535	**39.00 mm**	(8x)	6 mm	100 mm	ARY1574-C6	64.50
.1590	#21	4.038 mm	.748	**19.00 mm**	(3x)	6 mm	63 mm	CSG1590-C6	61.30
.1590	#21	4.038 mm	1.102	**28.00 mm**	(5x)	6 mm	75 mm	BGN1590-C6	62.60
.1590	#21	4.038 mm	1.535	**39.00 mm**	(8x)	6 mm	100 mm	ARY1590-C6	64.50
.1590	#21	4.038 mm	2.205	**56.00 mm**	(12x)	6 mm	100 mm	EFG1590-C6	67.10
.1610	#20	4.089 mm	.748	**19.00 mm**	(3x)	6 mm	63 mm	CSG1610-C6	61.30
.1610	#20	4.089 mm	1.575	**40.00 mm**	(8x)	6 mm	100 mm	ARY1610-C6	64.50
.1660	#19	4.216 mm	.787	**20.00 mm**	(3x)	6 mm	63 mm	CSG1660-C6	61.30
.1660	#19	4.216 mm	1.654	**42.00 mm**	(8x)	6 mm	100 mm	ARY1660-C6	64.50

continued on next page

NEW SIZES!

MINIATURE HIGH PERFORMANCE DRILLS

Hardened Steels (cont.)

continued from previous page

DRILL DIAMETER			FLUTE LENGTH			SHANK DIAMETER	OVERALL LENGTH	AlTiN NANO COATED	
inch	wire	metric	inch	metric	hole depth				
		D_1 +.000mm −.013mm		L_2 +.75mm −.00mm		D_2 (h6)	L_1	2 FL	PRICE
.1695	#18	4.305 mm	.787	**20.00 mm**	(3x)	6 mm	63 mm	CSG1695-C6	61.30
.1695	#18	4.305 mm	1.654	**42.00 mm**	(8x)	6 mm	100 mm	ARY1695-C6	64.50
.1718 (11/64)		4.365 mm	.827	**21.00 mm**	(3x)	6 mm	63 mm	CSG1718-C6	61.30
.1718 (11/64)		4.365 mm	1.181	**30.00 mm**	(5x)	6 mm	75 mm	BGN1718-C6	62.60
.1718 (11/64)		4.365 mm	1.654	**42.00 mm**	(8x)	6 mm	100 mm	ARY1718-C6	64.50
.1730	#17	4.394 mm	.827	**21.00 mm**	(3x)	6 mm	63 mm	CSG1730-C6	61.30
.1730	#17	4.394 mm	1.654	**42.00 mm**	(8x)	6 mm	100 mm	ARY1730-C6	64.50
.1770	#16	4.495 mm	.827	**21.00 mm**	(3x)	6 mm	63 mm	CSG1770-C6	61.30
.1770	#16	4.495 mm	1.181	**30.00 mm**	(5x)	6 mm	75 mm	BGN1770-C6	62.60
.1770	#16	4.495 mm	1.732	**44.00 mm**	(8x)	6 mm	100 mm	ARY1770-C6	64.50
.1770	#16	4.495 mm	2.441	**62.00 mm**	(12x)	6 mm	125 mm	EFG1770-C6	67.10
.1800	#15	4.572 mm	.866	**22.00 mm**	(3x)	6 mm	63 mm	CSG1800-C6	61.30
.1800	#15	4.572 mm	1.181	**30.00 mm**	(5x)	6 mm	75 mm	BGN1800-C6	62.60
.1800	#15	4.572 mm	1.732	**44.00 mm**	(8x)	6 mm	100 mm	ARY1800-C6	64.50
.1800	#15	4.572 mm	2.441	**62.00 mm**	(12x)	6 mm	125 mm	EFG1800-C6	67.10
.1820	#14	4.622 mm	.866	**22.00 mm**	(3x)	6 mm	63 mm	CSG1820-C6	61.30
.1820	#14	4.622 mm	1.811	**46.00 mm**	(8x)	6 mm	100 mm	ARY1820-C6	64.50
.1850	#13	4.700 mm	.866	**22.00 mm**	(3x)	6 mm	63 mm	CSG1850-C6	61.30
.1850	#13	4.700 mm	1.811	**46.00 mm**	(8x)	6 mm	100 mm	ARY1850-C6	64.50
.1875 (3/16)		4.762 mm	.906	**23.00 mm**	(3x)	6 mm	63 mm	CSG1875-C6	61.30
.1875 (3/16)		4.762 mm	1.260	**32.00 mm**	(5x)	6 mm	75 mm	BGN1875-C6	62.60
.1875 (3/16)		4.762 mm	1.811	**46.00 mm**	(8x)	6 mm	100 mm	ARY1875-C6	64.50
.1875 (3/16)		4.762 mm	2.598	**66.00 mm**	(12x)	6 mm	125 mm	EFG1875-C6	67.10
.1890	#12	4.800 mm	.906	**23.00 mm**	(3x)	6 mm	63 mm	CSG1890-C6	61.30
.1890	#12	4.800 mm	1.811	**46.00 mm**	(8x)	6 mm	100 mm	ARY1890-C6	64.50
.1910	#11	4.851 mm	.906	**23.00 mm**	(3x)	6 mm	63 mm	CSG1910-C6	61.30
.1910	#11	4.851 mm	1.890	**48.00 mm**	(8x)	6 mm	100 mm	ARY1910-C6	64.50
.1935	#10	4.914 mm	.906	**23.00 mm**	(3x)	6 mm	63 mm	CSG1935-C6	61.30
.1935	#10	4.914 mm	1.890	**48.00 mm**	(8x)	6 mm	100 mm	ARY1935-C6	64.50
.1960	#9	4.978 mm	.945	**24.00 mm**	(3x)	6 mm	63 mm	CSG1960-C6	61.30
.1960	#9	4.978 mm	1.890	**48.00 mm**	(8x)	6 mm	100 mm	ARY1960-C6	64.50
.1968		5.000 mm	.945	**24.00 mm**	(3x)	6 mm	63 mm	CSG1968-C6	61.30
.1968		5.000 mm	1.339	**34.00 mm**	(5x)	6 mm	75 mm	BGN1968-C6	62.60
.1968		5.000 mm	1.890	**48.00 mm**	(8x)	6 mm	100 mm	ARY1968-C6	64.50
.1990	#8	5.054 mm	.945	**24.00 mm**	(3x)	6 mm	63 mm	CSG1990-C6	61.30
.1990	#8	5.054 mm	1.969	**50.00 mm**	(8x)	6 mm	100 mm	ARY1990-C6	64.50
.2009	#7	5.105 mm	.945	**24.00 mm**	(3x)	6 mm	63 mm	CSG2009-C6	61.30
.2009	#7	5.105 mm	1.339	**34.00 mm**	(5x)	6 mm	75 mm	BGN2009-C6	62.60
.2009	#7	5.105 mm	1.969	**50.00 mm**	(8x)	6 mm	100 mm	ARY2009-C6	64.50
.2031 (13/64)		5.159 mm	.945	**24.00 mm**	(3x)	6 mm	63 mm	CSG2031-C6	61.30
.2031 (13/64)		5.159 mm	1.339	**34.00 mm**	(5x)	6 mm	75 mm	BGN2031-C6	62.60
.2031 (13/64)		5.159 mm	1.969	**50.00 mm**	(8x)	6 mm	100 mm	ARY2031-C6	64.50
.2040	#6	5.181 mm	.945	**24.00 mm**	(3x)	6 mm	63 mm	CSG2040-C6	61.30
.2040	#6	5.181 mm	1.969	**50.00 mm**	(8x)	6 mm	100 mm	ARY2040-C6	64.50
.2055	#5	5.219 mm	.945	**24.00 mm**	(3x)	6 mm	63 mm	CSG2055-C6	61.30
.2055	#5	5.219 mm	1.969	**50.00 mm**	(8x)	6 mm	100 mm	ARY2055-C6	64.50

continued on next page

NEW SIZES!

MINIATURE HIGH PERFORMANCE DRILLS

Hardened Steels (cont.)

continued from previous page

DRILL DIAMETER			FLUTE LENGTH			SHANK DIAMETER	OVERALL LENGTH	AlTiN NANO COATED	
inch	wire	metric	inch	metric	hole depth				
		D_1 +.000mm −.013mm		L_2 +.75mm −.00mm		D_2 (h6)	L_1	2 FL	PRICE
.2090	#4	5.308 mm	1.024	**26.00 mm**	(3x)	6 mm	75 mm	CSG2090-C6	61.30
.2090	#4	5.308 mm	2.047	**52.00 mm**	(8x)	6 mm	100 mm	ARY2090-C6	64.50
.2129	#3	5.410 mm	1.024	**26.00 mm**	(3x)	6 mm	75 mm	CSG2129-C6	61.30
.2129	#3	5.410 mm	1.417	**36.00 mm**	(5x)	6 mm	75 mm	BGN2129-C6	62.60
.2129	#3	5.410 mm	2.047	**52.00 mm**	(8x)	6 mm	100 mm	ARY2129-C6	64.50
.2187 (7/32)		5.556 mm	1.024	**26.00 mm**	(3x)	6 mm	75 mm	CSG2187-C6	61.30
.2187 (7/32)		5.556 mm	1.496	**38.00 mm**	(5x)	6 mm	100 mm	BGN2187-C6	62.60
.2187 (7/32)		5.556 mm	2.126	**54.00 mm**	(8x)	6 mm	100 mm	ARY2187-C6	64.50
.2210	#2	5.613 mm	1.024	**26.00 mm**	(3x)	6 mm	75 mm	CSG2210-C6	61.30
.2210	#2	5.613 mm	2.126	**54.00 mm**	(8x)	6 mm	100 mm	ARY2210-C6	64.50
.2280	#1	5.791 mm	1.102	**28.00 mm**	(3x)	6 mm	75 mm	CSG2280-C6	61.30
.2280	#1	5.791 mm	2.205	**56.00 mm**	(8x)	6 mm	100 mm	ARY2280-C6	64.50
.2340	A	5.943 mm	1.102	**28.00 mm**	(3x)	6 mm	75 mm	CSG2340-C6	61.30
.2340	A	5.943 mm	2.283	**58.00 mm**	(8x)	6 mm	100 mm	ARY2340-C6	64.50
.2343 (15/64)		5.953 mm	1.102	**28.00 mm**	(3x)	6 mm	75 mm	CSG2343-C6	61.30
.2343 (15/64)		5.953 mm	1.575	**40.00 mm**	(5x)	6 mm	100 mm	BGN2343-C6	62.60
.2343 (15/64)		5.953 mm	2.283	**58.00 mm**	(8x)	6 mm	100 mm	ARY2343-C6	64.50
.2362		6.000 mm	1.102	**28.00 mm**	(3x)	6 mm	75 mm	CSG2362-C6	61.30
.2362		6.000 mm	1.575	**40.00 mm**	(5x)	6 mm	100 mm	BGN2362-C6	62.60
.2362		6.000 mm	2.283	**58.00 mm**	(8x)	6 mm	100 mm	ARY2362-C6	64.50
.2380	B	6.045 mm	1.102	**28.00 mm**	(3x)	8 mm	75 mm	CSG2380-C6	63.40
.2380	B	6.045 mm	2.283	**58.00 mm**	(8x)	8 mm	100 mm	ARY2380-C6	66.40
.2420	C	6.146 mm	1.181	**30.00 mm**	(3x)	8 mm	75 mm	CSG2420-C6	63.40
.2420	C	6.146 mm	2.362	**60.00 mm**	(8x)	8 mm	100 mm	ARY2420-C6	66.40
.2460	D	6.248 mm	1.181	**30.00 mm**	(3x)	8 mm	75 mm	CSG2460-C6	63.40
.2460	D	6.248 mm	2.362	**60.00 mm**	(8x)	8 mm	100 mm	ARY2460-C6	66.40
.2500 (1/4)	E	6.350 mm	1.181	**30.00 mm**	(3x)	8 mm	75 mm	CSG2500-C6	63.40
.2500 (1/4)	E	6.350 mm	1.654	**42.00 mm**	(5x)	8 mm	100 mm	BGN2500-C6	64.60
.2500 (1/4)	E	6.350 mm	2.441	**62.00 mm**	(8x)	8 mm	125 mm	ARY2500-C6	66.40

SPEEDS & FEEDS (Miniature High Performance Drills – Hardened Steels)

Important Note: Values in table are in inches and are based on 3x and 5x drill lengths. For longer lengths, table values of IPR must be reduced (for 8x and 10x, reduce to 75%. For 12x, reduce to 65%). Pecking cycles are recommended to avoid chip pacing and breakage. For materials at 38-45 Rc, initial peck depth should be 1-2x Diameter with each subsequent peck at .5-1x Diameter. For higher hardness materials, peck depths should be .5-1x Diameter. For complete speeds and feeds charts, please go to www.harveytool.com.

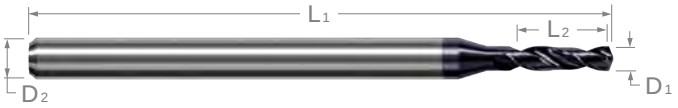
Material	Hardness	SFM	Chip Load IPR (Inches Per Revolution) By Drill Diameter								
			.015	.031	.047	.062	.078	.093	.125	.187	.250
Hardened Steels	38-45 Rc	150	.00029	.00060	.00090	.00119	.00150	.00179	.00240	.00359	.00480
	46-55 Rc	90	.00022	.00045	.00068	.00089	.00112	.00134	.00180	.00269	.00360
	56-68 Rc	40	.00014	.00030	.00045	.00060	.00075	.00089	.00120	.00180	.00240

View a comprehensive library of **Speeds & Feeds** charts for every Harvey Tool End Mill on the new Harveytool.com.

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MINIATURE HIGH PERFORMANCE DRILLS

Prehardened Steels



Available for 3x, 5x, 8x, 10x, & 12x Hole Depths!

- Optimized for drilling prehardened medium alloy steels, stainless steels, and tool steels up to 45Rc
- 140° point angle
- Specialized flute shape for improved chip evacuation and maximum rigidity
- AlTiN coated for improved lubricity and heat resistance
- h6 shank tolerance for high precision tool holders
- Solid carbide
- CNC ground in the USA



Specialized Flute Shape for Improved Chip Evacuation

DRILL DIAMETER			FLUTE LENGTH			SHANK DIAMETER	OVERALL LENGTH	AlTiN COATED	
inch	wire	metric	inch	metric	hole depth				
		D_1 $^{+.000mm}_{-.013mm}$		L_2 $^{+.25mm}_{-.00mm}$		D_2 (h6)	L_1	2 FL	PRICE
.0078		.200 mm	.037	**.95 mm**	(3x)	3 mm	50 mm	DHE0078-C3	41.00
.0078		.200 mm	.053	**1.35 mm**	(5x)	3 mm	50 mm	BVT0078-C3	42.20
.0079		.201 mm	.053	**1.35 mm**	(5x)	3 mm	50 mm	BVT0079-C3	42.20
.0083	#91	.210 mm	.039	**1.00 mm**	(3x)	3 mm	50 mm	DHE0083-C3	41.00
.0083	#91	.210 mm	.055	**1.40 mm**	(5x)	3 mm	50 mm	BVT0083-C3	42.20
.0087	#90	.221 mm	.041	**1.05 mm**	(3x)	3 mm	50 mm	DHE0087-C3	41.00
.0087	#90	.221 mm	.059	**1.50 mm**	(5x)	3 mm	50 mm	BVT0087-C3	42.20
.0091	#89	.231 mm	.043	**1.10 mm**	(3x)	3 mm	50 mm	DHE0091-C3	41.00
.0091	#89	.231 mm	.061	**1.55 mm**	(5x)	3 mm	50 mm	BVT0091-C3	42.20
.0095	#88	.241 mm	.045	**1.15 mm**	(3x)	3 mm	50 mm	DHE0095-C3	41.00
.0095	#88	.241 mm	.065	**1.65 mm**	(5x)	3 mm	50 mm	BVT0095-C3	42.20
.0100	#87	.254 mm	.047	**1.20 mm**	(3x)	3 mm	50 mm	DHE0100-C3	40.00
.0100	#87	.254 mm	.067	**1.70 mm**	(5x)	3 mm	50 mm	BVT0100-C3	41.00
.0100	#87	.254 mm	.098	**2.50 mm**	(8x)	3 mm	50 mm	ADS0100-C3	44.00
.0100	#87	.254 mm	.118	**3.00 mm**	(10x)	3 mm	50 mm	EXP0100-C3	45.40
.0100	#87	.254 mm	.138	**3.50 mm**	(12x)	3 mm	50 mm	CHT0100-C3	47.00
.0105	#86	.266 mm	.049	**1.25 mm**	(3x)	3 mm	50 mm	DHE0105-C3	40.00
.0105	#86	.266 mm	.071	**1.80 mm**	(5x)	3 mm	50 mm	BVT0105-C3	41.00
.0105	#86	.266 mm	.102	**2.60 mm**	(8x)	3 mm	50 mm	ADS0105-C3	44.00
.0105	#86	.266 mm	.146	**3.70 mm**	(12x)	3 mm	50 mm	CHT0105-C3	47.00
.0110	#85	.279 mm	.053	**1.35 mm**	(3x)	3 mm	50 mm	DHE0110-C3	40.00
.0110	#85	.279 mm	.075	**1.90 mm**	(5x)	3 mm	50 mm	BVT0110-C3	41.00
.0110	#85	.279 mm	.106	**2.70 mm**	(8x)	3 mm	50 mm	ADS0110-C3	44.00
.0110	#85	.279 mm	.130	**3.30 mm**	(10x)	3 mm	50 mm	EXP0110-C3	45.40
.0110	#85	.279 mm	.150	**3.80 mm**	(12x)	3 mm	50 mm	CHT0110-C3	47.00
.0115	#84	.292 mm	.055	**1.40 mm**	(3x)	3 mm	50 mm	DHE0115-C3	40.00
.0115	#84	.292 mm	.079	**2.00 mm**	(5x)	3 mm	50 mm	BVT0115-C3	41.00
.0115	#84	.292 mm	.110	**2.80 mm**	(8x)	3 mm	50 mm	ADS0115-C3	44.00
.0115	#84	.292 mm	.157	**4.00 mm**	(12x)	3 mm	50 mm	CHT0115-C3	47.00
.0118		.300 mm	.079	**2.00 mm**	(5x)	3 mm	50 mm	BVT0118-C3	41.00
.0118		.300 mm	.161	**4.10 mm**	(12x)	3 mm	50 mm	CHT0118-C3	47.00
.0120	#83	.304 mm	.057	**1.45 mm**	(3x)	3 mm	50 mm	DHE0120-C3	40.00
.0120	#83	.304 mm	.083	**2.10 mm**	(5x)	3 mm	50 mm	BVT0120-C3	41.00
.0120	#83	.304 mm	.118	**3.00 mm**	(8x)	3 mm	50 mm	ADS0120-C3	44.00
.0120	#83	.304 mm	.142	**3.60 mm**	(10x)	3 mm	50 mm	EXP0120-C3	45.40
.0120	#83	.304 mm	.165	**4.20 mm**	(12x)	3 mm	50 mm	CHT0120-C3	47.00

continued on next page

MINIATURE HIGH PERFORMANCE DRILLS

Prehardened Steels (cont.)

continued from previous page

DRILL DIAMETER			FLUTE LENGTH			SHANK DIAMETER	OVERALL LENGTH	AlTiN COATED	
inch	wire	metric	inch	metric	hole depth				
		D_1 $^{+.000mm}_{-.013mm}$		L_2 $^{+.25mm}_{-.00mm}$		D_2 (h6)	L_1	2 FL	PRICE
.0125	#82	.317 mm	.059	**1.50 mm**	(3x)	3 mm	50 mm	DHE0125-C3	40.00
.0125	#82	.317 mm	.083	**2.10 mm**	(5x)	3 mm	50 mm	BVT0125-C3	41.00
.0125	#82	.317 mm	.122	**3.10 mm**	(8x)	3 mm	50 mm	ADS0125-C3	44.00
.0125	#82	.317 mm	.173	**4.40 mm**	(12x)	3 mm	50 mm	CHT0125-C3	47.00
.0130	#81	.330 mm	.061	**1.55 mm**	(3x)	3 mm	50 mm	DHE0130-C3	40.00
.0130	#81	.330 mm	.087	**2.20 mm**	(5x)	3 mm	50 mm	BVT0130-C3	41.00
.0130	#81	.330 mm	.126	**3.20 mm**	(8x)	3 mm	50 mm	ADS0130-C3	44.00
.0130	#81	.330 mm	.154	**3.90 mm**	(10x)	3 mm	50 mm	EXP0130-C3	45.40
.0130	#81	.330 mm	.177	**4.50 mm**	(12x)	3 mm	50 mm	CHT0130-C3	47.00
.0135	#80	.342 mm	.065	**1.65 mm**	(3x)	3 mm	50 mm	DHE0135-C3	40.00
.0135	#80	.342 mm	.091	**2.30 mm**	(5x)	3 mm	50 mm	BVT0135-C3	41.00
.0135	#80	.342 mm	.130	**3.30 mm**	(8x)	3 mm	50 mm	ADS0135-C3	44.00
.0135	#80	.342 mm	.185	**4.70 mm**	(12x)	3 mm	50 mm	CHT0135-C3	47.00
.0140		.355 mm	.067	**1.70 mm**	(3x)	3 mm	50 mm	DHE0140-C3	40.00
.0140		.355 mm	.094	**2.40 mm**	(5x)	3 mm	50 mm	BVT0140-C3	41.00
.0140		.355 mm	.138	**3.50 mm**	(8x)	3 mm	50 mm	ADS0140-C3	44.00
.0140		.355 mm	.193	**4.90 mm**	(12x)	3 mm	50 mm	CHT0140-C3	47.00
.0144	#79	.368 mm	.069	**1.75 mm**	(3x)	3 mm	50 mm	DHE0144-C3	40.00
.0144	#79	.368 mm	.098	**2.50 mm**	(5x)	3 mm	50 mm	BVT0144-C3	41.00
.0144	#79	.368 mm	.142	**3.60 mm**	(8x)	3 mm	50 mm	ADS0144-C3	44.00
.0144	#79	.368 mm	.169	**4.30 mm**	(10x)	3 mm	50 mm	EXP0144-C3	45.40
.0144	#79	.368 mm	.197	**5.00 mm**	(12x)	3 mm	50 mm	CHT0144-C3	47.00
.0150		.381 mm	.071	**1.80 mm**	(3x)	3 mm	50 mm	DHE0150-C3	40.00
.0150		.381 mm	.102	**2.60 mm**	(5x)	3 mm	50 mm	BVT0150-C3	41.00
.0150		.381 mm	.146	**3.70 mm**	(8x)	3 mm	50 mm	ADS0150-C3	44.00
.0150		.381 mm	.205	**5.20 mm**	(12x)	3 mm	50 mm	CHT0150-C3	47.00
.0156 (1/64)		.396 mm	.075	**1.90 mm**	(3x)	3 mm	50 mm	DHE0156-C3	40.00
.0156 (1/64)		.396 mm	.106	**2.70 mm**	(5x)	3 mm	50 mm	BVT0156-C3	41.00
.0156 (1/64)		.396 mm	.154	**3.90 mm**	(8x)	3 mm	50 mm	ADS0156-C3	44.00
.0156 (1/64)		.396 mm	.185	**4.70 mm**	(10x)	3 mm	50 mm	EXP0156-C3	45.40
.0156 (1/64)		.396 mm	.213	**5.40 mm**	(12x)	3 mm	50 mm	CHT0156-C3	47.00
.0157		.400 mm	.106	**2.70 mm**	(5x)	3 mm	50 mm	BVT0157-C3	41.00
.0157		.400 mm	.220	**5.60 mm**	(12x)	3 mm	50 mm	CHT0157-C3	47.00
.0160	#78	.406 mm	.079	**2.00 mm**	(3x)	3 mm	50 mm	DHE0160-C3	40.00
.0160	#78	.406 mm	.106	**2.70 mm**	(5x)	3 mm	50 mm	BVT0160-C3	41.00
.0160	#78	.406 mm	.157	**4.00 mm**	(8x)	3 mm	50 mm	ADS0160-C3	44.00
.0160	#78	.406 mm	.189	**4.80 mm**	(10x)	3 mm	50 mm	EXP0160-C3	45.40
.0160	#78	.406 mm	.220	**5.60 mm**	(12x)	3 mm	50 mm	CHT0160-C3	47.00
.0170		.431 mm	.083	**2.10 mm**	(3x)	3 mm	50 mm	DHE0170-C3	40.00
.0170		.431 mm	.114	**2.90 mm**	(5x)	3 mm	50 mm	BVT0170-C3	41.00
.0170		.431 mm	.165	**4.20 mm**	(8x)	3 mm	50 mm	ADS0170-C3	44.00
.0170		.431 mm	.236	**6.00 mm**	(12x)	3 mm	50 mm	CHT0170-C3	47.00
.0180	#77	.457 mm	.087	**2.20 mm**	(3x)	3 mm	50 mm	DHE0180-C3	40.00
.0180	#77	.457 mm	.122	**3.10 mm**	(5x)	3 mm	50 mm	BVT0180-C3	41.00
.0180	#77	.457 mm	.177	**4.50 mm**	(8x)	3 mm	50 mm	ADS0180-C3	44.40
.0180	#77	.457 mm	.213	**5.40 mm**	(10x)	3 mm	50 mm	EXP0180-C3	45.40
.0180	#77	.457 mm	.244	**6.20 mm**	(12x)	3 mm	50 mm	CHT0180-C3	47.00

continued on next page

MINIATURE HIGH PERFORMANCE DRILLS

Prehardened Steels (cont.)

continued from previous page

DRILL DIAMETER			FLUTE LENGTH			SHANK DIAMETER	OVERALL LENGTH	AlTiN COATED	
inch	wire	metric	inch	metric	hole depth				
		D_1 +.000mm −.013mm		L_2 +.25mm −.00mm		D_2 (h6)	L_1	2 FL	PRICE
.0190		.482 mm	.091	**2.30 mm**	(3x)	3 mm	50 mm	DHE0190-C3	40.00
.0190		.482 mm	.130	**3.30 mm**	(5x)	3 mm	50 mm	BVT0190-C3	41.00
.0190		.482 mm	.185	**4.70 mm**	(8x)	3 mm	50 mm	ADS0190-C3	44.00
.0190		.482 mm	.260	**6.60 mm**	(12x)	3 mm	50 mm	CHT0190-C3	47.00
.0196		.500 mm	.094	**2.40 mm**	(3x)	3 mm	50 mm	DHE0196-C3	39.50
.0196		.500 mm	.134	**3.40 mm**	(5x)	3 mm	50 mm	BVT0196-C3	40.40
.0196		.500 mm	.193	**4.90 mm**	(8x)	3 mm	50 mm	ADS0196-C3	44.40
.0196		.500 mm	.228	**5.80 mm**	(10x)	3 mm	50 mm	EXP0196-C3	45.60
.0196		.500 mm	.268	**6.80 mm**	(12x)	3 mm	50 mm	CHT0196-C3	45.90
.0200	#76	.508 mm	.094	**2.40 mm**	(3x)	3 mm	50 mm	DHE0200-C3	39.50
.0200	#76	.508 mm	.134	**3.40 mm**	(5x)	3 mm	50 mm	BVT0200-C3	40.40
.0200	#76	.508 mm	.197	**5.00 mm**	(8x)	3 mm	50 mm	ADS0200-C3	44.40
.0200	#76	.508 mm	.228	**6.00 mm**	(10x)	3 mm	50 mm	EXP0200-C3	45.60
.0200	#76	.508 mm	.276	**7.00 mm**	(12x)	3 mm	50 mm	CHT0200-C3	45.90
.0210	#75	.533 mm	.098	**2.50 mm**	(3x)	3 mm	50 mm	DHE0210-C3	39.50
.0210	#75	.533 mm	.142	**3.60 mm**	(5x)	3 mm	50 mm	BVT0210-C3	40.40
.0210	#75	.533 mm	.205	**5.20 mm**	(8x)	3 mm	50 mm	ADS0210-C3	44.40
.0210	#75	.533 mm	.244	**6.20 mm**	(10x)	3 mm	50 mm	EXP0210-C3	45.60
.0210	#75	.533 mm	.291	**7.40 mm**	(12x)	3 mm	50 mm	CHT0210-C3	45.90
.0220		.558 mm	.106	**2.70 mm**	(3x)	3 mm	50 mm	DHE0220-C3	39.50
.0220		.558 mm	.150	**3.80 mm**	(5x)	3 mm	50 mm	BVT0220-C3	40.40
.0220		.558 mm	.213	**5.40 mm**	(8x)	3 mm	50 mm	ADS0220-C3	44.40
.0220		.558 mm	.299	**7.60 mm**	(12x)	3 mm	50 mm	CHT0220-C3	45.90
.0225	#74	.571 mm	.106	**2.70 mm**	(3x)	3 mm	50 mm	DHE0225-C3	39.50
.0225	#74	.571 mm	.154	**3.90 mm**	(5x)	3 mm	50 mm	BVT0225-C3	40.40
.0225	#74	.571 mm	.220	**5.60 mm**	(8x)	3 mm	50 mm	ADS0225-C3	44.40
.0225	#74	.571 mm	.268	**6.80 mm**	(10x)	3 mm	50 mm	EXP0225-C3	45.60
.0225	#74	.571 mm	.307	**7.80 mm**	(12x)	3 mm	50 mm	CHT0225-C3	45.90
.0230		.584 mm	.110	**2.80 mm**	(3x)	3 mm	50 mm	DHE0230-C3	39.50
.0230		.584 mm	.154	**3.90 mm**	(5x)	3 mm	50 mm	BVT0230-C3	40.40
.0230		.584 mm	.220	**5.60 mm**	(8x)	3 mm	50 mm	ADS0230-C3	44.40
.0230		.584 mm	.315	**8.00 mm**	(12x)	3 mm	50 mm	CHT0230-C3	45.90
.0236		.600 mm	.157	**4.00 mm**	(5x)	3 mm	50 mm	BVT0236-C3	40.40
.0236		.600 mm	.323	**8.20 mm**	(12x)	3 mm	50 mm	CHT0236-C3	45.90
.0240	#73	.609 mm	.114	**2.90 mm**	(3x)	3 mm	50 mm	DHE0240-C3	39.50
.0240	#73	.609 mm	.165	**4.20 mm**	(5x)	3 mm	50 mm	BVT0240-C3	40.40
.0240	#73	.609 mm	.236	**6.00 mm**	(8x)	3 mm	50 mm	ADS0240-C3	44.40
.0240	#73	.609 mm	.283	**7.20 mm**	(10x)	3 mm	50 mm	EXP0240-C3	45.60
.0240	#73	.609 mm	.331	**8.40 mm**	(12x)	3 mm	50 mm	CHT0240-C3	45.90
.0250	#72	.635 mm	.118	**3.00 mm**	(3x)	3 mm	50 mm	DHE0250-C3	39.50
.0250	#72	.635 mm	.165	**4.20 mm**	(5x)	3 mm	50 mm	BVT0250-C3	40.40
.0250	#72	.635 mm	.244	**6.20 mm**	(8x)	3 mm	50 mm	ADS0250-C3	44.40
.0250	#72	.635 mm	.291	**7.40 mm**	(10x)	3 mm	50 mm	EXP0250-C3	45.60
.0250	#72	.635 mm	.346	**8.80 mm**	(12x)	3 mm	50 mm	CHT0250-C3	45.90
.0260	#71	.660 mm	.122	**3.10 mm**	(3x)	3 mm	50 mm	DHE0260-C3	39.50
.0260	#71	.660 mm	.173	**4.40 mm**	(5x)	3 mm	50 mm	BVT0260-C3	40.40
.0260	#71	.660 mm	.252	**6.40 mm**	(8x)	3 mm	50 mm	ADS0260-C3	44.40

continued on next page

MINIATURE HIGH PERFORMANCE DRILLS

Prehardened Steels (cont.)

continued from previous page

DRILL DIAMETER			FLUTE LENGTH			SHANK DIAMETER	OVERALL LENGTH	AlTiN COATED	
inch	wire	metric	inch	metric	hole depth				
		D_1 +.000mm −.013mm		L_2 +.25mm −.00mm		D_2 (h6)	L_1	2 FL	PRICE
.0260	#71	.660 mm	.307	**7.80 mm**	(10x)	3 mm	50 mm	EXP0260-C3	45.60
.0260	#71	.660 mm	.354	**9.00 mm**	(12x)	3 mm	50 mm	CHT0260-C3	45.90
.0270		.685 mm	.130	**3.30 mm**	(3x)	3 mm	50 mm	DHE0270-C3	39.50
.0270		.685 mm	.181	**4.60 mm**	(5x)	3 mm	50 mm	BVT0270-C3	40.40
.0270		.685 mm	.260	**6.60 mm**	(8x)	3 mm	50 mm	ADS0270-C3	44.40
.0270		.685 mm	.370	**9.40 mm**	(12x)	3 mm	50 mm	CHT0270-C3	45.90
.0275		.700 mm	.189	**4.80 mm**	(5x)	3 mm	50 mm	BVT0275-C3	40.40
.0275		.700 mm	.378	**9.60 mm**	(12x)	3 mm	50 mm	CHT0275-C3	45.90
.0280	#70	.711 mm	.134	**3.40 mm**	(3x)	3 mm	50 mm	DHE0280-C3	39.50
.0280	#70	.711 mm	.189	**4.80 mm**	(5x)	3 mm	50 mm	BVT0280-C3	40.40
.0280	#70	.711 mm	.276	**7.00 mm**	(8x)	3 mm	50 mm	ADS0280-C3	44.40
.0280	#70	.711 mm	.331	**8.40 mm**	(10x)	3 mm	50 mm	EXP0280-C3	45.60
.0280	#70	.711 mm	.386	**9.80 mm**	(12x)	3 mm	50 mm	CHT0280-C3	45.90
.0292	#69	.741 mm	.138	**3.50 mm**	(3x)	3 mm	50 mm	DHE0292-C3	39.50
.0292	#69	.741 mm	.197	**5.00 mm**	(5x)	3 mm	50 mm	BVT0292-C3	40.40
.0292	#69	.741 mm	.283	**7.20 mm**	(8x)	3 mm	50 mm	ADS0292-C3	44.40
.0292	#69	.741 mm	.346	**8.80 mm**	(10x)	3 mm	50 mm	EXP0292-C3	45.60
.0292	#69	.741 mm	.394	**10.00 mm**	(12x)	3 mm	50 mm	CHT0292-C3	45.90
.0300		.762 mm	.142	**3.60 mm**	(3x)	3 mm	50 mm	DHE0300-C3	39.50
.0300		.762 mm	.205	**5.20 mm**	(5x)	3 mm	50 mm	BVT0300-C3	40.40
.0300		.762 mm	.291	**7.40 mm**	(8x)	3 mm	50 mm	ADS0300-C3	44.40
.0300		.762 mm	.413	**10.50 mm**	(12x)	3 mm	50 mm	CHT0300-C3	45.90
.0310	#68	.787 mm	.146	**3.70 mm**	(3x)	3 mm	50 mm	DHE0310-C3	40.00
.0310	#68	.787 mm	.213	**5.40 mm**	(5x)	3 mm	50 mm	BVT0310-C3	40.80
.0310	#68	.787 mm	.299	**7.60 mm**	(8x)	3 mm	50 mm	ADS0310-C3	44.40
.0310	#68	.787 mm	.362	**9.20 mm**	(10x)	3 mm	50 mm	EXP0310-C3	45.60
.0310	#68	.787 mm	.433	**11.00 mm**	(12x)	3 mm	50 mm	CHT0310-C3	47.10
.0312 (1/32)		.793 mm	.150	**3.80 mm**	(3x)	3 mm	50 mm	DHE0312-C3	40.00
.0312 (1/32)		.793 mm	.213	**5.40 mm**	(5x)	3 mm	50 mm	BVT0312-C3	40.80
.0312 (1/32)		.793 mm	.307	**7.80 mm**	(8x)	3 mm	50 mm	ADS0312-C3	44.40
.0312 (1/32)		.793 mm	.370	**9.40 mm**	(10x)	3 mm	50 mm	EXP0312-C3	45.60
.0312 (1/32)		.793 mm	.433	**11.00 mm**	(12x)	3 mm	50 mm	CHT0312-C3	47.10
.0315		.800 mm	.213	**5.40 mm**	(5x)	3 mm	50 mm	BVT0315-C3	40.80
.0315		.800 mm	.433	**11.00 mm**	(12x)	3 mm	50 mm	CHT0315-C3	47.10
.0320	#67	.812 mm	.154	**3.90 mm**	(3x)	3 mm	50 mm	DHE0320-C3	40.00
.0320	#67	.812 mm	.213	**5.40 mm**	(5x)	3 mm	50 mm	BVT0320-C3	40.80
.0320	#67	.812 mm	.315	**8.00 mm**	(8x)	3 mm	50 mm	ADS0320-C3	44.40
.0320	#67	.812 mm	.378	**9.60 mm**	(10x)	3 mm	50 mm	EXP0320-C3	45.60
.0320	#67	.812 mm	.433	**11.00 mm**	(12x)	3 mm	50 mm	CHT0320-C3	47.10
.0330	#66	.838 mm	.157	**4.00 mm**	(3x)	3 mm	50 mm	DHE0330-C3	40.00
.0330	#66	.838 mm	.220	**5.60 mm**	(5x)	3 mm	50 mm	BVT0330-C3	40.80
.0330	#66	.838 mm	.323	**8.20 mm**	(8x)	3 mm	50 mm	ADS0330-C3	44.40
.0330	#66	.838 mm	.386	**9.80 mm**	(10x)	3 mm	50 mm	EXP0330-C3	45.60
.0330	#66	.838 mm	.453	**11.50 mm**	(12x)	3 mm	50 mm	CHT0330-C3	47.10
.0350	#65	.889 mm	.165	**4.20 mm**	(3x)	3 mm	50 mm	DHE0350-C3	40.00
.0350	#65	.889 mm	.236	**6.00 mm**	(5x)	3 mm	50 mm	BVT0350-C3	40.80
.0350	#65	.889 mm	.339	**8.60 mm**	(8x)	3 mm	50 mm	ADS0350-C3	44.40

continued on next page

MINIATURE HIGH PERFORMANCE DRILLS

Prehardened Steels (cont.)

continued from previous page

DRILL DIAMETER			FLUTE LENGTH			SHANK DIAMETER	OVERALL LENGTH	AlTiN COATED	
inch	wire	metric	inch	metric	hole depth				
		D_1 $^{+.000mm}_{-.013mm}$		L_2 $^{+.25mm}_{-.00mm}$		D_2 (h6)	L_1	2 FL	PRICE
.0350	#65	.889 mm	.413	**10.50 mm**	(10x)	3 mm	50 mm	EXP0350-C3	45.60
.0350	#65	.889 mm	.472	**12.00 mm**	(12x)	3 mm	50 mm	CHT0350-C3	47.10
.0354		.900 mm	.236	**6.00 mm**	(5x)	3 mm	50 mm	BVT0354-C3	38.90
.0354		.900 mm	.492	**12.50 mm**	(12x)	3 mm	50 mm	CHT0354-C3	47.10
.0360	#64	.914 mm	.173	**4.40 mm**	(3x)	3 mm	50 mm	DHE0360-C3	40.00
.0360	#64	.914 mm	.244	**6.20 mm**	(5x)	3 mm	50 mm	BVT0360-C3	40.80
.0360	#64	.914 mm	.354	**9.00 mm**	(8x)	3 mm	50 mm	ADS0360-C3	44.40
.0360	#64	.914 mm	.413	**10.50 mm**	(10x)	3 mm	50 mm	EXP0360-C3	45.60
.0360	#64	.914 mm	.492	**12.50 mm**	(12x)	3 mm	50 mm	CHT0360-C3	47.10
.0370	#63	.939 mm	.173	**4.40 mm**	(3x)	3 mm	50 mm	DHE0370-C3	40.00
.0370	#63	.939 mm	.252	**6.40 mm**	(5x)	3 mm	50 mm	BVT0370-C3	40.80
.0370	#63	.939 mm	.362	**9.20 mm**	(8x)	3 mm	50 mm	ADS0370-C3	44.40
.0370	#63	.939 mm	.433	**11.00 mm**	(10x)	3 mm	50 mm	EXP0370-C3	45.60
.0370	#63	.939 mm	.512	**13.00 mm**	(12x)	3 mm	50 mm	CHT0370-C3	47.10
.0380	#62	.965 mm	.181	**4.60 mm**	(3x)	3 mm	50 mm	DHE0380-C3	40.00
.0380	#62	.965 mm	.260	**6.60 mm**	(5x)	3 mm	50 mm	BVT0380-C3	40.80
.0380	#62	.965 mm	.370	**9.40 mm**	(8x)	3 mm	50 mm	ADS0380-C3	44.40
.0380	#62	.965 mm	.453	**11.50 mm**	(10x)	3 mm	50 mm	EXP0380-C3	45.60
.0380	#62	.965 mm	.531	**13.50 mm**	(12x)	3 mm	50 mm	CHT0380-C3	47.10
.0390	#61	.990 mm	.189	**4.80 mm**	(3x)	3 mm	50 mm	DHE0390-C3	40.00
.0390	#61	.990 mm	.260	**6.60 mm**	(5x)	3 mm	50 mm	BVT0390-C3	40.80
.0390	#61	.990 mm	.378	**9.60 mm**	(8x)	3 mm	50 mm	ADS0390-C3	44.40
.0390	#61	.990 mm	.453	**11.50 mm**	(10x)	3 mm	50 mm	EXP0390-C3	45.60
.0390	#61	.990 mm	.531	**13.50 mm**	(12x)	3 mm	50 mm	CHT0390-C3	47.10
.0393		1.000 mm	.189	**4.80 mm**	(3x)	3 mm	50 mm	DHE0393-C3	43.70
.0393		1.000 mm	.268	**6.80 mm**	(5x)	3 mm	50 mm	BVT0393-C3	44.80
.0393		1.000 mm	.386	**9.80 mm**	(8x)	3 mm	50 mm	ADS0393-C3	47.50
.0393		1.000 mm	.472	**12.00 mm**	(10x)	3 mm	50 mm	EXP0393-C3	48.90
.0393		1.000 mm	.551	**14.00 mm**	(12x)	3 mm	50 mm	CHT0393-C3	50.40
.0400	#60	1.016 mm	.189	**4.80 mm**	(3x)	3 mm	50 mm	DHE0400-C3	43.70
.0400	#60	1.016 mm	.268	**6.80 mm**	(5x)	3 mm	50 mm	BVT0400-C3	44.80
.0400	#60	1.016 mm	.394	**10.00 mm**	(8x)	3 mm	50 mm	ADS0400-C3	47.50
.0400	#60	1.016 mm	.472	**12.00 mm**	(10x)	3 mm	50 mm	EXP0400-C3	48.90
.0400	#60	1.016 mm	.551	**14.00 mm**	(12x)	3 mm	50 mm	CHT0400-C3	50.40
.0410	#59	1.041 mm	.197	**5.00 mm**	(3x)	3 mm	50 mm	DHE0410-C3	43.70
.0410	#59	1.041 mm	.276	**7.00 mm**	(5x)	3 mm	50 mm	BVT0410-C3	44.80
.0410	#59	1.041 mm	.394	**10.00 mm**	(8x)	3 mm	50 mm	ADS0410-C3	47.50
.0410	#59	1.041 mm	.472	**12.00 mm**	(10x)	3 mm	50 mm	EXP0410-C3	48.90
.0410	#59	1.041 mm	.571	**14.50 mm**	(12x)	3 mm	50 mm	CHT0410-C3	50.40
.0420	#58	1.066 mm	.197	**5.00 mm**	(3x)	3 mm	50 mm	DHE0420-C3	43.70
.0420	#58	1.066 mm	.283	**7.20 mm**	(5x)	3 mm	50 mm	BVT0420-C3	44.80
.0420	#58	1.066 mm	.413	**10.50 mm**	(8x)	3 mm	50 mm	ADS0420-C3	47.50
.0420	#58	1.066 mm	.492	**12.50 mm**	(10x)	3 mm	50 mm	EXP0420-C3	48.90
.0420	#58	1.066 mm	.571	**14.50 mm**	(12x)	3 mm	50 mm	CHT0420-C3	50.40
.0430	#57	1.092 mm	.205	**5.20 mm**	(3x)	3 mm	50 mm	DHE0430-C3	43.70
.0430	#57	1.092 mm	.291	**7.40 mm**	(5x)	3 mm	50 mm	BVT0430-C3	44.80
.0430	#57	1.092 mm	.413	**10.50 mm**	(8x)	3 mm	50 mm	ADS0430-C3	47.50
.0430	#57	1.092 mm	.512	**13.00 mm**	(10x)	3 mm	50 mm	EXP0430-C3	48.90
.0430	#57	1.092 mm	.591	**15.00 mm**	(12x)	3 mm	50 mm	CHT0430-C3	50.40

continued on next page

MINIATURE HIGH PERFORMANCE DRILLS

Prehardened Steels (cont.)

continued from previous page

DRILL DIAMETER			FLUTE LENGTH			SHANK DIAMETER	OVERALL LENGTH	AlTiN COATED	
inch	wire	metric	inch	metric	hole depth				
		D_1 $^{+.000mm}_{-.013mm}$		L_2 $^{+.25mm}_{-.00mm}$		D_2 (h6)	L_1	2 FL	PRICE
.0450		1.143 mm	.307	**7.80 mm**	(5x)	3 mm	50 mm	BVT0450-C3	44.80
.0450		1.143 mm	.610	**15.50 mm**	(12x)	3 mm	50 mm	CHT0450-C3	50.40
.0465	#56	1.181 mm	.220	**5.60 mm**	(3x)	3 mm	50 mm	DHE0465-C3	43.70
.0465	#56	1.181 mm	.315	**8.00 mm**	(5x)	3 mm	50 mm	BVT0465-C3	44.80
.0465	#56	1.181 mm	.453	**11.50 mm**	(8x)	3 mm	50 mm	ADS0465-C3	47.50
.0465	#56	1.181 mm	.551	**14.00 mm**	(10x)	3 mm	50 mm	EXP0465-C3	48.90
.0465	#56	1.181 mm	.630	**16.00 mm**	(12x)	3 mm	63 mm	CHT0465-C3	50.40
.0468 (3/64)		1.190 mm	.220	**5.60 mm**	(3x)	3 mm	50 mm	DHE0468-C3	43.70
.0468 (3/64)		1.190 mm	.315	**8.00 mm**	(5x)	3 mm	50 mm	BVT0468-C3	44.80
.0468 (3/64)		1.190 mm	.453	**11.50 mm**	(8x)	3 mm	50 mm	ADS0468-C3	47.50
.0468 (3/64)		1.190 mm	.551	**14.00 mm**	(10x)	3 mm	50 mm	EXP0468-C3	48.90
.0468 (3/64)		1.190 mm	.650	**16.50 mm**	(12x)	3 mm	63 mm	CHT0468-C3	50.40
.0492		1.250 mm	.335	**8.50 mm**	(5x)	3 mm	50 mm	BVT0492-C3	44.80
.0492		1.250 mm	.669	**17.00 mm**	(12x)	3 mm	63 mm	CHT0492-C3	50.40
.0500		1.270 mm	.236	**6.00 mm**	(3x)	3 mm	50 mm	DHE0500-C3	43.70
.0500		1.270 mm	.335	**8.50 mm**	(5x)	3 mm	50 mm	BVT0500-C3	44.80
.0500		1.270 mm	.492	**12.50 mm**	(8x)	3 mm	50 mm	ADS0500-C3	47.50
.0500		1.270 mm	.591	**15.00 mm**	(10x)	3 mm	50 mm	EXP0500-C3	48.90
.0500		1.270 mm	.689	**17.50 mm**	(12x)	3 mm	63 mm	CHT0500-C3	50.40
.0520	#55	1.320 mm	.244	**6.20 mm**	(3x)	3 mm	50 mm	DHE0520-C3	43.70
.0520	#55	1.320 mm	.354	**9.00 mm**	(5x)	3 mm	50 mm	BVT0520-C3	44.80
.0520	#55	1.320 mm	.512	**13.00 mm**	(8x)	3 mm	50 mm	ADS0520-C3	47.50
.0520	#55	1.320 mm	.610	**15.50 mm**	(10x)	3 mm	50 mm	EXP0520-C3	48.90
.0520	#55	1.320 mm	.709	**18.00 mm**	(12x)	3 mm	63 mm	CHT0520-C3	50.40
.0550	#54	1.397 mm	.260	**6.60 mm**	(3x)	3 mm	50 mm	DHE0550-C3	43.70
.0550	#54	1.397 mm	.374	**9.50 mm**	(5x)	3 mm	50 mm	BVT0550-C3	44.80
.0550	#54	1.397 mm	.531	**13.50 mm**	(8x)	3 mm	50 mm	ADS0550-C3	47.50
.0550	#54	1.397 mm	.650	**16.50 mm**	(10x)	3 mm	63 mm	EXP0550-C3	48.90
.0550	#54	1.397 mm	.748	**19.00 mm**	(12x)	3 mm	63 mm	CHT0550-C3	50.40
.0590		1.500 mm	.283	**7.20 mm**	(3x)	3 mm	50 mm	DHE0590-C3	47.40
.0590		1.500 mm	.394	**10.00 mm**	(5x)	3 mm	50 mm	BVT0590-C3	48.20
.0590		1.500 mm	.571	**14.50 mm**	(8x)	3 mm	50 mm	ADS0590-C3	51.00
.0590		1.500 mm	.689	**17.50 mm**	(10x)	3 mm	63 mm	EXP0590-C3	52.50
.0590		1.500 mm	.827	**21.00 mm**	(12x)	3 mm	63 mm	CHT0590-C3	54.00
.0595	#53	1.511 mm	.283	**7.20 mm**	(3x)	3 mm	50 mm	DHE0595-C3	47.40
.0595	#53	1.511 mm	.394	**10.00 mm**	(5x)	3 mm	50 mm	BVT0595-C3	48.20
.0595	#53	1.511 mm	.571	**14.50 mm**	(8x)	3 mm	50 mm	ADS0595-C3	51.00
.0595	#53	1.511 mm	.709	**18.00 mm**	(10x)	3 mm	63 mm	EXP0595-C3	52.50
.0595	#53	1.511 mm	.827	**21.00 mm**	(12x)	3 mm	63 mm	CHT0595-C3	54.00
.0600		1.524 mm	.413	**10.50 mm**	(5x)	3 mm	50 mm	BVT0600-C3	48.20
.0600		1.524 mm	.827	**21.00 mm**	(12x)	3 mm	63 mm	CHT0600-C3	54.00
.0625 (1/16)		1.587 mm	.299	**7.60 mm**	(3x)	3 mm	50 mm	DHE0625-C3	47.40
.0625 (1/16)		1.587 mm	.413	**10.50 mm**	(5x)	3 mm	50 mm	BVT0625-C3	48.20
.0625 (1/16)		1.587 mm	.610	**15.50 mm**	(8x)	3 mm	50 mm	ADS0625-C3	51.00
.0625 (1/16)		1.587 mm	.728	**18.50 mm**	(10x)	3 mm	63 mm	EXP0625-C3	52.50
.0625 (1/16)		1.587 mm	.866	**22.00 mm**	(12x)	3 mm	63 mm	CHT0625-C3	54.00

continued on next page

MINIATURE HIGH PERFORMANCE DRILLS

Prehardened Steels (cont.)

continued from previous page

DRILL DIAMETER			FLUTE LENGTH			SHANK DIAMETER	OVERALL LENGTH	AlTiN COATED	
inch	wire	metric	inch	metric	hole depth				
		D_1 $^{+.000mm}_{-.013mm}$		L_2 $^{+.25mm}_{-.00mm}$		D_2 (h6)	L_1	2 FL	PRICE
.0635	#52	1.612 mm	.299	**7.60 mm**	(3x)	3 mm	50 mm	DHE0635-C3	47.40
.0635	#52	1.612 mm	.433	**11.00 mm**	(5x)	3 mm	50 mm	BVT0635-C3	48.20
.0635	#52	1.612 mm	.610	**15.50 mm**	(8x)	3 mm	50 mm	ADS0635-C3	51.00
.0635	#52	1.612 mm	.748	**19.00 mm**	(10x)	3 mm	63 mm	EXP0635-C3	52.50
.0635	#52	1.612 mm	.866	**22.00 mm**	(12x)	3 mm	63 mm	CHT0635-C3	54.00
.0670	#51	1.701 mm	.315	**8.00 mm**	(3x)	3 mm	50 mm	DHE0670-C3	47.40
.0670	#51	1.701 mm	.453	**11.50 mm**	(5x)	3 mm	50 mm	BVT0670-C3	48.20
.0670	#51	1.701 mm	.650	**16.50 mm**	(8x)	3 mm	63 mm	ADS0670-C3	51.00
.0670	#51	1.701 mm	.787	**20.00 mm**	(10x)	3 mm	63 mm	EXP0670-C3	52.50
.0670	#51	1.701 mm	.906	**23.00 mm**	(12x)	3 mm	63 mm	CHT0670-C3	54.00
.0700	#50	1.778 mm	.335	**8.50 mm**	(3x)	3 mm	50 mm	DHE0700-C3	47.40
.0700	#50	1.778 mm	.472	**12.00 mm**	(5x)	3 mm	50 mm	BVT0700-C3	48.20
.0700	#50	1.778 mm	.689	**17.50 mm**	(8x)	3 mm	63 mm	ADS0700-C3	51.00
.0700	#50	1.778 mm	.827	**21.00 mm**	(10x)	3 mm	63 mm	EXP0700-C3	52.50
.0700	#50	1.778 mm	.945	**24.00 mm**	(12x)	3 mm	63 mm	CHT0700-C3	54.00
.0730	#49	1.854 mm	.354	**9.00 mm**	(3x)	3 mm	50 mm	DHE0730-C3	47.40
.0730	#49	1.854 mm	.492	**12.50 mm**	(5x)	3 mm	50 mm	BVT0730-C3	48.20
.0730	#49	1.854 mm	.709	**18.00 mm**	(8x)	3 mm	63 mm	ADS0730-C3	51.00
.0730	#49	1.854 mm	.866	**22.00 mm**	(10x)	3 mm	63 mm	EXP0730-C3	52.50
.0730	#49	1.854 mm	.984	**25.00 mm**	(12x)	3 mm	63 mm	CHT0730-C3	54.00
.0760	#48	1.930 mm	.354	**9.00 mm**	(3x)	3 mm	50 mm	DHE0760-C3	47.40
.0760	#48	1.930 mm	.512	**13.00 mm**	(5x)	3 mm	50 mm	BVT0760-C3	48.20
.0760	#48	1.930 mm	.748	**19.00 mm**	(8x)	3 mm	63 mm	ADS0760-C3	51.00
.0760	#48	1.930 mm	.906	**23.00 mm**	(10x)	3 mm	63 mm	EXP0760-C3	52.50
.0760	#48	1.930 mm	1.063	**27.00 mm**	(12x)	3 mm	63 mm	CHT0760-C3	54.00
.0781 (5/64)		1.984 mm	.374	**9.50 mm**	(3x)	3 mm	50 mm	DHE0781-C3	47.40
.0781 (5/64)		1.984 mm	.531	**13.50 mm**	(5x)	3 mm	50 mm	BVT0781-C3	48.20
.0781 (5/64)		1.984 mm	.768	**19.50 mm**	(8x)	3 mm	63 mm	ADS0781-C3	51.00
.0781 (5/64)		1.984 mm	.906	**23.00 mm**	(10x)	3 mm	63 mm	EXP0781-C3	51.20
.0781 (5/64)		1.984 mm	1.063	**27.00 mm**	(12x)	3 mm	63 mm	CHT0781-C3	54.00
.0785	#47	1.993 mm	.374	**9.50 mm**	(3x)	3 mm	50 mm	DHE0785-C3	47.40
.0785	#47	1.993 mm	.531	**13.50 mm**	(5x)	3 mm	50 mm	BVT0785-C3	48.20
.0785	#47	1.993 mm	.768	**19.50 mm**	(8x)	3 mm	63 mm	ADS0785-C3	51.00
.0785	#47	1.993 mm	.906	**23.00 mm**	(10x)	3 mm	63 mm	EXP0785-C3	52.50
.0785	#47	1.993 mm	1.063	**27.00 mm**	(12x)	3 mm	63 mm	CHT0785-C3	54.00
.0787		2.000 mm	.374	**9.50 mm**	(3x)	4 mm	50 mm	DHE0787-C3	47.40
.0787		2.000 mm	.531	**13.50 mm**	(5x)	4 mm	50 mm	BVT0787-C3	52.00
.0787		2.000 mm	.768	**19.50 mm**	(8x)	4 mm	63 mm	ADS0787-C3	54.70
.0787		2.000 mm	.945	**24.00 mm**	(10x)	4 mm	63 mm	EXP0787-C3	56.40
.0787		2.000 mm	1.102	**28.00 mm**	(12x)	4 mm	63 mm	CHT0787-C3	57.90
.0800		2.032 mm	.531	**13.50 mm**	(5x)	4 mm	50 mm	BVT0800-C3	52.00
.0800		2.032 mm	1.102	**28.00 mm**	(12x)	4 mm	63 mm	CHT0800-C3	57.90
.0810	#46	2.057 mm	.394	**10.00 mm**	(3x)	4 mm	50 mm	DHE0810-C3	47.40
.0810	#46	2.057 mm	.551	**14.00 mm**	(5x)	4 mm	50 mm	BVT0810-C3	52.00
.0810	#46	2.057 mm	.787	**20.00 mm**	(8x)	4 mm	63 mm	ADS0810-C3	54.70
.0810	#46	2.057 mm	.945	**24.00 mm**	(10x)	4 mm	63 mm	EXP0810-C3	56.40
.0810	#46	2.057 mm	1.102	**28.00 mm**	(12x)	4 mm	63 mm	CHT0810-C3	57.90

continued on next page

MINIATURE HIGH PERFORMANCE DRILLS

Prehardened Steels (cont.)

continued from previous page

DRILL DIAMETER			FLUTE LENGTH			SHANK DIAMETER	OVERALL LENGTH	AlTiN COATED	
inch	wire	metric	inch	metric	hole depth				
		D_1 $^{+.000mm}_{-.013mm}$		L_2 $^{+.25mm}_{-.00mm}$		D_2 (h6)	L_1	2 FL	PRICE
.0820	#45	2.082 mm	.394	**10.00 mm**	(3x)	4 mm	50 mm	DHE0820-C3	47.40
.0820	#45	2.082 mm	.551	**14.00 mm**	(5x)	4 mm	50 mm	BVT0820-C3	52.00
.0820	#45	2.082 mm	.787	**20.00 mm**	(8x)	4 mm	63 mm	ADS0820-C3	54.70
.0820	#45	2.082 mm	.945	**24.00 mm**	(10x)	4 mm	63 mm	EXP0820-C3	56.40
.0820	#45	2.082 mm	1.142	**29.00 mm**	(12x)	4 mm	75 mm	CHT0820-C3	57.90
.0860	#44	2.184 mm	.413	**10.50 mm**	(3x)	4 mm	50 mm	DHE0860-C3	47.40
.0860	#44	2.184 mm	.571	**14.50 mm**	(5x)	4 mm	50 mm	BVT0860-C3	52.00
.0860	#44	2.184 mm	.827	**21.00 mm**	(8x)	4 mm	63 mm	ADS0860-C3	54.70
.0860	#44	2.184 mm	1.024	**26.00 mm**	(10x)	4 mm	63 mm	EXP0860-C3	56.40
.0860	#44	2.184 mm	1.181	**30.00 mm**	(12x)	4 mm	75 mm	CHT0860-C3	57.90
.0890	#43	2.260 mm	.413	**10.50 mm**	(3x)	4 mm	50 mm	DHE0890-C3	47.40
.0890	#43	2.260 mm	.591	**15.00 mm**	(5x)	4 mm	50 mm	BVT0890-C3	52.00
.0890	#43	2.260 mm	.866	**22.00 mm**	(8x)	4 mm	63 mm	ADS0890-C3	54.70
.0890	#43	2.260 mm	1.063	**27.00 mm**	(10x)	4 mm	63 mm	EXP0890-C3	56.40
.0890	#43	2.260 mm	1.220	**31.00 mm**	(12x)	4 mm	75 mm	CHT0890-C3	57.90
.0900		2.286 mm	.591	**15.00 mm**	(5x)	4 mm	50 mm	BVT0900-C3	52.00
.0900		2.286 mm	1.220	**31.00 mm**	(12x)	4 mm	75 mm	CHT0900-C3	57.90
.0935	#42	2.374 mm	.453	**11.50 mm**	(3x)	4 mm	50 mm	DHE0935-C3	47.40
.0935	#42	2.374 mm	.630	**16.00 mm**	(5x)	4 mm	63 mm	BVT0935-C3	52.00
.0935	#42	2.374 mm	.906	**23.00 mm**	(8x)	4 mm	63 mm	ADS0935-C3	54.70
.0935	#42	2.374 mm	1.102	**28.00 mm**	(10x)	4 mm	63 mm	EXP0935-C3	56.40
.0935	#42	2.374 mm	1.299	**33.00 mm**	(12x)	4 mm	75 mm	CHT0935-C3	57.90
.0937 (3/32)		2.381 mm	.453	**11.50 mm**	(3x)	4 mm	50 mm	DHE0937-C3	50.70
.0937 (3/32)		2.381 mm	.630	**16.00 mm**	(5x)	4 mm	63 mm	BVT0937-C3	52.00
.0937 (3/32)		2.381 mm	.906	**23.00 mm**	(8x)	4 mm	63 mm	ADS0937-C3	54.70
.0937 (3/32)		2.381 mm	1.102	**28.00 mm**	(10x)	4 mm	63 mm	EXP0937-C3	56.40
.0937 (3/32)		2.381 mm	1.299	**33.00 mm**	(12x)	4 mm	75 mm	CHT0937-C3	57.70
.0960	#41	2.438 mm	.453	**11.50 mm**	(3x)	4 mm	50 mm	DHE0960-C3	50.70
.0960	#41	2.438 mm	.630	**16.00 mm**	(5x)	4 mm	63 mm	BVT0960-C3	52.00
.0960	#41	2.438 mm	.945	**24.00 mm**	(8x)	4 mm	63 mm	ADS0960-C3	54.70
.0960	#41	2.438 mm	1.142	**29.00 mm**	(10x)	4 mm	75 mm	EXP0960-C3	56.40
.0960	#41	2.438 mm	1.339	**34.00 mm**	(12x)	4 mm	75 mm	CHT0960-C3	57.70
.0980	#40	2.489 mm	.472	**12.00 mm**	(3x)	4 mm	50 mm	DHE0980-C3	50.70
.0980	#40	2.489 mm	.669	**17.00 mm**	(5x)	4 mm	63 mm	BVT0980-C3	52.00
.0980	#40	2.489 mm	.945	**24.00 mm**	(8x)	4 mm	63 mm	ADS0980-C3	54.70
.0980	#40	2.489 mm	1.142	**29.00 mm**	(10x)	4 mm	75 mm	EXP0980-C3	56.40
.0980	#40	2.489 mm	1.339	**34.00 mm**	(12x)	4 mm	75 mm	CHT0980-C3	57.70
.0984		2.500 mm	.472	**12.00 mm**	(3x)	4 mm	50 mm	DHE0984-C3	53.60
.0984		2.500 mm	.669	**17.00 mm**	(5x)	4 mm	63 mm	BVT0984-C3	55.30
.0984		2.500 mm	.945	**24.00 mm**	(8x)	4 mm	63 mm	ADS0984-C3	58.00
.0984		2.500 mm	1.142	**29.00 mm**	(10x)	4 mm	75 mm	EXP0984-C3	59.40
.0984		2.500 mm	1.339	**34.00 mm**	(12x)	4 mm	75 mm	CHT0984-C3	60.80
.0995	#39	2.527 mm	.472	**12.00 mm**	(3x)	4 mm	50 mm	DHE0995-C3	53.60
.0995	#39	2.527 mm	.669	**17.00 mm**	(5x)	4 mm	63 mm	BVT0995-C3	55.30
.0995	#39	2.527 mm	.984	**25.00 mm**	(8x)	4 mm	63 mm	ADS0995-C3	58.00
.0995	#39	2.527 mm	1.181	**30.00 mm**	(10x)	4 mm	75 mm	EXP0995-C3	59.40
.0995	#39	2.527 mm	1.378	**35.00 mm**	(12x)	4 mm	75 mm	CHT0995-C3	60.80

continued on next page

MINIATURE HIGH PERFORMANCE DRILLS

Prehardened Steels (cont.)

continued from previous page

DRILL DIAMETER			FLUTE LENGTH			SHANK DIAMETER	OVERALL LENGTH	AlTiN COATED	
inch	wire	metric	inch	metric	hole depth				
		D_1 +.000mm −.013mm		L_2 +.25mm −.00mm		D_2 (h6)	L_1	2 FL	PRICE
.1000		2.540 mm	.472	**12.00 mm**	(3x)	4 mm	50 mm	DHE1000-C3	53.60
.1000		2.540 mm	.669	**17.00 mm**	(5x)	4 mm	63 mm	BVT1000-C3	55.30
.1000		2.540 mm	.984	**25.00 mm**	(8x)	4 mm	63 mm	ADS1000-C3	58.00
.1000		2.540 mm	1.181	**30.00 mm**	(10x)	4 mm	75 mm	EXP1000-C3	59.40
.1000		2.540 mm	1.378	**35.00 mm**	(12x)	4 mm	75 mm	CHT1000-C3	60.80
.1015	#38	2.578 mm	.472	**12.00 mm**	(3x)	4 mm	50 mm	DHE1015-C3	53.60
.1015	#38	2.578 mm	.669	**17.00 mm**	(5x)	4 mm	63 mm	BVT1015-C3	55.30
.1015	#38	2.578 mm	.984	**25.00 mm**	(8x)	4 mm	63 mm	ADS1015-C3	58.00
.1015	#38	2.578 mm	1.181	**30.00 mm**	(10x)	4 mm	75 mm	EXP1015-C3	59.40
.1015	#38	2.578 mm	1.378	**35.00 mm**	(12x)	4 mm	75 mm	CHT1015-C3	60.80
.1040	#37	2.641 mm	.492	**12.50 mm**	(3x)	4 mm	50 mm	DHE1040-C3	53.60
.1040	#37	2.641 mm	.709	**18.00 mm**	(5x)	4 mm	63 mm	BVT1040-C3	55.30
.1040	#37	2.641 mm	1.024	**26.00 mm**	(8x)	4 mm	63 mm	ADS1040-C3	58.00
.1040	#37	2.641 mm	1.220	**31.00 mm**	(10x)	4 mm	75 mm	EXP1040-C3	59.40
.1040	#37	2.641 mm	1.417	**36.00 mm**	(12x)	4 mm	75 mm	CHT1040-C3	60.80
.1065	#36	2.705 mm	.512	**13.00 mm**	(3x)	4 mm	50 mm	DHE1065-C3	53.60
.1065	#36	2.705 mm	.709	**18.00 mm**	(5x)	4 mm	63 mm	BVT1065-C3	55.30
.1065	#36	2.705 mm	1.024	**26.00 mm**	(8x)	4 mm	63 mm	ADS1065-C3	58.00
.1065	#36	2.705 mm	1.260	**32.00 mm**	(10x)	4 mm	75 mm	EXP1065-C3	59.40
.1065	#36	2.705 mm	1.417	**37.00 mm**	(12x)	4 mm	75 mm	CHT1065-C3	60.80
.1093 (7/64)		2.778 mm	.512	**13.00 mm**	(3x)	4 mm	50 mm	DHE1093-C3	53.60
.1093 (7/64)		2.778 mm	.748	**19.00 mm**	(5x)	4 mm	63 mm	BVT1093-C3	55.30
.1093 (7/64)		2.778 mm	1.063	**27.00 mm**	(8x)	4 mm	63 mm	ADS1093-C3	58.00
.1093 (7/64)		2.778 mm	1.299	**33.00 mm**	(10x)	4 mm	75 mm	EXP1093-C3	59.40
.1093 (7/64)		2.778 mm	1.496	**38.00 mm**	(12x)	4 mm	75 mm	CHT1093-C3	60.80
.1100	#35	2.794 mm	.531	**13.50 mm**	(3x)	4 mm	50 mm	DHE1100-C3	53.60
.1100	#35	2.794 mm	.748	**19.00 mm**	(5x)	4 mm	63 mm	BVT1100-C3	55.30
.1100	#35	2.794 mm	1.063	**27.00 mm**	(8x)	4 mm	63 mm	ADS1100-C3	58.00
.1100	#35	2.794 mm	1.299	**33.00 mm**	(10x)	4 mm	75 mm	EXP1100-C3	59.40
.1100	#35	2.794 mm	1.496	**38.00 mm**	(12x)	4 mm	75 mm	CHT1100-C3	60.80
.1110	#34	2.819 mm	.531	**13.50 mm**	(3x)	4 mm	50 mm	DHE1110-C3	53.60
.1110	#34	2.819 mm	.748	**19.00 mm**	(5x)	4 mm	63 mm	BVT1110-C3	55.30
.1110	#34	2.819 mm	1.063	**27.00 mm**	(8x)	4 mm	63 mm	ADS1110-C3	58.00
.1110	#34	2.819 mm	1.299	**33.00 mm**	(10x)	4 mm	75 mm	EXP1110-C3	59.40
.1110	#34	2.819 mm	1.535	**39.00 mm**	(12x)	4 mm	75 mm	CHT1110-C3	60.80
.1130	#33	2.870 mm	.531	**13.50 mm**	(3x)	4 mm	50 mm	DHE1130-C3	53.60
.1130	#33	2.870 mm	.748	**19.00 mm**	(5x)	4 mm	63 mm	BVT1130-C3	55.30
.1130	#33	2.870 mm	1.102	**28.00 mm**	(8x)	4 mm	63 mm	ADS1130-C3	58.00
.1130	#33	2.870 mm	1.339	**34.00 mm**	(10x)	4 mm	75 mm	EXP1130-C3	59.40
.1130	#33	2.870 mm	1.535	**39.00 mm**	(12x)	4 mm	75 mm	CHT1130-C3	60.80
.1160	#32	2.946 mm	.787	**20.00 mm**	(5x)	4 mm	63 mm	BVT1160-C3	55.30
.1160	#32	2.946 mm	1.575	**40.00 mm**	(12x)	4 mm	75 mm	CHT1160-C3	60.80
.1181		3.000 mm	.571	**14.50 mm**	(3x)	4 mm	50 mm	DHE1181-C3	53.60
.1181		3.000 mm	.787	**20.00 mm**	(5x)	4 mm	63 mm	BVT1181-C3	55.30
.1181		3.000 mm	1.142	**29.00 mm**	(8x)	4 mm	63 mm	ADS1181-C3	58.00
.1181		3.000 mm	1.378	**35.00 mm**	(10x)	4 mm	75 mm	EXP1181-C3	59.40
.1181		3.000 mm	1.654	**42.00 mm**	(12x)	4 mm	100 mm	CHT1181-C3	60.80

continued on next page

MINIATURE HIGH PERFORMANCE DRILLS

Prehardened Steels (cont.)

continued from previous page

DRILL DIAMETER			FLUTE LENGTH			SHANK DIAMETER	OVERALL LENGTH	AlTiN COATED	
inch	wire	metric	inch	metric	hole depth				
		D_1 +.000mm −.013mm		L_2 +.75mm −.00mm		D_2 (h6)	L_1	2 FL	PRICE
.1200	#31	3.048 mm	.571	**14.50 mm**	(3x)	6 mm	63 mm	DHE1200-C3	60.10
.1200	#31	3.048 mm	.827	**21.00 mm**	(5x)	6 mm	63 mm	BVT1200-C3	61.80
.1200	#31	3.048 mm	1.181	**30.00 mm**	(8x)	6 mm	75 mm	ADS1200-C3	64.60
.1200	#31	3.048 mm	1.417	**36.00 mm**	(10x)	6 mm	100 mm	EXP1200-C3	65.90
.1200	#31	3.048 mm	1.654	**42.00 mm**	(12x)	6 mm	100 mm	CHT1200-C3	67.20
.1240		3.149 mm	.827	**21.00 mm**	(5x)	6 mm	63 mm	BVT1240-C3	61.80
.1240		3.149 mm	1.732	**44.00 mm**	(12x)	6 mm	100 mm	CHT1240-C3	67.20
.1250 (1/8)		3.175 mm	.591	**15.00 mm**	(3x)	6 mm	63 mm	DHE1250-C3	60.10
.1250 (1/8)		3.175 mm	.827	**21.00 mm**	(5x)	6 mm	63 mm	BVT1250-C3	61.80
.1250 (1/8)		3.175 mm	1.220	**31.00 mm**	(8x)	6 mm	75 mm	ADS1250-C3	64.60
.1250 (1/8)		3.175 mm	1.457	**37.00 mm**	(10x)	6 mm	100 mm	EXP1250-C3	65.90
.1250 (1/8)		3.175 mm	1.732	**44.00 mm**	(12x)	6 mm	100 mm	CHT1250-C3	67.20
.1260		3.200 mm	.866	**22.00 mm**	(5x)	6 mm	63 mm	BVT1260-C3	61.80
.1260		3.200 mm	1.732	**44.00 mm**	(12x)	6 mm	100 mm	CHT1260-C3	67.20
.1285	#30	3.263 mm	.866	**22.00 mm**	(5x)	6 mm	63 mm	BVT1285-C3	61.80
.1285	#30	3.263 mm	1.732	**44.00 mm**	(12x)	6 mm	100 mm	CHT1285-C3	67.20
.1360	#29	3.454 mm	.630	**16.00 mm**	(3x)	6 mm	63 mm	DHE1360-C3	60.10
.1360	#29	3.454 mm	.906	**23.00 mm**	(5x)	6 mm	63 mm	BVT1360-C3	61.80
.1360	#29	3.454 mm	1.339	**34.00 mm**	(8x)	6 mm	75 mm	ADS1360-C3	64.60
.1360	#29	3.454 mm	1.575	**40.00 mm**	(10x)	6 mm	100 mm	EXP1360-C3	65.90
.1360	#29	3.454 mm	1.890	**48.00 mm**	(12x)	6 mm	100 mm	CHT1360-C3	67.20
.1405	#28	3.568 mm	.945	**24.00 mm**	(5x)	6 mm	75 mm	BVT1405-C3	61.80
.1405	#28	3.568 mm	1.969	**50.00 mm**	(12x)	6 mm	100 mm	CHT1405-C3	67.20
.1406 (9/64)		3.571 mm	.669	**17.00 mm**	(3x)	6 mm	63 mm	DHE1406-C3	60.10
.1406 (9/64)		3.571 mm	.945	**24.00 mm**	(5x)	6 mm	75 mm	BVT1406-C3	61.80
.1406 (9/64)		3.571 mm	1.378	**35.00 mm**	(8x)	6 mm	75 mm	ADS1406-C3	64.60
.1406 (9/64)		3.571 mm	1.654	**42.00 mm**	(10x)	6 mm	100 mm	EXP1406-C3	65.90
.1406 (9/64)		3.571 mm	1.969	**50.00 mm**	(12x)	6 mm	100 mm	CHT1406-C3	67.20
.1417		3.600 mm	.945	**24.00 mm**	(5x)	6 mm	75 mm	BVT1417-C3	61.80
.1417		3.600 mm	1.969	**50.00 mm**	(12x)	6 mm	100 mm	CHT1417-C3	67.20
.1440	#27	3.657 mm	.945	**24.00 mm**	(5x)	6 mm	75 mm	BVT1440-C3	61.80
.1440	#27	3.657 mm	1.969	**50.00 mm**	(12x)	6 mm	100 mm	CHT1440-C3	67.20
.1470	#26	3.733 mm	.709	**18.00 mm**	(3x)	6 mm	63 mm	DHE1470-C3	60.10
.1470	#26	3.733 mm	1.024	**26.00 mm**	(5x)	6 mm	75 mm	BVT1470-C3	61.80
.1470	#26	3.733 mm	1.417	**36.00 mm**	(8x)	6 mm	100 mm	ADS1470-C3	64.60
.1470	#26	3.733 mm	1.732	**44.00 mm**	(10x)	6 mm	100 mm	EXP1470-C3	65.90
.1470	#26	3.733 mm	2.047	**52.00 mm**	(12x)	6 mm	100 mm	CHT1470-C3	67.20
.1495	#25	3.797 mm	1.024	**26.00 mm**	(5x)	6 mm	75 mm	BVT1495-C3	61.80
.1495	#25	3.797 mm	2.047	**52.00 mm**	(12x)	6 mm	100 mm	CHT1495-C3	67.20
.1520	#24	3.860 mm	1.024	**26.00 mm**	(5x)	6 mm	75 mm	BVT1520-C3	61.80
.1520	#24	3.860 mm	2.126	**54.00 mm**	(12x)	6 mm	100 mm	CHT1520-C3	67.20
.1540	#23	3.911 mm	1.024	**26.00 mm**	(5x)	6 mm	75 mm	BVT1540-C3	61.80
.1540	#23	3.911 mm	2.126	**54.00 mm**	(12x)	6 mm	100 mm	CHT1540-C3	67.20
.1562 (5/32)		3.968 mm	.748	**19.00 mm**	(3x)	6 mm	63 mm	DHE1562-C3	60.10
.1562 (5/32)		3.968 mm	1.024	**26.00 mm**	(5x)	6 mm	75 mm	BVT1562-C3	61.80
.1562 (5/32)		3.968 mm	1.535	**39.00 mm**	(8x)	6 mm	100 mm	ADS1562-C3	64.60
.1562 (5/32)		3.968 mm	1.811	**46.00 mm**	(10x)	6 mm	100 mm	EXP1562-C3	65.90
.1562 (5/32)		3.968 mm	2.126	**54.00 mm**	(12x)	6 mm	100 mm	CHT1562-C3	67.20

continued on next page

MINIATURE HIGH PERFORMANCE DRILLS

Prehardened Steels (cont.)

continued from previous page

DRILL DIAMETER			FLUTE LENGTH			SHANK DIAMETER	OVERALL LENGTH	AlTiN COATED	
inch	wire	metric	inch	metric	hole depth				
		D_1 $^{+.000mm}_{-.013mm}$		L_2 $^{+.75mm}_{-.00mm}$		D_2 (h6)	L_1	2 FL	PRICE
.1570	#22	3.987 mm	1.024	**26.00 mm**	(5x)	6 mm	75 mm	BVT1570-C3	61.80
.1570	#22	3.987 mm	2.126	**54.00 mm**	(12x)	6 mm	100 mm	CHT1570-C3	67.20
.1574		4.000 mm	.748	**19.00 mm**	(3x)	6 mm	63 mm	DHE1574-C3	60.10
.1574		4.000 mm	1.102	**28.00 mm**	(5x)	6 mm	75 mm	BVT1574-C3	61.80
.1574		4.000 mm	1.535	**39.00 mm**	(8x)	6 mm	100 mm	ADS1574-C3	64.60
.1574		4.000 mm	1.890	**48.00 mm**	(10x)	6 mm	100 mm	EXP1574-C3	65.90
.1574		4.000 mm	2.205	**56.00 mm**	(12x)	6 mm	100 mm	CHT1574-C3	67.20
.1590	#21	4.038 mm	.748	**19.00 mm**	(3x)	6 mm	63 mm	DHE1590-C3	60.10
.1590	#21	4.038 mm	1.102	**28.00 mm**	(5x)	6 mm	75 mm	BVT1590-C3	61.80
.1590	#21	4.038 mm	1.535	**39.00 mm**	(8x)	6 mm	100 mm	ADS1590-C3	64.60
.1590	#21	4.038 mm	1.890	**48.00 mm**	(10x)	6 mm	100 mm	EXP1590-C3	65.90
.1590	#21	4.038 mm	2.205	**56.00 mm**	(12x)	6 mm	100 mm	CHT1590-C3	67.20
.1610	#20	4.089 mm	1.102	**28.00 mm**	(5x)	6 mm	75 mm	BVT1610-C3	61.80
.1610	#20	4.089 mm	2.205	**56.00 mm**	(12x)	6 mm	100 mm	CHT1610-C3	67.20
.1660	#19	4.216 mm	1.102	**28.00 mm**	(5x)	6 mm	75 mm	BVT1660-C3	61.80
.1660	#19	4.216 mm	2.283	**58.00 mm**	(12x)	6 mm	100 mm	CHT1660-C3	67.20
.1695	#18	4.305 mm	1.181	**30.00 mm**	(5x)	6 mm	75 mm	BVT1695-C3	61.80
.1695	#18	4.305 mm	2.362	**60.00 mm**	(12x)	6 mm	100 mm	CHT1695-C3	67.20
.1718 (11/64)		4.365 mm	.827	**21.00 mm**	(3x)	6 mm	63 mm	DHE1718-C3	60.10
.1718 (11/64)		4.365 mm	1.181	**30.00 mm**	(5x)	6 mm	75 mm	BVT1718-C3	61.80
.1718 (11/64)		4.365 mm	1.654	**42.00 mm**	(8x)	6 mm	100 mm	ADS1718-C3	64.60
.1718 (11/64)		4.365 mm	2.047	**52.00 mm**	(10x)	6 mm	100 mm	EXP1718-C3	65.90
.1718 (11/64)		4.365 mm	2.362	**60.00 mm**	(12x)	6 mm	100 mm	CHT1718-C3	67.20
.1730	#17	4.394 mm	1.181	**30.00 mm**	(5x)	6 mm	75 mm	BVT1730-C3	61.80
.1730	#17	4.394 mm	2.362	**60.00 mm**	(12x)	6 mm	100 mm	CHT1730-C3	67.20
.1770	#16	4.495 mm	.827	**21.00 mm**	(3x)	6 mm	63 mm	DHE1770-C3	60.10
.1770	#16	4.495 mm	1.181	**30.00 mm**	(5x)	6 mm	75 mm	BVT1770-C3	61.80
.1770	#16	4.495 mm	1.732	**44.00 mm**	(8x)	6 mm	100 mm	ADS1770-C3	64.60
.1770	#16	4.495 mm	2.047	**52.00 mm**	(10x)	6 mm	100 mm	EXP1770-C3	65.90
.1770	#16	4.495 mm	2.441	**62.00 mm**	(12x)	6 mm	125 mm	CHT1770-C3	67.20
.1800	#15	4.572 mm	.866	**22.00 mm**	(3x)	6 mm	63 mm	DHE1800-C3	60.10
.1800	#15	4.572 mm	1.181	**30.00 mm**	(5x)	6 mm	75 mm	BVT1800-C3	61.80
.1800	#15	4.572 mm	1.732	**44.00 mm**	(8x)	6 mm	100 mm	ADS1800-C3	64.60
.1800	#15	4.572 mm	2.126	**54.00 mm**	(10x)	6 mm	100 mm	EXP1800-C3	65.90
.1800	#15	4.572 mm	2.441	**62.00 mm**	(12x)	6 mm	125 mm	CHT1800-C3	67.20
.1820	#14	4.622 mm	1.260	**32.00 mm**	(5x)	6 mm	75 mm	BVT1820-C3	61.80
.1820	#14	4.622 mm	2.520	**64.00 mm**	(12x)	6 mm	125 mm	CHT1820-C3	67.20
.1850	#13	4.700 mm	1.260	**32.00 mm**	(5x)	6 mm	75 mm	BVT1850-C3	61.80
.1850	#13	4.700 mm	2.520	**64.00 mm**	(12x)	6 mm	125 mm	CHT1850-C3	67.20
.1875 (3/16)		4.762 mm	.906	**23.00 mm**	(3x)	6 mm	63 mm	DHE1875-C3	60.10
.1875 (3/16)		4.762 mm	1.260	**32.00 mm**	(5x)	6 mm	75 mm	BVT1875-C3	61.80
.1875 (3/16)		4.762 mm	1.811	**46.00 mm**	(8x)	6 mm	100 mm	ADS1875-C3	64.60
.1875 (3/16)		4.762 mm	2.205	**56.00 mm**	(10x)	6 mm	100 mm	EXP1875-C3	65.90
.1875 (3/16)		4.762 mm	2.598	**66.00 mm**	(12x)	6 mm	125 mm	CHT1875-C3	67.20
.1890	#12	4.800 mm	1.260	**32.00 mm**	(5x)	6 mm	75 mm	BVT1890-C3	61.80
.1890	#12	4.800 mm	2.598	**66.00 mm**	(12x)	6 mm	125 mm	CHT1890-C3	67.20
.1910	#11	4.851 mm	1.260	**32.00 mm**	(5x)	6 mm	75 mm	BVT1910-C3	61.80
.1910	#11	4.851 mm	2.598	**66.00 mm**	(12x)	6 mm	125 mm	CHT1910-C3	67.20

continued on next page

MINIATURE HIGH PERFORMANCE DRILLS

Prehardened Steels (cont.)

continued from previous page

DRILL DIAMETER			FLUTE LENGTH			SHANK DIAMETER	OVERALL LENGTH	AlTiN COATED	
inch	wire	metric	inch	metric	hole depth				
		D_1 $^{+.000mm}_{-.013mm}$		L_2 $^{+.75mm}_{-.00mm}$		D_2 (h6)	L_1	2 FL	PRICE
.1935	#10	4.914 mm	1.339	**34.00 mm**	(5x)	6 mm	75 mm	BVT1935-C3	61.80
.1935	#10	4.914 mm	2.677	**68.00 mm**	(12x)	6 mm	125 mm	CHT1935-C3	67.20
.1960	#9	4.978 mm	1.339	**34.00 mm**	(5x)	6 mm	75 mm	BVT1960-C3	61.80
.1960	#9	4.978 mm	2.677	**68.00 mm**	(12x)	6 mm	125 mm	CHT1960-C3	67.20
.1968		5.000 mm	.945	**24.00 mm**	(3x)	6 mm	63 mm	DHE1968-C3	60.10
.1968		5.000 mm	1.339	**34.00 mm**	(5x)	6 mm	75 mm	BVT1968-C3	61.80
.1968		5.000 mm	1.890	**48.00 mm**	(8x)	6 mm	100 mm	ADS1968-C3	64.60
.1968		5.000 mm	2.283	**58.00 mm**	(10x)	6 mm	100 mm	EXP1968-C3	65.90
.1968		5.000 mm	2.677	**68.00 mm**	(12x)	6 mm	125 mm	CHT1968-C3	67.20
.1990	#8	5.054 mm	1.339	**34.00 mm**	(5x)	6 mm	75 mm	BVT1990-C3	61.80
.1990	#8	5.054 mm	2.756	**70.00 mm**	(12x)	6 mm	125 mm	CHT1990-C3	67.20
.2009	#7	5.105 mm	.945	**24.00 mm**	(3x)	6 mm	63 mm	DHE2009-C3	60.10
.2009	#7	5.105 mm	1.339	**34.00 mm**	(5x)	6 mm	75 mm	BVT2009-C3	61.80
.2009	#7	5.105 mm	1.969	**50.00 mm**	(8x)	6 mm	100 mm	ADS2009-C3	64.60
.2009	#7	5.105 mm	2.362	**60.00 mm**	(10x)	6 mm	100 mm	EXP2009-C3	65.90
.2009	#7	5.105 mm	2.756	**70.00 mm**	(12x)	6 mm	125 mm	CHT2009-C3	67.20
.2031 (13/64)		5.159 mm	.945	**24.00 mm**	(3x)	6 mm	63 mm	DHE2031-C3	60.10
.2031 (13/64)		5.159 mm	1.339	**34.00 mm**	(5x)	6 mm	75 mm	BVT2031-C3	61.80
.2031 (13/64)		5.159 mm	1.969	**50.00 mm**	(8x)	6 mm	100 mm	ADS2031-C3	64.60
.2031 (13/64)		5.159 mm	2.362	**60.00 mm**	(10x)	6 mm	100 mm	EXP2031-C3	65.90
.2031 (13/64)		5.159 mm	2.756	**70.00 mm**	(12x)	6 mm	125 mm	CHT2031-C3	67.20
.2040	#6	5.181 mm	1.339	**34.00 mm**	(5x)	6 mm	75 mm	BVT2040-C3	61.80
.2040	#6	5.181 mm	2.835	**72.00 mm**	(12x)	6 mm	125 mm	CHT2040-C3	67.20
.2055	#5	5.219 mm	1.417	**36.00 mm**	(5x)	6 mm	75 mm	BVT2055-C3	61.80
.2055	#5	5.219 mm	2.835	**72.00 mm**	(12x)	6 mm	125 mm	CHT2055-C3	67.20
.2090		5.308 mm	1.417	**36.00 mm**	(5x)	6 mm	75 mm	BVT2090-C3	61.80
.2090		5.308 mm	2.835	**72.00 mm**	(12x)	6 mm	125 mm	CHT2090-C3	67.20
.2129	#3	5.410 mm	1.024	**26.00 mm**	(3x)	6 mm	75 mm	DHE2129-C3	60.10
.2129	#3	5.410 mm	1.417	**36.00 mm**	(5x)	6 mm	75 mm	BVT2129-C3	61.80
.2129	#3	5.410 mm	2.047	**52.00 mm**	(8x)	6 mm	100 mm	ADS2129-C3	64.60
.2129	#3	5.410 mm	2.520	**64.00 mm**	(10x)	6 mm	125 mm	EXP2129-C3	65.90
.2129	#3	5.410 mm	2.913	**74.00 mm**	(12x)	6 mm	125 mm	CHT2129-C3	67.20
.2165		5.500 mm	1.496	**38.00 mm**	(5x)	6 mm	100 mm	BVT2165-C3	61.80
.2165		5.500 mm	2.992	**76.00 mm**	(12x)	6 mm	125 mm	CHT2165-C3	67.20
.2187 (7/32)		5.556 mm	1.024	**26.00 mm**	(3x)	6 mm	75 mm	DHE2187-C3	60.10
.2187 (7/32)		5.556 mm	1.496	**38.00 mm**	(5x)	6 mm	100 mm	BVT2187-C3	61.80
.2187 (7/32)		5.556 mm	2.126	**54.00 mm**	(8x)	6 mm	100 mm	ADS2187-C3	64.60
.2187 (7/32)		5.556 mm	2.598	**66.00 mm**	(10x)	6 mm	125 mm	EXP2187-C3	65.90
.2187 (7/32)		5.556 mm	2.992	**76.00 mm**	(12x)	6 mm	125 mm	CHT2187-C3	67.20
.2205		5.600 mm	1.496	**38.00 mm**	(5x)	6 mm	100 mm	BVT2205-C3	61.80
.2205		5.600 mm	3.071	**78.00 mm**	(12x)	6 mm	125 mm	CHT2205-C3	67.20
.2210	#2	5.613 mm	1.496	**38.00 mm**	(5x)	6 mm	100 mm	BVT2210-C3	61.80
.2210	#2	5.613 mm	3.071	**78.00 mm**	(12x)	6 mm	125 mm	CHT2210-C3	67.20
.2280	#1	5.791 mm	1.575	**40.00 mm**	(5x)	6 mm	100 mm	BVT2280-C3	61.80
.2280	#1	5.791 mm	3.150	**80.00 mm**	(12x)	6 mm	125 mm	CHT2280-C3	67.20
.2340	A	5.943 mm	1.575	**40.00 mm**	(5x)	6 mm	100 mm	BVT2340-C3	61.80
.2340	A	5.943 mm	3.228	**82.00 mm**	(12x)	6 mm	125 mm	CHT2340-C3	67.20

continued on next page

MINIATURE HIGH PERFORMANCE DRILLS

Prehardened Steels (cont.)

continued from previous page

DRILL DIAMETER inch	wire	metric	FLUTE LENGTH inch	metric	hole depth	SHANK DIAMETER	OVERALL LENGTH	AlTiN COATED 2 FL	PRICE
		D_1 +.000mm −.013mm		L_2 +.75mm −.00mm		D_2 (h6)	L_1		
.2343 (15/64)		5.953 mm	1.102	**28.00 mm**	(3x)	6 mm	75 mm	DHE2343-C3	60.10
.2343 (15/64)		5.953 mm	1.575	**40.00 mm**	(5x)	6 mm	100 mm	BVT2343-C3	61.80
.2343 (15/64)		5.953 mm	2.283	**58.00 mm**	(8x)	6 mm	100 mm	ADS2343-C3	64.60
.2343 (15/64)		5.953 mm	2.756	**70.00 mm**	(10x)	6 mm	125 mm	EXP2343-C3	65.90
.2343 (15/64)		5.953 mm	3.228	**82.00 mm**	(12x)	6 mm	125 mm	CHT2343-C3	67.20
.2362		6.000 mm	1.102	**28.00 mm**	(3x)	6 mm	75 mm	DHE2362-C3	60.10
.2362		6.000 mm	1.575	**40.00 mm**	(5x)	6 mm	100 mm	BVT2362-C3	61.80
.2362		6.000 mm	2.283	**58.00 mm**	(8x)	6 mm	100 mm	ADS2362-C3	64.60
.2362		6.000 mm	2.756	**70.00 mm**	(10x)	6 mm	125 mm	EXP2362-C3	65.90
.2362		6.000 mm	3.228	**82.00 mm**	(12x)	6 mm	125 mm	CHT2362-C3	67.20
.2380	B	6.045 mm	1.575	**40.00 mm**	(5x)	8 mm	100 mm	BVT2380-C3	64.00
.2380	B	6.045 mm	3.307	**84.00 mm**	(12x)	8 mm	125 mm	CHT2380-C3	69.40
.2420	C	6.146 mm	1.654	**42.00 mm**	(5x)	8 mm	100 mm	BVT2420-C3	64.00
.2420	C	6.146 mm	3.307	**84.00 mm**	(12x)	8 mm	125 mm	CHT2420-C3	69.40
.2460	D	6.248 mm	1.654	**42.00 mm**	(5x)	8 mm	100 mm	BVT2460-C3	64.00
.2460	D	6.248 mm	3.386	**86.00 mm**	(12x)	8 mm	150 mm	CHT2460-C3	69.40
.2500 (1/4)	E	6.350 mm	1.181	**30.00 mm**	(3x)	8 mm	75 mm	DHE2500-C3	60.10
.2500 (1/4)	E	6.350 mm	1.654	**42.00 mm**	(5x)	8 mm	100 mm	BVT2500-C3	61.80
.2500 (1/4)	E	6.350 mm	2.441	**62.00 mm**	(8x)	8 mm	125 mm	ADS2500-C3	64.60
.2500 (1/4)	E	6.350 mm	2.913	**74.00 mm**	(10x)	8 mm	125 mm	EXP2500-C3	65.90
.2500 (1/4)	E	6.350 mm	3.465	**88.00 mm**	(12x)	8 mm	150 mm	CHT2500-C3	67.20

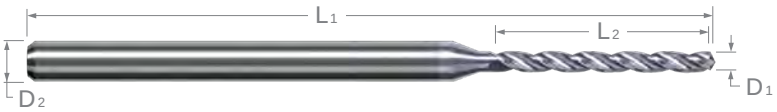
SPEEDS & FEEDS (Miniature High Performance Drills – Prehardened Steels)

Important Note: Values in table are in inches and are based on 3x and 5x drill lengths and a material hardness of 29-37 Rc. For longer lengths, table values of IPR must be reduced (for 8x and 10x, reduce to 75%; for 12x, reduce to 65%). For ferrous materials at 38-45 Rc, reduce IPR (for 3x and 5x, reduce to 80%; for 8x and 10x, reduce to 60%; for 12x, reduce to 52%). Pecking cycles are recommended to avoid chip packing and breakage. For materials at 29-37 Rc, initial peck depth should be 2-3x Diameter with each subsequent peck at 1-2x Diameter. For materials at 38-45 Rc, initial peck depth should be 1-2x Diameter with each subsequent peck at .5-1x Diameter. For complete speeds and feeds charts, please go to www.harveytool.com.

Material (Hardness: 29-37 Rc)	SFM	Chip Load IPR (Inches Per Revolution) By Drill Diameter .015	.031	.047	.062	.078	.093	.125	.187	.250
Carbon Steels Free Machining/Low Carbon steels, 10xx - 1029 & all 10Lxx, 11xx - 1139 & all 11Lxx, 12xx - 1215 & all 12Lxx	240	.00063	.00130	.00197	.00260	.00328	.00391	.00525	.00785	.01050
1030 - 1095, 1140 - 1151, 13xx, 15xx, 2xxx, 3xxx, 4xxx & 4xLxx, 5xxx & 5xLxx, 50xxx & 50Lxxx, 51xxx & 51Lxxx, 52xxx & 52Lxxx, 6xxx, 8xxx, 9xxx	150	.00058	.00119	.00180	.00238	.00300	.00357	.00480	.00718	.00960
Stainless Steels 203 EZ, 303 (all types), 416, 416Se, 416 Plus X, 420F, 420FSe, 430F, 430FSe, 440F, 440FSe	180	.00063	.00130	.00197	.00260	.00328	.00391	.00525	.00785	.01050
201, 202, 203, 205, 301, 302, 304, 304L, 308, 309, 310, 314, 316, 316L, 317, 321, 329, 330, 347, 348, 385, 403, 405, 409, 410, 413, 420, 429, 430, 434, 436, 442, 446, 501, 502	150	.00058	.00119	.00180	.00238	.00300	.00357	.00480	.00718	.00960
414, 431, 440A, 440B, 440C, 13-8, 15-5, 15-7, 17-4, 17-7	125	.00036	.00074	.00113	.00149	.00187	.00223	.00300	.00449	.00600
Tool Steels A, L, O, P, W series	125	.00058	.00119	.00180	.00238	.00300	.00357	.00480	.00718	.00960
D, H, M, T, S series	90	.00036	.00074	.00113	.00149	.00187	.00223	.00300	.00449	.00600
Titanium Alloys	100	.00036	.00074	.00113	.00149	.00187	.00223	.00300	.00449	.00600
High Temp Alloys Inconel, Hastelloy, Waspalloy, Monel, Nimonic, Haynes, Discoloy, Incoloy	70	.00036	.00074	.00113	.00149	.00187	.00223	.00300	.00449	.00600

MINIATURE HIGH PERFORMANCE DRILLS

Aluminum Alloys



Available for 3x, 5x, 8x, 10x, & 12x Hole Depths!

- Optimized for drilling aluminum and aluminum alloys with excellent performance in unfilled plastics, copper, brass, and bronze alloys
- Special 3 flute design to maximize chip flow, hole accuracy, and finish
- 130° point angle
- Polished flute valleys and TiB_2 coating prevent built-up edge and extend tool life
- h6 shank tolerance for high precision tool holders
- Solid carbide
- CNC ground in the USA



Special 3 Flute Design to Maximize Chip Flow, Hole Accuracy, and Finish

DRILL DIAMETER inch	wire	metric	FLUTE LENGTH inch	metric	hole depth	SHANK DIAMETER	OVERALL LENGTH	TiB_2 COATED 3 FL	PRICE
		D_1 +.000mm −.013mm		L_2 +.25mm −.00mm		D_2 (h6)	L_1		
.0150		.381 mm	.071	**1.80 mm**	(3x)	3 mm	50 mm	AVA0150-C8	44.60
.0150		.381 mm	.102	**2.60 mm**	(5x)	3 mm	50 mm	BAF0150-C8	45.60
.0150		.381 mm	.205	**5.20 mm**	(12x)	3 mm	50 mm	DOW0150-C8	51.40
.0156 (1/64)		.396 mm	.075	**1.90 mm**	(3x)	3 mm	50 mm	AVA0156-C8	44.60
.0156 (1/64)		.396 mm	.106	**2.70 mm**	(5x)	3 mm	50 mm	BAF0156-C8	45.60
.0156 (1/64)		.396 mm	.154	**3.90 mm**	(8x)	3 mm	50 mm	CBG0156-C8	48.70
.0156 (1/64)		.396 mm	.185	**4.70 mm**	(10x)	3 mm	50 mm	ERY0156-C8	50.00
.0156 (1/64)		.396 mm	.213	**5.40 mm**	(12x)	3 mm	50 mm	DOW0156-C8	51.40
.0160	#78	.406 mm	.079	**2.00 mm**	(3x)	3 mm	50 mm	AVA0160-C8	44.60
.0160	#78	.406 mm	.106	**2.70 mm**	(5x)	3 mm	50 mm	BAF0160-C8	45.60
.0160	#78	.406 mm	.157	**4.00 mm**	(8x)	3 mm	50 mm	CBG0160-C8	48.70
.0160	#78	.406 mm	.189	**4.80 mm**	(10x)	3 mm	50 mm	ERY0160-C8	50.00
.0160	#78	.406 mm	.220	**5.60 mm**	(12x)	3 mm	50 mm	DOW0160-C8	51.40
.0170		.431 mm	.114	**2.90 mm**	(5x)	3 mm	50 mm	BAF0170-C8	45.60
.0170		.431 mm	.236	**6.00 mm**	(12x)	3 mm	50 mm	DOW0170-C8	51.40
.0180	#77	.457 mm	.087	**2.20 mm**	(3x)	3 mm	50 mm	AVA0180-C8	44.60
.0180	#77	.457 mm	.122	**3.10 mm**	(5x)	3 mm	50 mm	BAF0180-C8	45.60
.0180	#77	.457 mm	.177	**4.50 mm**	(8x)	3 mm	50 mm	CBG0180-C8	48.70
.0180	#77	.457 mm	.213	**5.40 mm**	(10x)	3 mm	50 mm	ERY0180-C8	50.00
.0180	#77	.457 mm	.244	**6.20 mm**	(12x)	3 mm	50 mm	DOW0180-C8	51.40
.0190		.482 mm	.130	**3.30 mm**	(5x)	3 mm	50 mm	BAF0190-C8	45.60
.0190		.482 mm	.260	**6.60 mm**	(12x)	3 mm	50 mm	DOW0190-C8	51.40
.0196		.500 mm	.094	**2.40 mm**	(3x)	3 mm	50 mm	AVA0196-C8	44.00
.0196		.500 mm	.134	**3.40 mm**	(5x)	3 mm	50 mm	BAF0196-C8	45.10
.0196		.500 mm	.193	**4.90 mm**	(8x)	3 mm	50 mm	CBG0196-C8	48.20
.0196		.500 mm	.228	**5.80 mm**	(10x)	3 mm	50 mm	ERY0196-C8	49.30
.0196		.500 mm	.268	**6.80 mm**	(12x)	3 mm	50 mm	DOW0196-C8	50.70
.0200	#76	.508 mm	.094	**2.40 mm**	(3x)	3 mm	50 mm	AVA0200-C8	44.00
.0200	#76	.508 mm	.134	**3.40 mm**	(5x)	3 mm	50 mm	BAF0200-C8	45.10
.0200	#76	.508 mm	.197	**5.00 mm**	(8x)	3 mm	50 mm	CBG0200-C8	48.20
.0200	#76	.508 mm	.236	**6.00 mm**	(10x)	3 mm	50 mm	ERY0200-C8	49.30
.0200	#76	.508 mm	.276	**7.00 mm**	(12x)	3 mm	50 mm	DOW0200-C8	50.70
.0210	#75	.533 mm	.098	**2.50 mm**	(3x)	3 mm	50 mm	AVA0210-C8	44.00
.0210	#75	.533 mm	.142	**3.60 mm**	(5x)	3 mm	50 mm	BAF0210-C8	45.10
.0210	#75	.533 mm	.205	**5.20 mm**	(8x)	3 mm	50 mm	CBG0210-C8	48.20
.0210	#75	.533 mm	.244	**6.20 mm**	(10x)	3 mm	50 mm	ERY0210-C8	49.30
.0210	#75	.533 mm	.291	**7.40 mm**	(12x)	3 mm	50 mm	DOW0210-C8	50.70

continued on next page

MINIATURE HIGH PERFORMANCE DRILLS

Aluminum Alloys (cont.)

continued from previous page

DRILL DIAMETER			FLUTE LENGTH			SHANK DIAMETER	OVERALL LENGTH	TiB_2 COATED	
inch	wire	metric	inch	metric	hole depth				
		D_1 $^{+.000mm}_{-.013mm}$		L_2 $^{+.25mm}_{-.00mm}$		D_2 (h6)	L_1	3 FL	PRICE
.0220		.558 mm	.150	**3.80 mm**	(5x)	3 mm	50 mm	BAF0220-C8	45.10
.0220		.558 mm	.299	**7.60 mm**	(12x)	3 mm	50 mm	DOW0220-C8	50.70
.0225	#74	.571 mm	.106	**2.70 mm**	(3x)	3 mm	50 mm	AVA0225-C8	44.00
.0225	#74	.571 mm	.154	**3.90 mm**	(5x)	3 mm	50 mm	BAF0225-C8	45.10
.0225	#74	.571 mm	.220	**5.60 mm**	(8x)	3 mm	50 mm	CBG0225-C8	48.20
.0225	#74	.571 mm	.268	**6.80 mm**	(10x)	3 mm	50 mm	ERY0225-C8	49.30
.0225	#74	.571 mm	.307	**7.80 mm**	(12x)	3 mm	50 mm	DOW0225-C8	50.70
.0230		.584 mm	.154	**3.90 mm**	(5x)	3 mm	50 mm	BAF0230-C8	45.10
.0230		.584 mm	.315	**8.00 mm**	(12x)	3 mm	50 mm	DOW0230-C8	50.70
.0236		.600 mm	.157	**4.00 mm**	(5x)	3 mm	50 mm	BAF0236-C8	45.10
.0236		.600 mm	.323	**8.20 mm**	(12x)	3 mm	50 mm	DOW0236-C8	50.70
.0240	#73	.609 mm	.114	**2.90 mm**	(3x)	3 mm	50 mm	AVA0240-C8	44.00
.0240	#73	.609 mm	.165	**4.20 mm**	(5x)	3 mm	50 mm	BAF0240-C8	45.10
.0240	#73	.609 mm	.236	**6.00 mm**	(8x)	3 mm	50 mm	CBG0240-C8	48.20
.0240	#73	.609 mm	.283	**7.20 mm**	(10x)	3 mm	50 mm	ERY0240-C8	49.30
.0240	#73	.609 mm	.331	**8.40 mm**	(12x)	3 mm	50 mm	DOW0240-C8	50.70
.0250	#72	.635 mm	.118	**3.00 mm**	(3x)	3 mm	50 mm	AVA0250-C8	44.00
.0250	#72	.635 mm	.165	**4.20 mm**	(5x)	3 mm	50 mm	BAF0250-C8	45.10
.0250	#72	.635 mm	.244	**6.20 mm**	(8x)	3 mm	50 mm	CBG0250-C8	48.20
.0250	#72	.635 mm	.291	**7.40 mm**	(10x)	3 mm	50 mm	ERY0250-C8	49.30
.0250	#72	.635 mm	.346	**8.80 mm**	(12x)	3 mm	50 mm	DOW0250-C8	50.70
.0260	#71	.660 mm	.122	**3.10 mm**	(3x)	3 mm	50 mm	AVA0260-C8	44.00
.0260	#71	.660 mm	.173	**4.40 mm**	(5x)	3 mm	50 mm	BAF0260-C8	45.10
.0260	#71	.660 mm	.252	**6.40 mm**	(8x)	3 mm	50 mm	CBG0260-C8	48.20
.0260	#71	.660 mm	.307	**7.80 mm**	(10x)	3 mm	50 mm	ERY0260-C8	49.30
.0260	#71	.660 mm	.354	**9.00 mm**	(12x)	3 mm	50 mm	DOW0260-C8	50.70
.0270		.685 mm	.181	**4.60 mm**	(5x)	3 mm	50 mm	BAF0270-C8	45.10
.0270		.685 mm	.370	**9.40 mm**	(12x)	3 mm	50 mm	DOW0270-C8	50.70
.0275		.700 mm	.189	**4.80 mm**	(5x)	3 mm	50 mm	BAF0275-C8	45.10
.0275		.700 mm	.378	**9.60 mm**	(12x)	3 mm	50 mm	DOW0275-C8	50.70
.0280	#70	.711 mm	.134	**3.40 mm**	(3x)	3 mm	50 mm	AVA0280-C8	44.00
.0280	#70	.711 mm	.189	**4.80 mm**	(5x)	3 mm	50 mm	BAF0280-C8	45.10
.0280	#70	.711 mm	.276	**7.00 mm**	(8x)	3 mm	50 mm	CBG0280-C8	48.20
.0280	#70	.711 mm	.331	**8.40 mm**	(10x)	3 mm	50 mm	ERY0280-C8	49.30
.0280	#70	.711 mm	.386	**9.80 mm**	(12x)	3 mm	50 mm	DOW0280-C8	50.70
.0292	#69	.741 mm	.138	**3.50 mm**	(3x)	3 mm	50 mm	AVA0292-C8	44.00
.0292	#69	.741 mm	.197	**5.00 mm**	(5x)	3 mm	50 mm	BAF0292-C8	45.10
.0292	#69	.741 mm	.283	**7.20 mm**	(8x)	3 mm	50 mm	CBG0292-C8	48.20
.0292	#69	.741 mm	.346	**8.80 mm**	(10x)	3 mm	50 mm	ERY0292-C8	49.30
.0292	#69	.741 mm	.394	**10.00 mm**	(12x)	3 mm	50 mm	DOW0292-C8	50.70
.0300		.762 mm	.205	**5.20 mm**	(5x)	3 mm	50 mm	BAF0300-C8	45.10
.0300		.762 mm	.413	**10.50 mm**	(12x)	3 mm	50 mm	DOW0300-C8	50.70
.0310	#68	.787 mm	.146	**3.70 mm**	(3x)	3 mm	50 mm	AVA0310-C8	44.00
.0310	#68	.787 mm	.213	**5.40 mm**	(5x)	3 mm	50 mm	BAF0310-C8	45.10
.0310	#68	.787 mm	.299	**7.60 mm**	(8x)	3 mm	50 mm	CBG0310-C8	48.20
.0310	#68	.787 mm	.362	**9.20 mm**	(10x)	3 mm	50 mm	ERY0310-C8	49.80
.0310	#68	.787 mm	.433	**11.00 mm**	(12x)	3 mm	50 mm	DOW0310-C8	51.40
.0312 (1/32)		.793 mm	.150	**3.80 mm**	(3x)	3 mm	50 mm	AVA0312-C8	44.00
.0312 (1/32)		.793 mm	.213	**5.40 mm**	(5x)	3 mm	50 mm	BAF0312-C8	45.10

continued on next page

MINIATURE HIGH PERFORMANCE DRILLS

Aluminum Alloys (cont.)

continued from previous page

DRILL DIAMETER			FLUTE LENGTH			SHANK DIAMETER	OVERALL LENGTH	TiB_2 COATED	
inch	wire	metric	inch	metric	hole depth				
		D_1 $^{+.000mm}_{-.013mm}$		L_2 $^{+.25mm}_{-.00mm}$		D_2 (h6)	L_1	3 FL	PRICE
.0312 (1/32)		.793 mm	.307	**7.80 mm**	(8x)	3 mm	50 mm	CBG0312-C8	48.20
.0312 (1/32)		.793 mm	.370	**9.40 mm**	(10x)	3 mm	50 mm	ERY0312-C8	49.80
.0312 (1/32)		.793 mm	.433	**11.00 mm**	(12x)	3 mm	50 mm	DQW0312-C8	51.40
.0315		.800 mm	.213	**5.40 mm**	(5x)	3 mm	50 mm	BAF0315-C8	45.10
.0315		.800 mm	.433	**11.00 mm**	(12x)	3 mm	50 mm	DQW0315-C8	51.40
.0320	#67	.812 mm	.154	**3.90 mm**	(3x)	3 mm	50 mm	AVA0320-C8	44.00
.0320	#67	.812 mm	.213	**5.40 mm**	(5x)	3 mm	50 mm	BAF0320-C8	45.10
.0320	#67	.812 mm	.315	**8.00 mm**	(8x)	3 mm	50 mm	CBG0320-C8	48.20
.0320	#67	.812 mm	.378	**9.60 mm**	(10x)	3 mm	50 mm	ERY0320-C8	49.80
.0320	#67	.812 mm	.433	**11.00 mm**	(12x)	3 mm	50 mm	DQW0320-C8	51.40
.0330	#66	.838 mm	.157	**4.00 mm**	(3x)	3 mm	50 mm	AVA0330-C8	44.00
.0330	#66	.838 mm	.220	**5.60 mm**	(5x)	3 mm	50 mm	BAF0330-C8	45.10
.0330	#66	.838 mm	.323	**8.20 mm**	(8x)	3 mm	50 mm	CBG0330-C8	48.20
.0330	#66	.838 mm	.386	**9.80 mm**	(10x)	3 mm	50 mm	ERY0330-C8	49.80
.0330	#66	.838 mm	.453	**11.50 mm**	(12x)	3 mm	50 mm	DQW0330-C8	51.40
.0350	#65	.889 mm	.165	**4.20 mm**	(3x)	3 mm	50 mm	AVA0350-C8	44.00
.0350	#65	.889 mm	.236	**6.00 mm**	(5x)	3 mm	50 mm	BAF0350-C8	45.10
.0350	#65	.889 mm	.339	**8.60 mm**	(8x)	3 mm	50 mm	CBG0350-C8	48.20
.0350	#65	.889 mm	.413	**10.50 mm**	(10x)	3 mm	50 mm	ERY0350-C8	49.80
.0350	#65	.889 mm	.472	**12.00 mm**	(12x)	3 mm	50 mm	DQW0350-C8	51.40
.0354		.900 mm	.236	**6.00 mm**	(5x)	3 mm	50 mm	BAF0354-C8	45.10
.0354		.900 mm	.492	**12.50 mm**	(12x)	3 mm	50 mm	DQW0354-C8	51.40
.0360	#64	.914 mm	.173	**4.40 mm**	(3x)	3 mm	50 mm	AVA0360-C8	44.00
.0360	#64	.914 mm	.244	**6.20 mm**	(5x)	3 mm	50 mm	BAF0360-C8	45.10
.0360	#64	.914 mm	.354	**9.00 mm**	(8x)	3 mm	50 mm	CBG0360-C8	48.20
.0360	#64	.914 mm	.413	**10.50 mm**	(10x)	3 mm	50 mm	ERY0360-C8	49.80
.0360	#64	.914 mm	.492	**12.50 mm**	(12x)	3 mm	50 mm	DQW0360-C8	51.40
.0370	#63	.939 mm	.173	**4.40 mm**	(3x)	3 mm	50 mm	AVA0370-C8	44.00
.0370	#63	.939 mm	.252	**6.40 mm**	(5x)	3 mm	50 mm	BAF0370-C8	45.10
.0370	#63	.939 mm	.362	**9.20 mm**	(8x)	3 mm	50 mm	CBG0370-C8	48.20
.0370	#63	.939 mm	.433	**11.00 mm**	(10x)	3 mm	50 mm	ERY0370-C8	49.80
.0370	#63	.939 mm	.512	**13.00 mm**	(12x)	3 mm	50 mm	DQW0370-C8	51.40
.0380	#62	.965 mm	.181	**4.60 mm**	(3x)	3 mm	50 mm	AVA0380-C8	44.00
.0380	#62	.965 mm	.260	**6.60 mm**	(5x)	3 mm	50 mm	BAF0380-C8	45.10
.0380	#62	.965 mm	.370	**9.40 mm**	(8x)	3 mm	50 mm	CBG0380-C8	48.20
.0380	#62	.965 mm	.453	**11.50 mm**	(10x)	3 mm	50 mm	ERY0380-C8	49.80
.0380	#62	.965 mm	.531	**13.50 mm**	(12x)	3 mm	50 mm	DQW0380-C8	51.40
.0390	#61	.990 mm	.189	**4.80 mm**	(3x)	3 mm	50 mm	AVA0390-C8	44.00
.0390	#61	.990 mm	.260	**6.60 mm**	(5x)	3 mm	50 mm	BAF0390-C8	45.10
.0390	#61	.990 mm	.378	**9.60 mm**	(8x)	3 mm	50 mm	CBG0390-C8	48.20
.0390	#61	.990 mm	.453	**11.50 mm**	(10x)	3 mm	50 mm	ERY0390-C8	49.80
.0390	#61	.990 mm	.531	**13.50 mm**	(12x)	3 mm	50 mm	DQW0390-C8	51.40
.0393		1.000 mm	.189	**4.80 mm**	(3x)	3 mm	50 mm	AVA0393-C8	45.90
.0393		1.000 mm	.268	**6.80 mm**	(5x)	3 mm	50 mm	BAF0393-C8	47.00
.0393		1.000 mm	.386	**9.80 mm**	(8x)	3 mm	50 mm	CBG0393-C8	49.40
.0393		1.000 mm	.472	**12.00 mm**	(10x)	3 mm	50 mm	ERY0393-C8	51.00
.0393		1.000 mm	.551	**14.00 mm**	(12x)	3 mm	50 mm	DQW0393-C8	52.40

continued on next page

MINIATURE HIGH PERFORMANCE DRILLS

Aluminum Alloys (cont.)

continued from previous page

DRILL DIAMETER			FLUTE LENGTH			SHANK DIAMETER	OVERALL LENGTH	TiB_2 COATED	
inch	wire	metric	inch	metric	hole depth				
		D_1 $^{+.000mm}_{-.013mm}$		L_2 $^{+.25mm}_{-.00mm}$		D_2 (h6)	L_1	3 FL	PRICE
.0400	#60	1.016 mm	.189	**4.80 mm**	(3x)	3 mm	50 mm	AVA0400-C8	45.90
.0400	#60	1.016 mm	.268	**6.80 mm**	(5x)	3 mm	50 mm	BAF0400-C8	47.00
.0400	#60	1.016 mm	.394	**10.00 mm**	(8x)	3 mm	50 mm	CBG0400-C8	49.40
.0400	#60	1.016 mm	.472	**12.00 mm**	(10x)	3 mm	50 mm	ERY0400-C8	51.00
.0400	#60	1.016 mm	.551	**14.00 mm**	(12x)	3 mm	50 mm	DOW0400-C8	52.40
.0410	#59	1.041 mm	.197	**5.00 mm**	(3x)	3 mm	50 mm	AVA0410-C8	45.90
.0410	#59	1.041 mm	.276	**7.00 mm**	(5x)	3 mm	50 mm	BAF0410-C8	47.00
.0410	#59	1.041 mm	.394	**10.00 mm**	(8x)	3 mm	50 mm	CBG0410-C8	49.40
.0410	#59	1.041 mm	.472	**12.00 mm**	(10x)	3 mm	50 mm	ERY0410-C8	51.00
.0410	#59	1.041 mm	.571	**14.50 mm**	(12x)	3 mm	50 mm	DOW0410-C8	52.40
.0420	#58	1.066 mm	.197	**5.00 mm**	(3x)	3 mm	50 mm	AVA0420-C8	45.90
.0420	#58	1.066 mm	.283	**7.20 mm**	(5x)	3 mm	50 mm	BAF0420-C8	47.00
.0420	#58	1.066 mm	.413	**10.50 mm**	(8x)	3 mm	50 mm	CBG0420-C8	49.40
.0420	#58	1.066 mm	.492	**12.50 mm**	(10x)	3 mm	50 mm	ERY0420-C8	51.00
.0420	#58	1.066 mm	.571	**14.50 mm**	(12x)	3 mm	50 mm	DOW0420-C8	52.40
.0430	#57	1.092 mm	.205	**5.20 mm**	(3x)	3 mm	50 mm	AVA0430-C8	45.90
.0430	#57	1.092 mm	.291	**7.40 mm**	(5x)	3 mm	50 mm	BAF0430-C8	47.00
.0430	#57	1.092 mm	.413	**10.50 mm**	(8x)	3 mm	50 mm	CBG0430-C8	49.40
.0430	#57	1.092 mm	.512	**13.00 mm**	(10x)	3 mm	50 mm	ERY0430-C8	51.00
.0430	#57	1.092 mm	.591	**15.00 mm**	(12x)	3 mm	50 mm	DOW0430-C8	52.40
.0450		1.143 mm	.307	**7.80 mm**	(5x)	3 mm	50 mm	BAF0450-C8	47.00
.0450		1.143 mm	.610	**15.50 mm**	(12x)	3 mm	50 mm	DOW0450-C8	52.40
.0465	#56	1.181 mm	.220	**5.60 mm**	(3x)	3 mm	50 mm	AVA0465-C8	45.90
.0465	#56	1.181 mm	.315	**8.00 mm**	(5x)	3 mm	50 mm	BAF0465-C8	47.00
.0465	#56	1.181 mm	.453	**11.50 mm**	(8x)	3 mm	50 mm	CBG0465-C8	49.40
.0465	#56	1.181 mm	.551	**14.00 mm**	(10x)	3 mm	50 mm	ERY0465-C8	51.00
.0465	#56	1.181 mm	.630	**16.00 mm**	(12x)	3 mm	63 mm	DOW0465-C8	52.40
.0468 (3/64)		1.190 mm	.220	**5.60 mm**	(3x)	3 mm	50 mm	AVA0468-C8	45.90
.0468 (3/64)		1.190 mm	.315	**8.00 mm**	(5x)	3 mm	50 mm	BAF0468-C8	47.00
.0468 (3/64)		1.190 mm	.453	**11.50 mm**	(8x)	3 mm	50 mm	CBG0468-C8	49.40
.0468 (3/64)		1.190 mm	.551	**14.00 mm**	(10x)	3 mm	50 mm	ERY0468-C8	51.00
.0468 (3/64)		1.190 mm	.650	**16.50 mm**	(12x)	3 mm	63 mm	DOW0468-C8	52.40
.0492		1.250 mm	.335	**8.50 mm**	(5x)	3 mm	50 mm	BAF0492-C8	47.00
.0492		1.250 mm	.669	**17.00 mm**	(12x)	3 mm	63 mm	DOW0492-C8	52.40
.0500		1.270 mm	.236	**6.00 mm**	(3x)	3 mm	50 mm	AVA0500-C8	45.90
.0500		1.270 mm	.335	**8.50 mm**	(5x)	3 mm	50 mm	BAF0500-C8	47.00
.0500		1.270 mm	.492	**12.50 mm**	(8x)	3 mm	50 mm	CBG0500-C8	49.40
.0500		1.270 mm	.591	**15.00 mm**	(10x)	3 mm	50 mm	ERY0500-C8	51.00
.0500		1.270 mm	.689	**17.50 mm**	(12x)	3 mm	63 mm	DOW0500-C8	52.40
.0520	#55	1.320 mm	.244	**6.20 mm**	(3x)	3 mm	50 mm	AVA0520-C8	45.90
.0520	#55	1.320 mm	.354	**9.00 mm**	(5x)	3 mm	50 mm	BAF0520-C8	47.00
.0520	#55	1.320 mm	.512	**13.00 mm**	(8x)	3 mm	50 mm	CBG0520-C8	49.40
.0520	#55	1.320 mm	.610	**15.50 mm**	(10x)	3 mm	50 mm	ERY0520-C8	51.00
.0520	#55	1.320 mm	.709	**18.00 mm**	(12x)	3 mm	63 mm	DOW0520-C8	52.40
.0550	#54	1.397 mm	.260	**6.60 mm**	(3x)	3 mm	50 mm	AVA0550-C8	45.90
.0550	#54	1.397 mm	.374	**9.50 mm**	(5x)	3 mm	50 mm	BAF0550-C8	47.00
.0550	#54	1.397 mm	.531	**13.50 mm**	(8x)	3 mm	50 mm	CBG0550-C8	49.40

continued on next page

MINIATURE HIGH PERFORMANCE DRILLS

Aluminum Alloys (cont.)

continued from previous page

DRILL DIAMETER			FLUTE LENGTH			SHANK DIAMETER	OVERALL LENGTH	TiB_2 COATED	
inch	wire	metric	inch	metric	hole depth				
		D_1 $^{+.000mm}_{-.013mm}$		L_2 $^{+.25mm}_{-.00mm}$		D_2 (h6)	L_1	3 FL	PRICE
.0550	#54	1.397 mm	.650	**16.50 mm**	(10x)	3 mm	63 mm	ERY0550-C8	51.00
.0550	#54	1.397 mm	.748	**19.00 mm**	(12x)	3 mm	63 mm	DQW0550-C8	52.40
.0590		1.500 mm	.283	**7.20 mm**	(3x)	3 mm	50 mm	AVA0590-C8	46.40
.0590		1.500 mm	.394	**10.00 mm**	(5x)	3 mm	50 mm	BAF0590-C8	47.50
.0590		1.500 mm	.571	**14.50 mm**	(8x)	3 mm	50 mm	CBG0590-C8	49.40
.0590		1.500 mm	.689	**17.50 mm**	(10x)	3 mm	63 mm	ERY0590-C8	51.50
.0590		1.500 mm	.827	**21.00 mm**	(12x)	3 mm	63 mm	DQW0590-C8	53.40
.0595	#53	1.511 mm	.283	**7.20 mm**	(3x)	3 mm	50 mm	AVA0595-C8	46.40
.0595	#53	1.511 mm	.394	**10.00 mm**	(5x)	3 mm	50 mm	BAF0595-C8	47.50
.0595	#53	1.511 mm	.571	**14.50 mm**	(8x)	3 mm	50 mm	CBG0595-C8	49.40
.0595	#53	1.511 mm	.709	**18.00 mm**	(10x)	3 mm	63 mm	ERY0595-C8	51.50
.0595	#53	1.511 mm	.827	**21.00 mm**	(12x)	3 mm	63 mm	DQW0595-C8	53.40
.0600		1.524 mm	.413	**10.50 mm**	(5x)	3 mm	50 mm	BAF0600-C8	47.50
.0600		1.524 mm	.827	**21.00 mm**	(12x)	3 mm	63 mm	DQW0600-C8	53.40
.0625 (1/16)		1.587 mm	.299	**7.60 mm**	(3x)	3 mm	50 mm	AVA0625-C8	46.40
.0625 (1/16)		1.587 mm	.413	**10.50 mm**	(5x)	3 mm	50 mm	BAF0625-C8	47.50
.0625 (1/16)		1.587 mm	.610	**15.50 mm**	(8x)	3 mm	50 mm	CBG0625-C8	50.40
.0625 (1/16)		1.587 mm	.728	**18.50 mm**	(10x)	3 mm	63 mm	ERY0625-C8	51.80
.0625 (1/16)		1.587 mm	.866	**22.00 mm**	(12x)	3 mm	63 mm	DQW0625-C8	53.40
.0635	#52	1.612 mm	.299	**7.60 mm**	(3x)	3 mm	50 mm	AVA0635-C8	46.40
.0635	#52	1.612 mm	.433	**11.00 mm**	(5x)	3 mm	50 mm	BAF0635-C8	47.50
.0635	#52	1.612 mm	.610	**15.50 mm**	(8x)	3 mm	50 mm	CBG0635-C8	50.40
.0635	#52	1.612 mm	.748	**19.00 mm**	(10x)	3 mm	63 mm	ERY0635-C8	51.80
.0635	#52	1.612 mm	.866	**22.00 mm**	(12x)	3 mm	63 mm	DQW0635-C8	53.40
.0670	#51	1.701 mm	.315	**8.00 mm**	(3x)	3 mm	50 mm	AVA0670-C8	46.40
.0670	#51	1.701 mm	.453	**11.50 mm**	(5x)	3 mm	50 mm	BAF0670-C8	47.50
.0670	#51	1.701 mm	.650	**16.50 mm**	(8x)	3 mm	63 mm	CBG0670-C8	50.40
.0670	#51	1.701 mm	.787	**20.00 mm**	(10x)	3 mm	63 mm	ERY0670-C8	51.80
.0670	#51	1.701 mm	.906	**23.00 mm**	(12x)	3 mm	63 mm	DQW0670-C8	53.40
.0700	#50	1.778 mm	.335	**8.50 mm**	(3x)	3 mm	50 mm	AVA0700-C8	46.40
.0700	#50	1.778 mm	.472	**12.00 mm**	(5x)	3 mm	50 mm	BAF0700-C8	47.50
.0700	#50	1.778 mm	.689	**17.50 mm**	(8x)	3 mm	63 mm	CBG0700-C8	50.40
.0700	#50	1.778 mm	.827	**21.00 mm**	(10x)	3 mm	63 mm	ERY0700-C8	51.80
.0700	#50	1.778 mm	.945	**24.00 mm**	(12x)	3 mm	63 mm	DQW0700-C8	53.40
.0730	#49	1.854 mm	.354	**9.00 mm**	(3x)	3 mm	50 mm	AVA0730-C8	46.40
.0730	#49	1.854 mm	.492	**12.50 mm**	(5x)	3 mm	50 mm	BAF0730-C8	47.50
.0730	#49	1.854 mm	.709	**18.00 mm**	(8x)	3 mm	63 mm	CBG0730-C8	50.40
.0730	#49	1.854 mm	.866	**22.00 mm**	(10x)	3 mm	63 mm	ERY0730-C8	51.80
.0730	#49	1.854 mm	.984	**25.00 mm**	(12x)	3 mm	63 mm	DQW0730-C8	53.40
.0760	#48	1.930 mm	.354	**9.00 mm**	(3x)	3 mm	50 mm	AVA0760-C8	46.40
.0760	#48	1.930 mm	.512	**13.00 mm**	(5x)	3 mm	50 mm	BAF0760-C8	47.50
.0760	#48	1.930 mm	.748	**19.00 mm**	(8x)	3 mm	63 mm	CBG0760-C8	50.40
.0760	#48	1.930 mm	.906	**23.00 mm**	(10x)	3 mm	63 mm	ERY0760-C8	51.80
.0760	#48	1.930 mm	1.063	**27.00 mm**	(12x)	3 mm	63 mm	DQW0760-C8	53.40
.0781 (5/64)		1.984 mm	.374	**9.50 mm**	(3x)	3 mm	50 mm	AVA0781-C8	46.40
.0781 (5/64)		1.984 mm	.531	**13.50 mm**	(5x)	3 mm	50 mm	BAF0781-C8	47.50
.0781 (5/64)		1.984 mm	.768	**19.50 mm**	(8x)	3 mm	63 mm	CBG0781-C8	50.40

continued on next page

MINIATURE HIGH PERFORMANCE DRILLS

Aluminum Alloys (cont.)

continued from previous page

DRILL DIAMETER			FLUTE LENGTH			SHANK DIAMETER	OVERALL LENGTH	TiB_2 COATED	
inch	wire	metric	inch	metric	hole depth				
		D_1 $^{+.000mm}_{-.013mm}$		L_2 $^{+.25mm}_{-.00mm}$		D_2 (h6)	L_1	3 FL	PRICE
.0781 (5/64)		1.984 mm	.906	**23.00 mm**	(10x)	3 mm	63 mm	ERY0781-C8	51.80
.0781 (5/64)		1.984 mm	1.063	**27.00 mm**	(12x)	3 mm	63 mm	DQW0781-C8	53.40
.0785	#47	1.993 mm	.374	**9.50 mm**	(3x)	3 mm	50 mm	AVA0785-C8	46.40
.0785	#47	1.993 mm	.531	**13.50 mm**	(5x)	3 mm	50 mm	BAF0785-C8	47.50
.0785	#47	1.993 mm	.768	**19.50 mm**	(8x)	3 mm	63 mm	CBG0785-C8	50.40
.0785	#47	1.993 mm	1.063	**27.00 mm**	(12x)	3 mm	63 mm	DQW0785-C8	53.40
.0787		2.000 mm	.374	**9.50 mm**	(3x)	4 mm	50 mm	AVA0787-C8	47.70
.0787		2.000 mm	.531	**13.50 mm**	(5x)	4 mm	50 mm	BAF0787-C8	48.70
.0787		2.000 mm	.768	**19.50 mm**	(8x)	4 mm	63 mm	CBG0787-C8	51.50
.0787		2.000 mm	.945	**24.00 mm**	(10x)	4 mm	63 mm	ERY0787-C8	52.90
.0787		2.000 mm	1.102	**28.00 mm**	(12x)	4 mm	63 mm	DQW0787-C8	54.40
.0800		2.032 mm	.374	**9.50 mm**	(3x)	4 mm	50 mm	AVA0800-C8	47.70
.0800		2.032 mm	.531	**13.50 mm**	(5x)	4 mm	50 mm	BAF0800-C8	48.70
.0800		2.032 mm	.787	**20.00 mm**	(8x)	4 mm	63 mm	CBG0800-C8	51.50
.0800		2.032 mm	1.102	**28.00 mm**	(12x)	4 mm	63 mm	DQW0800-C8	54.40
.0810	#46	2.057 mm	.394	**10.00 mm**	(3x)	4 mm	50 mm	AVA0810-C8	47.70
.0810	#46	2.057 mm	.551	**14.00 mm**	(5x)	4 mm	50 mm	BAF0810-C8	48.70
.0810	#46	2.057 mm	.787	**20.00 mm**	(8x)	4 mm	63 mm	CBG0810-C8	51.50
.0810	#46	2.057 mm	.945	**24.00 mm**	(10x)	4 mm	63 mm	ERY0810-C8	52.90
.0810	#46	2.057 mm	1.102	**28.00 mm**	(12x)	4 mm	63 mm	DQW0810-C8	54.40
.0820	#45	2.082 mm	.394	**10.00 mm**	(3x)	4 mm	50 mm	AVA0820-C8	47.70
.0820	#45	2.082 mm	.551	**14.00 mm**	(5x)	4 mm	50 mm	BAF0820-C8	48.70
.0820	#45	2.082 mm	.787	**20.00 mm**	(8x)	4 mm	63 mm	CBG0820-C8	51.50
.0820	#45	2.082 mm	1.142	**29.00 mm**	(12x)	4 mm	75 mm	DQW0820-C8	54.40
.0860	#44	2.184 mm	.413	**10.50 mm**	(3x)	4 mm	50 mm	AVA0860-C8	47.70
.0860	#44	2.184 mm	.571	**14.50 mm**	(5x)	4 mm	50 mm	BAF0860-C8	48.70
.0860	#44	2.184 mm	.827	**21.00 mm**	(8x)	4 mm	63 mm	CBG0860-C8	51.50
.0860	#44	2.184 mm	1.024	**26.00 mm**	(10x)	4 mm	63 mm	ERY0860-C8	52.90
.0860	#44	2.184 mm	1.181	**30.00 mm**	(12x)	4 mm	75 mm	DQW0860-C8	54.40
.0890	#43	2.260 mm	.413	**10.50 mm**	(3x)	4 mm	50 mm	AVA0890-C8	47.70
.0890	#43	2.260 mm	.591	**15.00 mm**	(5x)	4 mm	50 mm	BAF0890-C8	48.70
.0890	#43	2.260 mm	.866	**22.00 mm**	(8x)	4 mm	63 mm	CBG0890-C8	51.50
.0890	#43	2.260 mm	1.063	**27.00 mm**	(10x)	4 mm	63 mm	ERY0890-C8	52.90
.0890	#43	2.260 mm	1.220	**31.00 mm**	(12x)	4 mm	75 mm	DQW0890-C8	54.40
.0900		2.286 mm	.433	**11.00 mm**	(3x)	4 mm	50 mm	AVA0900-C8	47.70
.0900		2.286 mm	.591	**15.00 mm**	(5x)	4 mm	50 mm	BAF0900-C8	48.70
.0900		2.286 mm	.866	**22.00 mm**	(8x)	4 mm	63 mm	CBG0900-C8	51.50
.0900		2.286 mm	1.220	**31.00 mm**	(12x)	4 mm	75 mm	DQW0900-C8	54.40
.0935	#42	2.374 mm	.453	**11.50 mm**	(3x)	4 mm	50 mm	AVA0935-C8	47.70
.0935	#42	2.374 mm	.630	**16.00 mm**	(5x)	4 mm	63 mm	BAF0935-C8	48.70
.0935	#42	2.374 mm	.906	**23.00 mm**	(8x)	4 mm	63 mm	CBG0935-C8	51.50
.0935	#42	2.374 mm	1.102	**28.00 mm**	(10x)	4 mm	63 mm	ERY0935-C8	52.90
.0935	#42	2.374 mm	1.299	**33.00 mm**	(12x)	4 mm	75 mm	DQW0935-C8	54.40
.0937 (3/32)		2.381 mm	.453	**11.50 mm**	(3x)	4 mm	50 mm	AVA0937-C8	47.70
.0937 (3/32)		2.381 mm	.630	**16.00 mm**	(5x)	4 mm	63 mm	BAF0937-C8	48.70
.0937 (3/32)		2.381 mm	.906	**23.00 mm**	(8x)	4 mm	63 mm	CBG0937-C8	51.50
.0937 (3/32)		2.381 mm	1.102	**28.00 mm**	(10x)	4 mm	63 mm	ERY0937-C8	52.90
.0937 (3/32)		2.381 mm	1.299	**33.00 mm**	(12x)	4 mm	75 mm	DQW0937-C8	54.40

continued on next page

MINIATURE HIGH PERFORMANCE DRILLS

Aluminum Alloys (cont.)

continued from previous page

DRILL DIAMETER			FLUTE LENGTH			SHANK DIAMETER	OVERALL LENGTH	TiB_2 COATED	
inch	wire	metric	inch	metric	hole depth				
		D_1 $^{+.000mm}_{-.013mm}$		L_2 $^{+.25mm}_{-.00mm}$		D_2 (h6)	L_1	3 FL	PRICE
.0960	#41	2.438 mm	.453	**11.50 mm**	(3x)	4 mm	50 mm	AVA0960-C8	47.70
.0960	#41	2.438 mm	.630	**16.00 mm**	(5x)	4 mm	63 mm	BAF0960-C8	48.70
.0960	#41	2.438 mm	.945	**24.00 mm**	(8x)	4 mm	63 mm	CBG0960-C8	51.50
.0960	#41	2.438 mm	1.142	**29.00 mm**	(10x)	4 mm	75 mm	ERY0960-C8	52.90
.0960	#41	2.438 mm	1.339	**34.00 mm**	(12x)	4 mm	75 mm	DOW0960-C8	54.40
.0980	#40	2.489 mm	.472	**12.00 mm**	(3x)	4 mm	50 mm	AVA0980-C8	47.70
.0980	#40	2.489 mm	.669	**17.00 mm**	(5x)	4 mm	63 mm	BAF0980-C8	48.70
.0980	#40	2.489 mm	.945	**24.00 mm**	(8x)	4 mm	63 mm	CBG0980-C8	51.50
.0980	#40	2.489 mm	1.142	**29.00 mm**	(10x)	4 mm	75 mm	ERY0980-C8	52.90
.0980	#40	2.489 mm	1.339	**34.00 mm**	(12x)	4 mm	75 mm	DOW0980-C8	54.40
.0984		2.500 mm	.472	**12.00 mm**	(3x)	4 mm	50 mm	AVA0984-C8	48.10
.0984		2.500 mm	.669	**17.00 mm**	(5x)	4 mm	63 mm	BAF0984-C8	49.10
.0984		2.500 mm	.945	**24.00 mm**	(8x)	4 mm	63 mm	CBG0984-C8	51.90
.0984		2.500 mm	1.142	**29.00 mm**	(10x)	4 mm	75 mm	ERY0984-C8	53.40
.0984		2.500 mm	1.339	**34.00 mm**	(12x)	4 mm	75 mm	DOW0984-C8	54.70
.0995	#39	2.527 mm	.472	**12.00 mm**	(3x)	4 mm	50 mm	AVA0995-C8	48.10
.0995	#39	2.527 mm	.669	**17.00 mm**	(5x)	4 mm	63 mm	BAF0995-C8	49.10
.0995	#39	2.527 mm	.984	**25.00 mm**	(8x)	4 mm	63 mm	CBG0995-C8	51.90
.0995	#39	2.527 mm	1.181	**30.00 mm**	(10x)	4 mm	75 mm	ERY0995-C8	53.40
.0995	#39	2.527 mm	1.378	**35.00 mm**	(12x)	4 mm	75 mm	DOW0995-C8	54.70
.1000		2.540 mm	.472	**12.00 mm**	(3x)	4 mm	50 mm	AVA1000-C8	48.10
.1000		2.540 mm	.669	**17.00 mm**	(5x)	4 mm	63 mm	BAF1000-C8	49.10
.1000		2.540 mm	.984	**25.00 mm**	(8x)	4 mm	63 mm	CBG1000-C8	51.90
.1000		2.540 mm	1.378	**35.00 mm**	(12x)	4 mm	75 mm	DOW1000-C8	54.70
.1015	#38	2.578 mm	.472	**12.00 mm**	(3x)	4 mm	50 mm	AVA1015-C8	48.10
.1015	#38	2.578 mm	.669	**17.00 mm**	(5x)	4 mm	63 mm	BAF1015-C8	49.10
.1015	#38	2.578 mm	.984	**25.00 mm**	(8x)	4 mm	63 mm	CBG1015-C8	51.90
.1015	#38	2.578 mm	1.181	**30.00 mm**	(10x)	4 mm	75 mm	ERY1015-C8	53.40
.1015	#38	2.578 mm	1.378	**35.00 mm**	(12x)	4 mm	75 mm	DOW1015-C8	54.70
.1040	#37	2.641 mm	.492	**12.50 mm**	(3x)	4 mm	50 mm	AVA1040-C8	48.10
.1040	#37	2.641 mm	.709	**18.00 mm**	(5x)	4 mm	63 mm	BAF1040-C8	49.10
.1040	#37	2.641 mm	1.024	**26.00 mm**	(8x)	4 mm	63 mm	CBG1040-C8	51.90
.1040	#37	2.641 mm	1.220	**31.00 mm**	(10x)	4 mm	75 mm	ERY1040-C8	53.40
.1040	#37	2.641 mm	1.417	**36.00 mm**	(12x)	4 mm	75 mm	DOW1040-C8	54.70
.1065	#36	2.705 mm	.512	**13.00 mm**	(3x)	4 mm	50 mm	AVA1065-C8	48.10
.1065	#36	2.705 mm	.709	**18.00 mm**	(5x)	4 mm	63 mm	BAF1065-C8	49.10
.1065	#36	2.705 mm	1.024	**26.00 mm**	(8x)	4 mm	63 mm	CBG1065-C8	51.90
.1065	#36	2.705 mm	1.260	**32.00 mm**	(10x)	4 mm	75 mm	ERY1065-C8	53.40
.1065	#36	2.705 mm	1.457	**37.00 mm**	(12x)	4 mm	75 mm	DOW1065-C8	54.70
.1093 (7/64)		2.778 mm	.512	**13.00 mm**	(3x)	4 mm	50 mm	AVA1093-C8	48.10
.1093 (7/64)		2.778 mm	.748	**19.00 mm**	(5x)	4 mm	63 mm	BAF1093-C8	49.10
.1093 (7/64)		2.778 mm	1.063	**27.00 mm**	(8x)	4 mm	63 mm	CBG1093-C8	51.90
.1093 (7/64)		2.778 mm	1.299	**33.00 mm**	(10x)	4 mm	75 mm	ERY1093-C8	53.40
.1093 (7/64)		2.778 mm	1.496	**38.00 mm**	(12x)	4 mm	75 mm	DOW1093-C8	54.70
.1100	#35	2.794 mm	.531	**13.50 mm**	(3x)	4 mm	50 mm	AVA1100-C8	48.10
.1100	#35	2.794 mm	.748	**19.00 mm**	(5x)	4 mm	63 mm	BAF1100-C8	49.10
.1100	#35	2.794 mm	1.063	**27.00 mm**	(8x)	4 mm	63 mm	CBG1100-C8	51.90
.1100	#35	2.794 mm	1.299	**33.00 mm**	(10x)	4 mm	75 mm	ERY1100-C8	53.40

continued on next page

MINIATURE HIGH PERFORMANCE DRILLS

Aluminum Alloys (cont.)

continued from previous page

DRILL DIAMETER			FLUTE LENGTH			SHANK DIAMETER	OVERALL LENGTH	TiB_2 COATED	
inch	wire	metric	inch	metric	hole depth				
		D_1 +.000mm −.013mm		L_2 +.25mm −.00mm		D_2 (h6)	L_1	3 FL	PRICE
.1100	#35	2.794 mm	1.496	**38.00 mm**	(12x)	4 mm	75 mm	DQW1100-C8	54.70
.1110	#34	2.819 mm	.531	**13.50 mm**	(3x)	4 mm	50 mm	AVA1110-C8	48.10
.1110	#34	2.819 mm	.748	**19.00 mm**	(5x)	4 mm	63 mm	BAF1110-C8	49.10
.1110	#34	2.819 mm	1.063	**27.00 mm**	(8x)	4 mm	63 mm	CBG1110-C8	51.90
.1110	#34	2.819 mm	1.299	**33.00 mm**	(10x)	4 mm	75 mm	ERY1110-C8	53.40
.1110	#34	2.819 mm	1.535	**39.00 mm**	(12x)	4 mm	75 mm	DQW1110-C8	54.70
.1130	#33	2.870 mm	.531	**13.50 mm**	(3x)	4 mm	50 mm	AVA1130-C8	48.10
.1130	#33	2.870 mm	.748	**19.00 mm**	(5x)	4 mm	63 mm	BAF1130-C8	49.10
.1130	#33	2.870 mm	1.102	**28.00 mm**	(8x)	4 mm	63 mm	CBG1130-C8	51.90
.1130	#33	2.870 mm	1.339	**34.00 mm**	(10x)	4 mm	75 mm	ERY1130-C8	53.40
.1130	#33	2.870 mm	1.535	**39.00 mm**	(12x)	4 mm	75 mm	DQW1130-C8	54.70
.1160	#32	2.946 mm	.551	**14.00 mm**	(3x)	4 mm	50 mm	AVA1160-C8	48.10
.1160	#32	2.946 mm	.787	**20.00 mm**	(5x)	4 mm	63 mm	BAF1160-C8	49.10
.1160	#32	2.946 mm	1.142	**29.00 mm**	(8x)	4 mm	63 mm	CBG1160-C8	51.90
.1160	#32	2.946 mm	1.575	**40.00 mm**	(12x)	4 mm	75 mm	DQW1160-C8	54.70
.1181		3.000 mm	.571	**14.50 mm**	(3x)	4 mm	50 mm	AVA1181-C8	49.10
.1181		3.000 mm	.787	**20.00 mm**	(5x)	4 mm	63 mm	BAF1181-C8	50.40
.1181		3.000 mm	1.142	**29.00 mm**	(8x)	4 mm	63 mm	CBG1181-C8	52.90
.1181		3.000 mm	1.378	**35.00 mm**	(10x)	4 mm	75 mm	ERY1181-C8	54.40
.1181		3.000 mm	1.654	**42.00 mm**	(12x)	4 mm	100 mm	DQW1181-C8	55.80
		D_1 +.000mm −.013mm		L_2 +.75mm −.00mm		D_2 (h6)	L_1	3 FL	PRICE
.1200	#31	3.048 mm	.571	**14.50 mm**	(3x)	6 mm	63 mm	AVA1200-C8	60.80
.1200	#31	3.048 mm	.827	**21.00 mm**	(5x)	6 mm	63 mm	BAF1200-C8	62.10
.1200	#31	3.048 mm	1.181	**30.00 mm**	(8x)	6 mm	75 mm	CBG1200-C8	63.40
.1200	#31	3.048 mm	1.654	**42.00 mm**	(12x)	6 mm	100 mm	DQW1200-C8	66.00
.1250 (1/8)		3.175 mm	.591	**15.00 mm**	(3x)	6 mm	63 mm	AVA1250-C8	60.80
.1250 (1/8)		3.175 mm	.827	**21.00 mm**	(5x)	6 mm	63 mm	BAF1250-C8	62.10
.1250 (1/8)		3.175 mm	1.220	**31.00 mm**	(8x)	6 mm	75 mm	CBG1250-C8	63.40
.1250 (1/8)		3.175 mm	1.732	**44.00 mm**	(12x)	6 mm	100 mm	DQW1250-C8	66.00
.1260		3.200 mm	.866	**22.00 mm**	(5x)	6 mm	63 mm	BAF1260-C8	62.10
.1260		3.200 mm	1.220	**31.00 mm**	(8x)	6 mm	75 mm	CBG1260-C8	66.00
.1285	#30	3.263 mm	.866	**22.00 mm**	(5x)	6 mm	63 mm	BAF1285-C8	62.10
.1285	#30	3.263 mm	1.732	**44.00 mm**	(12x)	6 mm	100 mm	DQW1285-C8	66.00
.1360	#29	3.454 mm	.630	**16.00 mm**	(3x)	6 mm	63 mm	AVA1360-C8	60.80
.1360	#29	3.454 mm	.906	**23.00 mm**	(5x)	6 mm	63 mm	BAF1360-C8	62.10
.1360	#29	3.454 mm	1.339	**34.00 mm**	(8x)	6 mm	75 mm	CBG1360-C8	63.40
.1360	#29	3.454 mm	1.575	**40.00 mm**	(10x)	6 mm	100 mm	ERY1360-C8	64.70
.1360	#29	3.454 mm	1.890	**48.00 mm**	(12x)	6 mm	100 mm	DQW1360-C8	66.00
.1405	#28	3.568 mm	.945	**24.00 mm**	(5x)	6 mm	75 mm	BAF1405-C8	62.10
.1405	#28	3.568 mm	1.969	**50.00 mm**	(12x)	6 mm	100 mm	DQW1405-C8	66.00
.1406 (9/64)		3.571 mm	.669	**17.00 mm**	(3x)	6 mm	63 mm	AVA1406-C8	60.80
.1406 (9/64)		3.571 mm	.945	**24.00 mm**	(5x)	6 mm	75 mm	BAF1406-C8	62.10
.1406 (9/64)		3.571 mm	1.378	**35.00 mm**	(8x)	6 mm	75 mm	CBG1406-C8	63.40
.1406 (9/64)		3.571 mm	1.654	**42.00 mm**	(10x)	6 mm	100 mm	ERY1406-C8	64.70
.1406 (9/64)		3.571 mm	1.969	**50.00 mm**	(12x)	6 mm	100 mm	DQW1406-C8	66.00
.1440	#27	3.657 mm	.945	**24.00 mm**	(5x)	6 mm	75 mm	BAF1440-C8	62.10
.1440	#27	3.657 mm	1.969	**50.00 mm**	(12x)	6 mm	100 mm	DQW1440-C8	66.00

continued on next page

MINIATURE HIGH PERFORMANCE DRILLS

Aluminum Alloys (cont.)

continued from previous page

DRILL DIAMETER			FLUTE LENGTH			SHANK DIAMETER	OVERALL LENGTH	TiB_2 COATED	
inch	wire	metric	inch	metric	hole depth				
		D_1 $^{+.000mm}_{-.013mm}$		L_2 $^{+.75mm}_{-.00mm}$		D_2 (h6)	L_1	3 FL	PRICE
.1470	#26	3.733 mm	.709	**18.00 mm**	(3x)	6 mm	63 mm	AVA1470-C8	60.80
.1470	#26	3.733 mm	1.024	**26.00 mm**	(5x)	6 mm	75 mm	BAF1470-C8	62.10
.1470	#26	3.733 mm	1.417	**36.00 mm**	(8x)	6 mm	100 mm	CBG1470-C8	63.40
.1470	#26	3.733 mm	1.732	**44.00 mm**	(10x)	6 mm	100 mm	ERY1470-C8	64.70
.1470	#26	3.733 mm	2.047	**52.00 mm**	(12x)	6 mm	100 mm	DQW1470-C8	66.00
.1495	#25	3.797 mm	1.024	**26.00 mm**	(5x)	6 mm	75 mm	BAF1495-C8	62.10
.1495	#25	3.797 mm	2.047	**52.00 mm**	(12x)	6 mm	100 mm	DQW1495-C8	66.00
.1520	#24	3.860 mm	1.024	**26.00 mm**	(5x)	6 mm	75 mm	BAF1520-C8	62.10
.1520	#24	3.860 mm	2.126	**54.00 mm**	(12x)	6 mm	100 mm	DQW1520-C8	66.00
.1540	#23	3.911 mm	1.024	**26.00 mm**	(5x)	6 mm	75 mm	BAF1540-C8	62.10
.1540	#23	3.911 mm	2.126	**54.00 mm**	(12x)	6 mm	100 mm	DQW1540-C8	66.00
.1562 (5/32)		3.968 mm	.748	**19.00 mm**	(3x)	6 mm	63 mm	AVA1562-C8	60.80
.1562 (5/32)		3.968 mm	1.024	**26.00 mm**	(5x)	6 mm	75 mm	BAF1562-C8	62.10
.1562 (5/32)		3.968 mm	1.535	**39.00 mm**	(8x)	6 mm	100 mm	CBG1562-C8	63.40
.1562 (5/32)		3.968 mm	1.811	**46.00 mm**	(10x)	6 mm	100 mm	ERY1562-C8	64.70
.1562 (5/32)		3.968 mm	2.126	**54.00 mm**	(12x)	6 mm	100 mm	DQW1562-C8	66.00
.1570	#22	3.987 mm	1.024	**26.00 mm**	(5x)	6 mm	75 mm	BAF1570-C8	62.10
.1570	#22	3.987 mm	1.535	**39.00 mm**	(8x)	6 mm	100 mm	CBG1570-C8	63.40
.1570	#22	3.987 mm	2.126	**54.00 mm**	(12x)	6 mm	100 mm	DQW1570-C8	66.00
.1574		4.000 mm	.748	**19.00 mm**	(3x)	6 mm	63 mm	AVA1574-C8	60.80
.1574		4.000 mm	1.102	**28.00 mm**	(5x)	6 mm	75 mm	BAF1574-C8	62.10
.1574		4.000 mm	1.535	**39.00 mm**	(8x)	6 mm	100 mm	CBG1574-C8	63.40
.1574		4.000 mm	1.890	**48.00 mm**	(10x)	6 mm	100 mm	ERY1574-C8	64.70
.1574		4.000 mm	2.205	**56.00 mm**	(12x)	6 mm	100 mm	DQW1574-C8	66.00
.1590	#21	4.038 mm	.748	**19.00 mm**	(3x)	6 mm	63 mm	AVA1590-C8	60.80
.1590	#21	4.038 mm	1.102	**28.00 mm**	(5x)	6 mm	75 mm	BAF1590-C8	62.10
.1590	#21	4.038 mm	1.535	**39.00 mm**	(8x)	6 mm	100 mm	CBG1590-C8	63.40
.1590	#21	4.038 mm	1.890	**48.00 mm**	(10x)	6 mm	100 mm	ERY1590-C8	64.70
.1590	#21	4.038 mm	2.205	**56.00 mm**	(12x)	6 mm	100 mm	DQW1590-C8	66.00
.1610	#20	4.089 mm	1.102	**28.00 mm**	(5x)	6 mm	75 mm	BAF1610-C8	62.10
.1610	#20	4.089 mm	2.205	**56.00 mm**	(12x)	6 mm	100 mm	DQW1610-C8	66.00
.1660	#19	4.216 mm	1.102	**28.00 mm**	(5x)	6 mm	75 mm	BAF1660-C8	62.10
.1660	#19	4.216 mm	2.283	**58.00 mm**	(12x)	6 mm	100 mm	DQW1660-C8	66.00
.1695	#18	4.305 mm	1.181	**30.00 mm**	(5x)	6 mm	75 mm	BAF1695-C8	62.10
.1695	#18	4.305 mm	2.362	**60.00 mm**	(12x)	6 mm	100 mm	DQW1695-C8	66.00
.1718 (11/64)		4.365 mm	.827	**21.00 mm**	(3x)	6 mm	63 mm	AVA1718-C8	60.80
.1718 (11/64)		4.365 mm	1.181	**30.00 mm**	(5x)	6 mm	75 mm	BAF1718-C8	62.10
.1718 (11/64)		4.365 mm	1.654	**42.00 mm**	(8x)	6 mm	100 mm	CBG1718-C8	63.40
.1718 (11/64)		4.365 mm	2.047	**52.00 mm**	(10x)	6 mm	100 mm	ERY1718-C8	64.70
.1718 (11/64)		4.365 mm	2.362	**60.00 mm**	(12x)	6 mm	100 mm	DQW1718-C8	66.00
.1730	#17	4.394 mm	1.181	**30.00 mm**	(5x)	6 mm	75 mm	BAF1730-C8	62.10
.1730	#17	4.394 mm	2.362	**60.00 mm**	(12x)	6 mm	100 mm	DQW1730-C8	66.00
.1770	#16	4.495 mm	.827	**21.00 mm**	(3x)	6 mm	63 mm	AVA1770-C8	60.80
.1770	#16	4.495 mm	1.181	**30.00 mm**	(5x)	6 mm	75 mm	BAF1770-C8	62.10
.1770	#16	4.495 mm	1.732	**44.00 mm**	(8x)	6 mm	100 mm	CBG1770-C8	63.40
.1770	#16	4.495 mm	2.047	**52.00 mm**	(10x)	6 mm	100 mm	ERY1770-C8	64.70
.1770	#16	4.495 mm	2.441	**62.00 mm**	(12x)	6 mm	125 mm	DQW1770-C8	66.00

continued on next page

MINIATURE HIGH PERFORMANCE DRILLS

Aluminum Alloys (cont.)

continued from previous page

DRILL DIAMETER			FLUTE LENGTH			SHANK DIAMETER	OVERALL LENGTH	TiB_2 COATED	
inch	wire	metric	inch	metric	hole depth				
		D_1 +.000mm −.013mm		L_2 +.75mm −.00mm		D_2 (h6)	L_1	3 FL	PRICE
.1800	#15	4.572 mm	.866	**22.00 mm**	(3x)	6 mm	63 mm	AVA1800-C8	60.80
.1800	#15	4.572 mm	1.181	**30.00 mm**	(5x)	6 mm	75 mm	BAF1800-C8	62.10
.1800	#15	4.572 mm	1.732	**44.00 mm**	(8x)	6 mm	100 mm	CBG1800-C8	63.40
.1800	#15	4.572 mm	2.126	**54.00 mm**	(10x)	6 mm	100 mm	ERY1800-C8	64.70
.1800	#15	4.572 mm	2.441	**62.00 mm**	(12x)	6 mm	125 mm	DOW1800-C8	66.00
.1820	#14	4.622 mm	1.260	**32.00 mm**	(5x)	6 mm	75 mm	BAF1820-C8	62.10
.1820	#14	4.622 mm	2.520	**64.00 mm**	(12x)	6 mm	125 mm	DOW1820-C8	66.00
.1850	#13	4.700 mm	1.260	**32.00 mm**	(5x)	6 mm	75 mm	BAF1850-C8	62.10
.1850	#13	4.700 mm	2.520	**64.00 mm**	(12x)	6 mm	125 mm	DOW1850-C8	66.00
.1875 (3/16)		4.762 mm	.906	**23.00 mm**	(3x)	6 mm	63 mm	AVA1875-C8	60.80
.1875 (3/16)		4.762 mm	1.260	**32.00 mm**	(5x)	6 mm	75 mm	BAF1875-C8	62.10
.1875 (3/16)		4.762 mm	1.811	**46.00 mm**	(8x)	6 mm	100 mm	CBG1875-C8	63.40
.1875 (3/16)		4.762 mm	2.205	**56.00 mm**	(10x)	6 mm	100 mm	ERY1875-C8	64.70
.1875 (3/16)		4.762 mm	2.598	**66.00 mm**	(12x)	6 mm	125 mm	DOW1875-C8	66.00
.1890	#12	4.800 mm	1.260	**32.00 mm**	(5x)	6 mm	75 mm	BAF1890-C8	62.10
.1890	#12	4.800 mm	2.598	**66.00 mm**	(12x)	6 mm	125 mm	DOW1890-C8	66.00
.1910	#11	4.851 mm	1.260	**32.00 mm**	(5x)	6 mm	75 mm	BAF1910-C8	62.10
.1910	#11	4.851 mm	2.598	**66.00 mm**	(12x)	6 mm	125 mm	DOW1910-C8	66.00
.1935	#10	4.914 mm	1.339	**34.00 mm**	(5x)	6 mm	75 mm	BAF1935-C8	62.10
.1935	#10	4.914 mm	2.677	**68.00 mm**	(12x)	6 mm	125 mm	DOW1935-C8	66.00
.1960	#9	4.978 mm	1.339	**34.00 mm**	(5x)	6 mm	75 mm	BAF1960-C8	62.10
.1960	#9	4.978 mm	2.677	**68.00 mm**	(12x)	6 mm	125 mm	DOW1960-C8	66.00
.1968		5.000 mm	.945	**24.00 mm**	(3x)	6 mm	63 mm	AVA1968-C8	60.80
.1968		5.000 mm	1.339	**34.00 mm**	(5x)	6 mm	75 mm	BAF1968-C8	62.10
.1968		5.000 mm	1.890	**48.00 mm**	(8x)	6 mm	100 mm	CBG1968-C8	63.40
.1968		5.000 mm	2.283	**58.00 mm**	(10x)	6 mm	100 mm	ERY1968-C8	64.70
.1968		5.000 mm	2.677	**68.00 mm**	(12x)	6 mm	125 mm	DOW1968-C8	66.00
.1990	#8	5.054 mm	1.339	**34.00 mm**	(5x)	6 mm	75 mm	BAF1990-C8	62.10
.1990	#8	5.054 mm	2.756	**70.00 mm**	(12x)	6 mm	125 mm	DOW1990-C8	66.00
.2009	#7	5.105 mm	.945	**24.00 mm**	(3x)	6 mm	63 mm	AVA2009-C8	60.80
.2009	#7	5.105 mm	1.339	**34.00 mm**	(5x)	6 mm	75 mm	BAF2009-C8	62.10
.2009	#7	5.105 mm	1.969	**50.00 mm**	(8x)	6 mm	100 mm	CBG2009-C8	63.40
.2009	#7	5.105 mm	2.362	**60.00 mm**	(10x)	6 mm	100 mm	ERY2009-C8	64.70
.2009	#7	5.105 mm	2.756	**70.00 mm**	(12x)	6 mm	125 mm	DOW2009-C8	66.00
.2031 (13/64)		5.159 mm	.945	**24.00 mm**	(3x)	6 mm	63 mm	AVA2031-C8	60.80
.2031 (13/64)		5.159 mm	1.339	**34.00 mm**	(5x)	6 mm	75 mm	BAF2031-C8	62.10
.2031 (13/64)		5.159 mm	1.969	**50.00 mm**	(8x)	6 mm	100 mm	CBG2031-C8	63.40
.2031 (13/64)		5.159 mm	2.362	**60.00 mm**	(10x)	6 mm	100 mm	ERY2031-C8	64.70
.2031 (13/64)		5.159 mm	2.756	**70.00 mm**	(12x)	6 mm	125 mm	DOW2031-C8	66.00
.2040	#6	5.181 mm	1.339	**34.00 mm**	(5x)	6 mm	75 mm	BAF2040-C8	62.10
.2040	#6	5.181 mm	2.835	**72.00 mm**	(12x)	6 mm	125 mm	DOW2040-C8	66.00
.2055	#5	5.219 mm	1.417	**36.00 mm**	(5x)	6 mm	75 mm	BAF2055-C8	62.10
.2055	#5	5.219 mm	2.835	**72.00 mm**	(12x)	6 mm	125 mm	DOW2055-C8	66.00
.2090	#4	5.308 mm	1.417	**36.00 mm**	(5x)	6 mm	75 mm	BAF2090-C8	62.10
.2090	#4	5.308 mm	2.835	**72.00 mm**	(12x)	6 mm	125 mm	DOW2090-C8	66.00
.2129	#3	5.410 mm	1.024	**26.00 mm**	(3x)	6 mm	75 mm	AVA2129-C8	60.80
.2129	#3	5.410 mm	1.417	**36.00 mm**	(5x)	6 mm	75 mm	BAF2129-C8	62.10
.2129	#3	5.410 mm	2.047	**52.00 mm**	(8x)	6 mm	100 mm	CBG2129-C8	63.40
.2129	#3	5.410 mm	2.520	**64.00 mm**	(10x)	6 mm	125 mm	ERY2129-C8	64.70
.2129	#3	5.410 mm	2.913	**74.00 mm**	(12x)	6 mm	125 mm	DOW2129-C8	66.00

continued on next page

MINIATURE HIGH PERFORMANCE DRILLS

Aluminum Alloys (cont.)

continued from previous page

DRILL DIAMETER			FLUTE LENGTH			SHANK DIAMETER	OVERALL LENGTH	TiB_2 COATED	
inch	wire	metric	inch	metric	hole depth				
		D_1 $^{+.000mm}_{-.013mm}$		L_2 $^{+.75mm}_{-.00mm}$		D_2 (h6)	L_1	3 FL	PRICE
.2187 (7/32)		5.556 mm	1.024	**26.00 mm**	(3x)	6 mm	75 mm	AVA2187-C8	60.80
.2187 (7/32)		5.556 mm	1.496	**38.00 mm**	(5x)	6 mm	100 mm	BAF2187-C8	62.10
.2187 (7/32)		5.556 mm	2.126	**54.00 mm**	(8x)	6 mm	100 mm	CBG2187-C8	63.40
.2187 (7/32)		5.556 mm	2.598	**66.00 mm**	(10x)	6 mm	125 mm	ERY2187-C8	64.70
.2187 (7/32)		5.556 mm	2.992	**76.00 mm**	(12x)	6 mm	125 mm	DOW2187-C8	66.00
.2210	#2	5.613 mm	1.496	**38.00 mm**	(5x)	6 mm	100 mm	BAF2210-C8	62.10
.2210	#2	5.613 mm	3.071	**78.00 mm**	(12x)	6 mm	125 mm	DOW2210-C8	66.00
.2280	#1	5.791 mm	1.575	**40.00 mm**	(5x)	6 mm	100 mm	BAF2280-C8	62.10
.2280	#1	5.791 mm	3.150	**80.00 mm**	(12x)	6 mm	125 mm	DOW2280-C8	66.00
.2340	A	5.943 mm	1.575	**40.00 mm**	(5x)	6 mm	100 mm	BAF2340-C8	62.10
.2340	A	5.943 mm	3.228	**82.00 mm**	(12x)	6 mm	125 mm	DOW2340-C8	66.00
.2343 (15/64)		5.953 mm	1.102	**28.00 mm**	(3x)	6 mm	75 mm	AVA2343-C8	60.80
.2343 (15/64)		5.953 mm	1.575	**40.00 mm**	(5x)	6 mm	100 mm	BAF2343-C8	62.10
.2343 (15/64)		5.953 mm	2.283	**58.00 mm**	(8x)	6 mm	100 mm	CBG2343-C8	63.40
.2343 (15/64)		5.953 mm	2.756	**70.00 mm**	(10x)	6 mm	125 mm	ERY2343-C8	64.70
.2343 (15/64)		5.953 mm	3.228	**82.00 mm**	(12x)	6 mm	125 mm	DOW2343-C8	66.00
.2362		6.000 mm	1.102	**28.00 mm**	(3x)	6 mm	75 mm	AVA2362-C8	60.80
.2362		6.000 mm	1.575	**40.00 mm**	(5x)	6 mm	100 mm	BAF2362-C8	62.10
.2362		6.000 mm	2.283	**58.00 mm**	(8x)	6 mm	100 mm	CBG2362-C8	63.40
.2362		6.000 mm	2.756	**70.00 mm**	(10x)	6 mm	125 mm	ERY2362-C8	64.70
.2362		6.000 mm	3.228	**82.00 mm**	(12x)	6 mm	125 mm	DOW2362-C8	66.00
.2380	B	6.045 mm	1.575	**40.00 mm**	(5x)	8 mm	100 mm	BAF2380-C8	64.20
.2380	B	6.045 mm	3.307	**84.00 mm**	(12x)	8 mm	125 mm	DOW2380-C8	68.20
.2420	C	6.146 mm	1.654	**42.00 mm**	(5x)	8 mm	100 mm	BAF2420-C8	64.20
.2420	C	6.146 mm	3.307	**84.00 mm**	(12x)	8 mm	125 mm	DOW2420-C8	68.20
.2460	D	6.248 mm	1.654	**42.00 mm**	(5x)	8 mm	100 mm	BAF2460-C8	64.20
.2460	D	6.248 mm	3.386	**86.00 mm**	(12x)	8 mm	150 mm	DOW2460-C8	68.20
.2500 (1/4)	E	6.350 mm	1.181	**30.00 mm**	(3x)	8 mm	75 mm	AVA2500-C8	60.80
.2500 (1/4)	E	6.350 mm	1.654	**42.00 mm**	(5x)	8 mm	100 mm	BAF2500-C8	62.10
.2500 (1/4)	E	6.350 mm	2.441	**62.00 mm**	(8x)	8 mm	125 mm	CBG2500-C8	63.40
.2500 (1/4)	E	6.350 mm	2.913	**74.00 mm**	(10x)	8 mm	125 mm	ERY2500-C8	64.70
.2500 (1/4)	E	6.350 mm	3.465	**88.00 mm**	(12x)	8 mm	150 mm	DOW2500-C8	66.00
.2510		6.375 mm	1.654	**42.00 mm**	(5x)	8 mm	100 mm	BAF2510-C8	70.50
.2570	F	6.528 mm	1.732	**44.00 mm**	(5x)	8 mm	100 mm	BAF2570-C8	70.50
.2812 (9/32)		7.142 mm	1.890	**48.00 mm**	(5x)	8 mm	100 mm	BAF2812-C8	70.50
.3125 (5/16)		7.937 mm	2.126	**54.00 mm**	(5x)	8 mm	100 mm	BAF3125-C8	70.50
.3150		8.000 mm	2.126	**54.00 mm**	(5x)	8 mm	100 mm	BAF3150-C8	70.50
.3750 (3/8)		9.525 mm	1.811	**46.00 mm**	(3x)	10 mm	100 mm	AVA3750-C8	118.10
.3750 (3/8)		9.525 mm	2.520	**64.00 mm**	(5x)	10 mm	125 mm	BAF3750-C8	121.00
.3770	V	9.575 mm	1.811	**46.00 mm**	(3x)	10 mm	100 mm	AVA3770-C8	118.10
.3770	V	9.575 mm	2.520	**64.00 mm**	(5x)	10 mm	125 mm	BAF3770-C8	121.00
.3937		10.000 mm	2.677	**68.00 mm**	(5x)	10 mm	125 mm	BAF3937-C8	121.00
.4375 (7/16)		11.112 mm	2.992	**76.00 mm**	(5x)	12 mm	125 mm	BAF4375-C8	153.60
.4724		12.000 mm	3.228	**82.00 mm**	(5x)	12 mm	125 mm	BAF4724-C8	153.60
.5000 (1/2)		12.700 mm	3.386	**86.00 mm**	(5x)	16 mm	150 mm	BAF5000-C8	270.10

See Speeds & Feeds on next page

MINIATURE HIGH PERFORMANCE DRILLS

Aluminum Alloys (cont.)

SPEEDS & FEEDS (Miniature High Performance Drills – Aluminum Alloys)

Important Note: Values in table are in inches and are based on 3x and 5x drill lengths. For longer lengths, table values of IPR must be reduced (for 8x and 10x, reduce to 75%; for 12x, reduce to 65%). Pecking cycles are recommended to avoid chip packing and breakage. The initial peck depth should be 3-5x diameter with each subsequent peck at 2-3x diameter. For complete speeds and feeds charts, please go to www.harveytool.com.

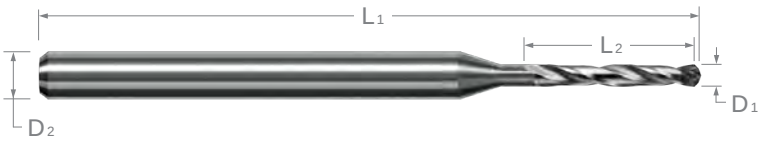
Material (Hardness: ≤ 28 Rc)	SFM	Chip Load IPR (Inches Per Revolution) By Drill Diameter								
		.015	.031	.047	.062	.078	.093	.125	.187	.250
Aluminum Alloys: Casting (2xx, 5xx, 7xx, 8xx)	450	.00079	.00164	.00248	.00327	.00412	.00491	.00660	.00987	.01320
Wrought (1xxx, 2xxx, 3xxx, 5xxx, 6xxx, 7xxx, 8xxx)	600									
Casting - 3%-5% Si (3xx, A3xx, C3xx, 4xx, A4xx, B4xx)	450	.00071	.00147	.00223	.00295	.00371	.00442	.00594	.00889	.01188
Casting - 5%-8% Si (3xx, A3xx, C3xx, 4xx, A4xx, B4xx)	420									
Casting - 8%-12% Si (3xx, A3xx, C3xx, 4xx, A4xx, B4xx)	390									
Casting - 12%-16% Si (3xx, A3xx, C3xx, 4xx, A4xx, B4xx)	350									
Wrought - 5%-8% Si (4xxx)	600									
Wrought - 8%-12% Si (4xxx)	480									
Magnesium Alloys	900	.00079	.00164	.00248	.00327	.00412	.00491	.00660	.00987	.01320
Zinc Alloys	480									
Copper Alloys: High Coppers - 90%+ (C1xxx)	170	.00063	.00131	.00199	.00262	.00329	.00393	.00528	.00790	.01056
Brass (Copper Zinc alloys, C2xxxx, C3xxxx, C4xxxx, C66400-C69800)	375									
Phosphor Bronzes (Copper Tin alloys, C5xxxx)	170									
Aluminum Bronzes (Copper Aluminum alloys, C60600-C64200)	375									
Silicon Bronzes (Copper Silicon alloys, C64700-C66100)	375									
Copper Nickels, Nickel Silvers (Copper Nickel alloys, C7xxxx)	170									
Cast Copper Alloys (C83300-C86200, C86400-C87900, C92200-C95800, C97300-C97800, C99400-C99700)	400									
Plastics: Unfilled Plastics	500	.00079	.00164	.00248	.00327	.00412	.00491	.00660	.00987	.01320
Reinforced Plastics	350	.00063	.00131	.00199	.00329	.00393	.00528	.00790	.01056	.01584

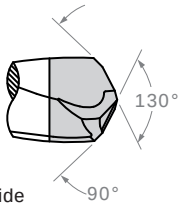
View a comprehensive library of **Speeds & Feeds** charts for every Harvey Tool End Mill on the new Harveytool.com.

Access **Simulation Files** in DXF format for every Harvey Tool product, downloadable now from the new Harveytool.com

MINIATURE HIGH PERFORMANCE DRILLS

PCD Diamond – Double Angle





- PCD diamond brazed on entire end of solid carbide body allows for increased tool life over carbide
- Full PCD tip allows for positive cutting geometry
- Double angle point geometry for superior performance in preventing push-out and delamination in layered composites
- Recommended work piece material: aluminum, copper, brass, bronze, plastic, graphite, carbon, carbon fiber materials, green carbide, gold, silver, magnesium, zinc, green ceramics
- h6 shank tolerance for high precision tool holders

DRILL DIAMETER			FLUTE LENGTH			SHANK DIAMETER	OVERALL LENGTH	PCD DIAMOND	
inch	wire	metric	inch	metric	hole depth				
		D_1 +.000mm −.013mm		L_2 +.25mm −.00mm		D_2 (h6)	L_1	2 FL	PRICE
.0937 (3/32)		2.381 mm	.630	**16.00 mm**	(5x)	4 mm	63 mm	BCF0937	554.80
.1181		3.000 mm	.787	**20.00 mm**	(5x)	4 mm	63 mm	BCF1181	554.80
		D_1 +.000mm −.013mm		L_2 +.75mm −.00mm		D_2 (h6)	L_1	2 FL	PRICE
.1250 (1/8)		3.175 mm	.827	**21.00 mm**	(5x)	6 mm	63 mm	BCF1250	510.30
.1299		3.300 mm	.866	**22.00 mm**	(5x)	6 mm	63 mm	BCF1299	510.30
.1650		4.190 mm	1.102	**28.00 mm**	(5x)	6 mm	75 mm	BCF1650	564.10
.1875 (3/16)		4.762 mm	1.260	**32.00 mm**	(5x)	6 mm	75 mm	BCF1875	564.10
.1910	#11	4.851 mm	1.260	**32.00 mm**	(5x)	6 mm	75 mm	BCF1910	564.10
.2500 (1/4)	E	6.350 mm	1.654	**42.00 mm**	(5x)	8 mm	100 mm	BCF2500	649.50
.2510		6.375 mm	1.654	**42.00 mm**	(5x)	8 mm	100 mm	BCF2510	649.50

For PCD End Mills, see pages 213 and 214.

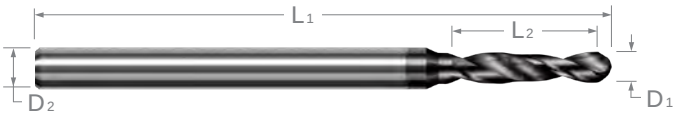
SPEEDS & FEEDS (Miniature High Performance Drills – PCD Diamond)

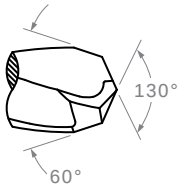
Important Note: Values in table are in inches and are based on 5x drill lengths. Since the melting point varies greatly from in plastics, the speed (RPM) used should be closely supervised. An additional reduction in RPM may be necessary to avoid excessive fraying, splitting and tear out of fibers. Pecking cycles are recommended to avoid chip packing and breakage. The initial peck depth should be 3-5x Diameter with each subsequent peck at 2-3x Diameter. For Metal Matrix Composites with aluminum, pecking should begin when part thickness is more than 1x Diameter and a feed reduction of 30%. For titanium, pecking should begin when part thickness is more than .5x Diameter and a feed reduction of 50% with a subsequent peck .5-1x Diameter. For complete speeds and feeds charts, please go to www.harveytool.com.

Material	Type	Hardness	SFM	Chip Load (IPR) By Drill Diameter				
				.078	.093	.125	.187	.250
Unfilled Plastics ETFE, FEP, HDPE, LDPE, PFA, Polyurethane, PTFE, Rulon, Teflon, UHMW	Unfilled	50 < 100 Rr, (55 < 85 Shore D)	800 - 1200	.0037	.0045	.0060	.0090	.0120
Acrylic, Acetal, Delrin, Lucite, Nylon 6, Nylon 6/6, PAI, PI, PEEK, Plexiglas, PS, PSU, Torlon 4203, Ultem 1000	Unfilled	100 > 150 Rr	500 - 800	.0041	.0049	.0066	.0099	.0132
Filled Plastics Vespel SP-3	Lubricant Filled (Oil, Moly, Graphite, Teflon, PTFE)	50 < 100 Rr, (55 < 85 Shore D)	800 - 1200	.0037	.0045	.0060	.0090	.0120
Nyoil, Nylatron, Plavis MS, Torlon 4301	Lubricant Filled (Oil, Moly, Graphite, Teflon, PTFE)	100 > 150 Rr	500 - 800	.0041	.0049	.0066	.0099	.0132
	Carbon/Glass Filled 5% < 20%	100 > 150 Rr	400 - 600	.0041	.0049	.0066	.0099	.0132
	Carbon/Glass Filled 21% < 40%	100 > 150 Rr	350 - 500	.0034	.0040	.0054	.0081	.0108
Fiber Reinforced Plastics FR4, G10, G11	Carbon/Glass Fiber 5% < 20%	100 > 150 Rr	350 - 500	.0041	.0049	.0066	.0099	.0132
G30	Carbon/Glass Fiber 21% < 40%	100 > 150 Rr	200 - 300	.0034	.0040	.0054	.0081	.0108
Metal Matrix Composites	Aluminum/Composite Layered		320 - 500	.0041	.0049	.0066	.0099	.0132
	Titanium/Composite Layered		160 - 260	.0030	.0036	.0048	.0072	.0096
Graphite POCO 3			400 - 600	.0043	.0051	.0069	.0103	.0138
Green Ceramic & Green Carbide			100 - 300	.0039	.0047	.0063	.0094	.0126

MINIATURE HIGH PERFORMANCE DRILLS

Composites – Double Angle





- Optimized for drilling layered composites with excellent performance in virgin plastics and other composite materials
- Double angle point geometry for superior performance in preventing push-out and delamination in layered composites
- Amorphous diamond coating for increased abrasion resistance
- h6 shank tolerance for high precision tool holders
- Solid carbide
- CNC ground in the USA



Double Angle Point Geometry Prevents Delamination

COMPOSITES

DRILL DIAMETER			FLUTE LENGTH			SHANK DIAMETER	OVERALL LENGTH	AMORPHOUS DIAMOND	
inch	wire	metric	inch	metric	hole depth				
		D_1 +.000mm −.013mm		L_2 +.25mm −.00mm		D_2 (h6)	L_1	2 FL	PRICE
.0312 (1/32)		.793 mm	.213	**5.40 mm**	(5x)	3 mm	50 mm	DDA0312-C4	57.10
.0314		.800 mm	.213	**5.40 mm**	(5x)	3 mm	50 mm	DDA0315-C4	57.10
.0320	#67	.812 mm	.213	**5.40 mm**	(5x)	3 mm	50 mm	DDA0320-C4	57.10
.0330	#66	.838 mm	.220	**5.60 mm**	(5x)	3 mm	50 mm	DDA0330-C4	57.10
.0350	#65	.889 mm	.236	**6.00 mm**	(5x)	3 mm	50 mm	DDA0350-C4	57.10
.0354		.900 mm	.236	**6.00 mm**	(5x)	3 mm	50 mm	DDA0354-C4	57.10
.0360	#64	.914 mm	.244	**6.20 mm**	(5x)	3 mm	50 mm	DDA0360-C4	57.10
.0370	#63	.939 mm	.252	**6.40 mm**	(5x)	3 mm	50 mm	DDA0370-C4	57.10
.0380	#62	.965 mm	.260	**6.60 mm**	(5x)	3 mm	50 mm	DDA0380-C4	57.10
.0390	#61	.990 mm	.260	**6.60 mm**	(5x)	3 mm	50 mm	DDA0390-C4	57.10
.0393		1.000 mm	.268	**6.80 mm**	(5x)	3 mm	50 mm	DDA0393-C4	58.50
.0400	#60	1.016 mm	.268	**6.80 mm**	(5x)	3 mm	50 mm	DDA0400-C4	58.50
.0410	#59	1.041 mm	.276	**7.00 mm**	(5x)	3 mm	50 mm	DDA0410-C4	58.50
.0420	#58	1.066 mm	.283	**7.20 mm**	(5x)	3 mm	50 mm	DDA0420-C4	58.50
.0430	#57	1.092 mm	.291	**7.40 mm**	(5x)	3 mm	50 mm	DDA0430-C4	58.50
.0450		1.143 mm	.307	**7.80 mm**	(5x)	3 mm	50 mm	DDA0450-C4	58.50
.0465	#56	1.181 mm	.315	**8.00 mm**	(5x)	3 mm	50 mm	DDA0465-C4	58.50
.0468 (3/64)		1.190 mm	.315	**8.00 mm**	(5x)	3 mm	50 mm	DDA0468-C4	58.50
.0492		1.250 mm	.335	**8.50 mm**	(5x)	3 mm	50 mm	DDA0492-C4	58.50
.0500		1.270 mm	.335	**8.50 mm**	(5x)	3 mm	50 mm	DDA0500-C4	58.50
.0520	#55	1.320 mm	.354	**9.00 mm**	(5x)	3 mm	50 mm	DDA0520-C4	58.50
.0550	#54	1.397 mm	.374	**9.50 mm**	(5x)	3 mm	50 mm	DDA0550-C4	58.50
.0590		1.500 mm	.394	**10.00 mm**	(5x)	3 mm	50 mm	DDA0590-C4	59.40
.0595	#53	1.511 mm	.394	**10.00 mm**	(5x)	3 mm	50 mm	DDA0595-C4	59.40
.0600		1.524 mm	.413	**10.50 mm**	(5x)	3 mm	50 mm	DDA0600-C4	59.40
.0625 (1/16)		1.587 mm	.413	**10.50 mm**	(5x)	3 mm	50 mm	DDA0625-C4	59.40
.0635	#52	1.612 mm	.433	**11.00 mm**	(5x)	3 mm	50 mm	DDA0635-C4	59.40
.0670	#51	1.701 mm	.453	**11.50 mm**	(5x)	3 mm	50 mm	DDA0670-C4	59.40

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MINIATURE HIGH PERFORMANCE DRILLS

Composites – Double Angle (cont.)

continued from previous page

DRILL DIAMETER inch	wire	metric	FLUTE LENGTH inch	metric	hole depth	SHANK DIAMETER	OVERALL LENGTH	AMORPHOUS DIAMOND 2 FL	PRICE
		D_1 +.000mm −.013mm		L_2 +.25mm −.00mm		D_2 (h6)	L_1		
.0700	#50	1.778 mm	.472	**12.00 mm**	(5x)	3 mm	50 mm	DDA0700-C4	59.40
.0730	#49	1.854 mm	.492	**12.50 mm**	(5x)	3 mm	50 mm	DDA0730-C4	59.40
.0760	#48	1.930 mm	.512	**13.00 mm**	(5x)	3 mm	50 mm	DDA0760-C4	59.40
.0781 (5/64)		1.984 mm	.531	**13.50 mm**	(5x)	3 mm	50 mm	DDA0781-C4	59.40
.0785	#47	1.993 mm	.531	**13.50 mm**	(5x)	3 mm	50 mm	DDA0785-C4	59.40
.0787		2.000 mm	.531	**13.50 mm**	(5x)	4 mm	50 mm	DDA0787-C4	60.40
.0800		2.032 mm	.531	**13.50 mm**	(5x)	4 mm	50 mm	DDA0800-C4	60.40
.0810	#46	2.057 mm	.551	**14.00 mm**	(5x)	4 mm	50 mm	DDA0810-C4	60.40
.0820	#45	2.082 mm	.551	**14.00 mm**	(5x)	4 mm	50 mm	DDA0820-C4	60.40
.0860	#44	2.184 mm	.571	**14.50 mm**	(5x)	4 mm	50 mm	DDA0860-C4	60.40
.0890	#43	2.260 mm	.591	**15.00 mm**	(5x)	4 mm	50 mm	DDA0890-C4	60.40
.0900		2.286 mm	.591	**15.00 mm**	(5x)	4 mm	50 mm	DDA0900-C4	60.40
.0935	#42	2.374 mm	.630	**16.00 mm**	(5x)	4 mm	63 mm	DDA0935-C4	60.40
.0937 (3/32)		2.381 mm	.630	**16.00 mm**	(5x)	4 mm	63 mm	DDA0937-C4	60.40
.0937 (3/32)		2.381 mm	.906	**23.00 mm**	(8x)	4 mm	63 mm	AWS0937-C4	62.10
.0960	#41	2.438 mm	.630	**16.00 mm**	(5x)	4 mm	63 mm	DDA0960-C4	60.40
.0980	#40	2.489 mm	.669	**17.00 mm**	(5x)	4 mm	63 mm	DDA0980-C4	60.40
.0984		2.500 mm	.669	**17.00 mm**	(5x)	4 mm	63 mm	DDA0984-C4	60.90
.0995	#39	2.527 mm	.669	**17.00 mm**	(5x)	4 mm	63 mm	DDA0995-C4	60.90
.1000		2.540 mm	.669	**17.00 mm**	(5x)	4 mm	63 mm	DDA1000-C4	60.90
.1000		2.540 mm	.984	**25.00 mm**	(8x)	4 mm	63 mm	AWS1000-C4	62.10
.1015	#38	2.578 mm	.669	**17.00 mm**	(5x)	4 mm	63 mm	DDA1015-C4	60.90
.1040	#37	2.641 mm	.709	**18.00 mm**	(5x)	4 mm	63 mm	DDA1040-C4	60.90
.1065	#36	2.705 mm	.709	**18.00 mm**	(5x)	4 mm	63 mm	DDA1065-C4	60.90
.1093 (7/64)		2.778 mm	.748	**19.00 mm**	(5x)	4 mm	63 mm	DDA1093-C4	60.90
.1100	#35	2.794 mm	.748	**19.00 mm**	(5x)	4 mm	63 mm	DDA1100-C4	60.90
.1110	#34	2.819 mm	.748	**19.00 mm**	(5x)	4 mm	63 mm	DDA1110-C4	60.90
.1130	#33	2.870 mm	.748	**19.00 mm**	(5x)	4 mm	63 mm	DDA1130-C4	60.90
.1160	#32	2.946 mm	.787	**20.00 mm**	(5x)	4 mm	63 mm	DDA1160-C4	60.90
.1181		3.000 mm	.787	**20.00 mm**	(5x)	4 mm	63 mm	DDA1181-C4	62.30
.1181		3.000 mm	1.142	**29.00 mm**	(8x)	4 mm	63 mm	AWS1181-C4	63.90
		D_1 +.000mm −.013mm		L_2 +.75mm −.00mm		D_2 (h6)	L1	2 FL	PRICE
.1200	#31	3.048 mm	.827	**21.00 mm**	(5x)	6 mm	63 mm	DDA1200-C4	73.70
.1250 (1/8)		3.175 mm	.590	**15.00 mm**	(3x)	6 mm	63 mm	BAA1250-C4	72.40
.1250 (1/8)		3.175 mm	.827	**21.00 mm**	(5x)	6 mm	63 mm	DDA1250-C4	73.70
.1250 (1/8)		3.175 mm	1.220	**31.00 mm**	(8x)	6 mm	75 mm	AWS1250-C4	75.70
.1285	#30	3.263 mm	.866	**22.00 mm**	(5x)	6 mm	63 mm	DDA1285-C4	73.70
.1360	#29	3.454 mm	.906	**23.00 mm**	(5x)	6 mm	63 mm	DDA1360-C4	73.70
.1406 (9/64)		3.571 mm	.945	**24.00 mm**	(5x)	6 mm	75 mm	DDA1406-C4	73.70
.1470	#26	3.733 mm	1.024	**26.00 mm**	(5x)	6 mm	75 mm	DDA1470-C4	73.70
.1562 (5/32)		3.968 mm	1.024	**26.00 mm**	(5x)	6 mm	75 mm	DDA1562-C4	73.70
.1574		4.000 mm	1.102	**28.00 mm**	(5x)	6 mm	75 mm	DDA1574-C4	73.70
.1590	#21	4.038 mm	1.102	**28.00 mm**	(5x)	6 mm	75 mm	DDA1590-C4	73.70

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MINIATURE HIGH PERFORMANCE DRILLS

Composites – Double Angle (cont.)

continued from previous page

DRILL DIAMETER			FLUTE LENGTH			SHANK DIAMETER	OVERALL LENGTH	AMORPHOUS DIAMOND	
inch	wire	metric	inch	metric	hole depth				
		D_1 +.000mm −.013mm		L_2 +.75mm −.00mm		D_2 (h6)	L_1	2 FL	PRICE
.1718 (11/64)		4.365 mm	1.181	**30.00 mm**	(5x)	6 mm	75 mm	DDA1718-C4	73.70
.1770	#16	4.495 mm	1.181	**30.00 mm**	(5x)	6 mm	75 mm	DDA1770-C4	73.70
.1800	#15	4.572 mm	1.181	**30.00 mm**	(5x)	6 mm	75 mm	DDA1800-C4	73.70
.1875 (3/16)		4.762 mm	1.260	**32.00 mm**	(5x)	6 mm	75 mm	DDA1875-C4	73.70
.1875 (3/16)		4.762 mm	1.811	**46.00 mm**	(8x)	6 mm	100 mm	AWS1875-C4	75.70
.1968		5.000 mm	1.339	**34.00 mm**	(5x)	6 mm	75 mm	DDA1968-C4	73.70
.2009	#7	5.105 mm	1.339	**34.00 mm**	(5x)	6 mm	75 mm	DDA2009-C4	73.70
.2031 (13/64)		5.159 mm	1.339	**34.00 mm**	(5x)	6 mm	75 mm	DDA2031-C4	73.70
.2129	#3	5.410 mm	1.417	**36.00 mm**	(5x)	6 mm	75 mm	DDA2129-C4	73.70
.2187 (7/32)		5.556 mm	1.496	**38.00 mm**	(5x)	6 mm	100 mm	DDA2187-C4	73.70
.2343 (15/64)		5.953 mm	1.575	**40.00 mm**	(5x)	6 mm	100 mm	DDA2343-C4	73.70
.2362		6.000 mm	1.575	**40.00 mm**	(5x)	6 mm	100 mm	DDA2362-C4	73.70
.2500 (1/4)	E	6.350 mm	1.181	**30.00 mm**	(3x)	8 mm	75 mm	BAA2500-C4	72.40
.2500 (1/4)	E	6.350 mm	1.654	**42.00 mm**	(5x)	8 mm	100 mm	DDA2500-C4	73.70
.2500 (1/4)	E	6.350 mm	2.441	**62.00 mm**	(8x)	8 mm	125 mm	AWS2500-C4	75.70

SPEEDS & FEEDS (Miniature High Performance Drills – Composites)

Important Note: Posted chiploads are for the double angle drills. For brad point drills, reduce chiploads by approx. 10%. Since the melting point varies greatly from plastic to plastic, the speed (RPM) used should be closely supervised. An additional reduction in RPM may be necessary to avoid excessive fraying, splitting and tear out of fibers. Pecking cycles are recommended to avoid chip packing and breakage. The initial peck depth should be 3-5x Diameter with each subsequent peck at 2-3x Diameter. Look at our online speeds and feeds for more information. For complete speeds and feeds charts, please go to www.harveytool.com.

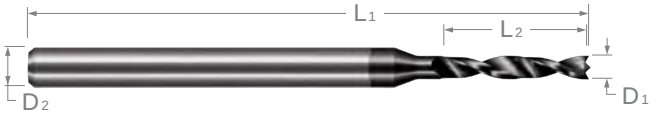
Material Type		Type	Hardness	SFM	Chip Load Per Revolution (IPR) By Cutter Diameter								
					.015	.031	.047	.062	.078	.093	.125	.187	.250
Unfilled Plastics	ETFE, FEP, HDPE, LDPE, PFA, Polyurethane, PTFE, Rulon, Teflon, UHMW	Unfilled	50 < 100 Rr, 55 < 85 Shore D	800-1200	.0006	.0013	.0020	.0027	.0034	.0040	.0054	.0081	.0108
	Acrylic, Acetal, Delrin, Lucite, Nylon 6, Nylon 6/6, PAI, PI, PEEK, Plexiglas, PS, PSU, Torlon 4203, Ultem 1000	Unfilled	100 > 150 Rr	500-800	.0007	.0015	.0022	.0029	.0037	.0044	.0059	.0089	.0119
Filled Plastics	Vespel SP-3	Lubricant Filled (Oil, Moly, Graphite, Teflon, PTFE)	50 < 100 Rr, 55 < 85 Shore D	800-1200	.0006	.0013	.0020	.0027	.0034	.0040	.0054	.0081	.0108
	Nyoil, Nylatron, Plavis MS, Torlon 4301	Lubricant Filled (Oil, Moly, Graphite, Teflon, PTFE)	100 > 150 Rr	500-800	.0007	.0015	.0022	.0029	.0037	.0044	.0059	.0089	.0119
		Carbon/Glass Filled 5% < 20%	100 > 150 Rr	400-600	.0007	.0015	.0022	.0029	.0037	.0044	.0059	.0089	.0119
		Carbon/Glass Filled 21% < 40%	100 > 150 Rr	350-500	.0006	.0012	.0018	.0024	.0030	.0036	.0049	.0073	.0097
Fiber Reinforced	FR4, G10, G11	Carbon/Glass Fiber 5% < 20%	100 > 150 Rr	350-500	.0007	.0015	.0022	.0029	.0037	.0044	.0059	.0089	.0119
	G30	Carbon/Glass Fiber 21% < 40%	100 > 150 Rr	200-300	.0006	.0012	.0018	.0024	.0030	.0036	.0049	.0073	.0097

View a comprehensive library of **Speeds & Feeds** charts for every Harvey Tool End Mill on the new Harveytool.com.

Access **Simulation Files** in DXF format for every Harvey Tool product, downloadable now from the new Harveytool.com

MINIATURE HIGH PERFORMANCE DRILLS

Composites – Brad Point



- Optimized for drilling glass or carbon fiber filled and reinforced composites with excellent performance in other filled, layered, and woven composite materials
- Center and OD spur point geometry for accurate scoring action, prevents fraying, uncut fibers, and tear out
- Amorphous diamond coating for increased abrasion resistance
- h6 shank tolerance for high precision tool holders
- Solid carbide
- CNC ground in the USA



Brad Point Prevents Fraying & Tear Out

DRILL DIAMETER			FLUTE LENGTH			SHANK DIAMETER	OVERALL LENGTH	AMORPHOUS DIAMOND	
inch	wire	metric	inch	metric	hole depth				
		D_1 +.000mm −.013mm		L_2 +.25mm −.00mm		D_2 (h6)	L_1	2 FL	PRICE
.0312 (1/32)		.793 mm	.213	**5.40 mm**	(5x)	3 mm	50 mm	BSW0312-C4	49.20
.0315		.800 mm	.213	**5.40 mm**	(5x)	3 mm	50 mm	BSW0315-C4	49.20
.0320	#67	.812 mm	.213	**5.40 mm**	(5x)	3 mm	50 mm	BSW0320-C4	49.20
.0330	#66	.838 mm	.220	**5.60 mm**	(5x)	3 mm	50 mm	BSW0330-C4	49.20
.0350	#65	.889 mm	.236	**6.00 mm**	(5x)	3 mm	50 mm	BSW0350-C4	49.20
.0354		.900 mm	.236	**6.00 mm**	(5x)	3 mm	50 mm	BSW0354-C4	49.20
.0360	#64	.914 mm	.244	**6.20 mm**	(5x)	3 mm	50 mm	BSW0360-C4	49.20
.0370	#63	.939 mm	.252	**6.40 mm**	(5x)	3 mm	50 mm	BSW0370-C4	49.20
.0380	#62	.965 mm	.260	**6.60 mm**	(5x)	3 mm	50 mm	BSW0380-C4	49.20
.0390	#61	.990 mm	.260	**6.60 mm**	(5x)	3 mm	50 mm	BSW0390-C4	49.20
.0393		1.000 mm	.268	**6.80 mm**	(5x)	3 mm	50 mm	BSW0393-C4	51.50
.0400	#60	1.016 mm	.268	**6.80 mm**	(5x)	3 mm	50 mm	BSW0400-C4	51.50
.0410	#59	1.041 mm	.276	**7.00 mm**	(5x)	3 mm	50 mm	BSW0410-C4	51.50
.0420	#58	1.066 mm	.283	**7.20 mm**	(5x)	3 mm	50 mm	BSW0420-C4	51.50
.0430	#57	1.092 mm	.291	**7.40 mm**	(5x)	3 mm	50 mm	BSW0430-C4	51.50
.0450		1.143 mm	.307	**7.80 mm**	(5x)	3 mm	50 mm	BSW0450-C4	51.50
.0465	#56	1.181 mm	.315	**8.00 mm**	(5x)	3 mm	50 mm	BSW0465-C4	51.50
.0468 (3/64)		1.190 mm	.315	**8.00 mm**	(5x)	3 mm	50 mm	BSW0468-C4	51.50
.0492		1.250 mm	.335	**8.50 mm**	(5x)	3 mm	50 mm	BSW0492-C4	51.50
.0500		1.270 mm	.335	**8.50 mm**	(5x)	3 mm	50 mm	BSW0500-C4	51.50
.0520	#55	1.320 mm	.354	**9.00 mm**	(5x)	3 mm	50 mm	BSW0520-C4	51.50
.0550	#54	1.397 mm	.374	**9.50 mm**	(5x)	3 mm	50 mm	BSW0550-C4	51.50
.0590		1.500 mm	.394	**10.00 mm**	(5x)	3 mm	50 mm	BSW0590-C4	51.50
.0595	#53	1.511 mm	.394	**10.00 mm**	(5x)	3 mm	50 mm	BSW0595-C4	51.50
.0600		1.524 mm	.413	**10.50 mm**	(5x)	3 mm	50 mm	BSW0600-C4	51.50
.0625 (1/16)		1.587 mm	.413	**10.50 mm**	(5x)	3 mm	50 mm	BSW0625-C4	51.50
.0635	#52	1.612 mm	.433	**11.00 mm**	(5x)	3 mm	50 mm	BSW0635-C4	51.50
.0670	#51	1.701 mm	.453	**11.50 mm**	(5x)	3 mm	50 mm	BSW0670-C4	51.50
.0700	#50	1.778 mm	.472	**12.00 mm**	(5x)	3 mm	50 mm	BSW0700-C4	51.50
.0730	#49	1.854 mm	.492	**12.50 mm**	(5x)	3 mm	50 mm	BSW0730-C4	51.50
.0760	#48	1.930 mm	.512	**13.00 mm**	(5x)	3 mm	50 mm	BSW0760-C4	51.50
.0781 (5/64)		1.984 mm	.531	**13.50 mm**	(5x)	3 mm	50 mm	BSW0781-C4	51.50
.0785	#47	1.993 mm	.531	**13.50 mm**	(5x)	3 mm	50 mm	BSW0785-C4	51.50
.0787		2.000 mm	.531	**13.50 mm**	(5x)	4 mm	50 mm	BSW0787-C4	53.50

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MINIATURE HIGH PERFORMANCE DRILLS

Composites – Brad Point (cont.)

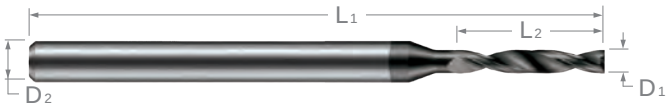
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DRILL DIAMETER			FLUTE LENGTH			SHANK DIAMETER	OVERALL LENGTH	AMORPHOUS DIAMOND	
inch	wire	metric	inch	metric	hole depth				
		D_1 +.000mm −.013mm		L_2 +.25mm −.00mm		D_2 (h6)	L_1	2 FL	PRICE
.0800		2.032 mm	.531	**13.50 mm**	(5x)	4 mm	50 mm	BSW0800-C4	53.50
.0810	#46	2.057 mm	.551	**14.00 mm**	(5x)	4 mm	50 mm	BSW0810-C4	53.50
.0820	#45	2.082 mm	.551	**14.00 mm**	(5x)	4 mm	50 mm	BSW0820-C4	53.50
.0860	#44	2.184 mm	.571	**14.50 mm**	(5x)	4 mm	50 mm	BSW0860-C4	53.50
.0890	#43	2.260 mm	.591	**15.00 mm**	(5x)	4 mm	50 mm	BSW0890-C4	53.50
.0900		2.286 mm	.591	**15.00 mm**	(5x)	4 mm	50 mm	BSW0900-C4	53.50
.0935	#42	2.374 mm	.630	**16.00 mm**	(5x)	4 mm	63 mm	BSW0935-C4	54.20
.0937 (3/32)		2.381 mm	.630	**16.00 mm**	(5x)	4 mm	63 mm	BSW0937-C4	54.20
.0960	#41	2.438 mm	.630	**16.00 mm**	(5x)	4 mm	63 mm	BSW0960-C4	54.20
.0980	#40	2.489 mm	.669	**17.00 mm**	(5x)	4 mm	63 mm	BSW0980-C4	54.20
.0984		2.500 mm	.669	**17.00 mm**	(5x)	4 mm	63 mm	BSW0984-C4	54.70
.0995	#39	2.527 mm	.669	**17.00 mm**	(5x)	4 mm	63 mm	BSW0995-C4	54.70
.1000		2.540 mm	.669	**17.00 mm**	(5x)	4 mm	63 mm	BSW1000-C4	54.70
.1015	#38	2.578 mm	.669	**17.00 mm**	(5x)	4 mm	63 mm	BSW1015-C4	54.70
.1040	#37	2.641 mm	.709	**18.00 mm**	(5x)	4 mm	63 mm	BSW1040-C4	54.70
.1065	#36	2.705 mm	.709	**18.00 mm**	(5x)	4 mm	63 mm	BSW1065-C4	54.70
.1093 (7/64)		2.778 mm	.748	**19.00 mm**	(5x)	4 mm	63 mm	BSW1093-C4	54.70
.1100	#35	2.794 mm	.748	**19.00 mm**	(5x)	4 mm	63 mm	BSW1100-C4	54.70
.1110	#34	2.819 mm	.748	**19.00 mm**	(5x)	4 mm	63 mm	BSW1110-C4	54.70
.1130	#33	2.870 mm	.748	**19.00 mm**	(5x)	4 mm	63 mm	BSW1130-C4	54.70
.1160	#32	2.946 mm	.787	**20.00 mm**	(5x)	4 mm	63 mm	BSW1160-C4	54.70
.1181		3.000 mm	.787	**20.00 mm**	(5x)	4 mm	63 mm	BSW1181-C4	54.70
		D_1 +.000mm −.013mm		L_2 +.75mm −.00mm		D_2 (h6)	L_1	2 FL	PRICE
.1200	#31	3.048 mm	.827	**21.00 mm**	(5x)	6 mm	63 mm	BSW1200-C4	63.10
.1250 (1/8)		3.175 mm	.827	**21.00 mm**	(5x)	6 mm	63 mm	BSW1250-C4	63.10
.1285	#30	3.263 mm	.866	**22.00 mm**	(5x)	6 mm	63 mm	BSW1285-C4	63.10
.1360	#29	3.454 mm	.906	**23.00 mm**	(5x)	6 mm	63 mm	BSW1360-C4	63.10
.1406 (9/64)		3.571 mm	.945	**24.00 mm**	(5x)	6 mm	75 mm	BSW1406-C4	63.10
.1470	#26	3.733 mm	1.024	**26.00 mm**	(5x)	6 mm	75 mm	BSW1470-C4	63.10
.1562 (5/32)		3.968 mm	1.024	**26.00 mm**	(5x)	6 mm	75 mm	BSW1562-C4	63.10
.1574		4.000 mm	1.102	**28.00 mm**	(5x)	6 mm	75 mm	BSW1574-C4	63.10
.1590	#21	4.038 mm	1.102	**28.00 mm**	(5x)	6 mm	75 mm	BSW1590-C4	63.10
.1718 (11/64)		4.365 mm	1.181	**30.00 mm**	(5x)	6 mm	75 mm	BSW1718-C4	63.10
.1770	#16	4.495 mm	1.181	**30.00 mm**	(5x)	6 mm	75 mm	BSW1770-C4	63.10
.1800	#15	4.572 mm	1.181	**30.00 mm**	(5x)	6 mm	75 mm	BSW1800-C4	63.10
.1875 (3/16)		4.762 mm	1.260	**32.00 mm**	(5x)	6 mm	75 mm	BSW1875-C4	63.10
.1968		5.000 mm	1.339	**34.00 mm**	(5x)	6 mm	75 mm	BSW1968-C4	63.10
.2009	#7	5.105 mm	1.339	**34.00 mm**	(5x)	6 mm	75 mm	BSW2009-C4	63.10
.2031 (13/64)		5.159 mm	1.339	**34.00 mm**	(5x)	6 mm	75 mm	BSW2031-C4	63.10
.2129	#3	5.410 mm	1.417	**36.00 mm**	(5x)	6 mm	75 mm	BSW2129-C4	63.10
.2187 (7/32)		5.556 mm	1.496	**38.00 mm**	(5x)	6 mm	100 mm	BSW2187-C4	63.10
.2343 (15/64)		5.953 mm	1.575	**40.00 mm**	(5x)	6 mm	100 mm	BSW2343-C4	63.10
.2362		6.000 mm	1.575	**40.00 mm**	(5x)	6 mm	100 mm	BSW2362-C4	63.10
.2500 (1/4)	E	6.350 mm	1.654	**42.00 mm**	(5x)	8 mm	100 mm	BSW2500-C4	63.10

PLEASE SEE SPEEDS & FEEDS ON PAGE 422

MINIATURE HIGH PERFORMANCE DRILLS

Flat Bottom



Ideal for Inclined & Rounded Surfaces

- Flat bottom design (no point angle and no dish) allows for drilling on irregular surfaces and reduces burrs on break through
- Ideal for drilling on inclined and rounded surfaces, creating flat bottom holes, tilted drilling for angled holes, and drilling intersecting holes, half holes, shoulders, or thin plates
- h6 shank tolerance for high precision tool holders
- Solid carbide
- CNC ground in the USA



No Point Angle & No Dish Allows for Drilling on Irregular Surfaces

DRILL DIAMETER			FLUTE LENGTH			SHANK DIAMETER	OVERALL LENGTH	AlTiN COATED		TiB_2 COATED	
inch	wire	metric	inch	metric	hole depth						
		D_1 +.000mm −.013mm		L_2 +.25mm −.00mm		D_2 (h6)	L_1	2 FL	PRICE	2 FL	PRICE
.0312 (1/32)		.793 mm	.213	**5.40 mm**	(5x)	3 mm	50 mm	FBD0312-C3	46.00	FBD0312-C8	49.10
.0314		.800 mm	.213	**5.40 mm**	(5x)	3 mm	50 mm	FBD0315-C3	46.00	FBD0315-C8	49.10
.0320	#67	.812 mm	.213	**5.40 mm**	(5x)	3 mm	50 mm	FBD0320-C3	46.00	FBD0320-C8	49.10
.0330	#66	.838 mm	.220	**5.60 mm**	(5x)	3 mm	50 mm	FBD0330-C3	46.00	FBD0330-C8	49.10
.0350	#65	.889 mm	.236	**6.00 mm**	(5x)	3 mm	50 mm	FBD0350-C3	46.00	FBD0350-C8	49.10
.0354		.900 mm	.236	**6.00 mm**	(5x)	3 mm	50 mm	FBD0354-C3	46.00	FBD0354-C8	49.10
.0360	#64	.914 mm	.244	**6.20 mm**	(5x)	3 mm	50 mm	FBD0360-C3	46.00	FBD0360-C8	49.10
.0370	#63	.939 mm	.252	**6.40 mm**	(5x)	3 mm	50 mm	FBD0370-C3	46.00	FBD0370-C8	49.10
.0380	#62	.965 mm	.260	**6.60 mm**	(5x)	3 mm	50 mm	FBD0380-C3	46.00	FBD0380-C8	49.10
.0390	#61	.990 mm	.260	**6.60 mm**	(5x)	3 mm	50 mm	FBD0390-C3	46.00	FBD0390-C8	49.10
.0393		1.000 mm	.268	**6.80 mm**	(5x)	3 mm	50 mm	FBD0393-C3	50.40	FBD0393-C8	53.60
.0400	#60	1.016 mm	.268	**6.80 mm**	(5x)	3 mm	50 mm	FBD0400-C3	50.40	FBD0400-C8	53.60
.0410	#59	1.041 mm	.276	**7.00 mm**	(5x)	3 mm	50 mm	FBD0410-C3	50.40	FBD0410-C8	53.60
.0420	#58	1.066 mm	.283	**7.20 mm**	(5x)	3 mm	50 mm	FBD0420-C3	50.40	FBD0420-C8	53.60
.0430	#57	1.092 mm	.291	**7.40 mm**	(5x)	3 mm	50 mm	FBD0430-C3	50.40	FBD0430-C8	53.60
.0450		1.143 mm	.307	**7.80 mm**	(5x)	3 mm	50 mm	FBD0450-C3	50.40	FBD0450-C8	53.60
.0465	#56	1.181 mm	.315	**8.00 mm**	(5x)	3 mm	50 mm	FBD0465-C3	50.40	FBD0465-C8	53.60
.0468 (3/64)		1.190 mm	.315	**8.00 mm**	(5x)	3 mm	50 mm	FBD0468-C3	50.40	FBD0468-C8	53.60
.0492		1.250 mm	.335	**8.50 mm**	(5x)	3 mm	50 mm	FBD0492-C3	50.40	FBD0492-C8	53.60
.0500		1.270 mm	.335	**8.50 mm**	(5x)	3 mm	50 mm	FBD0500-C3	50.40	FBD0500-C8	53.60
.0520	#55	1.320 mm	.354	**9.00 mm**	(5x)	3 mm	50 mm	FBD0520-C3	50.40	FBD0520-C8	53.60
.0550	#54	1.397 mm	.374	**9.50 mm**	(5x)	3 mm	50 mm	FBD0550-C3	50.40	FBD0550-C8	53.60
.0590		1.500 mm	.394	**10.00 mm**	(5x)	3 mm	50 mm	FBD0590-C3	54.20	FBD0590-C8	57.40
.0595	#53	1.511 mm	.394	**10.00 mm**	(5x)	3 mm	50 mm	FBD0595-C3	54.20	FBD0595-C8	57.40
.0600		1.524 mm	.413	**10.50 mm**	(5x)	3 mm	50 mm	FBD0600-C3	54.20	FBD0600-C8	57.40
.0625 (1/16)		1.587 mm	.299	**7.60 mm**	(3x)	3 mm	50 mm	FBF0625-C3	53.00	FBF0625-C8	56.10
.0625 (1/16)		1.587 mm	.413	**10.50 mm**	(5x)	3 mm	50 mm	FBD0625-C3	54.20	FBD0625-C8	57.40
.0635	#52	1.612 mm	.433	**11.00 mm**	(5x)	3 mm	50 mm	FBD0635-C3	54.20	FBD0635-C8	57.40
.0670	#51	1.701 mm	.453	**11.50 mm**	(5x)	3 mm	50 mm	FBD0670-C3	54.20	FBD0670-C8	57.40
.0700	#50	1.778 mm	.334	**8.50 mm**	(3x)	3 mm	50 mm	FBF0700-C3	53.00	FBF0700-C8	56.10
.0700	#50	1.778 mm	.472	**12.00 mm**	(5x)	3 mm	50 mm	FBD0700-C3	54.20	FBD0700-C8	57.40

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MINIATURE HIGH PERFORMANCE DRILLS

Flat Bottom (cont.)

continued from previous page

DRILL DIAMETER			FLUTE LENGTH			SHANK DIAMETER	OVERALL LENGTH	AlTiN COATED		TiB_2 COATED	
inch	wire	metric	inch	metric	hole depth						
		D_1 +.000mm −.013mm		L_2 +.25mm −.00mm		D_2 (h6)	L_1	2 FL	PRICE	2 FL	PRICE
.0730	#49	1.854 mm	.492	**12.50 mm**	(5x)	3 mm	50 mm	FBD0730-C3	54.20	FBD0730-C8	57.40
.0760	#48	1.930 mm	.512	**13.00 mm**	(5x)	3 mm	50 mm	FBD0760-C3	54.20	FBD0760-C8	57.40
.0781 (5/64)		1.984 mm	.531	**13.50 mm**	(5x)	3 mm	50 mm	FBD0781-C3	54.20	FBD0781-C8	57.40
.0785	#47	1.993 mm	.531	**13.50 mm**	(5x)	3 mm	50 mm	FBD0785-C3	54.20	FBD0785-C8	57.40
.0787		2.000 mm	.531	**13.50 mm**	(5x)	4 mm	50 mm	FBD0787-C3	58.50	FBD0787-C8	61.60
.0800		2.032 mm	.531	**13.50 mm**	(5x)	4 mm	50 mm	FBD0800-C3	58.50	FBD0800-C8	61.60
.0810	#46	2.057 mm	.551	**14.00 mm**	(5x)	4 mm	50 mm	FBD0810-C3	58.50	FBD0810-C8	61.60
.0820	#45	2.082 mm	.551	**14.00 mm**	(5x)	4 mm	50 mm	FBD0820-C3	58.50	FBD0820-C8	61.60
.0860	#44	2.184 mm	.571	**14.50 mm**	(5x)	4 mm	50 mm	FBD0860-C3	58.50	FBD0860-C8	61.60
.0890	#43	2.260 mm	.591	**15.00 mm**	(5x)	4 mm	50 mm	FBD0890-C3	58.50	FBD0890-C8	61.60
.0900		2.286 mm	.591	**15.00 mm**	(5x)	4 mm	50 mm	FBD0900-C3	58.50	FBD0900-C8	61.60
.0935	#42	2.374 mm	.630	**16.00 mm**	(5x)	4 mm	63 mm	FBD0935-C3	58.50	FBD0935-C8	61.60
.0937 (3/32)		2.381 mm	.630	**16.00 mm**	(5x)	4 mm	63 mm	FBD0937-C3	58.50	FBD0937-C8	61.60
.0960	#41	2.438 mm	.630	**16.00 mm**	(5x)	4 mm	63 mm	FBD0960-C3	58.50	FBD0960-C8	61.60
.0980	#40	2.489 mm	.669	**17.00 mm**	(5x)	4 mm	63 mm	FBD0980-C3	58.50	FBD0980-C8	61.60
.0984		2.500 mm	.669	**17.00 mm**	(5x)	4 mm	63 mm	FBD0984-C3	62.00	FBD0984-C8	65.20
.0995	#39	2.527 mm	.669	**17.00 mm**	(5x)	4 mm	63 mm	FBD0995-C3	62.00	FBD0995-C8	65.20
.1000		2.540 mm	.669	**17.00 mm**	(5x)	4 mm	63 mm	FBD1000-C3	62.00	FBD1000-C8	65.20
.1015	#38	2.578 mm	.669	**17.00 mm**	(5x)	4 mm	63 mm	FBD1015-C3	62.00	FBD1015-C8	65.20
.1040	#37	2.641 mm	.709	**18.00 mm**	(5x)	4 mm	63 mm	FBD1040-C3	62.00	FBD1040-C8	65.20
.1065	#36	2.705 mm	.709	**18.00 mm**	(5x)	4 mm	63 mm	FBD1065-C3	62.00	FBD1065-C8	65.20
.1093 (7/64)		2.778 mm	.748	**19.00 mm**	(5x)	4 mm	63 mm	FBD1093-C3	62.00	FBD1093-C8	65.20
.1100	#35	2.794 mm	.748	**19.00 mm**	(5x)	4 mm	63 mm	FBD1100-C3	62.00	FBD1100-C8	65.20
.1110	#34	2.819 mm	.748	**19.00 mm**	(5x)	4 mm	63 mm	FBD1110-C3	62.00	FBD1110-C8	65.20
.1130	#33	2.870 mm	.748	**19.00 mm**	(5x)	4 mm	63 mm	FBD1130-C3	62.00	FBD1130-C8	65.20
.1160	#32	2.946 mm	.787	**20.00 mm**	(5x)	4 mm	63 mm	FBD1160-C3	62.00	FBD1160-C8	65.20
.1181		3.000 mm	.787	**20.00 mm**	(5x)	4 mm	63 mm	FBD1181-C3	62.00	FBD1181-C8	65.20
		D_1 +.000mm −.013mm		L_2 +.75mm −.00mm		D_2 (h6)	L_1	2 FL	PRICE	2 FL	PRICE
.1200	#31	3.048 mm	.570	**14.50 mm**	(3x)	6 mm	63 mm	FBF1200-C3	68.20	FBF1200-C8	71.30
.1200	#31	3.048 mm	.827	**21.00 mm**	(5x)	6 mm	63 mm	FBD1200-C3	69.50	FBD1200-C8	72.60
.1250 (1/8)		3.175 mm	.590	**15.00 mm**	(3x)	6 mm	63 mm	FBF1250-C3	68.20	FBF1250-C8	71.30
.1250 (1/8)		3.175 mm	.827	**21.00 mm**	(5x)	6 mm	63 mm	FBD1250-C3	69.50	FBD1250-C8	72.60
.1360	#29	3.454 mm	.629	**16.00 mm**	(3x)	6 mm	63 mm	FBF1360-C3	68.20	FBF1360-C8	71.30
.1360	#29	3.454 mm	.906	**23.00 mm**	(5x)	6 mm	63 mm	FBD1360-C3	69.50	FBD1360-C8	72.60
.1406 (9/64)		3.571 mm	.945	**24.00 mm**	(5x)	6 mm	75 mm	FBD1406-C3	69.50	FBD1406-C8	72.60
.1470	#26	3.733 mm	1.024	**26.00 mm**	(5x)	6 mm	75 mm	FBD1470-C3	69.50	FBD1470-C8	72.60
.1562 (5/32)		3.968 mm	1.024	**26.00 mm**	(5x)	6 mm	75 mm	FBD1562-C3	69.50	FBD1562-C8	72.60
.1574		4.000 mm	1.102	**28.00 mm**	(5x)	6 mm	75 mm	FBD1574-C3	69.50	FBD1574-C8	72.60
.1590	#21	4.038 mm	.748	**19.00 mm**	(3x)	6 mm	75 mm	FBF1590-C3	68.20	FBF1590-C8	71.30
.1590	#21	4.038 mm	1.102	**28.00 mm**	(5x)	6 mm	75 mm	FBD1590-C3	69.50	FBD1590-C8	72.60
.1718 (11/64)		4.365 mm	1.181	**30.00 mm**	(5x)	6 mm	75 mm	FBD1718-C3	69.50	FBD1718-C8	72.60
.1770	#16	4.495 mm	1.181	**30.00 mm**	(5x)	6 mm	75 mm	FBD1770-C3	69.50	FBD1770-C8	72.60
.1800	#15	4.572 mm	1.181	**30.00 mm**	(5x)	6 mm	75 mm	FBD1800-C3	69.50	FBD1800-C8	72.60
.1875 (3/16)		4.762 mm	1.260	**32.00 mm**	(5x)	6 mm	75 mm	FBD1875-C3	69.50	FBD1875-C8	72.60
.1968		5.000 mm	1.339	**34.00 mm**	(5x)	6 mm	75 mm	FBD1968-C3	69.50	FBD1968-C8	72.60
.2009	#7	5.105 mm	1.339	**34.00 mm**	(5x)	6 mm	75 mm	FBD2009-C3	69.50	FBD2009-C8	72.60

continued on next page

MINIATURE HIGH PERFORMANCE DRILLS

Flat Bottom (cont.)

continued from previous page

DRILL DIAMETER			FLUTE LENGTH			SHANK DIAMETER	OVERALL LENGTH	AlTiN COATED		TiB_2 COATED	
inch	wire	metric	inch	metric	hole depth						
		D_1 +.000mm −.013mm		L_2 +.75mm −.00mm		D_2 (h6)	L_1	2 FL	PRICE	2 FL	PRICE
.2031 (13/64)		5.159 mm	1.339	**34.00 mm**	(5x)	6 mm	75 mm	FBD2031-C3	69.50	FBD2031-C8	72.60
.2129	#3	5.410 mm	1.417	**36.00 mm**	(5x)	6 mm	75 mm	FBD2129-C3	69.50	FBD2129-C8	72.60
.2187 (7/32)		5.556 mm	1.496	**38.00 mm**	(5x)	6 mm	100 mm	FBD2187-C3	69.50	FBD2187-C8	72.60
.2343 (15/64)		5.953 mm	1.575	**40.00 mm**	(5x)	6 mm	100 mm	FBD2343-C3	69.50	FBD2343-C8	72.60
.2362		6.000 mm	1.575	**40.00 mm**	(5x)	6 mm	100 mm	FBD2362-C3	69.50	FBD2362-C8	72.60
.2500 (1/4)	E	6.350 mm	1.181	**30.00 mm**	(3x)	8 mm	100 mm	FBF2500-C3	68.20	FBF2500-C8	71.30
.2500 (1/4)	E	6.350 mm	1.654	**42.00 mm**	(5x)	8 mm	100 mm	FBD2500-C3	69.50	FBD2500-C8	72.60

SPEEDS & FEEDS (Miniature High Performance Drills – Flat Bottom)

Important Note: Values in table are for a fully enclosed tool that is 1x diameter into the workpiece. A starting hole is required on a flat surface. For drilling on inclined or rounded surfaces please refer to the complete speeds and feeds chart available online at www.harveytool.com. Values in table are also based on a material hardness of 29-37 Rc for Ferrous Materials and up to 28 Rc for Non-Ferrous Materials. For higher hardness materials, table values of IPR must be reduced. For Ferrous materials at 38-45 Rc reduce IPR to 80% of the chart value. Pecking cycles are recommended to avoid chip packing and breakage. Initial Peck must fully submerge the drill point into the material. Do not use a pecking cycle for half-hole drilling or any situation where the drill is not fully enclosed in the material during the drilling operation. For steels at 29-37 Rc, an initial peck should be 2-3x Diameter, and each subsequent peck should be 1-2x Diameter. For harder steels at 38-45 Rc, 1-2x Diameter is recommended for an initial peck, and each subsequent peck should be .5-1x Diameter. For Non-Ferrous Materials, an initial peck should be 3-5x Diameter, and each subsequent peck should be 2-3x Diameter.

Coating	Material	SFM	Chip Load IPR (Inches Per Revolution) By Drill Diameter								
			.015	.031	.047	.062	.078	.093	.125	.187	.250
AlTiN Hardness: 29-37 Rc (279-344 HBn)	**Carbon Steels** Free-Machining/Low Carbon steels, 10xx - 1029 & all 10Lxx, 11xx - 1139 & all 11Lxx, 12xx - 1215 & all 12Lxx	240	.00063	.00130	.00197	.00260	.00328	.00391	.00525	.00785	.01050
	1030 - 1095, 1140 - 1151, 13xx, 15xx, 2xxx, 3xxx, 4xxx & 4xLxx, 5xxx & 5xLxx, 50xxx & 50Lxxx, 51xxx & 51Lxxx, 52xxx & 52Lxxx, 6xxx, 8xxx, 9xxx	150	.00058	.00119	.00180	.00238	.00300	.00357	.00480	.00718	.00960
	Stainless Steels 203 EZ, 303 (all types), 416, 416Se, 416 Plus X, 420F, 420FSe, 430F, 430FSe, 440F, 440FSe	180	.00063	.00130	.00197	.00260	.00328	.00391	.00525	.00785	.01050
	201, 202, 203, 205, 301, 302, 304, 304L, 308, 309, 310, 314, 316, 316L, 317, 321, 329, 330, 347, 348, 385, 403, 405, 409, 410, 413, 420, 429, 430, 434, 436, 442, 446, 501, 502	150	.00058	.00119	.00180	.00238	.00300	.00357	.00480	.00718	.00960
	414, 431, 440A, 440B, 440C, 13-8, 15-5, 15-7, 17-4, 17-7	125	.00036	.00074	.00113	.00149	.00187	.00223	.00300	.00449	.00600
	Tool Steels A, L, O, P, W series	125	.00058	.00119	.00180	.00238	.00300	.00357	.00480	.00718	.00960
	D, H, M, T, S series	90	.00036	.00074	.00113	.00149	.00187	.00223	.00300	.00449	.00600
	Titanium Alloys	100	.00036	.00074	.00113	.00149	.00187	.00223	.00300	.00449	.00600
	High Temp Alloys Inconel, Hastelloy, Waspalloy, Monel, Nimonic, Haynes, Discoloy, Incoloy	70	.00036	.00074	.00113	.00149	.00187	.00223	.00300	.00449	.00600
TiB_2 Hardness: ≤ 28 Rc (≤ 271 HBn)	**Aluminum Alloys:** Casting (2xx, 5xx, 7xx, 8xx)	450	.00072	.00149	.00226	.00298	.00374	.00446	.00600	.00898	.01200
	Wrought (1xxx, 2xxx, 3xxx, 5xxx, 6xxx, 7xxx, 8xxx)	600									
	Casting - 3%-5% Si (3xx, A3xx, C3xx, 4xx, A4xx, B4xx)	450	.00065	.00134	.00203	.00268	.00337	.00402	.00540	.00808	.01080
	Casting - 5%-8% Si (3xx, A3xx, C3xx, 4xx, A4xx, B4xx)	420									
	Casting - 8%-12% Si (3xx, A3xx, C3xx, 4xx, A4xx, B4xx)	390									
	Casting - 12%-16% Si (3xx, A3xx, C3xx, 4xx, A4xx, B4xx)	350									
	Wrought - 5%-8% Si (4xxx)	600									
	Wrought - 8%-12% Si (4xxx)	480									
	Magnesium Alloys	900	.00072	.00149	.00226	.00298	.00374	.00446	.00600	.00898	.01200
	Zinc Alloys	480									
	Copper Alloys: High Coppers - 90%+ (C1xxx)	170	.00058	.00119	.00180	.00238	.00300	.00357	.00480	.00718	.00960
	Brass (Copper Zinc alloys, C2xxxx, C3xxxx, C4xxxx, C66400-C69800)	375									
	Phosphor Bronzes (Copper Tin alloys, C5xxxx)	170									
	Aluminum Bronzes (Copper Aluminum alloys, C60600-C64200)	375									
	Silicon Bronzes (Copper Silicon alloys, C64700-C66100)	375									
	Copper Nickels, Nickel Silvers (Copper Nickel alloys, C7xxxx)	170									
	Cast Copper Alloys (C83300-C86200, C86400-C87900, C92200-C95800, C97300-C97800, C99400-C99700)	400									
	Plastics: Unfilled Plastics	500	.00072	.00149	.00226	.00298	.00374	.00446	.00600	.00898	.01200
	Reinforced Plastics	350	.00058	.00119	.00180	.00238	.00300	.00357	.00480	.00718	.00960

MINIATURE HIGH PERFORMANCE DRILLS

Deep Hole – Coolant-Through



Available in 12x & 20x Flute Lengths!

- Drill up to 20x diameter in depth
- Coolant through design for improved chip removal and heat reduction at the drill tip
- 140° point angle
- Specialized flute shape for improved chip evacuation and maximum rigidity
- h6 shank tolerance for high precision tool holders
- AlTiN coated for improved lubricity and heat resistance
- CNC ground in Germany
- Solid carbide



Coolant Through Design for Improved Chip Removal

DRILL DIAMETER			FLUTE LENGTH			SHANK DIAMETER	OVERALL LENGTH	AlTiN COATED	
inch	wire	metric	inch	metric	hole depth				
		D_1 $^{+.000mm}_{-.013mm}$		L_2 $^{+.25mm}_{-.00mm}$		D_2 (h6)	L_1	2 FL	PRICE
.0520	#55	1.320 mm	.709	**18.00 mm**	(12x)	3 mm	63 mm	ACD0520-C3	166.50
.0550	#54	1.397 mm	.748	**19.00 mm**	(12x)	3 mm	63 mm	ACD0550-C3	166.50
.0590		1.500 mm	.827	**21.00 mm**	(12x)	3 mm	63 mm	ACD0590-C3	166.50
.0590		1.500 mm	1.280	**32.50 mm**	(20x)	3 mm	75 mm	CXZ0590-C3	197.70
.0595	#53	1.511 mm	.827	**21.00 mm**	(12x)	3 mm	63 mm	ACD0595-C3	166.50
.0625 (1/16)		1.587 mm	.866	**22.00 mm**	(12x)	3 mm	63 mm	ACD0625-C3	166.50
.0625 (1/16)		1.587 mm	1.358	**34.50 mm**	(20x)	3 mm	75 mm	CXZ0625-C3	197.70
.0700	#50	1.778 mm	.945	**24.00 mm**	(12x)	3 mm	63 mm	ACD0700-C3	166.50
.0781 (5/64)		1.984 mm	1.063	**27.00 mm**	(12x)	3 mm	63 mm	ACD0781-C3	166.50
.0781 (5/64)		1.984 mm	1.693	**43.00 mm**	(20x)	3 mm	100 mm	CXZ0781-C3	197.70
.0787		2.000 mm	1.102	**28.00 mm**	(12x)	4 mm	63 mm	ACD0787-C3	172.40
.0787		2.000 mm	1.732	**44.00 mm**	(20x)	4 mm	100 mm	CXZ0787-C3	219.20
.0890	#43	2.260 mm	1.220	**31.00 mm**	(12x)	4 mm	75 mm	ACD0890-C3	172.40
.0937 (3/32)		2.381 mm	1.299	**33.00 mm**	(12x)	4 mm	75 mm	ACD0937-C3	172.40
.0937 (3/32)		2.381 mm	2.047	**52.00 mm**	(20x)	4 mm	100 mm	CXZ0937-C3	219.20
.1015	#38	2.578 mm	1.378	**35.00 mm**	(12x)	4 mm	75 mm	ACD1015-C3	172.40
.1065	#36	2.705 mm	1.457	**37.00 mm**	(12x)	4 mm	75 mm	ACD1065-C3	172.40
.1093 (7/64)		2.778 mm	1.496	**38.00 mm**	(12x)	4 mm	75 mm	ACD1093-C3	172.40
.1093 (7/64)		2.778 mm	2.362	**60.00 mm**	(20x)	4 mm	100 mm	CXZ1093-C3	219.20
.1181		3.000 mm	1.654	**42.00 mm**	(12x)	4 mm	100 mm	ACD1181-C3	172.40
.1181		3.000 mm	2.559	**65.00 mm**	(20x)	4 mm	100 mm	CXZ1181-C3	219.20

See Speeds & Feeds on next page

MINIATURE HIGH PERFORMANCE DRILLS

Deep Hole – Coolant-Through (cont.)

SPEEDS & FEEDS (Miniature High Performance Drills – Deep Hole)

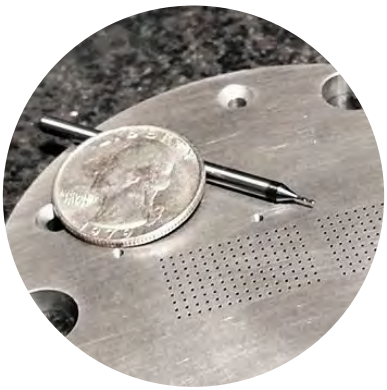
Important Note: Values in table are in inches and are based on 12x length drills and a material hardness of 29-37 Rc. For longer lengths and higher hardness materials, table values of IPR must be reduced (for 20x, reduce to 75%). For ferrous materials at 38-45 Rc, reduce IPR to 80%. For complete speeds and feeds charts, please see www.harveytool.com.

Material (Hardness: 29-37 Rc)	SFM	Chip Load IPR (Inches Per Revolution) By Drill Diameter							
		.031	.047	.062	.078	.093	.125	.187	.250
Carbon Steels Free Machining/Low Carbon steels, 10xx - 1029 & all 10Lxx, 11xx - 1139 & all 11Lxx, 12xx - 1215 & all 12Lxx	240	.00110	.00167	.00220	.00277	.00330	.00444	.00664	.00887
1030 - 1095, 1140 - 1151, 13xx, 15xx, 2xxx, 3xxx, 4xxx & 4xLxx, 5xxx & 5xLxx, 50xxx & 50Lxxx, 51xxx & 51Lxxx, 52xxx & 52Lxxx, 6xxx, 8xxx, 9xxx	150	.00101	.00153	.00201	.00253	.00302	.00406	.00607	.00811
Stainless Steels 203 EZ, 303 (all types), 416, 416Se, 416 Plus X, 420F, 420FSe, 430F, 430FSe, 440F, 440FSe	180	.00110	.00167	.00220	.00277	.00330	.00444	.00664	.00887
201, 202, 203, 205, 301, 302, 304, 304L, 308, 309, 310, 314, 316, 316L, 317, 321, 329, 330, 347, 348, 385, 403, 405, 409, 410, 413, 420, 429, 430, 434, 436, 442, 446, 501, 502	150	.00101	.00153	.00201	.00253	.00302	.00406	.00607	.00811
414, 431, 440A, 440B, 440C, 13-8, 15-5, 15-7, 17-4, 17-7	125	.00063	.00095	.00126	.00158	.00189	.00254	.00379	.00507
Tool Steels A, L, O, P, W series	125	.00101	.00153	.00201	.00253	.00302	.00406	.00607	.00811
D, H, M, T, S series	90	.00063	.00095	.00126	.00158	.00189	.00254	.00379	.00507
Titanium Alloys	100	.00063	.00095	.00126	.00158	.00189	.00254	.00379	.00507
High Temp Alloys Inconel, Hastelloy, Waspalloy, Monel, Nimonic, Haynes, Discoloy, Incoloy	70	.00063	.00095	.00126	.00158	.00189	.00254	.00379	.00507

Deep Hole Drilling Guidelines

For best results, the following steps are recommended:

- For hole depths of 12x Diameter or greater, drill a pilot hole up to 1.5x D in depth using a drill with 3x LOF or shorter.
- Insert primary drill at low speed (~500 rpm) and start coolant flow.
- Increase speed and feed to recommended parameters.
- Under optimal conditions, it is possible to feed to full hole depth without pecking. If necessary, use 2-4 pecks to get to full hole depth.
- After reaching desired hole depth, reduce speed (~500 RPM) before retracting the drill.
- Cutting oil is recommended. As an alternative, it is possible to use emulsions with EP additives. Use a fine mesh prefilter (=5µm) on spindle through coolant to prevent a blockage of the coolant hole. A minimum coolant pressure of 600-800 PSI is recommended.



Selecting the Right Harvey Tool Miniature Drill

With so many different types of miniature drills to choose from, it can be tough to identify the right solution for your specific job. Learn how to choose right the first time in our "In the Loupe" blog post **Selecting the Right Miniature Drill**.

Read more on harveyperformance.com/in-the-loupe/

MINIATURE DRILLS



Miniature Drills Down to .002"

- For tools .020″ and smaller, there is an intermediate neck diameter as pictured above
- 130° drill point
- Carbide
- CNC ground in Germany

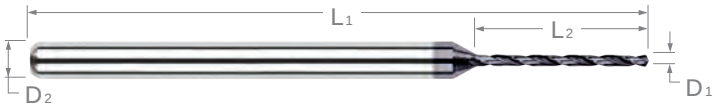
DRILL DIAMETER			FLUTE LENGTH	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN COATED		AMORPHOUS DIAMOND	
inch	wire	metric									
D_1 $^{+.0000″}_{-.0003″}$ *			L_2	D_2	L_1	2 FL	PRICE	2 FL	PRICE	2 FL	PRICE
.0020		.050 mm	.014	1/8	1-1/2	810020**	37.80				
.0020		.050 mm	.028	1/8	1-1/2	20020	37.80				
.0039	#102	.100 mm	.026	1/8	1-1/2	810039**	26.90				
.0039	#102	.100 mm	.039	1/8	1-1/2	20039	26.90				
.0051	#99	.130 mm	.034	1/8	1-1/2	810051**	26.20				
.0051	#99	.130 mm	.056	1/8	1-1/2	20051	26.20				
.0059	#97	.150 mm	.040	1/8	1-1/2	810059**	24.40				
.0059	#97	.150 mm	.066	1/8	1-1/2	20059	24.40				
.0063	#96		.042	1/8	1-1/2	810063	24.40				
.0063	#96		.066	1/8	1-1/2	20063	24.40				
.0067	#95		.066	1/8	1-1/2	20067	24.40				
.0069		.175 mm	.066	1/8	1-1/2	20069	24.40				
.0071	#94		.106	1/8	1-1/2	20071	22.20				
.0075	#93		.106	1/8	1-1/2	20075	22.20				
.0079	#92	.200 mm	.054	1/8	1-1/2	810079**	18.60	810079-C3**	23.50		
.0079	#92	.200 mm	.160	1/8	1-1/2	20079	18.60	20079-C3	23.50		
.0083	#91		.160	1/8	1-1/2	20083	18.60	20083-C3	23.50		
.0087	#90		.126	1/8	1-1/2	20087	18.60	20087-C3	23.50		
.0089		.225 mm	.160	1/8	1-1/2	20089	18.60	20089-C3	23.50		
.0091	#89		.160	1/8	1-1/2	20091	18.20	20091-C3	23.10		
.0095	#88		.064	1/8	1-1/2	810095**	18.20	810095-C3**	23.10		
.0095	#88		.160	1/8	1-1/2	20095	18.20	20095-C3	23.10		
.0098		.250 mm	.066	1/8	1-1/2	810098**	18.20	810098-C3**	23.10		
.0098		.250 mm	.160	1/8	1-1/2	20098	18.20	20098-C3	23.10		
.0100	#87		.068	1/8	1-1/2	810100**	18.20	810100-C3**	23.10		
.0100	#87		.160	1/8	1-1/2	20100	18.20	20100-C3	23.10	20100-C4	30.60
.0105	#86		.160	1/8	1-1/2	20105	18.20	20105-C3	23.10		
.0108		.275 mm	.160	1/8	1-1/2	20108	18.20	20108-C3	23.10		
.0110	#85		.160	1/8	1-1/2	20110	18.20	20110-C3	23.10		
.0115	#84		.180	1/8	1-1/2	20115	18.20	20115-C3	23.10		
.0118		.300 mm	.180	1/8	1-1/2	20118	18.20	20118-C3	23.10		

* Tolerance for all AlTiN coating is +.0002"/−.0003". ** Total overhang from shank transition is .250"

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MINIATURE DRILLS

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DRILL DIAMETER inch	wire	metric	FLUTE LENGTH	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN COATED		AMORPHOUS DIAMOND	
D_1 +.0000″ −.0003″ *			L_2	D_2	L_1	2 FL	PRICE	2 FL	PRICE	2 FL	PRICE
.0120	#83		.080	1/8	1-1/2	810120**	16.40	810120-C3**	21.30		
.0120	#83		.230	1/8	1-1/2	20120	16.40	20120-C3	21.30		
.0125	#82		.230	1/8	1-1/2	20125	16.40	20125-C3	21.30		
.0130	#81		.230	1/8	1-1/2	20130	16.40	20130-C3	21.30		
.0135	#80		.270	1/8	1-1/2	20135	16.00	20135-C3	20.90		
.0138		.350 mm	.270	1/8	1-1/2	20138	16.00	20138-C3	20.90		
.0145	#79		.100	1/8	1-1/2	810145**	16.00	810145-C3**	20.90		
.0145	#79		.270	1/8	1-1/2	20145	16.00	20145-C3	20.90	20145-C4	28.40
.0157		.400 mm	.105	1/8	1-1/2	810157**	16.00	810157-C3**	20.90		
.0157		.400 mm	.270	1/8	1-1/2	20157	16.00	20157-C3	20.90		
.0160	#78		.270	1/8	1-1/2	20160	16.00	20160-C3	20.90		
.0168			.270	1/8	1-1/2	20168	16.00	20168-C3	20.90		
.0177		.450 mm	.270	1/8	1-1/2	20177	16.00	20177-C3	20.90		
.0180	#77		.120	1/8	1-1/2	810180**	14.90	810180-C3**	19.80		
.0180	#77		.270	1/8	1-1/2	20180	14.90	20180-C3	19.80		
.0197		.500 mm	.275	1/8	1-1/2	20197	14.90	20197-C3	19.80		
.0200	#76		.135	1/8	1-1/2	810200**	14.90	810200-C3**	19.80		
.0200	#76		.275	1/8	1-1/2	20200	14.90	20200-C3	19.80	20200-C4	27.30
.0210	#75		.275	1/8	1-1/2	20205	14.90	20205-C3	19.80		
.0225	#74		.150	1/8	1-1/2	810210	14.90	810210-C3	19.80		
.0225	#74		.275	1/8	1-1/2	20210	14.90	20210-C3	19.80		
.0236		.600 mm	.275	1/8	1-1/2	20214	14.90	20214-C3	19.80		
.0240	#73		.275	1/8	1-1/2	20215	14.90	20215-C3	19.80		
.0250	#72		.170	1/8	1-1/2	810220	14.90	810220-C3	19.80		
.0250	#72		.275	1/8	1-1/2	20220	14.90	20220-C3	19.80		
.0260	#71		.275	1/8	1-1/2	20225	14.90	20225-C3	19.80		
.0276		.700 mm	.335	1/8	1-1/2	20229	14.90	20229-C3	19.80		
.0280	#70		.335	1/8	1-1/2	20230	14.90	20230-C3	19.80		
.0292	#69		.335	1/8	1-1/2	20235	14.90	20235-C3	19.80		
.0302			.395	1/8	1-1/2	20240	14.90	20240-C3	19.80		
.0310	#68		.210	1/8	1-1/2	810245	13.90	810245-C3	18.80		
.0310	#68		.395	1/8	1-1/2	20245	13.90	20245-C3	18.80		
.0312 (1/32)			.210	1/8	1-1/2	810250	13.90	810250-C3	18.80		
.0312 (1/32)			.395	1/8	1-1/2	20250	13.90	20250-C3	18.80	20250-C4	26.30
.0315		.800 mm	.395	1/8	1-1/2	20253	13.90	20253-C3	18.80		
.0320	#67		.395	1/8	1-1/2	20255	13.90	20255-C3	18.80		

* Tolerance for all AlTiN coating is +.0002"/−.0003". ** Total overhang from shank transition is .250"

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MINIATURE DRILLS

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DRILL DIAMETER inch	wire	metric	FLUTE LENGTH	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN COATED		AMORPHOUS DIAMOND	
D_1 $^{+.0000''}_{-.0003''}$ *			L_2	D_2	L_1	2 FL	PRICE	2 FL	PRICE	2 FL	PRICE
.0330	#66		.395	1/8	1-1/2	20260	13.90	20260-C3	18.80		
.0350	#65		.395	1/8	1-1/2	20265	13.90	20265-C3	18.80		
.0354		.900 mm	.395	1/8	1-1/2	20267	13.90	20267-C3	18.80		
.0360	#64		.395	1/8	1-1/2	20270	13.90	20270-C3	18.80		
.0370	#63		.395	1/8	1-1/2	20275	13.90	20275-C3	18.80		
.0380	#62		.395	1/8	1-1/2	20280	13.90	20280-C3	18.80		
.0390	#61		.395	1/8	1-1/2	20285	13.90	20285-C3	18.80		
.0394		1.000 mm	.395	1/8	1-1/2	20290	13.90	20290-C3	18.80		
.0400	#60		.395	1/8	1-1/2	20295	13.90	20295-C3	18.80		
.0410	#59		.395	1/8	1-1/2	20300	13.90	20300-C3	18.80		
.0420	#58		.395	1/8	1-1/2	20305	13.90	20305-C3	18.80		
.0430	#57		.395	1/8	1-1/2	20310	13.90	20310-C3	18.80		
.0433		1.100 mm	.395	1/8	1-1/2	20311	13.90	20311-C3	18.80		
.0440			.395	1/8	1-1/2	20315	13.90	20315-C3	18.80		
.0465	#56		.395	1/8	1-1/2	20320	13.90	20320-C3	18.80		
.0469 (3/64)			.395	1/8	1-1/2	20325	13.90	20325-C3	18.80		
.0472		1.200 mm	.395	1/8	1-1/2	20327	13.90	20327-C3	18.80		
.0492		1.250 mm	.395	1/8	1-1/2	20330	13.90	20330-C3	18.80		
.0500		1.270 mm	.395	1/8	1-1/2	20332	13.90	20332-C3	18.80		
.0512		1.300 mm	.413	1/8	1-1/2	20335	13.90	20335-C3	18.80		
.0520	#55		.413	1/8	1-1/2	20340	13.90	20340-C3	18.80		
.0520	#55		.500	1/8	1-1/2	815340	13.90	815340-C3	18.80		
.0531		1.350 mm	.413	1/8	1-1/2	20345	13.90	20345-C3	18.80		
.0550	#54		.413	1/8	1-1/2	20350	13.90	20350-C3	18.80	20350-C4	26.30
.0550	#54		.525	1/8	1-1/2	815350	13.90	815350-C3	18.80		
.0571		1.450 mm	.413	1/8	1-1/2	20355	13.90	20355-C3	18.80		
.0591		1.500 mm	.413	1/8	1-1/2	20360	13.90	20360-C3	18.80		
.0595	#53		.413	1/8	1-1/2	20365	13.90	20365-C3	18.80		
.0595	#53		.575	1/8	2	815365	14.60	815365-C3	19.50		
.0610		1.550 mm	.413	1/8	1-1/2	20370	13.90	20370-C3	18.80		
.0625 (1/16)			.413	1/8	1-1/2	20375	13.90	20375-C3	18.80	20375-C4	26.30
.0625 (1/16)			.600	1/8	2	815375	14.60	815375-C3	19.50		
D_1 $^{+.0000''}_{-.0005''}$ ***			L_2	D_2	L_1	2 FL	PRICE	2 FL	PRICE	2 FL	PRICE
.0630		1.600 mm	.413	1/8	1-1/2	20376	13.90	20376-C3	18.80		
.0635	#52		.413	1/8	1-1/2	20377	13.90	20377-C3	18.80		
.0635	#52		.600	1/8	2	815377	14.60	815377-C3	19.50		
.0670	#51		.413	1/8	1-1/2	20384	13.90	20384-C3	18.80		
.0670	#51		.650	1/8	2	815384	14.60	815384-C3	19.50		

* Tolerance for all AlTiN coating is +.0002"/−.0003". *** Tolerance for AlTiN coating is +.0002"/−.0005".

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MINIATURE DRILLS

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DRILL DIAMETER inch	wire	metric	FLUTE LENGTH	SHANK DIAMETER	OVERALL LENGTH	UNCOATED 2 FL	UNCOATED PRICE	AlTiN COATED 2 FL	AlTiN COATED PRICE	AMORPHOUS DIAMOND 2 FL	AMORPHOUS DIAMOND PRICE
D_1 $^{+.0000''}_{-.0005''}$ ***			L_2	D_2	L_1						
.0700	#50		.413	1/8	1-1/2	20390	13.90	20390-C3	18.80		
.0700	#50		.700	1/8	2	815390	14.60	815390-C3	19.50		
.0730	#49		.413	1/8	1-1/2	20396	13.90	20396-C3	18.80		
.0760	#48		.413	1/8	1-1/2	20402	13.90	20402-C3	18.80		
.0760	#48		.750	1/8	2	815402	14.60	815402-C3	19.50		
.0781 (5/64)			.413	1/8	1-1/2	20407	13.90	20407-C3	18.80		
.0781 (5/64)			.750	1/8	2	815407	14.60	815407-C3	19.50		
.0785	#47		.413	1/8	1-1/2	20408	13.90	20408-C3	18.80		
.0787		2.000 mm	.413	1/8	1-1/2	20409	13.90	20409-C3	18.80		
.0810	#46		.413	1/8	1-1/2	20414	13.90	20414-C3	18.80		
.0810	#46		.800	1/8	2	815414	14.60	815414-C3	19.50		
.0820	#45		.413	1/8	1-1/2	20416	13.90	20416-C3	18.80		
.0860	#44		.413	1/8	1-1/2	20424	13.90	20424-C3	18.80		
.0890	#43		.413	1/8	1-1/2	20430	13.90	20430-C3	18.80		
.0890	#43		.850	1/8	2	815430	14.60	815430-C3	19.50		
.0935	#42		.413	1/8	1-1/2	20439	13.90	20439-C3	18.80		
.0938 (3/32)			.413	1/8	1-1/2	20440	13.90	20440-C3	18.80		
.0938 (3/32)			.900	1/8	2	815440	14.60	815440-C3	19.50		
.0960	#41		.413	1/8	1-1/2	20445	13.90	20445-C3	18.80		
.0980	#40		.413	1/8	1-1/2	20449	13.90	20449-C3	18.80		
.0984		2.500 mm	.413	1/8	1-1/2	20450	13.90	20450-C3	18.80		
.0995	#39		.413	1/8	1-1/2	20453	13.90	20453-C3	18.80		
.1015	#38		.413	1/8	1-1/2	20457	13.90	20457-C3	18.80		
.1040	#37		.413	1/8	1-1/2	20462	13.90	20462-C3	18.80		
.1065	#36		.413	1/8	1-1/2	20467	13.90	20467-C3	18.80		
.1094 (7/64)			.413	1/8	1-1/2	20473	13.90	20473-C3	18.80		
.1094 (7/64)			1.100	1/8	2-1/2	815473	14.60	815473-C3	19.50		
.1100	#35		.413	1/8	1-1/2	20475	13.90	20475-C3	18.80		
.1110	#34		.413	1/8	1-1/2	20477	13.90	20477-C3	18.80		
.1130	#33		.413	1/8	1-1/2	20481	13.90	20481-C3	18.80		
.1160	#32		.413	1/8	1-1/2	20487	13.90	20487-C3	18.80		
.1181		3.000 mm	.413	1/8	1-1/2	20491	13.90	20491-C3	18.80		
.1200	#31		.413	1/8	1-1/2	20493	13.90	20493-C3	18.80		
.1250 (1/8)			.413	1/8	1-1/2	20498	13.90	20498-C3	18.80		
.1250 (1/8)			1.200	1/8	2-1/2	815498	14.60	815498-C3	19.50		

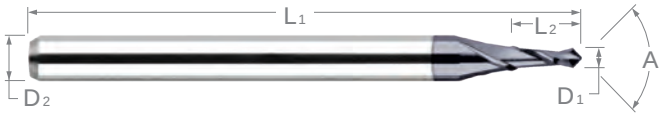
*** Tolerance for AlTiN coating is +.0002"/−.0005".

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MINIATURE DRILLS

Spotting Drills



Stocked in 9 Included Angles

- Thinned web to reduce walking
- Self-centering point geometry
- 2 flutes
- Solid carbide
- CNC ground in the USA

INCLUDED ANGLE	DRILL DIAMETER	FLUTE LENGTH	WEB THICKNESS	TYPE	SHANK DIAMETER	OVERALL LENGTH		UNCOATED		AlTiN COATED	
A +1° −1°	D1	L2			D2	L1		2 FL	PRICE	2 FL	PRICE
60°	.020	.060 (3x)	.0020	I	1/8	1-1/2		932720	30.20	932720-C3	35.10
	.030	.090 (3x)	.0030	I	1/8	1-1/2		932730	29.60	932730-C3	34.50
	.031 (1/32)	.093 (3x)	.0030	I	1/8	1-1/2		932731	29.60	932731-C3	34.50
	.045	.135 (3x)	.0030	I	1/8	1-1/2		932745	25.60	932745-C3	30.50
	.060	.180 (3x)	.0050	I	1/8	1-1/2		932760	29.60	932760-C3	34.50
	.062 (1/16)	.186 (3x)	.0050	I	1/8	1-1/2		932762	29.60	932762-C3	34.50
	.090	.270 (3x)	.0050	I	1/8	1-1/2		932790	29.60	932790-C3	34.50
	.093 (3/32)	.279 (3x)	.0060	I	1/8	1-1/2		932793	29.60	932793-C3	34.50
	.125 (1/8)	.375 (3x)	.0100	I	1/8	1-1/2		932808	29.60	932808-C3	34.50
	.125 (1/8)	.375 (3x)	.0100	II	1/8	1-1/2		932811	29.60	932811-C3	34.50
	.187 (3/16)	.625 (3x)	.0130	II	3/16	2		932812	26.50	932812-C3	31.80
	.250 (1/4)	.750 (3x)	.0180	II	1/4	2-1/2		932816	32.00	932816-C3	39.20
82°	.010	.030 (3x)	.0015	I	1/8	1-1/2		983110	35.30	983110-C3	40.20
	.020	.060 (3x)	.0020	I	1/8	1-1/2		983120	30.20	983120-C3	35.10
	.030	.090 (3x)	.0030	I	1/8	1-1/2		983130	28.50	983130-C3	33.40
	.045	.135 (3x)	.0030	I	1/8	1-1/2		983145	25.60	983145-C3	30.50
	.060	.180 (3x)	.0050	I	1/8	1-1/2		983160	25.30	983160-C3	30.20
	.090	.270 (3x)	.0050	I	1/8	1-1/2		983190	24.20	983190-C3	29.10
	.125 (1/8)	.375 (3x)	.0100	I	1/8	1-1/2		983208	22.90	983208-C3	27.80
	.125 (1/8)	.375 (3x)	.0100	II	1/8	1-1/2		965208	22.90	965208-C3	27.80
	.187 (3/16)	.625 (3x)	.0130	II	3/16	2		965212	26.50	965212-C3	31.80
	.250 (1/4)	.750 (3x)	.0180	II	1/4	2-1/2		965216	33.00	965216-C3	40.20
90°	.008	.024 (3x)	.0015	I	1/8	1-1/2		11408	43.00	11408-C3	47.90
	.010	.030 (3x)	.0015	I	1/8	1-1/2		11410	34.20	11410-C3	39.10
	.010	.030 (3x)	.0015	I	1/8	3	*LONG!*	987910	41.00	987910-C3	45.90
	.012	.036 (3x)	.0015	I	1/8	1-1/2		11412	43.00	11412-C3	47.90
	.015 (1/64)	.045 (3x)	.0015	I	1/8	1-1/2		11415	34.20	11415-C3	39.10
	.020	.030 (1.5x)	.0020	I	1/8	1-1/2		816020	29.60	816020-C3	34.50
	.020	.060 (3x)	.0020	I	1/8	1-1/2		11420	29.60	11420-C3	34.50
	.020	.060 (3x)	.0020	I	1/8	3	*LONG!*	987920	36.40	987920-C3	41.30
	.025	.075 (3x)	.0020	I	1/8	1-1/2		11425	29.60	11425-C3	34.50
	.030	.045 (1.5x)	.0030	I	1/8	1-1/2		816030	27.30	816030-C3	34.40
	.030	.090 (3x)	.0030	I	1/8	1-1/2		11430	27.30	11430-C3	32.20
	.030	.090 (3x)	.0030	I	1/8	3	*LONG!*	987930	34.50	987930-C3	39.40
	.031 (1/32)	.093 (3x)	.0030	I	1/8	1-1/2		11431	27.30	11431-C3	32.20
	.035	.105 (3x)	.0030	I	1/8	1-1/2		11435	27.30	11435-C3	32.20
	.039 (1 mm)	.117 (3x)	.0030	I	1/8	1-1/2		11439	27.30	11439-C3	32.20

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TYPE I

On center design reduces walking and minimizes flat at bottom of spot. Ideally suited for starting smaller diameter drills and shallow spots.



TYPE II

Ahead of center design improves tip strength. Ideally suited for larger diameter drills and tougher materials.

MINIATURE DRILLS

Spotting Drills (cont.)

continued from previous page

INCLUDED ANGLE	DRILL DIAMETER	FLUTE LENGTH	WEB THICKNESS	TYPE	SHANK DIAMETER	OVERALL LENGTH		UNCOATED		AlTiN COATED	
A $^{+1°}_{-1°}$	D_1	L_2			D_2	L_1		2 FL	PRICE	2 FL	PRICE
	.040	.120 (3x)	.0030	I	1/8	1-1/2		11440	25.00	11440-C3	29.90
	.045	.068 (1.5x)	.0030	I	1/8	1-1/2		816045	25.00	816045-C3	29.90
	.045	.135 (3x)	.0030	I	1/8	1-1/2		11445	25.00	11445-C3	29.90
	.045	.135 (3x)	.0030	I	1/8	3	*LONG!*	987945	32.00	987945-C3	36.90
	.047 (3/64)	.141 (3x)	.0040	I	1/8	1-1/2		11447	25.00	11447-C3	29.90
	.050	.150 (3x)	.0040	I	1/8	1-1/2		11450	25.00	11450-C3	29.90
	.055	.165 (3x)	.0040	I	1/8	1-1/2		11455	25.00	11455-C3	29.90
	.060	.090 (1.5x)	.0050	I	1/8	1-1/2		816060	24.70	816060-C3	29.60
	.060	.180 (3x)	.0050	I	1/8	1-1/2		11460	24.70	11460-C3	29.60
	.060	.180 (3x)	.0050	I	1/8	3	*LONG!*	987960	31.60	987960-C3	36.50
	.062 (1/16)	.093 (1.5x)	.0050	I	1/8	1-1/2		816062	24.70	816062-C3	29.60
	.062 (1/16)	.186 (3x)	.0050	I	1/8	1-1/2		11462	24.70	11462-C3	29.60
	.070	.210 (3x)	.0050	I	1/8	1-1/2		11470	24.70	11470-C3	29.60
	.075	.225 (3x)	.0050	I	1/8	1-1/2		11475	24.70	11475-C3	29.60
	.078 (5/64)	.234 (3x)	.0050	I	1/8	1-1/2		11478	24.70	11478-C3	29.60
	.080	.240 (3x)	.0050	I	1/8	1-1/2		11480	24.70	11480-C3	29.60
	.090	.135 (1.5x)	.0050	I	1/8	1-1/2		816090	23.20	816090-C3	28.10
	.090	.270 (3x)	.0050	I	1/8	1-1/2		11490	23.20	11490-C3	28.10
	.090	.270 (3x)	.0050	I	1/8	3	*LONG!*	987990	30.40	987990-C3	35.30
	.093 (3/32)	.279 (3x)	.0060	I	1/8	1-1/2		11493	23.20	11493-C3	28.10
	.100	.300 (3x)	.0060	I	1/8	1-1/2		11500	23.20	11500-C3	28.10
	.109 (7/64)	.327 (3x)	.0080	I	1/8	1-1/2		11509	23.20	11509-C3	28.10
90°	.118 (3 mm)	.354 (3x)	.0080	I	1/8	1-1/2		1153M	23.20	1153M-C3	28.10
	.125 (1/8)	.188 (1.5x)	.0100	I	1/8	1-1/2		816108	21.70	816108-C3	26.60
	.125 (1/8)	.375 (3x)	.0100	I	1/8	1-1/2		11525	21.70	11525-C3	26.60
	.125 (1/8)	.375 (3x)	.0100	I	1/8	3	*LONG!*	988008	29.60	988008-C3	34.50
	.125 (1/8)	.188 (1.5x)	.0100	II	1/8	1-1/2		787708	21.70	787708-C3	26.60
	.125 (1/8)	.375 (3x)	.0100	II	1/8	1-1/2		37508	21.70	37508-C3	26.60
	.125 (1/8)	.375 (3x)	.0100	II	1/8	4	*LONG!*	55808	31.40	55808-C3	36.70
	.140 (9/64)	.375 (2.5x)	.0100	II	3/16	2		37509	31.00	37509-C3	36.30
	.156 (5/32)	.375 (2.5x)	.0110	II	3/16	2		37510	25.80	37510-C3	31.10
	.187 (3/16)	.625 (3.5x)	.0130	I	3/16	2		803912	25.00	803912-C3	30.30
	.187 (3/16)	.312 (1.5x)	.0130	II	3/16	2		787712	25.00	787712-C3	30.30
	.187 (3/16)	.625 (3.5x)	.0130	II	3/16	2		37512	25.00	37512-C3	30.30
	.187 (3/16)	.625 (3.5x)	.0130	II	3/16	4	*LONG!*	55812	38.60	55812-C3	45.80
	.218 (7/32)	.750 (3.5x)	.0150	II	1/4	2-1/2		37514	39.70	37514-C3	46.90
	.236 (6 mm)	.750 (3x)	.0160	II	1/4	2-1/2		37515	39.70	37515-C3	46.90
	.250 (1/4)	.750 (3x)	.0180	I	1/4	2-1/2		803916	31.10	803916-C3	38.30
	.250 (1/4)	.375 (1.5x)	.0180	II	1/4	2-1/2		787716	31.10	787716-C3	38.30
	.250 (1/4)	.750 (3x)	.0180	II	1/4	2-1/2		37516	31.10	37516-C3	38.30
	.250 (1/4)	.750 (3x)	.0180	II	1/4	6	*LONG!*	55816	52.20	55816-C3	61.70
	.312 (5/16)	.750 (2.5x)	.0220	II	5/16	2-1/2		37520	53.40	37520-C3	61.80
	.375 (3/8)	.500 (1.5x)	.0270	II	3/8	2-1/2		787724	56.60	787724-C3	66.10
	.375 (3/8)	1.000 (2.5x)	.0270	II	3/8	2-1/2		37524	56.60	37524-C3	66.10
	.500 (1/2)	1.000 (2x)	.0350	II	1/2	3		37532	97.80	37532-C3	112.00
	.030	.090 (3x)	.0030	I	1/8	1-1/2		975830	28.50	975830-C3	33.40
	.060	.180 (3x)	.0050	I	1/8	1-1/2		975860	25.30	975860-C3	30.20
	.090	.270 (3x)	.0050	I	1/8	1-1/2		975890	25.60	975890-C3	30.50
100°	.125 (1/8)	.375 (3x)	.0100	I	1/8	1-1/2		975908	22.90	975908-C3	27.80
	.125 (1/8)	.375 (3x)	.0100	II	1/8	1-1/2		955908	22.90	955908-C3	27.80
	.187 (3/16)	.625 (3x)	.0130	II	3/16	2		955912	26.50	955912-C3	31.80
	.250 (1/4)	.750 (3x)	.0180	II	1/4	2-1/2		955916	33.00	955916-C3	40.20

continued on next page

MINIATURE DRILLS

Spotting Drills (cont.)

continued from previous page

INCLUDED ANGLE	DRILL DIAMETER	FLUTE LENGTH		WEB THICKNESS	TYPE	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN COATED	
A $^{+1°}_{-1°}$	D_1	L_2				D_2	L_1	2 FL	PRICE	2 FL	PRICE
	.010	.030	(3x)	.0015	I	1/8	1-1/2	11610	34.20	11610-C3	39.10
	.015 (1/64)	.045	(3x)	.0015	I	1/8	1-1/2	11615	34.20	11615-C3	39.10
	.020	.060	(3x)	.0020	I	1/8	1-1/2	11620	29.60	11620-C3	34.50
	.025	.075	(3x)	.0020	I	1/8	1-1/2	11625	29.60	11625-C3	34.50
	.030	.090	(3x)	.0030	I	1/8	1-1/2	11630	27.30	11630-C3	32.20
	.031 (1/32)	.093	(3x)	.0030	I	1/8	1-1/2	11631	27.30	11631-C3	32.20
	.040	.120	(3x)	.0030	I	1/8	1-1/2	11640	25.00	11640-C3	29.90
	.045	.135	(3x)	.0030	I	1/8	1-1/2	11645	25.00	11645-C3	29.90
	.047 (3/64)	.141	(3x)	.0040	I	1/8	1-1/2	11647	25.00	11647-C3	29.90
	.050	.150	(3x)	.0040	I	1/8	1-1/2	11650	25.00	11650-C3	29.90
	.055	.165	(3x)	.0040	I	1/8	1-1/2	11655	25.00	11655-C3	29.90
	.060	.180	(3x)	.0050	I	1/8	1-1/2	11660	24.70	11660-C3	29.60
	.062 (1/16)	.186	(3x)	.0050	I	1/8	1-1/2	11662	24.70	11662-C3	29.60
120°	.070	.210	(3x)	.0050	I	1/8	1-1/2	11670	24.70	11670-C3	29.60
	.078 (5/64)	.234	(3x)	.0050	I	1/8	1-1/2	11678	24.70	11678-C3	29.60
	.090	.270	(3x)	.0050	I	1/8	1-1/2	11690	23.20	11690-C3	28.10
	.093 (3/32)	.279	(3x)	.0060	I	1/8	1-1/2	11693	23.20	11693-C3	28.10
	.100	.300	(3x)	.0060	I	1/8	1-1/2	11700	23.20	11700-C3	28.10
	.118 (3 mm)	.354	(3x)	.0080	I	1/8	1-1/2	1173M	23.20	1173M-C3	28.10
	.125 (1/8)	.375	(3x)	.0100	I	1/8	1-1/2	11725	21.70	11725-C3	26.60
	.125 (1/8)	.375	(3x)	.0100	II	1/8	1-1/2	38208	21.70	38208-C3	26.60
	.156 (5/32)	.375	(2.5x)	.0110	II	3/16	2	38210	48.40	38210-C3	53.70
	.187 (3/16)	.625	(3.5x)	.0130	I	3/16	2	804012	25.00	804012-C3	30.30
	.187 (3/16)	.625	(3.5x)	.0130	II	3/16	2	38212	25.00	38212-C3	30.30
	.250 (1/4)	.750	(3x)	.0180	I	1/4	2-1/2	804016	31.10	804016-C3	38.30
	.250 (1/4)	.750	(3x)	.0180	II	1/4	2-1/2	38216	31.10	38216-C3	38.30
	.375 (3/8)	1.000	(2.5x)	.0270	II	3/8	2-1/2	38224	56.60	38224-C3	66.10
	.030	.090	(3x)	.0030	I	1/8	1-1/2	839530	31.40	839530-C3	36.10
	.060	.180	(3x)	.0050	I	1/8	1-1/2	839560	31.40	839560-C3	36.10
130°	.090	.270	(3x)	.0050	I	1/8	1-1/2	839590	31.40	839590-C3	36.10
	.125 (1/8)	.375	(3x)	.0100	I	1/8	1-1/2	839608	33.00	839608-C3	37.50
	.250 (1/4)	.750	(3x)	.0180	II	1/4	2-1/2	847016	34.40	847016-C3	41.60
	.010	.030	(3x)	.0015	I	1/8	1-1/2	39810	35.30	39810-C3	40.20
	.015 (1/64)	.045	(3x)	.0015	I	1/8	1-1/2	39815	35.30	39815-C3	40.20
	.020	.030	(1.5x)	.0020	I	1/8	1-1/2	815820	30.20	815820-C3	35.10
	.020	.060	(3x)	.0020	I	1/8	1-1/2	39820	30.20	39820-C3	35.10
	.025	.075	(3x)	.0020	I	1/8	1-1/2	39825	30.20	39825-C3	35.10
	.030	.045	(1.5x)	.0030	I	1/8	1-1/2	815830	28.50	815830-C3	33.40
	.030	.090	(3x)	.0030	I	1/8	1-1/2	39830	28.50	39830-C3	33.40
	.031 (1/32)	.093	(3x)	.0030	I	1/8	1-1/2	39831	28.50	39831-C3	33.40
140°	.040	.060	(1.5x)	.0030	I	1/8	1-1/2	815840	25.60	815840-C3	30.50
	.040	.120	(3x)	.0030	I	1/8	1-1/2	39840	25.60	39840-C3	30.50
	.045	.135	(3x)	.0030	I	1/8	1-1/2	39845	25.60	39845-C3	30.50
	.047 (3/64)	.141	(3x)	.0040	I	1/8	1-1/2	39847	25.60	39847-C3	30.50
	.050	.150	(3x)	.0040	I	1/8	1-1/2	39850	25.60	39850-C3	30.50
	.055	.165	(3x)	.0040	I	1/8	1-1/2	39855	25.60	39855-C3	30.50
	.060	.090	(1.5x)	.0050	I	1/8	1-1/2	815860	25.30	815860-C3	30.20
	.060	.180	(3x)	.0050	I	1/8	1-1/2	39860	25.30	39860-C3	30.20
	.062 (1/16)	.186	(3x)	.0050	I	1/8	1-1/2	39862	25.30	39862-C3	30.20

continued on next page

MINIATURE DRILLS

Spotting Drills (cont.)

continued from previous page

INCLUDED ANGLE	DRILL DIAMETER	FLUTE LENGTH		WEB THICKNESS	TYPE	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN COATED	
A $^{+1°}_{-1°}$	D_1	L_2				D_2	L_1	2 FL	PRICE	2 FL	PRICE
140°	.070	.210	(3x)	.0050	I	1/8	1-1/2	39870	25.30	39870-C3	30.20
	.075	.225	(3x)	.0050	I	1/8	1-1/2	39875	25.30	39875-C3	30.20
	.078 (5/64)	.234	(3x)	.0050	I	1/8	1-1/2	39878	25.30	39878-C3	30.20
	.090	.135	(1.5x)	.0050	I	1/8	1-1/2	815890	24.20	815890-C3	29.10
	.090	.270	(3x)	.0050	I	1/8	1-1/2	39890	24.20	39890-C3	29.10
	.093 (3/32)	.279	(3x)	.0060	I	1/8	1-1/2	39893	24.20	39893-C3	29.10
	.100	.300	(3x)	.0060	I	1/8	1-1/2	39900	24.20	39900-C3	29.10
	.118 (3mm)	.354	(3x)	.0080	I	1/8	1-1/2	3993M	24.20	3993M-C3	29.10
	.125 (1/8)	.188	(1.5x)	.0100	I	1/8	1-1/2	815908	22.90	815908-C3	27.80
	.125 (1/8)	.375	(3x)	.0100	I	1/8	1-1/2	39925	22.90	39925-C3	27.80
	.125 (1/8)	.375	(3x)	.0100	II	1/8	1-1/2	41008	22.90	41008-C3	27.80
	.140 (9/64)	.375	(2.5x)	.0100	II	3/16	2	41009	26.50	41009-C3	31.80
	.156 (5/32)	.375	(2.5x)	.0110	II	3/16	2	41010	26.50	41010-C3	31.80
	.187 (3/16)	.625	(3x)	.0130	I	3/16	2	804112	26.50	804112-C3	31.80
	.187 (3/16)	.625	(3x)	.0130	II	3/16	2	41012	26.50	41012-C3	31.80
	.250 (1/4)	.750	(3x)	.0180	I	1/4	2-1/2	804116	33.00	804116-C3	40.20
	.250 (1/4)	.750	(3x)	.0180	II	1/4	2-1/2	41016	33.00	41016-C3	40.20
	.375 (3/8)	1.000	(2.5x)	.0270	II	3/8	2-1/2	41024	58.20	41024-C3	67.70
150°	.020	.060	(3x)	.0020	I	1/8	1-1/2	961120	28.50	961120-C3	33.40
	.030	.090	(3x)	.0030	I	1/8	1-1/2	961130	28.50	961130-C3	33.40
	.040	.120	(3x)	.0030	I	1/8	1-1/2	961140	25.60	961140-C3	30.50
	.045	.135	(3x)	.0030	I	1/8	1-1/2	961145	25.60	961145-C3	30.50
	.047	.141	(3x)	.0040	I	1/8	1-1/2	961147	25.60	961147-C3	30.50
	.060	.180	(3x)	.0050	I	1/8	1-1/2	961160	25.30	961160-C3	30.20
	.062 (1/16)	.186	(3x)	.0050	I	1/8	1-1/2	961162	25.60	961162-C3	30.50
	.078 (5/64)	.234	(3x)	.0050	I	1/8	1-1/2	961178	25.60	961178-C3	30.50
	.090	.270	(3x)	.0050	I	1/8	1-1/2	961190	25.60	961190-C3	30.50
	.093 (3/32)	.279	(3x)	.0060	I	1/8	1-1/2	961193	25.60	961193-C3	30.50
	.125 (1/8)	.375	(3x)	.0100	I	1/8	1-1/2	961208	22.90	961208-C3	27.80
	.125 (1/8)	.375	(3x)	.0100	II	1/8	1-1/2	949508	22.90	949508-C3	27.80
	.187 (3/16)	.625	(3x)	.0130	II	3/16	2	949512	26.50	949512-C3	31.80
	.250 (1/4)	.750	(3x)	.0180	II	1/4	2-1/2	949516	33.00	949516-C3	40.20
170°	.060	.180	(3x)	.0050	I	1/8	1-1/2	893660	25.60	893660-C3	30.50
	.125 (1/8)	.375	(3x)	.0100	I	1/8	1-1/2	893708	25.60	893708-C3	30.50
	.250 (1/4)	.750	(3x)	.0180	II	1/4	2-1/2	893716	33.00	893716-C3	40.20

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MINIATURE REAMERS



	D1 Tolerances
Uncoated	+.0000″ −.0002″
AlTiN Coated	+.0002″ −.0000″

- Available uncoated or with AlTiN coating for improved lubricity and heat resistance
- Straight flutes for through and blind hole applications
- Oversized, common shanks to maintain strength, stiffness, and accuracy
- 45° chamfer angle
- h6 shank tolerance for high precision tool holders
- Solid carbide
- CNC ground in the USA

REAMER DIAMETER	WIRE	MARGIN LENGTH	OVERALL REACH	CHAMFER LENGTH	FLUTES	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN COATED	
D_1*		L_2 +.020″ −.000″	L_3 +.020″ −.000″	L_4		D_2 (h6)	L_1	TOOL #	PRICE	TOOL #	PRICE
.0080		.062	.100	.0013	4	1/8	1-1/2	RSB0080	52.00	RSB0080-C3	56.60
.0083	#91	.062	.100	.0014	4	1/8	1-1/2	RSB0083	52.00	RSB0083-C3	56.60
.0085		.062	.109	.0014	4	1/8	1-1/2	RSB0085	52.00	RSB0085-C3	56.60
.0087	#90	.062	.109	.0015	4	1/8	1-1/2	RSB0087	52.00	RSB0087-C3	56.60
.0090		.062	.118	.0015	4	1/8	1-1/2	RSB0090	52.00	RSB0090-C3	56.60
.0091	#89	.062	.118	.0015	4	1/8	1-1/2	RSB0091	52.00	RSB0091-C3	56.60
.0095	#88	.062	.118	.0016	4	1/8	1-1/2	RSB0095	52.00	RSB0095-C3	56.60
.0100	#87	.078	.125	.0017	4	1/8	1-1/2	RSB0100	52.00	RSB0100-C3	56.60
.0105	#86	.078	.125	.0018	4	1/8	1-1/2	RSB0105	52.00	RSB0105-C3	56.60
.0110	#85	.078	.141	.0018	4	1/8	1-1/2	RSB0110	52.00	RSB0110-C3	56.60
.0115	#84	.078	.141	.0019	4	1/8	1-1/2	RSB0115	52.00	RSB0115-C3	56.60
.0120	#83	.093	.156	.0020	4	1/8	1-1/2	RSB0120	52.00	RSB0120-C3	56.60
.0125	#82	.093	.172	.0021	4	1/8	1-1/2	RSB0125	52.00	RSB0125-C3	56.60
.0130	#81	.093	.172	.0022	4	1/8	1-1/2	RSB0130	52.00	RSB0130-C3	56.60
.0135	#80	.109	.187	.0023	4	1/8	1-1/2	RSB0135	52.00	RSB0135-C3	56.60
.0140		.109	.187	.0023	4	1/8	1-1/2	RSB0140	52.00	RSB0140-C3	56.60
.0145	#79	.109	.187	.0024	4	1/8	1-1/2	RSB0145	52.00	RSB0145-C3	56.60
.0150		.109	.187	.0025	4	1/8	1-1/2	RSB0150	52.00	RSB0150-C3	56.60
.0155		.109	.187	.0026	4	1/8	1-1/2	RSB0155	52.00	RSB0155-C3	56.60
.0160	#78	.125	.218	.0027	4	1/8	1-1/2	RSB0160	39.20	RSB0160-C3	43.70
.0165		.125	.218	.0019	4	1/8	1-1/2	RSB0165	39.20	RSB0165-C3	43.70
.0170		.125	.218	.0020	4	1/8	1-1/2	RSB0170	39.20	RSB0170-C3	43.70
.0175		.125	.218	.0020	4	1/8	1-1/2	RSB0175	39.20	RSB0175-C3	43.70
.0180	#77	.140	.250	.0021	4	1/8	1-1/2	RSB0180	39.20	RSB0180-C3	43.70
.0185		.140	.250	.0021	4	1/8	1-1/2	RSB0185	39.20	RSB0185-C3	43.70
.0190		.140	.250	.0022	4	1/8	1-1/2	RSB0190	39.20	RSB0190-C3	43.70
.0195		.140	.250	.0022	4	1/8	1-1/2	RSB0195	39.20	RSB0195-C3	43.70
.0200	#76	.140	.250	.0023	4	1/8	1-1/2	RSB0200	39.20	RSB0200-C3	43.70
.0205		.140	.250	.0024	4	1/8	1-1/2	RSB0205	39.20	RSB0205-C3	43.70
.0210	#75	.172	.281	.0024	4	1/8	1-1/2	RSB0210	39.20	RSB0210-C3	43.70
.0215		.172	.281	.0025	4	1/8	1-1/2	RSB0215	39.20	RSB0215-C3	43.70
.0220		.172	.281	.0025	4	1/8	1-1/2	RSB0220	39.20	RSB0220-C3	43.70
.0225	#74	.172	.281	.0026	4	1/8	1-1/2	RSB0225	39.20	RSB0225-C3	43.70
.0230		.172	.281	.0026	4	1/8	1-1/2	RSB0230	39.20	RSB0230-C3	43.70
.0235		.172	.281	.0027	4	1/8	1-1/2	RSB0235	39.20	RSB0235-C3	43.70
.0240	#73	.187	.312	.0028	4	1/8	1-1/2	RSB0240	39.20	RSB0240-C3	43.70
.0245		.187	.312	.0028	4	1/8	1-1/2	RSB0245	39.20	RSB0245-C3	43.70
.0250	#72	.187	.312	.0029	4	1/8	1-1/2	RSB0250	39.20	RSB0250-C3	43.70
.0255		.187	.312	.0029	4	1/8	1-1/2	RSB0255	39.20	RSB0255-C3	43.70
.0260	#71	.187	.312	.0030	4	1/8	1-1/2	RSB0260	39.20	RSB0260-C3	43.70
.0265		.187	.312	.0030	4	1/8	1-1/2	RSB0265	39.20	RSB0265-C3	43.70

* Tolerance for Uncoated is +.0000"/−.0002". Tolerance for AlTiN coating is +.0002"/−.0000".

continued on next page

MINIATURE REAMERS

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continued from previous page

REAMER DIAMETER	WIRE	MARGIN LENGTH	OVERALL REACH	CHAMFER LENGTH	FLUTES	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN COATED	
D_1*		L_2 $^{+.020''}_{-.000''}$	L_3 $^{+.020''}_{-.000''}$	L_4		D_2 (h6)	L_1	TOOL #	PRICE	TOOL #	PRICE
.0270		.218	.375	.0031	4	1/8	2	RSB0270	39.20	RSB0270-C3	43.70
.0275		.218	.375	.0032	4	1/8	2	RSB0275	39.20	RSB0275-C3	43.70
.0280	#70	.218	.375	.0032	4	1/8	2	RSB0280	39.20	RSB0280-C3	43.70
.0285		.218	.375	.0033	4	1/8	2	RSB0285	39.20	RSB0285-C3	43.70
.0290		.218	.375	.0033	4	1/8	2	RSB0290	39.20	RSB0290-C3	43.70
.0292	#69	.218	.375	.0034	4	1/8	2	RSB0292	39.20	RSB0292-C3	43.70
.0295 (.75 mm)		.218	.375	.0034	4	1/8	2	RSB0295	39.20	RSB0295-C3	43.70
.0300		.218	.375	.0035	4	1/8	2	RSB0300	39.20	RSB0300-C3	43.70
.0305		.218	.375	.0035	4	1/8	2	RSB0305	39.20	RSB0305-C3	43.70
.0310	#68	.218	.375	.0036	4	1/8	2	RSB0310	39.20	RSB0310-C3	43.70
.0315 (.80 mm)		.218	.375	.0036	4	1/8	2	RSB0315	39.20	RSB0315-C3	43.70
.0320	#67	.250	.437	.0037	4	1/8	2	RSB0320	39.20	RSB0320-C3	43.70
.0325		.250	.437	.0037	4	1/8	2	RSB0325	39.20	RSB0325-C3	43.70
.0330	#66	.250	.437	.0038	4	1/8	2	RSB0330	39.20	RSB0330-C3	43.70
.0335 (.85 mm)		.250	.437	.0039	4	1/8	2	RSB0335	39.20	RSB0335-C3	43.70
.0340		.250	.437	.0039	4	1/8	2	RSB0340	39.20	RSB0340-C3	43.70
.0345		.250	.437	.0040	4	1/8	2	RSB0345	39.20	RSB0345-C3	43.70
.0350	#65	.250	.437	.0040	4	1/8	2	RSB0350	39.20	RSB0350-C3	43.70
.0355		.250	.437	.0041	4	1/8	2	RSB0355	39.20	RSB0355-C3	43.70
.0360	#64	.281	.500	.0041	4	1/8	2	RSB0360	39.20	RSB0360-C3	43.70
.0365		.281	.500	.0042	4	1/8	2	RSB0365	39.20	RSB0365-C3	43.70
.0370	#63	.281	.500	.0043	4	1/8	2	RSB0370	39.20	RSB0370-C3	43.70
.0375		.281	.500	.0043	4	1/8	2	RSB0375	39.20	RSB0375-C3	43.70
.0380	#62	.281	.500	.0044	4	1/8	2	RSB0380	39.20	RSB0380-C3	43.70
.0385		.281	.500	.0044	4	1/8	2	RSB0385	39.20	RSB0385-C3	43.70
.0390	#61	.281	.500	.0045	4	1/8	2	RSB0390	39.20	RSB0390-C3	43.70
.0395		.281	.500	.0045	4	1/8	2	RSB0395	39.20	RSB0395-C3	43.70
.0400	#60	.281	.500	.0046	4	1/8	2	RSB0400	39.20	RSB0400-C3	43.70
.0405		.281	.500	.0047	4	1/8	2	RSB0405	39.20	RSB0405-C3	43.70
.0410	#59	.281	.500	.0047	4	1/8	2	RSB0410	39.20	RSB0410-C3	43.70
.0415		.281	.500	.0048	4	1/8	2	RSB0415	39.20	RSB0415-C3	43.70
.0420	#58	.281	.500	.0048	4	1/8	2	RSB0420	39.20	RSB0420-C3	43.70
.0425		.312	.562	.0049	4	1/8	2	RSB0425	39.20	RSB0425-C3	43.70
.0430	#57	.312	.562	.0049	4	1/8	2	RSB0430	39.20	RSB0430-C3	43.70
.0435		.312	.562	.0050	4	1/8	2	RSB0435	39.20	RSB0435-C3	43.70
.0440		.312	.562	.0044	4	1/8	2	RSB0440	39.20	RSB0440-C3	43.70
.0445		.312	.562	.0045	4	1/8	2	RSB0445	39.20	RSB0445-C3	43.70
.0450		.312	.562	.0045	4	1/8	2	RSB0450	39.20	RSB0450-C3	43.70
.0455		.312	.562	.0046	4	1/8	2	RSB0455	39.20	RSB0455-C3	43.70
.0460		.312	.562	.0046	4	1/8	2	RSB0460	39.20	RSB0460-C3	43.70
.0465	#56	.312	.562	.0047	4	1/8	2	RSB0465	39.20	RSB0465-C3	43.70
.0469 (3/64)		.312	.562	.0047	4	1/8	2	RSB0469	32.90	RSB0469-C3	37.40
.0470		.312	.562	.0047	4	1/8	2	RSB0470	32.90	RSB0470-C3	37.40
.0475		.312	.562	.0048	4	1/8	2	RSB0475	32.90	RSB0475-C3	37.40
.0480		.375	.625	.0048	4	1/8	2	RSB0480	32.90	RSB0480-C3	37.40
.0485		.375	.625	.0049	4	1/8	2	RSB0485	32.90	RSB0485-C3	37.40
.0490		.375	.625	.0049	4	1/8	2	RSB0490	32.90	RSB0490-C3	37.40
.0495		.375	.625	.0050	4	1/8	2	RSB0495	32.90	RSB0495-C3	37.40
.0500		.375	.625	.0050	4	1/8	2	RSB0500	32.90	RSB0500-C3	37.40

* Tolerance for Uncoated is +.0000"/−.0002". Tolerance for AlTiN coating is +.0002"/−.0000".

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MINIATURE REAMERS

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REAMER DIAMETER	WIRE	MARGIN LENGTH	OVERALL REACH	CHAMFER LENGTH	FLUTES	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN COATED	
D_1*		L_2 +.020″ −.000″	L_3 +.020″ −.000″	L_4		D_2 (h6)	L_1	TOOL #	PRICE	TOOL #	PRICE
.0505		.375	.625	.0051	4	1/8	2	RSB0505	32.90	RSB0505-C3	37.40
.0510		.375	.625	.0051	4	1/8	2	RSB0510	32.90	RSB0510-C3	37.40
.0515		.375	.625	.0052	4	1/8	2	RSB0515	32.90	RSB0515-C3	37.40
.0520	#55	.375	.625	.0052	4	1/8	2	RSB0520	32.90	RSB0520-C3	37.40
.0525		.375	.625	.0053	4	1/8	2	RSB0525	32.90	RSB0525-C3	37.40
.0530		.437	.687	.0053	4	1/8	2	RSB0530	32.90	RSB0530-C3	37.40
.0535		.437	.687	.0054	4	1/8	2	RSB0535	32.90	RSB0535-C3	37.40
.0540		.437	.687	.0054	4	1/8	2	RSB0540	32.90	RSB0540-C3	37.40
.0545		.437	.687	.0055	4	1/8	2	RSB0545	32.90	RSB0545-C3	37.40
.0550	#54	.437	.687	.0055	4	1/8	2	RSB0550	32.90	RSB0550-C3	37.40
.0555		.437	.750	.0056	4	1/8	2	RSB0555	32.90	RSB0555-C3	37.40
.0560		.437	.750	.0056	4	1/8	2	RSB0560	32.90	RSB0560-C3	37.40
.0565		.437	.750	.0057	4	1/8	2	RSB0565	32.90	RSB0565-C3	37.40
.0570		.437	.750	.0057	4	1/8	2	RSB0570	32.90	RSB0570-C3	37.40
.0575		.437	.750	.0058	4	1/8	2	RSB0575	32.90	RSB0575-C3	37.40
.0580		.437	.750	.0058	4	1/8	2	RSB0580	32.90	RSB0580-C3	37.40
.0585		.437	.750	.0059	4	1/8	2	RSB0585	32.90	RSB0585-C3	37.40
.0590		.437	.750	.0059	4	1/8	2	RSB0590	32.90	RSB0590-C3	37.40
.0595	#53	.437	.750	.0060	4	1/8	2	RSB0595	32.90	RSB0595-C3	37.40
.0600		.437	.812	.0060	4	1/8	2	RSB0600	32.90	RSB0600-C3	37.40
.0605		.437	.812	.0061	4	1/8	2	RSB0605	32.90	RSB0605-C3	37.40
.0610 (1.55 mm)		.437	.812	.0061	4	1/8	2	RSB0610	32.90	RSB0610-C3	37.40
.0615		.437	.812	.0062	4	1/8	2	RSB0615	32.90	RSB0615-C3	37.40
.0620		.437	.812	.0062	4	1/8	2	RSB0620	32.90	RSB0620-C3	37.40
.0625 (1/16)		.437	.812	.0063	4	1/8	2	RSB0625	32.90	RSB0625-C3	37.40
.0630 (1.60 mm)		.437	.812	.0063	4	1/8	2	RSB0630	32.90	RSB0630-C3	37.40
.0635	#52	.437	.812	.0064	4	1/8	2	RSB0635	32.90	RSB0635-C3	37.40
.0640		.437	.812	.0064	4	1/8	2	RSB0640	32.90	RSB0640-C3	37.40
.0650 (1.65 mm)		.437	.812	.0065	4	1/8	2	RSB0650	32.90	RSB0650-C3	37.40
.0660		.500	.875	.0066	4	1/8	2	RSB0660	32.90	RSB0660-C3	37.40
.0670	#51	.500	.875	.0067	4	1/8	2	RSB0670	32.90	RSB0670-C3	37.40
.0680		.500	.875	.0068	4	1/8	2	RSB0680	32.90	RSB0680-C3	37.40
.0690		.500	.875	.0062	4	1/8	2	RSB0690	32.90	RSB0690-C3	37.40
.0700	#50	.562	.937	.0063	4	1/8	2	RSB0700	32.90	RSB0700-C3	37.40
.0710		.562	.937	.0064	4	1/8	2	RSB0710	32.90	RSB0710-C3	37.40
.0720		.562	.937	.0065	4	1/8	2	RSB0720	32.90	RSB0720-C3	37.40
.0730	#49	.562	.937	.0066	4	1/8	2	RSB0730	32.90	RSB0730-C3	37.40
.0740		.562	.937	.0067	4	1/8	2	RSB0740	32.90	RSB0740-C3	37.40
.0750		.562	1.000	.0068	4	1/8	2	RSB0750	32.90	RSB0750-C3	37.40
.0760	#48	.562	1.000	.0068	4	1/8	2	RSB0760	32.90	RSB0760-C3	37.40
.0765		.562	1.000	.0069	4	1/8	2	RSB0765	32.90	RSB0765-C3	37.40
.0770		.562	1.000	.0069	4	1/8	2	RSB0770	32.90	RSB0770-C3	37.40
.0775		.562	1.000	.0070	4	1/8	2	RSB0775	32.90	RSB0775-C3	37.40
.0780		.562	1.000	.0070	4	1/8	2	RSB0780	32.90	RSB0780-C3	37.40
.0781 (5/64)		.562	1.000	.0070	4	1/8	2	RSB0781	32.90	RSB0781-C3	37.40
.0785	#47	.562	1.000	.0071	4	1/8	2	RSB0785	32.90	RSB0785-C3	37.40
.0787 (2.00 mm)		.562	1.000	.0071	4	1/8	2	RSB0787	32.90	RSB0787-C3	37.40
.0790		.562	1.000	.0071	4	1/8	2	RSB0790	32.90	RSB0790-C3	37.40
.0795		.562	1.000	.0072	4	1/8	2	RSB0795	32.90	RSB0795-C3	37.40

* Tolerance for Uncoated is +.0000"/−.0002". Tolerance for AlTiN coating is +.0002"/−.0000".

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MINIATURE REAMERS

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REAMER DIAMETER	WIRE	MARGIN LENGTH	OVERALL REACH	CHAMFER LENGTH	FLUTES	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN COATED	
D_1*		L_2 +.020″ −.000″	L_3 +.020″ −.000″	L_4		D_2 (h6)	L_1	TOOL #	PRICE	TOOL #	PRICE
.0800		.562	1.000	.0072	4	1/8	2	RSB0800	32.90	RSB0800-C3	37.40
.0810	#46	.562	1.000	.0073	4	1/8	2	RSB0810	32.90	RSB0810-C3	37.40
.0820	#45	.562	1.000	.0074	4	1/8	2	RSB0820	32.90	RSB0820-C3	37.40
.0830		.562	1.000	.0075	4	1/8	2	RSB0830	32.90	RSB0830-C3	37.40
.0840		.625	1.125	.0076	4	1/8	2-1/2	RSB0840	32.90	RSB0840-C3	37.40
.0850		.625	1.125	.0077	4	1/8	2-1/2	RSB0850	32.90	RSB0850-C3	37.40
.0860	#44	.625	1.125	.0077	4	1/8	2-1/2	RSB0860	32.90	RSB0860-C3	37.40
.0870		.625	1.125	.0078	4	1/8	2-1/2	RSB0870	32.90	RSB0870-C3	37.40
.0880		.625	1.125	.0079	4	1/8	2-1/2	RSB0880	32.90	RSB0880-C3	37.40
.0890	#43	.625	1.125	.0080	4	1/8	2-1/2	RSB0890	32.90	RSB0890-C3	37.40
.0900		.625	1.125	.0081	4	1/8	2-1/2	RSB0900	32.90	RSB0900-C3	37.40
.0910		.625	1.125	.0082	4	1/8	2-1/2	RSB0910	32.90	RSB0910-C3	37.40
.0920		.625	1.125	.0083	4	1/8	2-1/2	RSB0920	32.90	RSB0920-C3	37.40
.0925 (2.35 mm)		.687	1.250	.0083	4	1/8	2-1/2	RSB0925	32.90	RSB0925-C3	37.40
.0930		.687	1.250	.0084	4	1/8	2-1/2	RSB0930	32.90	RSB0930-C3	37.40
.0935	#42	.687	1.250	.0084	4	1/8	2-1/2	RSB0935	32.90	RSB0935-C3	37.40
.0937 (3/32)		.687	1.250	.0084	4	1/8	2-1/2	RSB0937	32.90	RSB0937-C3	37.40
.0940		.687	1.250	.0085	4	1/8	2-1/2	RSB0940	32.90	RSB0940-C3	37.40
.0945 (2.40 mm)		.687	1.250	.0085	4	1/8	2-1/2	RSB0945	32.90	RSB0945-C3	37.40
.0950		.687	1.250	.0086	4	1/8	2-1/2	RSB0950	32.90	RSB0950-C3	37.40
.0960	#41	.687	1.250	.0086	4	1/8	2-1/2	RSB0960	32.90	RSB0960-C3	37.40
.0970		.687	1.250	.0087	4	1/8	2-1/2	RSB0970	32.90	RSB0970-C3	37.40
.0980	#40	.687	1.250	.0088	4	1/8	2-1/2	RSB0980	32.90	RSB0980-C3	37.40
.0990		.687	1.250	.0089	4	1/8	2-1/2	RSB0990	32.90	RSB0990-C3	37.40
.0995	#39	.687	1.250	.0090	4	1/8	2-1/2	RSB0995	32.90	RSB0995-C3	37.40
.1000		.750	1.375	.0090	4	1/8	2-1/2	RSB1000	32.90	RSB1000-C3	37.40
.1010		.750	1.375	.0091	4	1/8	2-1/2	RSB1010	32.90	RSB1010-C3	37.40
.1015	#38	.750	1.375	.0091	4	1/8	2-1/2	RSB1015	32.90	RSB1015-C3	37.40
.1020		.750	1.375	.0092	4	1/8	2-1/2	RSB1020	32.90	RSB1020-C3	37.40
.1030		.750	1.375	.0093	4	1/8	2-1/2	RSB1030	32.90	RSB1030-C3	37.40
.1040	#37	.750	1.375	.0094	4	1/8	2-1/2	RSB1040	32.90	RSB1040-C3	37.40
.1050		.750	1.375	.0095	4	1/8	2-1/2	RSB1050	32.90	RSB1050-C3	37.40
.1060		.750	1.375	.0095	4	1/8	2-1/2	RSB1060	32.90	RSB1060-C3	37.40
.1065	#36	.750	1.375	.0096	4	1/8	2-1/2	RSB1065	32.90	RSB1065-C3	37.40
.1070		.750	1.375	.0096	4	1/8	2-1/2	RSB1070	32.90	RSB1070-C3	37.40
.1080		.750	1.375	.0097	4	1/8	2-1/2	RSB1080	32.90	RSB1080-C3	37.40
.1083 (2.75 mm)		.750	1.375	.0097	4	1/8	2-1/2	RSB1083	32.90	RSB1083-C3	37.40
.1085		.750	1.375	.0098	4	1/8	2-1/2	RSB1085	32.90	RSB1085-C3	37.40
.1090		.750	1.375	.0098	4	1/8	2-1/2	RSB1090	32.90	RSB1090-C3	37.40
.1094 (7/64)		.750	1.375	.0098	4	1/8	2-1/2	RSB1094	32.90	RSB1094-C3	37.40
.1100	#35	.750	1.375	.0099	4	1/8	2-1/2	RSB1100	32.90	RSB1100-C3	37.40
.1105		.750	1.375	.0099	4	1/8	2-1/2	RSB1105	32.90	RSB1105-C3	37.40
.1110	#34	.750	1.375	.0100	4	1/8	2-1/2	RSB1110	32.90	RSB1110-C3	37.40
.1120		.750	1.375	.0101	4	1/8	2-1/2	RSB1120	32.90	RSB1120-C3	37.40
.1130	#33	.750	1.500	.0102	4	1/8	2-1/2	RSB1130	32.90	RSB1130-C3	37.40
.1140		.750	1.500	.0103	4	1/8	2-1/2	RSB1140	32.90	RSB1140-C3	37.40
.1150		.750	1.500	.0104	4	1/8	2-1/2	RSB1150	32.90	RSB1150-C3	37.40
.1160	#32	.750	1.500	.0104	4	1/8	2-1/2	RSB1160	32.90	RSB1160-C3	37.40
.1170		.750	1.500	.0105	4	1/8	2-1/2	RSB1170	32.90	RSB1170-C3	37.40

* Tolerance for Uncoated is +.0000"/−.0002". Tolerance for AlTiN coating is +.0002"/−.0000".

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MINIATURE REAMERS

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REAMER DIAMETER	WIRE	MARGIN LENGTH	OVERALL REACH	CHAMFER LENGTH	FLUTES	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN COATED	
D_1*		L_2 +.020″ −.000″	L_3 +.020″ −.000″	L_4		D_2 (h6)	L_1	TOOL #	PRICE	TOOL #	PRICE
.1180		.750	1.500	.0106	4	1/8	2-1/2	RSB1180	32.90	RSB1180-C3	37.40
.1190		.750	1.500	.0107	4	1/8	2-1/2	RSB1190	32.90	RSB1190-C3	37.40
.1200	#31	.750	1.500	.0108	4	1/8	2-1/2	RSB1200	32.90	RSB1200-C3	37.40
.1210		.750	1.500	.0109	4	1/8	2-1/2	RSB1210	32.90	RSB1210-C3	37.40
.1220 (3.10 mm)		.750	1.500	.0110	4	1/8	2-1/2	RSB1220	32.90	RSB1220-C3	37.40
D_1*		L_2 +.030″ −.000″	L_3 +.030″ −.000″	L_4		D_2 (h6)	L_1	TOOL #	PRICE	TOOL #	PRICE
.1230		.750	1.500	.0111	4	3/16	3	RSB1230	38.60	RSB1230-C3	43.50
.1235		.750	1.500	.0111	4	3/16	3	RSB1235	38.60	RSB1235-C3	43.50
.1240		.750	1.500	.0112	4	3/16	3	RSB1240	38.60	RSB1240-C3	43.50
.1245		.750	1.500	.0112	4	3/16	3	RSB1245	38.60	RSB1245-C3	43.50
.1250 (1/8)		.750	1.500	.0113	4	3/16	3	RSB1250	38.60	RSB1250-C3	43.50
.1255		.750	1.500	.0113	4	3/16	3	RSB1255	38.60	RSB1255-C3	43.50
.1260 (3.20 mm)		.750	1.500	.0113	4	3/16	3	RSB1260	38.60	RSB1260-C3	43.50
.1265		.750	1.500	.0114	4	3/16	3	RSB1265	38.60	RSB1265-C3	43.50
.1285	#30	.750	1.500	.0116	4	3/16	3	RSB1285	38.60	RSB1285-C3	43.50
.1360	#29	.750	1.625	.0122	4	3/16	3	RSB1360	38.60	RSB1360-C3	43.50
.1390		.750	1.625	.0125	4	3/16	3	RSB1390	38.60	RSB1390-C3	43.50
.1395		.750	1.625	.0126	4	3/16	3	RSB1395	38.60	RSB1395-C3	43.50
.1400		.750	1.625	.0126	4	3/16	3	RSB1400	38.60	RSB1400-C3	43.50
.1405	#28	.750	1.625	.0126	4	3/16	3	RSB1405	38.60	RSB1405-C3	43.50
.1406 (9/64)		.750	1.625	.0127	4	3/16	3	RSB1406	38.60	RSB1406-C3	43.50
.1410		.750	1.625	.0127	4	3/16	3	RSB1410	38.60	RSB1410-C3	43.50
.1415		.750	1.625	.0127	4	3/16	3	RSB1415	38.60	RSB1415-C3	43.50
.1420		.750	1.625	.0128	4	3/16	3	RSB1420	38.60	RSB1420-C3	43.50
.1440	#27	.750	1.625	.0130	4	3/16	3	RSB1440	38.60	RSB1440-C3	43.50
.1470	#26	.875	1.750	.0132	4	3/16	3	RSB1470	38.60	RSB1470-C3	43.50
.1495	#25	.875	1.750	.0135	4	3/16	3	RSB1495	38.60	RSB1495-C3	43.50
.1520	#24	.875	1.750	.0137	4	3/16	3	RSB1520	38.60	RSB1520-C3	43.50
.1540	#23	.875	1.750	.0139	4	3/16	3	RSB1540	38.60	RSB1540-C3	43.50
.1545		.875	1.750	.0139	4	3/16	3	RSB1545	38.60	RSB1545-C3	43.50
.1550		.875	1.750	.0140	4	3/16	3	RSB1550	38.60	RSB1550-C3	43.50
.1555		.875	1.750	.0140	4	3/16	3	RSB1555	38.60	RSB1555-C3	43.50
.1560		.875	1.750	.0140	4	3/16	3	RSB1560	38.60	RSB1560-C3	43.50
.1562 (5/32)		.875	1.750	.0141	4	3/16	3	RSB1562	38.60	RSB1562-C3	43.50
.1565		.875	1.750	.0141	4	3/16	3	RSB1565	38.60	RSB1565-C3	43.50
.1570	#22	.875	1.750	.0141	4	3/16	3	RSB1570	38.60	RSB1570-C3	43.50
.1575 (4.00 mm)		.875	1.750	.0142	4	3/16	3	RSB1575	38.60	RSB1575-C3	43.50
.1580		.875	1.875	.0142	4	3/16	3	RSB1580	38.60	RSB1580-C3	43.50
.1585		.875	1.875	.0143	4	3/16	3	RSB1585	38.60	RSB1585-C3	43.50
.1590	#21	.875	1.875	.0143	4	3/16	3	RSB1590	38.60	RSB1590-C3	43.50
.1610	#20	.875	1.875	.0145	4	3/16	3	RSB1610	38.60	RSB1610-C3	43.50
.1660	#19	.875	1.875	.0149	4	3/16	3	RSB1660	38.60	RSB1660-C3	43.50
.1695	#18	1.000	2.000	.0153	4	3/16	4	RSB1695	42.80	RSB1695-C3	49.40
.1705		1.000	2.000	.0153	4	3/16	4	RSB1705	42.80	RSB1705-C3	49.40
.1710		1.000	2.000	.0154	4	3/16	4	RSB1710	42.80	RSB1710-C3	49.40
.1715		1.000	2.000	.0154	4	3/16	4	RSB1715	42.80	RSB1715-C3	49.40
.1719 (11/64)		1.000	2.000	.0155	4	3/16	4	RSB1719	42.80	RSB1719-C3	49.40

* Tolerance for Uncoated is +.0000"/−.0002". Tolerance for AlTiN coating is +.0002"/−.0000".

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MINIATURE REAMERS

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REAMER DIAMETER	WIRE	MARGIN LENGTH	OVERALL REACH	CHAMFER LENGTH	FLUTES	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN COATED	
D_1*		L_2 +.030″ −.000″	L_3 +.030″ −.000″	L_4		D_2 (h6)	L_1	TOOL #	PRICE	TOOL #	PRICE
.1725		1.000	2.000	.0155	4	3/16	4	RSB1725	42.80	RSB1725-C3	49.40
.1730	#17	1.000	2.000	.0156	4	3/16	4	RSB1730	42.80	RSB1730-C3	49.40
.1735		1.000	2.000	.0156	4	3/16	4	RSB1735	42.80	RSB1735-C3	49.40
.1770	#16	1.000	2.000	.0159	4	3/16	4	RSB1770	42.80	RSB1770-C3	49.40
.1800	#15	1.000	2.125	.0162	4	3/16	4	RSB1800	42.80	RSB1800-C3	49.40
.1820	#14	1.000	2.125	.0164	4	3/16	4	RSB1820	42.80	RSB1820-C3	49.40
.1850 (4.70 mm)	#13	1.000	2.125	.0167	4	1/4	4	RSB1850	51.70	RSB1850-C3	58.70
.1860		1.000	2.125	.0167	4	1/4	4	RSB1860	51.70	RSB1860-C3	58.70
.1865		1.000	2.125	.0168	4	1/4	4	RSB1865	51.70	RSB1865-C3	58.70
.1870		1.000	2.125	.0168	4	1/4	4	RSB1870	51.70	RSB1870-C3	58.70
.1875 (3/16)		1.000	2.125	.0169	4	1/4	4	RSB1875	51.70	RSB1875-C3	58.70
.1880		1.000	2.125	.0169	4	1/4	4	RSB1880	51.70	RSB1880-C3	58.70
.1885		1.000	2.125	.0170	4	1/4	4	RSB1885	51.70	RSB1885-C3	58.70
.1890	#12	1.000	2.125	.0170	4	1/4	4	RSB1890	51.70	RSB1890-C3	58.70
.1910	#11	1.000	2.125	.0172	4	1/4	4	RSB1910	51.70	RSB1910-C3	59.60
.1935	#10	1.000	2.125	.0174	4	1/4	4	RSB1935	51.70	RSB1935-C3	59.60
.1960	#9	1.000	2.125	.0176	4	1/4	4	RSB1960	51.70	RSB1960-C3	59.60
.1969 (5.00 mm)		1.000	2.125	.0177	4	1/4	4	RSB1969	54.20	RSB1969-C3	62.10
.1990	#8	1.000	2.125	.0179	4	1/4	4	RSB1990	54.20	RSB1990-C3	62.10
.2010	#7	1.000	2.125	.0181	4	1/4	4	RSB2010	54.20	RSB2010-C3	62.10
.2015		1.000	2.125	.0181	4	1/4	4	RSB2015	54.20	RSB2015-C3	62.10
.2020		1.000	2.125	.0182	4	1/4	4	RSB2020	54.20	RSB2020-C3	62.10
.2025		1.000	2.125	.0182	4	1/4	4	RSB2025	54.20	RSB2025-C3	62.10
.2031 (13/64)		1.000	2.250	.0183	4	1/4	4	RSB2031	55.00	RSB2031-C3	62.80
.2035		1.000	2.250	.0183	4	1/4	4	RSB2035	55.00	RSB2035-C3	62.80
.2040	#6	1.000	2.250	.0184	4	1/4	4	RSB2040	55.00	RSB2040-C3	62.80
.2045		1.000	2.250	.0184	4	1/4	4	RSB2045	55.00	RSB2045-C3	62.80
.2055	#5	1.000	2.250	.0185	4	1/4	4	RSB2055	55.00	RSB2055-C3	62.80
.2090	#4	1.000	2.250	.0188	4	1/4	4	RSB2090	55.00	RSB2090-C3	62.80
.2130	#3	1.000	2.250	.0192	4	1/4	4	RSB2130	55.00	RSB2130-C3	62.80
.2170		1.000	2.375	.0195	4	1/4	4	RSB2170	55.00	RSB2170-C3	62.80
.2175		1.000	2.375	.0196	4	1/4	4	RSB2175	55.00	RSB2175-C3	62.80
.2180		1.000	2.375	.0196	4	1/4	4	RSB2180	55.00	RSB2180-C3	62.80
.2185		1.000	2.375	.0197	4	1/4	4	RSB2185	55.00	RSB2185-C3	62.80
.2187 (7/32)		1.000	2.375	.0197	4	1/4	4	RSB2187	55.00	RSB2187-C3	62.80
.2190		1.000	2.375	.0197	4	1/4	4	RSB2190	55.00	RSB2190-C3	62.80
.2195		1.000	2.375	.0198	4	1/4	4	RSB2195	55.00	RSB2195-C3	62.80
.2200		1.000	2.375	.0198	4	1/4	4	RSB2200	55.00	RSB2200-C3	62.80
.2205 (5.60 mm)		1.000	2.375	.0198	4	1/4	4	RSB2205	55.00	RSB2205-C3	62.80
.2210	#2	1.000	2.375	.0199	4	1/4	4	RSB2210	55.00	RSB2210-C3	62.80
.2280	#1	1.125	2.500	.0182	6	1/4	4	RSB2280	59.70	RSB2280-C3	67.50
.2330		1.125	2.500	.0186	6	1/4	4	RSB2330	59.70	RSB2330-C3	67.50
.2335		1.125	2.500	.0187	6	1/4	4	RSB2335	59.70	RSB2335-C3	67.50
.2340	A	1.125	2.500	.0187	6	1/4	4	RSB2340	59.70	RSB2340-C3	67.50
.2344 (15/64)		1.125	2.500	.0188	6	1/4	4	RSB2344	59.70	RSB2344-C3	67.50
.2350		1.125	2.500	.0188	6	1/4	4	RSB2350	59.70	RSB2350-C3	67.50
.2355		1.125	2.500	.0188	6	1/4	4	RSB2355	59.70	RSB2355-C3	67.50
.2360		1.125	2.500	.0189	6	1/4	4	RSB2360	59.70	RSB2360-C3	67.50

* Tolerance for Uncoated is +.0000"/−.0002". Tolerance for AlTiN coating is +.0002"/−.0000".

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MINIATURE REAMERS

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REAMER DIAMETER	WIRE	MARGIN LENGTH	OVERALL REACH	CHAMFER LENGTH	FLUTES	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN COATED	
D_1*		L_2 +.030″ −.000″	L_3 +.030″ −.000″	L_4		D_2 (h6)	L_1	TOOL #	PRICE	TOOL #	PRICE
.2362 (6.00 mm)		1.125	2.500	.0189	6	1/4	4	RSB2362	59.70	RSB2362-C3	67.50
.2380	B	1.125	2.500	.0190	6	1/4	4	RSB2380	59.70	RSB2380-C3	67.50
.2420	C	1.125	2.500	.0194	6	1/4	4	RSB2420	59.70	RSB2420-C3	67.50
.2460	D	1.125	2.500	.0197	6	1/4	4	RSB2460	59.70	RSB2460-C3	67.50
.2485		1.125	2.750	.0199	6	5/16	4	RSB2485	62.60	RSB2485-C3	72.20
.2490		1.125	2.750	.0199	6	5/16	4	RSB2490	62.60	RSB2490-C3	72.20
.2495		1.125	2.750	.0200	6	5/16	4	RSB2495	62.60	RSB2495-C3	72.20
.2500 (1/4)	E	1.125	2.750	.0200	6	5/16	4	RSB2500	62.60	RSB2500-C3	72.20
.2505		1.125	2.750	.0200	6	5/16	4	RSB2505	62.60	RSB2505-C3	72.20
.2510		1.125	2.750	.0201	6	5/16	4	RSB2510	62.60	RSB2510-C3	72.20
.2515		1.125	2.750	.0201	6	5/16	4	RSB2515	62.60	RSB2515-C3	72.20
.2570	F	1.125	2.750	.0206	6	5/16	4	RSB2570	62.60	RSB2570-C3	72.20

* Tolerance for Uncoated is +.0000"/−.0002". Tolerance for AlTiN coating is +.0002"/−.0000".

SPEEDS & FEEDS (Miniature Reamers)

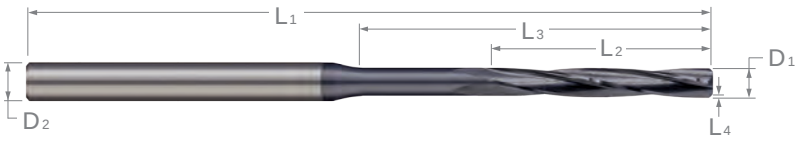
Important Note: Values in table are based on a material hardness of 29-37 Rc for Ferrous Materials and up to 28 Rc for Non-Ferrous Materials. For higher hardness materials, table values of IPR must be reduced. For ferrous materials at 38-45 Rc, reduce IPR to 80%. For complete speeds and feeds charts, please see www.harveytool.com.

In order to maintain appropriate stock removal amounts based on the reamer size, a hole should be pre-drilled at a diameter that is 90-94% of the finished reamed hole diameter. For example, for a finished reamed hole diameter of .0625", the pre-drilled hole diameter should be in the range of .056"-.058". The pre-drilled hole should not be smaller than 85% of the finished reamed hole diameter.

Material	SFM	Chip Load IPR (Inches Per Revolution) By Reamer Diameter								
		.015	.031	.047	.062	.078	.093	.125	.187	.250
Aluminum Alloys Casting (2xx, 5xx, 7xx, 8xx)	450	.00041	.00084	.00127	.00167	.00211	.00251	.00338	.00505	.00675
Wrought (1xxx, 2xxx, 3xxx, 5xxx, 6xxx, 7xxx, 8xxx)	600									
Casting - 3%-5% Si (3xx, A3xx, C3xx, 4xx, A4xx, B4xx)	450	.00036	.00075	.00114	.00151	.00190	.00226	.00304	.00454	.00608
Casting - 5%-8% Si (3xx, A3xx, C3xx, 4xx, A4xx, B4xx)	420									
Casting - 8%-12% Si (3xx, A3xx, C3xx, 4xx, A4xx, B4xx)	390									
Casting - 12%-16% Si (3xx, A3xx, C3xx, 4xx, A4xx, B4xx)	350									
Wrought - 5%-8% Si (4xxx)	600									
Wrought - 8%-12% Si (4xxx)	480									
Magnesium Alloys	900	.00041	.00084	.00127	.00167	.00211	.00251	.00338	.00505	.00675
Zinc Alloys	480									
Copper Alloys High Coppers - 90%+ (C1xxxx)	170	.00032	.00067	.00102	.00134	.00168	.00201	.00270	.00404	.00540
Brass (Copper Zinc alloys, C2xxxx, C3xxxx, C4xxxx, C66400-C69800)	375									
Phosphor Bronzes (Copper Tin alloys, C5xxxx)	170									
Aluminum Bronzes (Copper Aluminum alloys, C60600-C64200)	375									
Silicon Bronzes (Copper Silicon alloys, C64700-C66100)	375									
Copper Nickels, Nickel Silvers (Copper Nickel alloys, C7xxxx)	170									
Cast Copper Alloys (C83300-C86200, C86400-C87900, C92200-C95800, C97300-C97800, C99400-C99700)	400									
Carbon Steels Free Machining/Low Carbon steels, 10xx - 1029 & all 10Lxx, 11xx - 1139 & all 11Lxx, 12xx - 1215 & all 12Lxx	240	.00035	.00073	.00111	.00146	.00184	.00220	.00295	.00442	.00591
1030 - 1095, 1140 - 1151, 13xx, 15xx, 2xxx, 3xxx, 4xxx & 4xLxx, 5xxx & 5xLxx, 50xxx & 50Lxxx, 51xxx & 51Lxxx, 52xxx & 52Lxxx, 6xxx, 8xxx, 9xxx	150	.00032	.00067	.00102	.00134	.00168	.00201	.00270	.00404	.00540
Stainless Steels 203 EZ, 303 (all types), 416, 416Se, 416 Plus X, 420F, 420FSe, 430F, 430FSe, 440F, 440FSe	180	.00035	.00073	.00111	.00146	.00184	.00220	.00295	.00442	.00591
201, 202, 203, 205, 301, 302, 304, 304L, 308, 309, 310, 314, 316, 316L, 317, 321, 329, 330, 347, 348, 385, 403, 405, 409, 410, 413, 420, 429, 430, 434, 436, 442, 446, 501, 502	150	.00032	.00067	.00102	.00134	.00168	.00201	.00270	.00404	.00540
414, 431, 440A, 440B, 440C, 13-8, 15-5, 15-7, 17-4, 17-7	125	.00020	.00042	.00063	.00084	.00105	.00126	.00169	.00252	.00338
Tool Steels A, L, O, P, W series	125	.00032	.00067	.00102	.00134	.00168	.00201	.00270	.00404	.00540
D, H, M, T, S series	90	.00020	.00042	.00063	.00084	.00105	.00126	.00169	.00252	.00338
Titanium Alloys	100	.00020	.00042	.00063	.00084	.00105	.00126	.00169	.00252	.00338
High Temp Alloys Inconel, Hastelloy, Waspalloy, Monel, Nimonic, Haynes, Discoloy, Incoloy	70	.00020	.00042	.00063	.00084	.00105	.00126	.00169	.00252	.00338

MINIATURE REAMERS

Right Hand Spiral



	D1 Tolerances
Uncoated	+.0000″ −.0002″
AlTiN Coated	+.0002″ −.0000″

- Helical flutes increase shearing action on chamfer for superior finish
- Right hand spiral flutes for increased chip evacuation in blind hole applications
- Available uncoated or with AlTiN coating for improved lubricity and heat resistance
- Oversized, common shanks to maintain strength, stiffness, and accuracy
- 45° chamfer angle
- h6 shank tolerance for high precision tool holders
- Solid carbide
- CNC ground in the USA

REAMER DIAMETER	WIRE	MARGIN LENGTH	OVERALL REACH	CHAMFER LENGTH	FLUTES	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN COATED	
D1*		L2 +.020″ −.000″	L3 +.020″ −.000″	L4		D2 (h6)	L1	TOOL #	PRICE	TOOL #	PRICE
.0100	#87	.078	.125	.0017	4	1/8	1-1/2	RRH0100	55.40	RRH0100-C3	60.30
.0150		.109	.187	.0025	4	1/8	1-1/2	RRH0150	55.40	RRH0150-C3	60.30
.0200	#76	.140	.250	.0023	4	1/8	1-1/2	RRH0200	41.70	RRH0200-C3	46.60
.0250	#72	.187	.312	.0029	4	1/8	1-1/2	RRH0250	41.70	RRH0250-C3	46.60
.0300		.218	.375	.0035	4	1/8	2	RRH0300	41.70	RRH0300-C3	46.60
.0305		.218	.375	.0035	4	1/8	2	RRH0305	41.70	RRH0305-C3	46.60
.0310	#68	.218	.375	.0036	4	1/8	2	RRH0310	41.70	RRH0310-C3	46.60
.0315 (.80 mm)		.218	.375	.0036	4	1/8	2	RRH0315	41.70	RRH0315-C3	46.60
.0350	#65	.250	.437	.0040	4	1/8	2	RRH0350	41.70	RRH0350-C3	46.60
.0400	#60	.281	.500	.0046	4	1/8	2	RRH0400	41.70	RRH0400-C3	46.60
.0500		.375	.625	.0050	4	1/8	2	RRH0500	35.00	RRH0500-C3	39.90
.0600		.437	.812	.0060	4	1/8	2	RRH0600	35.00	RRH0600-C3	39.90
.0620		.437	.812	.0062	4	1/8	2	RRH0620	35.00	RRH0620-C3	39.90
.0625 (1/16)		.437	.812	.0063	4	1/8	2	RRH0625	35.00	RRH0625-C3	39.90
.0630 (1.60 mm)		.437	.812	.0063	4	1/8	2	RRH0630	35.00	RRH0630-C3	39.90
.0700	#50	.562	.937	.0063	4	1/8	2	RRH0700	35.00	RRH0700-C3	39.90
.0781 (5/64)		.562	1.000	.0070	4	1/8	2	RRH0781	35.00	RRH0781-C3	39.90
.0800		.562	1.000	.0072	4	1/8	2	RRH0800	35.00	RRH0800-C3	39.90
.0900		.625	1.125	.0081	4	1/8	2-1/2	RRH0900	35.00	RRH0900-C3	39.90
.0935	#42	.687	1.250	.0084	4	1/8	2-1/2	RRH0935	35.00	RRH0935-C3	39.90
.0937 (3/32)		.687	1.250	.0084	4	1/8	2-1/2	RRH0937	35.00	RRH0937-C3	39.90
.0940		.687	1.250	.0085	4	1/8	2-1/2	RRH0940	35.00	RRH0940-C3	39.90
.0950		.687	1.250	.0086	4	1/8	2-1/2	RRH0950	35.00	RRH0950-C3	39.90
.1000		.750	1.375	.0090	4	1/8	2-1/2	RRH1000	35.00	RRH1000-C3	39.90

* Tolerance for Uncoated is +.0000"/−.0002". Tolerance for AlTiN coating is +.0002"/−.0000".

continued on next page

MINIATURE REAMERS

Right Hand Spiral (cont.)

continued from previous page

REAMER DIAMETER	WIRE	MARGIN LENGTH	OVERALL REACH	CHAMFER LENGTH	FLUTES	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN COATED	
D_1*		L_2 +.030″ −.000″	L_3 +.030″ −.000″	L_4		D_2 (h6)	L_1	TOOL #	PRICE	TOOL #	PRICE
.1245		.750	1.500	.0112	4	3/16	3	RRH1245	41.10	RRH1245-C3	46.40
.1250 (1/8)		.750	1.500	.0113	4	3/16	3	RRH1250	41.10	RRH1250-C3	46.40
.1255		.750	1.500	.0113	4	3/16	3	RRH1255	41.10	RRH1255-C3	46.40
.1285	#30	.750	1.500	.0116	4	3/16	3	RRH1285	41.10	RRH1285-C3	46.40
.1560		.875	1.750	.0140	4	3/16	3	RRH1560	41.10	RRH1560-C3	46.40
.1575 (4.00 mm)		.875	1.750	.0142	4	3/16	3	RRH1575	41.10	RRH1575-C3	46.40
.1870		1.000	2.125	.0168	4	1/4	4	RRH1870	55.10	RRH1870-C3	63.50
.1875 (3/16)		1.000	2.125	.0169	4	1/4	4	RRH1875	55.10	RRH1875-C3	63.50
.1880		1.000	2.125	.0169	4	1/4	4	RRH1880	55.10	RRH1880-C3	63.50

* Tolerance for Uncoated is +.0000"/−.0002". Tolerance for AlTiN coating is +.0002"/−.0000".

PLEASE SEE SPEEDS & FEEDS ON PAGE 458

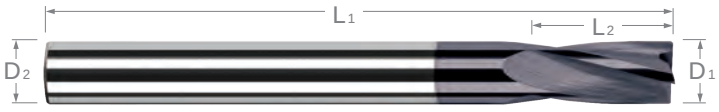


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NEW SIZES!

COUNTERBORES
Flat Bottom



For Spot Facing or Counterboring on Irregular Surfaces

- **Flat bottom (no dish)** design allows spot facing or counterboring on irregular surfaces
- Ideal for castings, rounded parts, concaved, or drafted surfaces
- Center cutting
- Can be used for flat bottom reaming or straightening misaligned holes
- 15° helix
- 4 flutes
- Solid carbide
- Ground with full cylindrical margin (not side cutting)
- AlTiN coating for increased performance in ferrous materials
- AlTiN Nano coating for superior performance in ferrous and difficult to machine materials
- CNC ground in the USA

	CUTTER DIAMETER	FLUTE LENGTH	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN COATED		AlTiN NANO COATED	
	D_1 $^{+.0000''}_{-.0005''}$*	L_2 $^{+.030''}_{-.000''}$	D_2	L_1	4 FL	PRICE	4 FL	PRICE	4 FL	PRICE
	.0200	.060	1/8	1-1/2	23320	30.60	23320-C3	35.50		
	.0300	1/8	1/8	1-1/2	23330	30.60	23330-C3	35.50		
	.0312 (1/32)	1/8	1/8	1-1/2	23331	30.60	23331-C3	35.50		
	.0394 (1 mm)	5/32	1/8	1-1/2	2331M	30.60	2331M-C3	35.50		
	.0400	5/32	1/8	1-1/2	23340	30.60	23340-C3	35.50		
	.0469 (3/64)	3/16	1/8	1-1/2	23347	30.60	23347-C3	35.50		
	.0500	3/16	1/8	1-1/2	23350	30.60	23350-C3	35.50		
	.0550	1/4	1/8	1-1/2	23355	30.60	23355-C3	35.50		
	.0600	1/4	1/8	1-1/2	23360	30.60	23360-C3	35.50		
	.0625 (1/16)	1/4	1/8	1-1/2	23362	30.60	23362-C3	35.50	23362-C6	37.80
	.0700	9/32	1/8	1-1/2	23370	30.60	23370-C3	35.50		
	.0781 (5/64)	5/16	1/8	1-1/2	23378	30.60	23378-C3	35.50		
	.0787 (2 mm)	5/16	1/8	1-1/2	2332M	30.60	2332M-C3	35.50		
	.0800	5/16	1/8	1-1/2	23380	30.60	23380-C3	35.50		
	.0900	3/8	1/8	1-1/2	23390	30.60	23390-C3	37.70		
	.0937 (3/32)	3/8	1/8	1-1/2	23393	30.60	23393-C3	35.50	23393-C6	37.80
	.1094 (7/64)	3/8	1/8	1-1/2	23407	30.60	23407-C3	35.50		
	.1181 (3 mm)	3/8	1/8	1-1/2	2343M	30.60	2343M-C3	35.50	2343M-C6	37.80
	.1250 (1/8)	1/2	1/8	1-1/2	23408	30.60	23408-C3	35.50	23408-C6	37.80
NEW	.1406 (9/64)	9/16	3/16	2	23409	29.30	23409-C3	34.60	23409-C6	37.00
	.1562 (5/32)	5/8	3/16	2	23410	29.30	23410-C3	34.60		
	.1575 (4 mm)	5/8	3/16	2	2344M	29.30	2344M-C3	34.60		
NEW	.1719 (11/64)	5/8	3/16	2	23411	29.30	23411-C3	34.60	23411-C6	37.00
	.1875 (3/16)	3/4	3/16	2	23412	29.30	23412-C3	34.60	23412-C6	37.00
NEW	.1968 (5 mm)	3/4	1/4	2-1/2	2345M	40.00	2345M-C3	47.20	2345M-C6	50.60
	.2031 (13/64)	3/4	1/4	2-1/2	23413	40.00	23413-C3	47.20		
	.2187 (7/32)	3/4	1/4	2-1/2	23414	40.00	23414-C3	47.20		
	.2344 (15/64)	7/8	1/4	2-1/2	23415	40.00	23415-C3	47.20		
	.2362 (6 mm)	7/8	1/4	2-1/2	2346M	40.00	2346M-C3	47.20	2346M-C6	50.60
	.2500 (1/4)	7/8	1/4	2-1/2	23416	40.00	23416-C3	47.20	23416-C6	50.60
	.2656 (17/64)	7/8	5/16	2-1/2	23417	49.40	23417-C3	57.80		
	.2812 (9/32)	7/8	5/16	2-1/2	23418	49.40	23418-C3	57.80		
	.2969 (19/64)	7/8	5/16	2-1/2	23419	49.40	23419-C3	57.80		

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NEW SIZES!

COUNTERBORES

Flat Bottom (cont.)

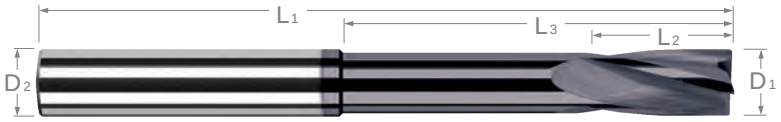
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CUTTER DIAMETER	FLUTE LENGTH	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN COATED		AlTiN NANO COATED		
D_1 $^{+.0000''}_{-.0005''}$*	L_2 $^{+.030''}_{-.000''}$	D_2	L_1	4 FL	PRICE	4 FL	PRICE	4 FL	PRICE	
.3125 (5/16)	1	5/16	2-1/2	23420	49.40	23420-C3	57.80	23420-C6	61.30	NEW
.3150 (8 mm)	1	3/8	2-1/2	2348M	59.00	2348M-C3	68.50			
.3281 (21/64)	1	3/8	2-1/2	23421	59.00	23421-C3	68.50			
.3437 (11/32)	1	3/8	2-1/2	23422	59.00	23422-C3	68.50			
.3594 (23/64)	1	3/8	2-1/2	23423	59.00	23423-C3	68.50			
.3750 (3/8)	1	3/8	2-1/2	23424	59.00	23424-C3	68.50	23424-C6	70.90	
.3937 (10 mm)	1	7/16	2-3/4	2340M	72.80	2340M-C3	84.70			
.4062 (13/32)	1	7/16	2-3/4	23426	72.80	23426-C3	84.70			
.4375 (7/16)	1	7/16	2-3/4	23428	72.80	23428-C3	84.70			
.4687 (15/32)	1	1/2	3	23430	95.70	23430-C3	109.90			
.4724 (12 mm)	1	1/2	3	23476	95.70	23476-C3	109.90			
.5000 (1/2)	1	1/2	3	23432	95.70	23432-C3	109.90	23432-C6	111.10	NEW
.5625 (9/16)	1-1/2	5/8	3-1/2	23436	135.90	23436-C3	150.10			
.6250 (5/8)	1-1/2	5/8	3-1/2	23440	152.20	23440-C3	166.40			
.6875 (11/16)	1-1/2	3/4	4	23444	220.50	23444-C3	235.90			
.7500 (3/4)	1-1/2	3/4	4	23448	220.50	23448-C3	235.90			

* Tolerance listed above refers to uncoated counterbores. Tolerance for AlTiN and AlTiN Nano coating is +.0002"/–.0005".

COUNTERBORES

Flat Bottom – Long Reach



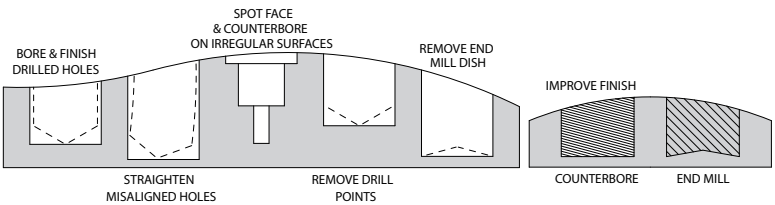
Undersized Neck to Avoid Heeling

- **Flat bottom (no dish)** design allows spot facing or counterboring on irregular surfaces
- Ideal for castings, rounded parts, concaved, or drafted surfaces
- Can be used for flat bottom reaming or straightening misaligned holes
- Center cutting
- Ground with full cylindrical margin (not side cutting)
- 15° helix
- 4 flutes
- Solid carbide
- CNC ground in the USA

CUTTER DIAMETER	FLUTE LENGTH	OVERALL REACH	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN COATED	
D_1 $^{+.0000''}_{-.0005''}$*	L_2 $^{+.030''}_{-.000''}$	L_3 $^{+.030''}_{-.000''}$	D_2	L_1	4 FL	PRICE	4 FL	PRICE
.0312 (1/32)	1/8	1/4	1/8	2-1/2	25431	36.20	25431-C3	41.10
.0394 (1 mm)	5/32	5/16	1/8	2-1/2	2541M	36.20	2541M-C3	41.10
.0469 (3/64)	3/16	3/8	1/8	2-1/2	25447	36.20	25447-C3	41.10
.0625 (1/16)	1/4	1/2	1/8	2-1/2	25462	36.20	25462-C3	41.10
.0781 (5/64)	5/16	5/8	1/8	2-1/2	25478	36.20	25478-C3	41.10
.0787 (2 mm)	5/16	5/8	1/8	2-1/2	2542M	36.20	2542M-C3	41.10
.0937 (3/32)	3/8	3/4	1/8	2-1/2	25493	36.20	25493-C3	41.10
.1094 (7/64)	3/8	7/8	1/8	2-1/2	25507	36.20	25507-C3	41.10
.1181 (3 mm)	3/8	1	1/8	2-1/2	2553M	36.20	2553M-C3	41.10
.1250 (1/8)	1/2	1	1/8	2-1/2	25508	36.20	25508-C3	41.10
.1406 (9/64)	9/16	1-1/8	3/16	3	25509	44.10	25509-C3	49.40
.1562 (5/32)	5/8	1-1/4	3/16	3	25510	44.10	25510-C3	49.40
.1575 (4 mm)	5/8	1-1/4	3/16	3	2554M	44.10	2554M-C3	49.40
.1719 (11/64)	5/8	1-3/8	3/16	3	25511	44.10	25511-C3	49.40
.1875 (3/16)	3/4	1-1/2	3/16	3	25512	44.10	25512-C3	49.40
.1968 (5 mm)	3/4	1-9/16	1/4	4	2555M	61.10	2555M-C3	69.50
.2031 (13/64)	3/4	1-5/8	1/4	4	25513	58.50	25513-C3	66.90
.2187 (7/32)	3/4	1-3/4	1/4	4	25514	58.50	25514-C3	66.90
.2344 (15/64)	7/8	1-7/8	1/4	4	25515	58.50	25515-C3	66.90
.2362 (6 mm)	7/8	1-7/8	1/4	4	2556M	61.10	2556M-C3	69.50
.2500 (1/4)	7/8	2	1/4	4	25516	58.50	25516-C3	66.90
.2656 (17/64)	7/8	2-1/8	5/16	4	25517	74.20	25517-C3	84.30
.2812 (9/32)	7/8	2-1/4	5/16	4	25518	74.20	25518-C3	84.30
.2969 (19/64)	7/8	2-3/8	5/16	4	25519	74.20	25519-C3	84.30
.3125 (5/16)	1	2-1/2	5/16	4	25520	74.20	25520-C3	84.30
.3150 (8 mm)	1	2-1/2	3/8	4	2558M	95.70	2558M-C3	108.70
.3437 (11/32)	1	2-3/4	3/8	4	25522	89.50	25522-C3	102.50
.3750 (3/8)	1	3	3/8	4	25524	89.50	25524-C3	102.50
.3937 (10 mm)	1	3	7/16	4	2550M	111.30	2550M-C3	125.50
.4375 (7/16)	1	3	7/16	4	25528	103.90	25528-C3	118.10
.5000 (1/2)	1	3	1/2	4	25532	127.40	25532-C3	141.60

* Tolerance listed above refers to uncoated counterbores. Tolerance for AlTiN coating is +.0002"/−.0005".

APPLICATIONS:

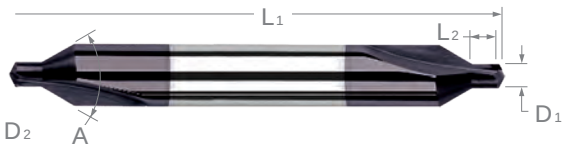


SPOT EFFECTIVELY. The flat bottom removes end mill dish or drill points while effectively spotting on irregular surfaces.

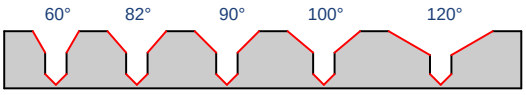
HOLD POSITION. The full cylindrical margin and back taper are not side cutting and won't grab or deflect.

CONTROL FINISH. The slow helix with a low rake avoids part engagement and helps to control finish.

COMBINED DRILL & COUNTERSINKS



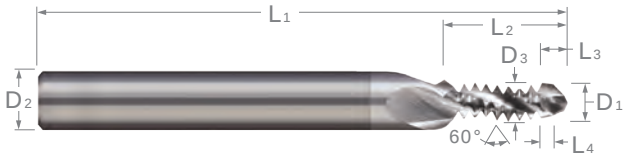
- 60°, 82°, 90°, 100°, and 120° included angles - plain type
- 2 flutes
- 118° included tip angle
- Double-ended
- Solid carbide
- CNC ground in the USA

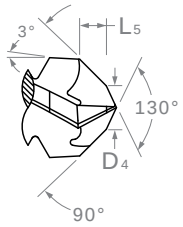


Stocked in *Five* Angles!

INCLUDED ANGLE	SIZE	DRILL DIAMETER	DRILL LENGTH	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN COATED	
A +1° −1°		D_1 +.0015″ +.0005″	L_2 +.005″ −.000″	D_2	L_1	2 FL	PRICE	2 FL	PRICE
60°	0000	1/64	1/64	1/8	1-1/2	11002	32.70	11002-C3	38.70
	000	.020	.020	1/8	1-1/2	11005	24.80	11005-C3	30.80
	00	.025	.025	1/8	1-1/2	11010	19.40	11010-C3	25.40
	0	1/32	1/32	1/8	1-1/2	11020	19.40	11020-C3	25.40
	1	3/64	3/64	1/8	1-1/2	11030	16.30	11030-C3	22.30
	2	5/64	5/64	3/16	2	11040	24.80	11040-C3	32.00
	3	7/64	7/64	1/4	2	11050	28.20	11050-C3	38.00
	4	1/8	1/8	5/16	2-1/2	11060	38.60	11060-C3	50.50
	5	3/16	3/16	7/16	2-3/4	11070	57.60	11070-C3	75.30
82°	00	.025	.025	1/8	1-1/2	25610	20.50	25610-C3	26.50
	0	1/32	1/32	1/8	1-1/2	25620	20.50	25620-C3	26.50
	1	3/64	3/64	1/8	1-1/2	25630	17.20	25630-C3	23.20
	2	5/64	5/64	3/16	2	25640	26.50	25640-C3	33.70
	3	7/64	7/64	1/4	2	25650	30.00	25650-C3	39.80
	4	1/8	1/8	5/16	2-1/2	25660	40.70	25660-C3	52.60
	5	3/16	3/16	7/16	2-3/4	25670	61.20	25670-C3	78.90
90°	0000	1/64	1/64	1/8	1-1/2	17902	33.70	17902-C3	39.70
	000	.020	.020	1/8	1-1/2	17905	25.60	17905-C3	31.60
	00	.025	.025	1/8	1-1/2	17910	20.00	17910-C3	26.00
	0	1/32	1/32	1/8	1-1/2	17920	20.00	17920-C3	26.00
	1	3/64	3/64	1/8	1-1/2	17930	16.80	17930-C3	22.80
	2	5/64	5/64	3/16	2	17940	25.60	17940-C3	32.80
	3	7/64	7/64	1/4	2	17950	29.10	17950-C3	38.90
	4	1/8	1/8	5/16	2-1/2	17960	39.60	17960-C3	51.50
	5	3/16	3/16	7/16	2-3/4	17970	59.40	17970-C3	77.10
100°	0	1/32	1/32	1/8	1-1/2	849520	23.00	849520-C3	28.40
	1	3/64	3/64	1/8	1-1/2	849530	19.30	849530-C3	25.30
	2	5/64	5/64	3/16	2	849540	29.30	849540-C3	35.20
	3	7/64	7/64	1/4	2	849550	33.30	849550-C3	41.10
	4	1/8	1/8	5/16	2-1/2	849560	45.20	849560-C3	54.40
120°	2	5/64	5/64	3/16	2	822540	29.30	822540-C3	34.20
	3	7/64	7/64	1/4	2	822550	33.30	822550-C3	38.50
	4	1/8	1/8	5/16	2-1/2	822560	45.20	822560-C3	50.40

COMBINATION DRILL / THREAD MILLS

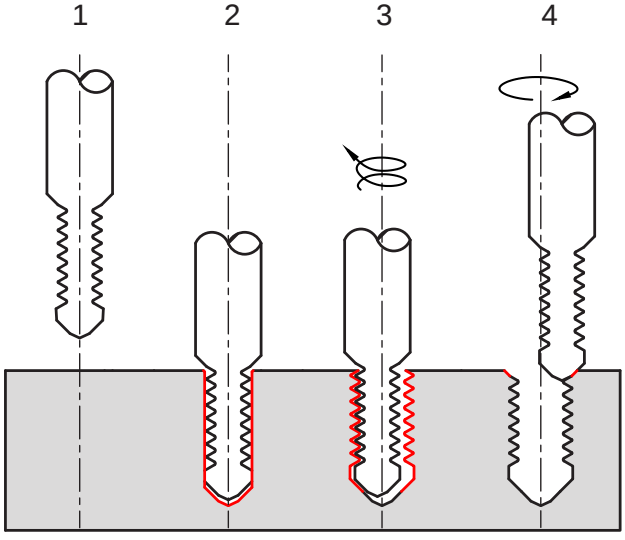




- Designed for combined drilling, threading, thread relief cutting, and chamfering
- One cutter for 4 different operations saves time on tool changes and leaves more room in the tool carousel
- Length of cut includes transition angle, allowing for optional 45° chamfer pass
- Optimized for cutting non-ferrous materials such as aluminum, unfilled plastics, copper, brass, and bronze alloys
- Recommended for cutting, threading and chamfering through holes
- 3 flutes to center
- Cuts internal 60° UN threads
- 90° included back chamfer
- Solid carbide
- CNC ground in the USA

THREAD SIZE	DRILL DIAMETER	LENGTH OF CUT	THREAD DIAMETER	SECONDARY POINT ANGLE DIAMETER	LENGTH OF TIP	LENGTH OF THREAD RELIEF	CHAMFER LENGTH	SHANK DIA.	OAL	UNCOATED		TiB_2 COATED	
	D_1 +.0005″ −.0005″	L_2 +.030″ −.000″	D_3 +.0005″ −.0005″	D_4	L_3	L_4	L_5	D_2	L_1	3 FL	PRICE	3 FL	PRICE
4-40	.0876	.2513	.085	.0356	.0580	.0250	.0247	1/8	2	820616	113.80	820616-C8	121.00
6-32	.1076	.3323	.100	.0475	.0707	.0312	.0284	3/16	2	820622	117.40	820622-C8	124.60
8-32	.1336	.3652	.115	.0735	.0767	.0312	.0284	3/16	2	820628	125.70	820628-C8	132.90
10-24	.1494	.4966	.120	.0760	.0939	.0416	.0345	1/4	2	820634	131.90	820634-C8	139.60
10-32	.1596	.4681	.120	.0995	.0828	.0312	.0284	1/4	2	820636	131.90	820636-C8	139.60
1/4-20	.2013	.7154	.180	.1172	.1168	.0500	.0394	3/8	2-1/2	820644	157.10	820644-C8	169.60
1/4-28	.2152	.7078	.180	.1494	.1016	.0357	.0310	3/8	2-1/2	820646	157.10	820646-C8	169.10
5/16-18	.2584	.8750	.240	.1671	.1372	.0555	.0427	3/8	2-1/2	820654	171.70	820654-C8	184.00
5/16-24	.2719	.8248	.240	.1985	.1224	.0416	.0345	3/8	2-1/2	820656	193.10	820656-C8	206.10
3/8-16	.3141	1.019	.285	.2140	.1592	.0625	.0468	1/2	3	820664	229.50	820664-C8	243.60
7/16-20	.3888	1.154	.335	.3047	.1605	.0500	.0394	1/2	3-1/2	820676	248.10	820676-C8	262.80
1/2-13	.4251	1.279	.350	.3064	.2036	.0769	.0553	5/8	3-1/2	820684	256.00	820684-C8	287.20

Combination Drill/Thread Mills Order of Operations

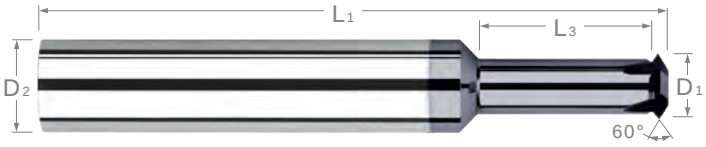


1. Approach the workpiece by centering the tool along the axis of the anticipated hole.
2. Drill a hole to the desired depth. For simultaneous chamfering, use the full length of cut to engage on the transition of the tool.
3. To begin thread, lift drill up by ½x - 1x pitch, then helically interpolate up 1 pitch. Return tool to center axis of the hole for retraction.
4. Re-engage the tool on top of the hole to create, increase, or finish the chamfer if desired.

NEW SIZES!

THREAD MILLING CUTTERS

Single Form – UN Threads



- Single thread form – can mill multiple pitches
- Cuts internal and external 60° UN threads
- Mills right hand and left hand threads
- Tip of included angle ground to a point
- Solid carbide
- CNC ground in the USA

For thread fit chart, search for keyword THREADFIT on www.harveytool.com

Stocked in Multiple Reach Lengths!



THREAD SIZE	CUTTER DIA.	NECK DIA.	MAX DEPTH OF THREAD	FLUTES	SHANK DIA.	OVERALL LENGTH	UNCOATED		AlTiN COATED		AMORPHOUS DIAMOND		
	D_1 +.000″ −.002″		L_3 +.020″ −.000″		D_2	L_1	TOOL #	PRICE	TOOL #	PRICE	TOOL #	PRICE	
00	.032	.016	1/16	2	1/8	1-1/2	71001	76.60	71001-C3	81.50			
00	.032	.016	3/32	2	1/8	1-1/2	41401	81.10	41401-C3	86.00			
0	.044	.024	3/32	2	1/8	1-1/2	71002	73.90	71002-C3	78.80	71002-C4	86.30	
0	.044	.024	1/8	2	1/8	1-1/2	41402	78.50	41402-C3	83.40	41402-C4	90.90	
0	.044	.024	3/16	2	1/8	1-1/2	54202	84.40	54202-C3	89.30	54202-C4	96.80	
0	.044	.024	1/4	2	1/8	1-1/2	993902	88.30	993902-C3	93.20			
0	.044	.024	5/16	2	1/8	1-1/2	901202	92.00	901202-C3	96.90			
1	.054	.032	1/8	2	1/8	1-1/2	71004	73.90	71004-C3	78.80	71004-C4	86.30	
1	.054	.032	3/16	2	1/8	1-1/2	41404	78.50	41404-C3	83.40	41404-C4	90.90	
1	.054	.032	1/4	2	1/8	1-1/2	54204	84.40	54204-C3	89.30	54204-C4	96.80	
1	.054	.032	5/16	2	1/8	1-1/2	993904	88.30	993904-C3	93.20			
1	.054	.032	3/8	2	1/8	1-1/2	901204	92.00	901204-C3	96.90			
2	.064	.038	5/32	2	1/8	1-1/2	71006	73.90	71006-C3	78.80	71006-C4	86.30	
2	.064	.038	3/16	2	1/8	1-1/2	822706	76.20	822706-C3	81.10			NEW
2	.064	.038	7/32	2	1/8	1-1/2	41406	78.50	41406-C3	83.40	41406-C4	90.90	
2	.064	.038	1/4	2	1/8	1-1/2	821406	81.40	821406-C3	86.30			NEW
2	.064	.038	5/16	2	1/8	1-1/2	54206	84.40	54206-C3	89.30	54206-C4	96.80	
2	.064	.038	7/16	2	1/8	1-1/2	993906	88.30	993906-C3	93.20			
2	.064	.038	9/16	2	1/8	1-1/2	901206	92.00	901206-C3	96.90			
3	.072	.040	5/32	2	1/8	1-1/2	71008	73.90	71008-C3	78.80	71008-C4	86.30	
3	.072	.040	1/4	2	1/8	1-1/2	41408	78.50	41408-C3	83.40	41408-C4	90.90	
3	.072	.040	3/8	2	1/8	1-1/2	54208	84.40	54208-C3	89.30	54208-C4	96.80	
3	.072	.040	1/2	2	1/8	1-1/2	993908	88.30	993908-C3	93.20			
4	.080	.040	1/8	2	3/16	2	71010	74.10	71010-C3	79.40	71010-C4	91.20	
4	.080	.040	3/16	2	3/16	2	820310	76.40	820310-C3	81.70			
4	.080	.040	1/4	2	3/16	2	41410	78.70	41410-C3	84.00	41410-C4	95.80	
4	.080	.040	5/16	2	3/16	2	821410	81.70	821410-C3	87.00			
4	.080	.040	3/8	2	3/16	2	54210	84.80	54210-C3	90.10	54210-C4	101.90	
4	.080	.040	7/16	2	3/16	2	771810	86.90	771810-C3	92.20			NEW
4	.080	.040	1/2	2	3/16	2	993910	89.00	993910-C3	94.30			
4	.080	.040	5/8	2	3/16	2	901210	93.40	901210-C3	98.70			
5	.093	.050	3/16	4	3/16	2	71015	73.90	71015-C3	79.20			
5	.093	.050	1/4	4	3/16	2	822715	76.20	822715-C3	81.50			
5	.093	.050	3/8	4	3/16	2	41415	78.50	41415-C3	83.80	41415-C4	95.60	
5	.093	.050	1/2	4	3/16	2	54215	84.40	54215-C3	89.70			
5	.093	.050	5/8	4	3/16	2	993915	89.00	993915-C3	94.30			

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NEW SIZES!

THREAD MILLING CUTTERS

Single Form – UN Threads (cont.)

continued from previous page

THREAD SIZE	CUTTER DIA. D_1 +.000″ −.002″	NECK DIA.	MAX DEPTH OF THREAD L_3 +.020″ −.000″	FLUTES	SHANK DIA. D_2	OVERALL LENGTH L_1	UNCOATED TOOL #	UNCOATED PRICE	AlTiN COATED TOOL #	AlTiN COATED PRICE	AMORPHOUS DIAMOND TOOL #	AMORPHOUS DIAMOND PRICE
6	.098	.050	**5/32**	4	3/16	2	932920	74.10	932920-C3	79.40		
6	.098	.050	**1/4**	4	3/16	2	71020	74.10	71020-C3	79.40	71020-C4	91.20
6	.098	.050	**5/16**	4	3/16	2	822720	76.20	822720-C3	81.50		
6	.098	.050	**3/8**	4	3/16	2	41420	78.70	41420-C3	84.00	41420-C4	95.80
6	.098	.050	**7/16**	4	3/16	2	821420	81.70	821420-C3	87.00		
6	.098	.050	**1/2**	4	3/16	2	54220	84.80	54220-C3	90.10	54220-C4	101.90
6	.098	.050	**5/8**	4	3/16	2	993920	89.00	993920-C3	94.30		
6	.098	.050	**3/4**	4	3/16	2	901220	93.40	901220-C3	98.70		
8	.120	.070	**7/32**	4	1/4	2-1/2	932930	75.10	932930-C3	82.30		
8	.120	.070	**5/16**	4	1/4	2-1/2	71030	76.00	71030-C3	83.20	71030-C4	95.40
8	.120	.070	**3/8**	4	1/4	2-1/2	820330	78.50	820330-C3	85.70		
8	.120	.070	**1/2**	4	1/4	2-1/2	41430	81.10	41430-C3	88.30	41430-C4	100.50
8	.120	.070	**9/16**	4	1/4	2-1/2	821430	83.80	821430-C3	88.70		
8	.120	.070	**5/8**	4	1/4	2-1/2	54230	86.70	54230-C3	93.90	54230-C4	106.10
8	.120	.070	**3/4**	4	1/4	2-1/2	993930	93.40	993930-C3	100.60		
8	.120	.070	**7/8**	4	1/4	2-1/2	901230	99.00	901230-C3	106.20		
10	.135	.070	**7/32**	4	1/4	2-1/2	932940	75.10	932940-C3	82.30		
10	.135	.070	**5/16**	4	1/4	2-1/2	71040	76.00	71040-C3	83.20	71040-C4	95.40
10	.135	.070	**3/8**	4	1/4	2-1/2	820340	78.50	820340-C3	85.70		
10	.135	.070	**1/2**	4	1/4	2-1/2	41440	81.10	41440-C3	88.30	41440-C4	100.50
10	.135	.070	**5/8**	4	1/4	2-1/2	54240	86.70	54240-C3	93.90	54240-C4	106.10
10	.135	.070	**3/4**	4	1/4	2-1/2	771840	90.00	771840-C3	97.20		
10	.135	.070	**7/8**	4	1/4	2-1/2	993940	93.40	993940-C3	100.60		
10	.135	.070	**1-1/8**	4	1/4	2-1/2	901240	99.00	901240-C3	106.20		
12	.160	.095	**3/8**	4	1/4	2-1/2	71045	76.00	71045-C3	83.20		
12	.160	.095	**1/2**	4	1/4	2-1/2	822745	78.50	822745-C3	85.70		
12	.160	.095	**5/8**	4	1/4	2-1/2	41445	81.10	41445-C3	88.30		
12	.160	.095	**7/8**	4	1/4	2-1/2	54245	86.70	54245-C3	93.90		
1/4	.180	.115	**5/16**	4	1/4	2-1/2	932950	75.10	932950-C3	82.30		
1/4	.180	.115	**3/8**	4	1/4	2-1/2	772950	75.60	772950-C3	82.80		
1/4	.180	.115	**1/2**	4	1/4	2-1/2	71050	76.00	71050-C3	83.20	71050-C4	95.40
1/4	.180	.115	**5/8**	4	1/4	2-1/2	822750	78.50	822750-C3	85.70		
1/4	.180	.115	**3/4**	4	1/4	2-1/2	41450	81.10	41450-C3	88.30	41450-C4	100.50
1/4	.180	.115	**7/8**	4	1/4	2-1/2	821450	83.80	821450-C3	91.00		
1/4	.180	.115	**1**	4	1/4	2-1/2	54250	86.70	54250-C3	93.90	54250-C4	106.10
1/4	.180	.115	**1-1/4**	4	1/4	2-1/2	993950	93.40	993950-C3	100.60		
1/4	.180	.115	**1-1/2**	4	1/4	3	901250	99.00	901250-C3	106.20		
5/16	.240	.160	**1/2**	4	1/4	2-1/2	71055	76.00	71055-C3	83.20	71055-C4	95.40
5/16	.240	.160	**5/8**	4	1/4	2-1/2	822755	78.50	822755-C3	85.70		
5/16	.240	.160	**3/4**	4	1/4	2-1/2	41455	81.10	41455-C3	88.30	41455-C4	100.50
NEW 5/16	.240	.160	**7/8**	4	1/4	2-1/2	821455	85.30	821455-C3	92.50		
5/16	.240	.160	**1**	4	1/4	2-1/2	54255	89.50	54255-C3	96.70	54255-C4	108.90
5/16	.240	.160	**1-1/4**	4	1/4	2-1/2	993955	93.40	993955-C3	100.60		
5/16	.240	.160	**1-1/2**	4	1/4	3	901255	99.00	901255-C3	106.20		

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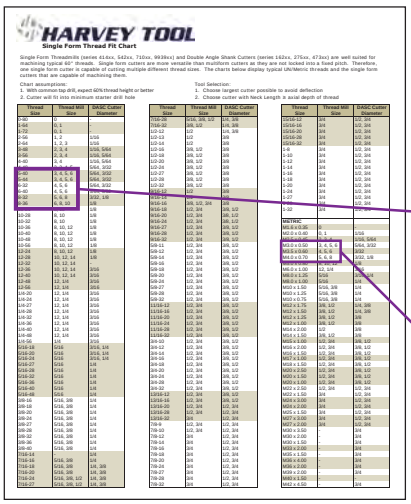
NEW SIZES!

THREAD MILLING CUTTERS

Single Form – UN Threads (cont.)

continued from previous page

THREAD SIZE	CUTTER DIA.	NECK DIA.	MAX DEPTH OF THREAD	FLUTES	SHANK DIA.	OVERALL LENGTH	UNCOATED		AlTiN COATED		AMORPHOUS DIAMOND		
	D_1 +.000″ −.002″		L_3 +.020″ −.000″		D_2	L_1	TOOL #	PRICE	TOOL #	PRICE	TOOL #	PRICE	
3/8	.300	.218	**3/4**	4	3/8	2-1/2	71060	99.00	71060-C3	107.30	71060-C4	122.40	
3/8	.300	.218	**7/8**	4	3/8	2-1/2	822760	101.40	822760-C3	110.90			
3/8	.300	.218	**1**	4	3/8	2-1/2	41460	103.90	41460-C3	113.40	41460-C4	127.30	
3/8	.300	.218	**1-1/4**	4	3/8	2-1/2	54260	109.50	54260-C3	119.00	54260-C4	132.90	
3/8	.300	.218	**1-1/2**	4	3/8	3	993960	113.60	993960-C3	123.10			
3/8	.300	.218	**1-3/4**	4	3/8	3	901260	117.70	901260-C3	127.20			
7/16	.340	.230	**3/4**	4	3/8	2-1/2	71065	111.50	71065-C3	121.00			
7/16	.340	.230	**1**	4	3/8	2-1/2	41465	116.20	41465-C3	125.70			
1/2	.388	.250	**3/4**	4	1/2	3	71070	111.50	71070-C3	125.70			
1/2	.388	.250	**1**	4	1/2	3	822770	114.10	822770-C3	128.30			
1/2	.388	.250	**1-1/4**	4	1/2	3	41470	116.70	41470-C3	130.90	41470-C4	144.90	
1/2	.388	.250	**1-1/2**	4	1/2	3	821470	120.50	821470-C3	134.70			NEW
1/2	.388	.250	**1-3/4**	4	1/2	4	54270	124.40	54270-C3	138.60			
1/2	.388	.250	**2-1/4**	4	1/2	4	993970	129.70	993970-C3	143.90			
1/2	.388	.250	**2-3/4**	4	1/2	6	901270	134.80	901270-C3	149.00			
9/16	.400	.270	**7/8**	6	1/2	3	71073	116.50	71073-C3	130.70			
9/16	.400	.270	**1-1/4**	6	1/2	3	41473	116.50	41473-C3	130.70			
5/8	.450	.300	**1**	6	1/2	3	71075	116.50	71075-C3	130.70			
5/8	.450	.300	**1-3/8**	6	1/2	3	41475	122.00	41475-C3	136.20			
3/4	.495	.325	**1**	6	1/2	3	71080	116.50	71080-C3	130.70			
3/4	.495	.325	**1-1/4**	6	1/2	3	822780	119.20	822780-C3	133.40			NEW
3/4	.495	.325	**1-3/8**	6	1/2	3	41480	122.00	41480-C3	136.20			
3/4	.495	.325	**1-3/4**	6	1/2	4	54280	128.40	54280-C3	142.60			
3/4	.495	.325	**2-1/4**	6	1/2	4	993980	134.00	993980-C3	148.20			
3/4	.495	.325	**2-3/4**	6	1/2	6	901280	139.50	901280-C3	153.70			
7/8	.590	.400	**1-1/4**	6	5/8	3-1/2	71085	158.40	71085-C3	172.60			
7/8	.590	.400	**1-1/2**	6	5/8	3-1/2	41485	167.20	41485-C3	181.40			
1	.620	.420	**1-5/16**	6	5/8	3-1/2	71090	158.40	71090-C3	172.60			
1	.620	.420	**1-3/4**	6	5/8	3-1/2	41490	167.20	41490-C3	181.40			


HARVEY TOOL
Single Form Thread Fit Chart

SINGLE FORM THREAD FIT CHARTS

5-40	3, 4, 5, 6
5-44	3, 4, 5, 6
6-32	4, 5, 6
6-40	4, 5, 6
8-32	5, 6, 8

M3.0 x 0.50	3, 4, 5, 6
M3.5 x 0.60	4, 5, 6
M4.0 x 0.70	5, 6, 8

Our single form thread milling cutters can produce a range of thread sizes, from common UN threads to metric threads.

For example, our 5 thread size single form cutters (pictured left) can produce a range of thread sizes from 5-40 to 8-32 as well as M3.0 x 0.50 to M4.0 x 0.70.

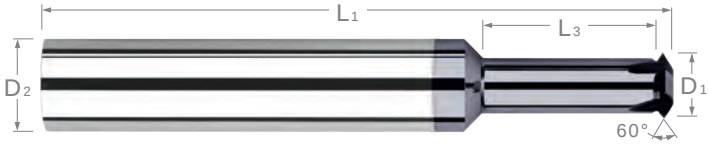
For help with choosing the right thread mill, please call our Technical Support Team at **800-645-5609**.

To download the thread fit charts, search for keyword THREADFIT on www.harveytool.com

NEW SIZES!

THREAD MILLING CUTTERS

Single Form – Metric



For thread fit chart, search for keyword THREADFIT on www.harveytool.com

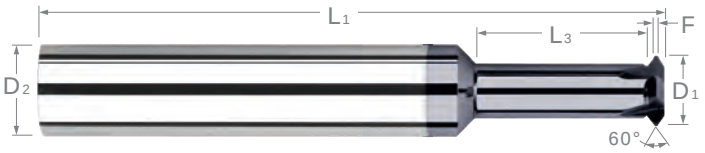
- Single thread form – can mill multiple pitches
- Cuts internal and external 60° metric threads
- Mills right hand and left hand threads
- Tip of included angle ground to a point
- Solid carbide
- CNC ground in the USA

	THREAD SIZE	CUTTER DIA. D_1 +.00 mm −.05 mm	NECK DIA.	MAX DEPTH OF THREAD L_3 +.50 mm −.00 mm	FLUTES	SHANK DIA. D_2	OVERALL LENGTH L_1	UNCOATED TOOL #	UNCOATED PRICE	AlTiN COATED TOOL #	AlTiN COATED PRICE
	M1.6	1.16 mm	.696 mm	**2.10 mm**	2	3 mm	38 mm	890316	78.50	890316-C3	83.40
	M1.6	1.16 mm	.696 mm	**3.50 mm**	2	3 mm	38 mm	882116	78.50	882116-C3	83.40
NEW	M1.6	1.16 mm	.696 mm	**5.60 mm**	2	3 mm	38 mm	826516	80.80	826516-C3	85.70
	M2	1.50 mm	.900 mm	**2.70 mm**	2	3 mm	38 mm	890319	78.50	890319-C3	83.40
	M2	1.50 mm	.900 mm	**4.50 mm**	2	3 mm	38 mm	882119	78.50	882119-C3	83.40
	M2	1.50 mm	.900 mm	**7.00 mm**	2	3 mm	38 mm	826519	80.80	826519-C3	85.70
NEW	M2	1.50 mm	.900 mm	**9.00 mm**	2	3 mm	38 mm	761419	82.00	761419-C3	86.90
	M2.5	1.90 mm	1.140 mm	**3.50 mm**	2	3 mm	38 mm	890322	78.50	890322-C3	83.40
	M2.5	1.90 mm	1.140 mm	**5.80 mm**	2	3 mm	38 mm	882122	78.50	882122-C3	83.40
NEW	M2.5	1.90 mm	1.140 mm	**9.00 mm**	2	3 mm	38 mm	826522	80.80	826522-C3	85.70
	M3	2.30 mm	1.380 mm	**4.00 mm**	4	3 mm	38 mm	890324	78.50	890324-C3	83.40
	M3	2.30 mm	1.380 mm	**6.80 mm**	4	3 mm	38 mm	882124	78.50	882124-C3	83.40
	M3	2.30 mm	1.380 mm	**11.00 mm**	4	3 mm	38 mm	826524	80.80	826524-C3	85.70
NEW	M3	2.30 mm	1.380 mm	**14.00 mm**	4	3 mm	38 mm	761424	82.00	761424-C3	86.90
	M4	3.00 mm	1.800 mm	**5.50 mm**	4	3 mm	38 mm	890326	79.60	890326-C3	84.50
	M4	3.00 mm	1.800 mm	**9.00 mm**	4	3 mm	38 mm	882126	80.80	882126-C3	85.70
	M4	3.00 mm	1.800 mm	**14.00 mm**	4	3 mm	38 mm	826526	83.20	826526-C3	88.10
NEW	M4	3.00 mm	1.800 mm	**18.00 mm**	4	3 mm	50 mm	761426	84.40	761426-C3	89.30
	M5	4.00 mm	2.400 mm	**7.00 mm**	4	4 mm	50 mm	890328	80.80	890328-C3	86.10
	M5	4.00 mm	2.400 mm	**12.00 mm**	4	4 mm	50 mm	882128	83.20	882128-C3	88.50
	M5	4.00 mm	2.400 mm	**19.00 mm**	4	4 mm	50 mm	826528	85.90	826528-C3	91.20
	M6	4.80 mm	2.880 mm	**8.50 mm**	4	6 mm	50 mm	890330	79.60	890330-C3	86.80
	M6	4.80 mm	2.880 mm	**14.00 mm**	4	6 mm	50 mm	882130	80.80	882130-C3	88.00
	M6	4.80 mm	2.880 mm	**23.00 mm**	4	6 mm	63 mm	826530	87.10	826530-C3	94.30
	M8	6.00 mm	3.600 mm	**11.00 mm**	4	6 mm	50 mm	890332	80.80	890332-C3	88.00
	M8	6.00 mm	3.600 mm	**18.00 mm**	4	6 mm	50 mm	882132	85.90	882132-C3	93.10
	M10	8.00 mm	4.800 mm	**15.00 mm**	4	8 mm	63 mm	890334	104.70	890334-C3	113.10
	M10	8.00 mm	4.800 mm	**24.00 mm**	4	8 mm	63 mm	882134	110.20	882134-C3	118.60
	M16	13.70 mm	8.220 mm	**25.00 mm**	6	14 mm	75 mm	890339	123.50	890339-C3	137.70
	M16	13.70 mm	8.220 mm	**42.00 mm**	6	14 mm	89 mm	882139	136.00	882139-C3	150.20

NEW SIZES!

THREAD MILLING CUTTERS

Single Form – UN Threads – For Hardened Steels





Tip of Included Angle Ground to a Flat for Increased Wear Resistance

- **Designed for threading hardened steels 46-68Rc**
- Single thread form designed to mill common pitch sizes
- Cuts internal and external 60° UN threads
- Tip of included angle ground to a flat for increased wear resistance
- Large rigid core diameter and eccentric relief for improved strength
- Mills left hand and right hand threads
- h6 shank tolerance for high precision tool holders
- Latest generation AlTiN Nano coating offers superior hardness and heat resistance
- Select carbide grade for improved edge retention
- CNC ground in the USA

THREAD SIZE	PITCH RANGE*	CUTTER DIAMETER	TIP FLAT	NECK DIAMETER	MAX DEPTH OF THREAD	FLUTES	SHANK DIAMETER	OVERALL LENGTH	AlTiN NANO COATED	
		D_1 +.000″ −.002″	F +.0000″ −.0005″		L_3 +.020″ −.000″		D_2 (h6)	L_1	TOOL #	PRICE
0	80	.044	.0013	.028	**3/32**	3	1/8	1-1/2	986602-C6	89.70
0	80	.044	.0013	.028	**1/8**	3	1/8	1-1/2	993102-C6	93.50
0	80	.044	.0013	.028	**3/16**	3	1/8	1-1/2	959502-C6	97.80
0	80	.044	.0013	.028	**1/4**	3	1/8	1-1/2	930302-C6	102.10
0	80	.044	.0013	.028	**5/16**	3	1/8	1-1/2	898902-C6	106.00
1	64-72	.054	.0014	.034	**1/8**	3	1/8	1-1/2	986604-C6	89.70
1	64-72	.054	.0014	.034	**3/16**	3	1/8	1-1/2	993104-C6	93.50
1	64-72	.054	.0014	.034	**1/4**	3	1/8	1-1/2	959504-C6	97.80
1	64-72	.054	.0014	.034	**5/16**	3	1/8	1-1/2	930304-C6	101.90
2	56-64	.064	.0016	.041	**5/32**	3	1/8	1-1/2	986606-C6	89.70
2	56-64	.064	.0016	.041	**7/32**	3	1/8	1-1/2	993106-C6	93.50
2	56-64	.064	.0016	.041	**1/4**	3	1/8	1-1/2	771706-C6	95.60 NEW
2	56-64	.064	.0016	.041	**5/16**	3	1/8	1-1/2	959506-C6	97.80
2	56-64	.064	.0016	.041	**7/16**	3	1/8	1-1/2	930306-C6	102.10
3	48-56	.072	.0018	.046	**5/32**	3	1/8	1-1/2	986608-C6	89.70
3	48-56	.072	.0018	.046	**1/4**	3	1/8	1-1/2	993108-C6	93.50
3	48-56	.072	.0018	.046	**3/8**	3	1/8	1-1/2	959508-C6	97.80
4	40-48	.080	.0021	.050	**5/32**	3	3/16	2	986610-C6	90.40
4	40-48	.080	.0021	.050	**1/4**	3	3/16	2	993110-C6	95.70
4	40-48	.080	.0021	.050	**5/16**	3	3/16	2	771710-C6	97.70
4	40-48	.080	.0021	.050	**3/8**	3	3/16	2	959510-C6	99.70
4	40-48	.080	.0021	.050	**1/2**	3	3/16	2	930310-C6	103.90
4	40-48	.080	.0021	.050	**5/8**	3	3/16	2	898910-C6	108.00
5	40-44	.093	.0023	.063	**3/16**	4	3/16	2	986615-C6	95.70
5	40-44	.093	.0023	.063	**1/2**	4	3/16	2	959515-C6	99.70
5	40-44	.093	.0023	.063	**5/8**	4	3/16	2	930315-C6	103.90
6	32-40	.098	.0025	.062	**1/4**	4	3/16	2	986620-C6	90.40
6	32-40	.098	.0025	.062	**5/16**	4	3/16	2	773220-C6	93.00
6	32-40	.098	.0025	.062	**3/8**	4	3/16	2	993120-C6	95.70
6	32-40	.098	.0025	.062	**1/2**	4	3/16	2	959520-C6	99.70
6	32-40	.098	.0025	.062	**5/8**	4	3/16	2	930320-C6	103.90

*Tools are designed to produce an 83% depth of thread maximum.

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NEW SIZES!

THREAD MILLING CUTTERS

Single Form – UN Threads – For Hardened Steels (cont.)

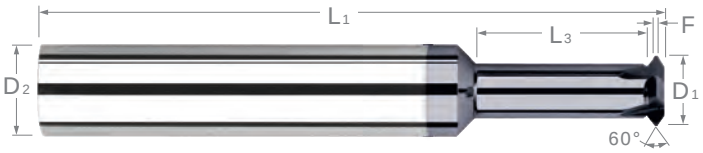
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THREAD SIZE	PITCH RANGE*	CUTTER DIAMETER	TIP FLAT	NECK DIAMETER	MAX DEPTH OF THREAD	FLUTES	SHANK DIAMETER	OVERALL LENGTH	AlTiN NANO COATED	
		D_1 +.000″ −.002″	F +.0000″ −.0005″		L_3 +.020″ −.000″		D_2 (h6)	L_1	TOOL #	PRICE
8	32-36	.120	.0028	.084	**5/16**	4	1/4	2-1/2	986630-C6	94.90
8	32-36	.120	.0028	.084	**1/2**	4	1/4	2-1/2	993130-C6	100.40
8	32-36	.120	.0028	.084	**5/8**	4	1/4	2-1/2	959530-C6	105.70
8	32-36	.120	.0028	.084	**3/4**	4	1/4	2-1/2	930330-C6	110.90
8	32-36	.120	.0028	.084	**7/8**	4	1/4	2-1/2	898930-C6	116.20
10	24-36	.135	.0028	.086	**5/16**	5	1/4	2-1/2	986640-C6	94.90
10	24-36	.135	.0028	.086	**3/8**	5	1/4	2-1/2	773240-C6	97.70
10	24-36	.135	.0028	.086	**1/2**	5	1/4	2-1/2	993140-C6	100.40
10	24-36	.135	.0028	.086	**5/8**	5	1/4	2-1/2	959540-C6	105.70
10	24-36	.135	.0028	.086	**7/8**	5	1/4	2-1/2	930340-C6	110.90
10	24-36	.135	.0028	.086	**1-1/8**	5	1/4	2-1/2	898940-C6	116.20
12	24-32	.160	.0030	.111	**3/8**	5	1/4	2-1/2	986645-C6	94.90
12	24-32	.160	.0030	.111	**5/8**	5	1/4	2-1/2	993145-C6	105.70
1/4	20-32	.180	.0030	.122	**5/16**	5	1/4	2-1/2	845750-C6	94.90
1/4	20-32	.180	.0030	.122	**1/2**	5	1/4	2-1/2	986650-C6	100.40
1/4	20-32	.180	.0030	.122	**5/8**	5	1/4	2-1/2	773250-C6	103.10
1/4	20-32	.180	.0030	.122	**3/4**	5	1/4	2-1/2	993150-C6	105.70
1/4	20-32	.180	.0030	.122	**1**	5	1/4	2-1/2	959550-C6	110.90
1/4	20-32	.180	.0030	.122	**1-1/4**	5	1/4	2-1/2	930350-C6	116.00
5/16	18-28	.240	.0036	.174	**3/8**	5	1/4	2-1/2	845755-C6	94.90
5/16	18-28	.240	.0036	.174	**1/2**	5	1/4	2-1/2	986655-C6	100.40
5/16	18-28	.240	.0036	.174	**5/8**	5	1/4	2-1/2	773255-C6	103.10
5/16	18-28	.240	.0036	.174	**3/4**	5	1/4	2-1/2	993155-C6	105.70
5/16	18-28	.240	.0036	.174	**1**	5	1/4	2-1/2	959555-C6	110.90
5/16	18-28	.240	.0036	.174	**1-1/4**	5	1/4	2-1/2	930355-C6	116.00
3/8	16-28	.300	.0036	.227	**1/2**	5	3/8	2-1/2	845760-C6	122.40
3/8	16-28	.300	.0036	.227	**3/4**	5	3/8	2-1/2	986660-C6	127.70
3/8	16-28	.300	.0036	.227	**1**	5	3/8	2-1/2	993160-C6	133.10
3/8	16-28	.300	.0036	.227	**1-1/4**	5	3/8	2-1/2	959560-C6	138.40
3/8	16-28	.300	.0036	.227	**1-1/2**	5	3/8	3	930360-C6	143.70
1/2	12-18	.388	.0056	.294	**3/4**	5	1/2	3	986670-C6	141.10
NEW 1/2	12-18	.388	.0056	.294	**1**	5	1/2	3	773270-C6	145.80
1/2	12-18	.388	.0056	.294	**1-1/4**	5	1/2	3	993170-C6	150.50
1/2	12-18	.388	.0056	.294	**1-3/4**	5	1/2	4	959570-C6	156.00
1/2	12-18	.388	.0056	.294	**2-1/4**	5	1/2	4	930370-C6	161.20
3/4	10-16	.495	.0063	.385	**1**	6	1/2	3	986680-C6	149.60
3/4	10-16	.495	.0063	.385	**1-3/8**	6	1/2	3	993180-C6	162.10
3/4	10-16	.495	.0063	.385	**1-3/4**	6	1/2	4	959580-C6	174.80
3/4	10-16	.495	.0063	.385	**2-1/4**	6	1/2	4	930380-C6	187.40
1	8-14	.620	.0071	.480	**1-5/16**	6	5/8	3-1/2	986690-C6	177.10
1	8-14	.620	.0071	.480	**1-3/4**	6	5/8	3-1/2	993190-C6	189.80

*Tools are designed to produce an 83% depth of thread maximum.

THREAD MILLING CUTTERS

Single Form – Metric – For Hardened Steels





Tip of Included Angle Ground to a Flat for Increased Wear Resistance

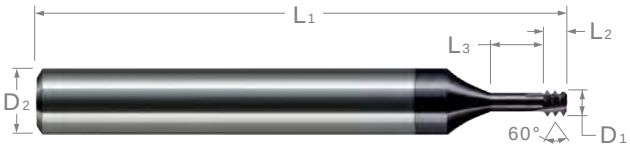
- **Designed for threading hardened steels 48-68Rc**
- Single thread form designed to mill common pitch sizes
- Cuts internal and external 60° Metric threads
- Tip of included angle ground to a flat for increased wear resistance
- Large rigid core diameter and eccentric relief for improved strength
- Mills left hand and right hand threads
- h6 shank tolerance for high precision tool holders
- Latest generation AlTiN Nano coating offers superior hardness and heat resistance
- Select carbide grade for improved edge retention
- CNC ground in the USA

THREAD SIZE	PITCH RANGE*	CUTTER DIA.	TIP FLAT	NECK DIA.	MAX DEPTH OF THREAD	FLUTES	SHANK DIA.	OVERALL LENGTH	AlTiN NANO COATED	
		D_1 +.00 mm −.05 mm	F +.000 mm −.127 mm		L_3 +.50 mm −.00 mm		D_2	L_1	TOOL #	PRICE
M1.6	0.35	1.16 mm	.035	.742 mm	**2.10 mm**	3	3 mm	38 mm	771616-C6	89.00
M1.6	0.35	1.16 mm	.035	.742 mm	**3.50 mm**	3	3 mm	38 mm	772716-C6	89.00
M2	0.40	1.50 mm	.040	.960 mm	**2.70 mm**	3	3 mm	38 mm	771619-C6	89.00
M2	0.40	1.50 mm	.040	.960 mm	**4.50 mm**	3	3 mm	38 mm	772719-C6	89.00
M2.5	0.45	1.90 mm	.045	1.216 mm	**3.50 mm**	3	3 mm	38 mm	771622-C6	89.00
M2.5	0.45	1.90 mm	.045	1.216 mm	**5.80 mm**	3	3 mm	38 mm	772722-C6	89.00
M3	0.50	2.30 mm	.050	1.541 mm	**4.00 mm**	4	3 mm	38 mm	771624-C6	89.00
M3	0.50	2.30 mm	.050	1.541 mm	**6.80 mm**	4	3 mm	38 mm	772724-C6	89.00
M4	0.70	3.00 mm	.070	2.010 mm	**5.50 mm**	4	3 mm	38 mm	771626-C6	90.30
M4	0.70	3.00 mm	.070	2.010 mm	**9.00 mm**	4	3 mm	38 mm	772726-C6	91.40
M5	0.80	4.00 mm	.080	2.800 mm	**7.00 mm**	5	4 mm	50 mm	771628-C6	91.40
M5	0.80	4.00 mm	.080	2.800 mm	**12.00 mm**	5	4 mm	50 mm	772728-C6	94.50
M6	1.00	4.80 mm	.100	3.360 mm	**8.50 mm**	5	6 mm	50 mm	771630-C6	92.70
M6	1.00	4.80 mm	.100	3.360 mm	**14.00 mm**	5	6 mm	50 mm	772730-C6	93.90

*Tools are designed to produce an 83% depth of thread maximum.

THREAD MILLING CUTTERS

Tri-Form – UN Threads



Left-Hand Cut, Left Hand Spiral Design



Left-Hand Cut, Left-Hand Spiral Design

- **Designed for threading in hardened steels and difficult-to-machine materials**
- Left-hand cut, left-hand spiral design for climb milling from top to bottom of right-hand threads
- Three forms and helical design reduces tool pressure and deflection resulting in accurate threads
- Cuts internal 60° UN threads
- Able to cut larger threads of the same pitch
- h6 shank tolerance for high precision tool holders
- Latest generation AlTiN Nano coating offers superior hardness and heat resistance
- Select carbide grade for maximum tool life
- CNC ground in the USA

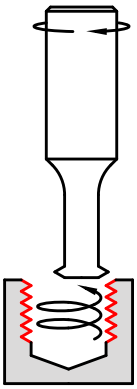
THREAD SIZE	CUTTER DIAMETER	LENGTH OF CUT	NECK DIAMETER	MAX DEPTH OF THREAD	FLUTES	SHANK DIAMETER	OVERALL LENGTH	AlTiN NANO COATED	
	D_1 $^{+.0005''}_{-.0005''}$	L_2		L_3 $^{+.020''}_{-.000''}$		D_2 (h6)	L_1	3 FL	PRICE
2-56	.065	.053	.042	**3/32**	3	1/4	2-1/2	899910-C6	176.10
2-56	.065	.053	.042	**5/32**	3	1/4	2-1/2	896410-C6	183.40
4-40	.085	.075	.053	**3/32**	3	1/4	2-1/2	899916-C6	176.10
4-40	.085	.075	.053	**5/32**	3	1/4	2-1/2	896416-C6	183.40
6-32	.100	.093	.061	**5/32**	3	1/4	2-1/2	899922-C6	176.10
6-32	.100	.093	.061	**1/4**	3	1/4	2-1/2	896422-C6	183.40
8-32	.126	.093	.087	**7/32**	3	1/4	2-1/2	899928-C6	163.60
8-32	.126	.093	.087	**5/16**	3	1/4	2-1/2	896428-C6	171.00
10-24	.138	.125	.086	**7/32**	3	1/4	2-1/2	899934-C6	163.60
10-24	.138	.125	.086	**5/16**	3	1/4	2-1/2	896434-C6	171.00
10-32	.145	.093	.106	**7/32**	3	1/4	2-1/2	899936-C6	163.60
10-32	.145	.093	.106	**5/16**	3	1/4	2-1/2	896436-C6	171.00
1/4-20	.187	.150	.124	**5/16**	3	1/4	2-1/2	899944-C6	163.60
1/4-20	.187	.150	.124	**1/2**	3	1/4	2-1/2	896444-C6	171.00
1/4-28	.197	.107	.151	**5/16**	3	1/4	2-1/2	899946-C6	163.60
1/4-28	.197	.107	.151	**1/2**	3	1/4	2-1/2	896446-C6	171.00
5/16-18	.236	.166	.166	**3/8**	3	1/4	2-1/2	899954-C6	163.60
5/16-18	.236	.166	.166	**1/2**	3	1/4	2-1/2	896454-C6	171.00
3/8-16	.264	.187	.186	**1/2**	3	5/16	2-1/2	899964-C6	172.50
3/8-16	.264	.187	.186	**3/4**	3	5/16	2-1/2	896464-C6	179.90

Tri-Form Thread Mills

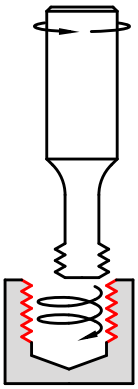
Our Tri-Form Thread Mills are unlike traditional right-handed thread mills, as they have a left-hand cut, left-hand spiral design.

- Improves thread accuracy and surface finish by climb milling from the top to the bottom of a hole.
- Tri-Form Thread Mills eliminate the need to arc-in when engaging the tool, which reduces radial pressure and deflection.

Traditional Right-Handed Thread Mill

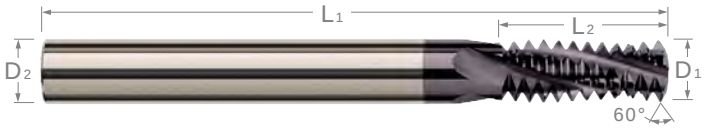


Tri-Form Thread Mill



THREAD MILLING CUTTERS

Multi-Form – UN Threads



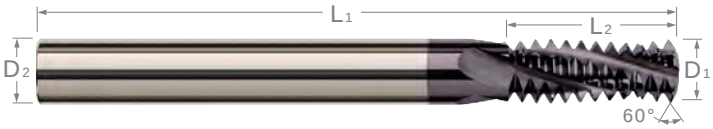
- Cuts internal and external 60° UN threads
- Mills right hand and left hand threads
- Able to cut larger threads of the same pitch
- Helical flutes
- Solid carbide
- CNC ground in the USA

THREAD SIZE	CUTTER DIAMETER	LENGTH OF CUT	FLUTES	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN COATED		TiB_2 COATED	
	D_1 $^{+.0005''}_{-.0005''}$	L_2		D_2	L_1	TOOL #	PRICE	TOOL #	PRICE	TOOL #	PRICE
2-56	.065	.125	3*	1/8	2	70010	88.00	70010-C3	92.90	70010-C8	95.20
3-48	.075	.167	3*	1/8	2	70012	93.00	70012-C3	97.90		
4-40	.085	.175	3*	1/8	2	70016	93.00	70016-C3	97.90	70016-C8	100.20
5-44	.095	.228	3	1/8	2	70020	93.00	70020-C3	97.90		
6-32	.100	.218	3	1/8	2	70022	96.20	70022-C3	101.10	70022-C8	103.40
8-32	.115	.250	3	1/8	2	70028	103.20	70028-C3	108.10	70028-C8	110.40
8-36	.115	.250	3	1/8	2	70031	103.20	70031-C3	108.10		
10-24	.120	.312	3	1/8	2	70034	108.50	70034-C3	113.40	70034-C8	115.70
10-28	.120	.312	3	1/8	2	70035	110.70	70035-C3	115.60		
10-32	.120	.312	3	1/8	2	70036	108.50	70036-C3	113.40	70036-C8	115.70
1/4-20	.180	.500	3	3/16	2-1/2	70044	129.80	70044-C3	135.10	70044-C8	137.00
1/4-28	.180	.500	3	3/16	2-1/2	70046	129.80	70046-C3	135.10	70046-C8	137.00
5/16-18	.235	.625	3	1/4	2-1/2	70054	140.50	70054-C3	147.70	70054-C8	148.20
5/16-24	.235	.625	3	1/4	2-1/2	70056	158.80	70056-C3	166.00	70056-C8	166.50
3/8-16	.285	.750	4	5/16	3	70064	189.00	70064-C3	197.40	70064-C8	205.40
3/8-24	.285	.750	4	5/16	3	70066	189.00	70066-C3	197.40	70066-C8	205.40
7/16-14	.305	.750	4	5/16	3	70074	189.00	70074-C3	197.40	70074-C8	205.40
7/16-20	.335	.875	4	3/8	3-1/2	70076	203.90	70076-C3	213.40	70076-C8	223.80
1/2-13	.350	.875	4	3/8	3-1/2	70084	210.70	70084-C3	220.20		
1/2-20	.370	1.000	6	3/8	3-1/2	70086	221.20	70086-C3	230.70		
1/2-32	.370	1.000	6	3/8	3-1/2	70089	221.20	70089-C3	230.70		
9/16-12	.370	.875	4	3/8	3-1/2	70092	210.70	70092-C3	220.20		
9/16-18	.370	.875	4	3/8	3-1/2	70094	210.70	70094-C3	220.20		
5/8-11	.470	1.250	4	1/2	3-1/2	70104	260.50	70104-C3	274.70		
3/4-10	.495	1.250	4	1/2	3-1/2	70124	260.50	70124-C3	274.70		
3/4-12	.495	1.250	4	1/2	3-1/2	70126	260.50	70126-C3	274.70		
3/4-16	.490	1.250	4	1/2	3-1/2	70128	265.80	70128-C3	280.00		
7/8-9	.620	1.375	4	5/8	4	70132	388.30	70132-C3	403.70		
7/8-14	.490	1.250	4	1/2	3-1/2	70134	265.80	70134-C3	280.00		
1-8	.620	1.375	4	5/8	4	70154	388.30	70154-C3	403.70		
1-12	.745	1.500	6	3/4	4	70158	495.30	70158-C3	510.70		

*Straight flutes

THREAD MILLING CUTTERS

Multi-Form – UN Threads – For Hardened Steels



- Designed for threading hardened steels 46-68 Rc
- Cuts internal and external 60° UN threads
- Mill right hand and left hand threads
- Able to cut larger threads of the same pitch
- Variable helix design reduces chatter and harmonics and produces more accurate threads
- Latest generation AlTiN Nano coating offers superior hardness and heat resistance
- Select carbide grade for maximum tool life
- CNC ground in the USA

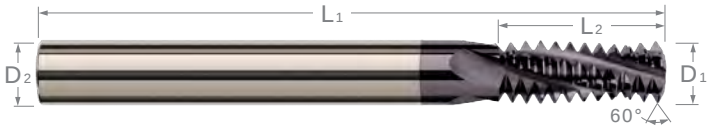
THREAD SIZE	CUTTER DIAMETER	LENGTH OF CUT	FLUTES	SHANK DIAMETER	OVERALL LENGTH	AlTiN NANO COATED	
	D_1 $^{+.000''}_{-.002''}$	L_2		D_2	L_1	TOOL #	PRICE
4-40	.085	.180	3	1/8	2	836716-C6	117.10
6-32	.100	.218	3	1/8	2	836722-C6	120.90
8-32	.115	.250	3	1/8	2	836728-C6	129.40
10-24	.120	.312	3	3/16	2	836734-C6	135.80
10-32	.120	.312	3	3/16	2	836736-C6	135.80
1/4-20	.180	.500	3	3/16	2-1/2	836744-C6	161.70
1/4-28	.180	.500	3	3/16	2-1/2	836746-C6	161.70
5/16-18	.240	.625	3	1/4	2-1/2	836754-C6	176.80
5/16-24	.240	.625	3	1/4	2-1/2	836756-C6	198.80
3/8-16	.285	.750	4	5/16	3	836764-C6	236.30
3/8-24	.285	.750	4	5/16	3	836766-C6	236.30
7/16-20	.335	.875	4	3/8	3-1/2	836776-C6	255.40
1/2-13	.350	.875	4	3/8	3-1/2	836784-C6	263.60
3/4-16	.495	1.250	4	1/2	3-1/2	836798-C6	335.00

View a comprehensive library of **Speeds & Feeds** charts for every Harvey Tool End Mill on the new Harveytool.com.

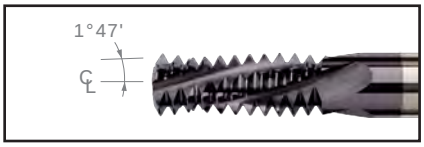
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THREAD MILLING CUTTERS

Multi-Form – N.P.T. Threads



- Cuts internal and external 60° National Pipe Taper (N.P.T.) threads
- Mills right hand and left hand threads
- Helical flutes
- Solid carbide
- CNC ground in the USA

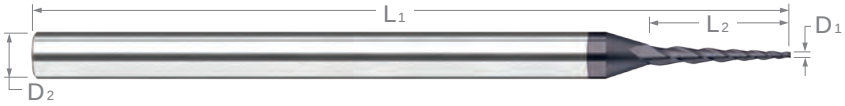


THREAD SIZE	CUTTER DIAMETER	LENGTH OF CUT	FLUTES	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN COATED		TiB_2 COATED	
	D_1 $^{+.0005''}_{-.0005''}$	L_2		D_2	L_1	TOOL #	PRICE	TOOL #	PRICE	TOOL #	PRICE
1/16, 1/8-27	.245*	.437	3	1/4	2-1/2	70204	143.30	70204-C3	150.50	70204-C8	151.00
1/4, 3/8-18	.305*	.625	4	5/16	3	70214	196.30	70214-C3	204.70	70214-C8	212.70
1/4, 3/8-18	.363*	.680	4	3/8	3-1/2	790414	208.80	790414-C3	218.30		
1/2, 3/4-14	.495*	.875	4	1/2	3-1/2	70226	229.00	70226-C3	243.20		
1,2-11.5	.620*	1.125	4	5/8	4	70232	323.60	70232-C3	339.00		

*Major cutter diameter

THREAD MILLING CUTTERS

N.P.T. Tapered End Mills – Square



1°47' Angle for NPT threads

- 1°47' angle for preparation of parts prior to internal or external NPT thread milling
- Length of cut and diameters designed for range of standard NPT dimensions
- 3 flutes
- Center cutting
- Solid carbide
- CNC ground in the USA



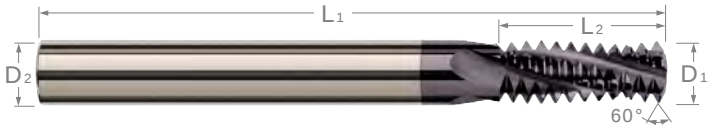
ANGLE PER SIDE	END DIAMETER	LENGTH OF CUT	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN NANO COATED	
A_1 $^{+0°30'}_{-0°30'}$	D_1 $^{+.0005''}_{-.0005''}$	L_2 $^{+.020''}_{-.000''}$	D_2 (h6)	L_1	3 FL	PRICE	3 FL	PRICE
1°47'	.200	**.625** (3x)	1/4	2	912282	58.90	912282-C6	69.50
	.300	**.900** (3x)	3/8	2-1/2	912286	73.50	912286-C6	85.40
	.400	**1.250** (3x)	1/2	3	912292	98.80	912292-C6	114.20

N.P.T. Thread Fit Chart

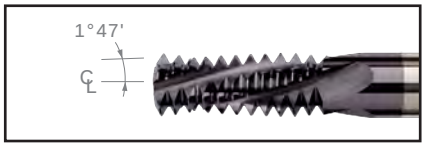
Thread Mill Tool #	Thread Size	Tapered End Mill Tool #
70204	1/16, 1/8-27	912282
70214, 790914	1/4, 3/8-18	912282, 912286
70226	1/2, 3/4-14	912286
70232	1, 2-11.5	912292

THREAD MILLING CUTTERS

Multi-Form – N.P.T.F. Threads



- Cuts internal and external 60° National Pipe Taper - Fuel (N.P.T.F.) threads
- Mills right hand and left hand threads
- Helical flutes
- Solid carbide
- CNC ground in the USA

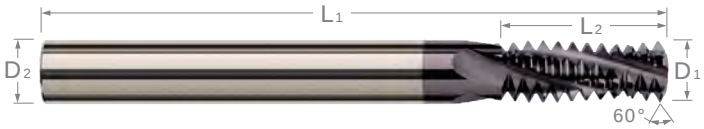


THREAD SIZE	CUTTER DIAMETER	LENGTH OF CUT	FLUTES	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN COATED	
	D_1 $^{+.0005''}_{-.0005''}$	L_2		D_2	L_1	TOOL #	PRICE	TOOL #	PRICE
1/16, 1/8-27	.245*	.437	3	1/4	2-1/2	784304	164.20	784304-C3	171.40
1/4, 3/8-18	.305*	.625	4	5/16	3	784314	197.90	784314-C3	206.30
1/2, 3/4-14	.495*	.875	4	1/2	3-1/2	784326	259.20	784326-C3	273.40
1, 2-11.5	.620*	1.125	4	5/8	4	784332	385.60	784332-C3	401.00

*Major Cutter Diameter

THREAD MILLING CUTTERS

Multi-Form – Metric



- Cuts internal and external 60° metric threads
- Mills right hand and left hand threads
- Able to cut larger threads of the same pitch
- Helical flutes
- Solid carbide
- CNC ground in the USA

THREAD SIZE	CUTTER DIAMETER	LENGTH OF CUT	FLUTES	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN COATED	
	D_1 $^{+.0005''}_{-.0005''}$	L_2		D_2	L_1	TOOL #	PRICE	TOOL #	PRICE
M3-0.50	.085	.178	3	1/8	2	16903	115.70	16903-C3	120.60
M4-0.70	.115	.276	3	1/8	2	16907	115.70	16907-C3	120.60
M4.5-0.75	.120	.250	3	1/8	2	16909	115.70	16909-C3	120.60
M5-0.80	.120	.312	3	1/8	2	16911	115.70	16911-C3	120.60
M6-1.00	.170	.500	3	3/16	2-1/2	16917	140.30	16917-C3	145.60
M8-1.25	.235	.625	3	1/4	2-1/2	16923	150.80	16923-C3	158.00
M10-1.50	.300	.750	4	5/16	3	16929	203.30	16929-C3	211.70
M12-1.75	.360	.875	4	3/8	3-1/2	16935	226.20	16935-C3	235.70
M14-1.50	.370	.875	4	3/8	3-1/2	16941	226.20	16941-C3	235.70
M16-2.00	.470	1.250	4	1/2	3-1/2	16947	278.50	16947-C3	292.70
M18-1.50	.490	1.250	4	1/2	3-1/2	16953	278.50	16953-C3	292.70
M20-2.50	.495	1.250	4	1/2	3-1/2	16959	278.50	16959-C3	292.70

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THREAD MILLING CUTTERS

Multi-Form – Coolant-Through – UN Threads



- Coolant through design for maximum chip ejection in blind holes
- Mills right hand and left hand 60° UN threads
- Able to cut larger threads of the same pitch
- Helical flutes
- Solid carbide
- CNC ground in the USA



Coolant-Fed for Chip Removal

THREAD SIZE	CUTTER DIAMETER	LENGTH OF CUT	FLUTES	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN COATED	
	D_1 $^{+.000''}_{-.002''}$	L_2		D_2	L_1	TOOL #	PRICE	TOOL #	PRICE
10-24	.145	.312	3	3/16	2-3/8	17334	111.50	17334-C3	116.80
10-32	.150	.312	3	3/16	2-3/8	17336	111.50	17336-C3	116.80
1/4-20	.180	.500	3	3/16	2-3/8	17344	135.10	17344-C3	140.40
1/4-28	.180	.500	3	3/16	2-3/8	17346	135.10	17346-C3	140.40
5/16-18	.235	.625	3	1/4	2-3/8	17354	145.50	17354-C3	152.70
5/16-24	.235	.625	3	1/4	2-3/8	17356	169.90	17356-C3	177.10
3/8-16	.285	.750	4	5/16	3	17364	196.00	17364-C3	204.40
3/8-24	.285	.750	4	5/16	3	17366	196.00	17366-C3	204.40
7/16-14	.305	.750	4	5/16	3	17374	196.00	17374-C3	204.40
7/16-20	.335	.875	4	3/8	3	17376	211.20	17376-C3	220.70
1/2-13	.350	.875	4	3/8	3	17384	217.90	17384-C3	227.40

THREAD MILLING CUTTERS

Multi-Form – Coolant-Through – Metric



- Coolant through design for maximum chip ejection in blind holes
- Mills right hand and left hand 60° Metric threads
- Able to cut larger threads of the same pitch
- Helical flutes
- Solid carbide
- CNC ground in the USA



Coolant-Fed for Chip Removal

THREAD SIZE	CUTTER DIAMETER	LENGTH OF CUT	FLUTES	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN COATED	
	D_1 $^{+.000''}_{-.002''}$	L_2		D_2	L_1	TOOL #	PRICE	TOOL #	PRICE
M3-0.50	.085	.1780	3	1/8	2	819624	122.00	819624-C3	126.90
M4-0.70	.115	.2760	3	1/8	2	819626	122.00	819626-C3	126.90
M5-0.80	.120	.3125	3	1/8	2	819628	122.00	819628-C3	126.90
M6-1.00	.170	.5000	3	3/16	2-1/2	819630	148.10	819630-C3	153.40
M8-1.25	.235	.6250	3	1/4	2-1/2	819632	159.10	819632-C3	166.30

THREAD MILLING CUTTERS

Multi-Form – Long Flute – UN Threads



Designed for Deep Threaded Applications!

- Designed for deep threaded applications
- Larger cutter diameter for maximum strength
- Due to increased cutter diameter, tools are designed to achieve 60% threads
- Cuts internal 60° UN threads only
- Mills right hand and left hand threads
- Able to cut larger threads of the same pitch
- Helical flutes
- Solid carbide
- CNC ground in the USA

THREAD SIZE	CUTTER DIAMETER	LENGTH OF CUT	FLUTES	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN COATED		TiB_2 COATED	
	D_1 $^{+.0005''}_{-.0005''}$	L_2		D_2	L_1	TOOL #	PRICE	TOOL #	PRICE	TOOL #	PRICE
2-56	.069	.215	3*	1/8	2	987110	109.20	987110-C3	114.10	987110-C8	116.40
3-48	.079	.250	3	1/8	2	987112	114.60	987112-C3	119.50		
4-40	.089	.275	3	1/8	2	987116	114.60	987116-C3	119.50	987116-C8	121.80
6-32	.110	.375	3	1/8	2	987122	114.60	987122-C3	119.50	987122-C8	121.80
8-32	.131	.407	3	3/16	2-1/2	987128	122.00	987128-C3	127.30	987128-C8	129.20
8-36	.131	.417	3	3/16	2-1/2	987131	128.30	987131-C3	133.60		
10-24	.145	.500	3	3/16	2-1/2	987134	150.50	987134-C3	155.80	987134-C8	157.70
10-32	.150	.500	3	3/16	2-1/2	987136	150.50	987136-C3	155.80	987136-C8	157.70
1/4-20	.195	.750	3	1/4	2-1/2	987144	153.00	987144-C3	160.20	987144-C8	160.70
1/4-28	.195	.750	3	1/4	2-1/2	987146	153.00	987146-C3	160.20	987146-C8	160.70
5/16-18	.245	.944	3	5/16	3	987154	198.60	987154-C3	207.00		
5/16-24	.245	.958	3	5/16	3	987156	203.90	987156-C3	212.30		
3/8-16	.300	1.125	4	3/8	3-1/2	987164	236.80	987164-C3	246.30		
3/8-24	.300	1.125	4	3/8	3-1/2	987166	243.70	987166-C3	253.20		
7/16-20	.350	1.300	4	3/8	3-1/2	987176	243.70	987176-C3	253.20		
1/2-13	.400	1.308	4	1/2	3-1/2	987184	247.20	987184-C3	261.40		

*Straight flutes

THREAD MILLING CUTTERS

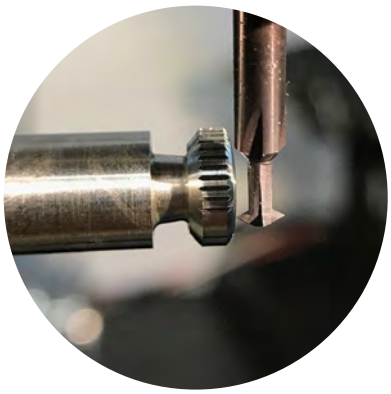
Multi-Form – Long Flute – Metric



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- Helical flutes
- Solid carbide
- CNC ground in the USA

THREAD SIZE	CUTTER DIAMETER	LENGTH OF CUT	FLUTES	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN COATED	
	D_1 $^{+.0005''}_{-.0005''}$	L_2		D_2	L_1	TOOL #	PRICE	TOOL #	PRICE
M3-0.50	.090	.276	3	1/8	2	842903	135.00	842903-C3	139.90
M4-0.70	.124	.441	3	3/16	2-1/2	842907	138.30	842907-C3	143.60
M5-0.80	.155	.504	3	3/16	2-1/2	842911	135.40	842911-C3	140.70
M6-1.00	.186	.748	3	1/4	2-1/2	842917	160.10	842917-C3	167.30
M8-1.25	.245	.984	3	5/16	2-1/2	842923	205.90	842923-C3	214.30
M10-1.50	.311	1.122	4	3/8	3-1/2	842929	258.30	842929-C3	267.80
M16-2.00	.490	1.890	4	1/2	3-1/2	842947	333.90	842947-C3	348.10



★★★★★

"Using my @harveytool 60 degree double angle cutter to mill some texture into a crown for a 1 in 30 piece."

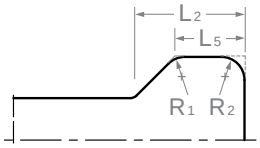
— @horological

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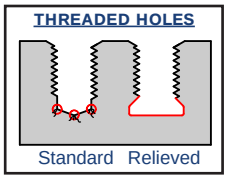
THREAD MILLING CUTTERS

Thread Relief Cutter





- Tool designed to relieve stress concentrations at corners of undercut and bottom of last thread to prevent fracture and failure
- Relief is typically done before threading operation to avoid damaging the thread forms
- Chamfer eliminates burrs and partial threads at last thread
- Flattens bottom of hole to achieve maximum thread depth
- Center cutting
- Solid carbide
- CNC ground in the USA



CUTTER DIA. D_1 +.000″ −.001″	LOC L_2 +.002″ −.000″	WIDTH (TSC) L_5	RADIUS 1 R_1 +.001″ −.001″	RADIUS 2 R_2 +.001″ −.001″	NECK DIA. D_3	NECK LENGTH L_3 +.010″ −.000″	RADIAL DOC	SHANK DIA. D_2	OAL L_1	UNCOATED 4 FL	UNCOATED PRICE	AlTiN COATED 4 FL	AlTiN COATED PRICE
.066	.029	.015	.000	.005	.036	.172	.014	1/8	1-1/2	896602	56.70	896602-C3	61.60
.075	.030	.015	.000	.005	.042	.187	.015	1/8	1-1/2	877502	54.30	877502-C3	59.20
.084	.038	.020	.000	.005	.045	.218	.018	3/16	2	988804	52.70	988804-C3	58.00
.102	.049	.025	.000	.010	.051	.281	.024	3/16	2	985707	53.70	985707-C3	59.00

D_1 +.000″ −.002″	L_2 +.005″ −.000″	L_5	R_1 +.001″ −.001″	R_2 +.001″ −.001″	D_3	L_3 +.030″ −.000″		D_2	L_1	4 FL	PRICE	4 FL	PRICE
.125	.054	.030	.000	.010	.074	.343	.024	1/4	2-1/2	979609	65.20	979609-C3	72.40
.142	.050	.020	.000	.010	.078	.359	.030	1/4	2-1/2	975405	66.70	975405-C3	73.90
.168	.050	.020	.000	.010	.103	.422	.030	1/4	2-1/2	955305	65.20	955305-C3	72.40
.193	.055	.020	.000	.010	.118	.547	.035	1/4	2-1/2	952505	67.00	952505-C3	74.20
.193	.075	.040	.015	.015	.118	.547	.035	1/4	2-1/2	952516	67.00	952516-C3	74.20
.245	.072	.030	.000	.010	.155	.797	.042	1/4	2-1/2	946009	69.60	946009-C3	76.80
.245	.102	.060	.020	.020	.155	.797	.042	1/4	2-1/2	946027	69.60	946027-C3	76.80
.355	.086	.030	.000	.010	.236	1.078	.056	3/8	2-1/2	942909	108.40	942909-C3	117.90
.355	.116	.060	.020	.020	.236	1.078	.056	3/8	2-1/2	942927	108.40	942927-C3	117.90
.355	.136	.080	.030	.030	.236	1.078	.056	3/8	2-1/2	942931	108.40	942931-C3	117.90

View a comprehensive library of **Speeds & Feeds** charts for every Harvey Tool End Mill on the new Harveytool.com.

Access **Simulation Files** in DXF format for every Harvey Tool product, downloadable now from the new Harveytool.com

TOOL HOLDERS

Browse a fully stocked and expanded offering of Tool Holders and Collets, including Extended Reach Tool Holders, Solid ER Integrated Tool Holders, Saw Arbors, ER Collets, ER Performance Collets, and accompanying nuts and wrenches. When your machine setup includes a Harvey Tool holder and collet, you can rest assured that you'll maximize tool performance and repeatability.

Tool Holders 484

Extended Reach Tool Holders & Collets 484



Solid ER Integrated Tool Holders 485



Solid ER Integrated Tool Holders – Coolant-Through 485



Saw Arbors 486



Collets 487

ER Collets 487

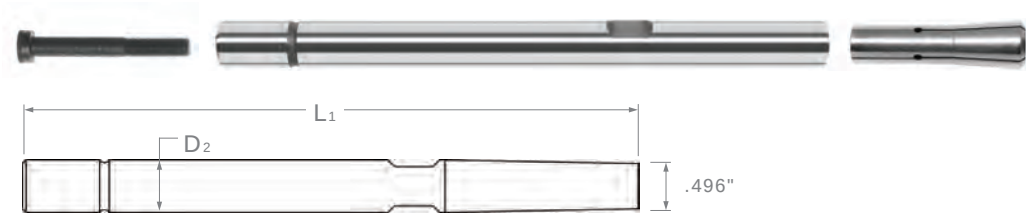


ER Performance Collets 488



TOOL HOLDERS

Extended Reach Tool Holders & Collets



- Center gripping collet with threaded draw screw
- More accurate than traditional single-set screw type holders
- High precision concentricity and rigidity
- Maximum T.I.R. of .0002" from shank to collet pocket
- Quick tool changes
- Coolant through capable
- Wrench included
- Collet not included — choose from many sizes
- Two offsetting flats to maintain T.I.R.
- Use with mills, lathes, and grinders



Center Gripping Collet Design.
Choose from Six Sizes!

Tool Holders

SHANK DIAMETER	OVERALL LENGTH	TOOL HOLDERS (Collet Not Included)	
D_2	L_1	TOOL #	PRICE
1/2	3	36730	225.10
1/2	5	36750	237.00
1/2	6	36760	251.20

Collets

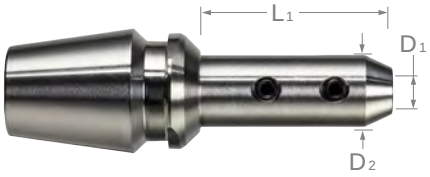
mm & in

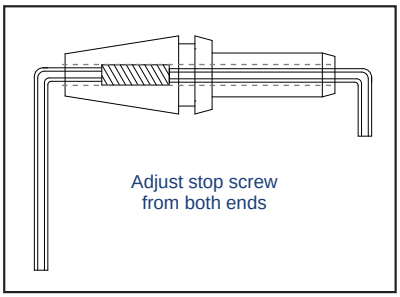
COLLET SIZE	TOOL #	PRICE
1/8	36810	74.90
3/16	36820	74.90
1/4	36830	74.90
3 mm	36840	74.90
4 mm	36850	74.90
6 mm	36860	74.90



TOOL HOLDERS

Solid ER Integrated Tool Holders



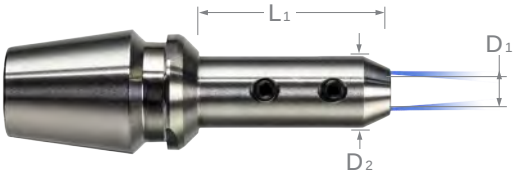


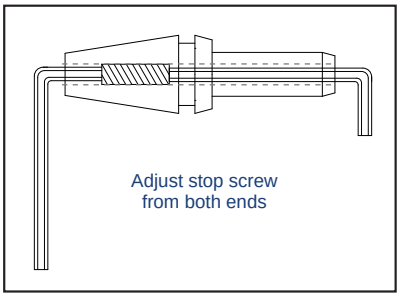
- Reached taper integrated holder that eliminates the need for multiple spindle accessories
- Designed for Turn Mill Centers and Machining Centers
- Works with any ER holder or spindle
- Multiple reaches
- Maximum T.I.R. of <.0002”
- Capable of quick change with included stop screw
- Stop screw can be adjusted from both ends of holder

BORE DIAMETER	SHAFT DIAMETER	PROJECTION LENGTH	TAPER	TOOL HOLDERS	
D_1	D_2	L_1		TOOL #	PRICE
.1250	9.5 mm	16 mm	ER16	83001	271.60
.1250	9.5 mm	25 mm	ER16	83003	271.60
.1875	9.5 mm	16 mm	ER16	83002	271.60
.1875	9.5 mm	25 mm	ER16	83004	271.60
.2500	12.5 mm	14 mm	ER20	83005	318.20
.2500	12.5 mm	25 mm	ER20	83006	318.20

TOOL HOLDERS

Solid ER Integrated Tool Holders – Coolant-Through



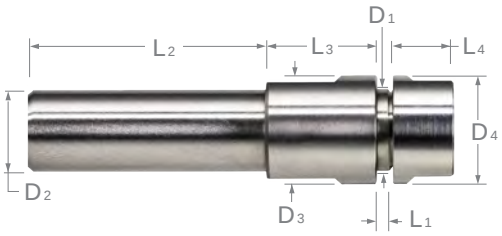


- Reached taper integrated holder that eliminates the need for multiple spindle accessories
- Designed for Turn Mill Centers and Machining Centers
- Works with any ER holder or spindle
- Multiple reaches
- Maximum T.I.R. of <.0002”
- Capable of quick change with included stop screw
- Compatible with coolant through holders
- Stop screw can be adjusted from both ends of holder

BORE DIAMETER	SHAFT DIAMETER	PROJECTION LENGTH	TAPER	TOOL HOLDERS	
D_1	D_2	L_1		TOOL #	PRICE
.1250	9.5 mm	25 mm	ER16	83203	349.30

SAW ARBORS

Straight Shank



- Maximum T.I.R. of .0001”
- Straight shank allows for chucking at multiple depths
- Key not included

ARBOR DIAMETER	ARBOR LENGTH	SHANK DIAMETER	SHANK LENGTH	FLANGE DIAMETER	FLANGE LENGTH	NUT DIAMETER	NUT LENGTH	THREAD LENGTH (IN FRONT OF ARBOR)	SAW ARBORS	
D_1	L_1	D_2	L_2	D_3	L_3	D_4	L_4		TOOL #	PRICE
.375	.050	.375	1.40	.500	.500	.500	.276	.300	84101	242.10
.500	.050	.500	1.40	.625	.500	.625	.276	.300	84102	242.10
1.000	.125	.750	2.00	1.250	1.500	1.250	.437	.500	84103	309.40

For Slitting Saws, see pages 366-368.

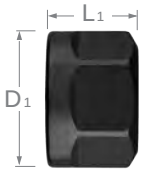
ER COLLETS



- Maximum T.I.R. of .0004”
- High polished finish helps resists oxidation
- Related nut and wrench sold separately

SIZE	BORE DIAMETER	CLAMP RANGE	ER COLLETS	
	D_1		TOOL #	PRICE
ER11	1/8	.086 - .125	82401	15.70
ER16	1/8	.086 - .125	82402	17.10
ER16	3/16	.148 - .187	82403	17.10
ER16	1/4	.211 - .250	82404	17.10

ER COLLETS
Nuts



- Special anti-friction coating increases clamping pressure of tool shank

SIZE	HEAD DIAMETER	NUT LENGTH	THREAD SIZE	MAX TORQUE	ER NUTS	
	D_1	L_1			TOOL #	PRICE
ER11	19 mm	12 mm	M14 x 0.75	25 ft. lbs	82461	29.30
ER16	27.5 mm	18 mm	M22 x 1.5	42 ft. lbs	82462	29.30

ER COLLETS
Wrenches



SIZE	LENGTH	WIDTH	THICKNESS	ER WRENCHES	
				TOOL #	PRICE
ER11	4.80	1.50	0.20	82481	14.00
ER16	5.60	2.00	0.20	82482	14.00

ER PERFORMANCE COLLETS



- Specialized, low profile design reduces radial distortion and improves repeatability during tool changeover
- Maximum T.I.R. of .0002"
- Works with any ER holder or spindle
- High polished finish helps resist oxidation
- Related nut and wrench sold separately

SIZE	BORE DIAMETER	CLAMP RANGE	ER PERFORMANCE COLLETS	
	D_1		TOOL #	PRICE
ER11	1/8	.1050 - .1250	85501	36.60
ER16	1/8	.1050 - .1250	85502	36.60
ER16	3/16	.1470 - .1875	85503	36.60
ER16	1/4	.2100 - .2500	85504	36.60

ER PERFORMANCE COLLETS

Nuts



- Provides increased clamping pressure on tool shank which reduces vibration and increases tool life
- Allows collet to sit further into the collet pocket, creating a more concentric tool
- Special anti-friction coating increases clamping pressure of tool shank

SIZE	HEAD DIAMETER	NUT LENGTH	THREAD SIZE	MAX TORQUE	ER PERFORMANCE NUTS	
	D_1	L_1			TOOL #	PRICE
ER11	18 mm	12 mm	M14 x 0.75	25 ft. lbs	85561	35.80
ER16	26 mm	14 mm	M22 x 1.5	42 ft. lbs	85562	35.80

ER PERFORMANCE COLLETS

Wrenches



SIZE	LENGTH	WIDTH	THICKNESS	ER PERFORMANCE WRENCHES	
				TOOL #	PRICE
ER11	Please see page 443 for ER11 Wrench size				
ER16	6.50	2.20	0.20	85582	34.90



IN THE LOUPE

Your Source for Machining Solutions

Our corporate blog, In the Loupe, is dedicated to machining how-tos, technical tips, and tool selection guides. Access helpful resources at any time and share them easily with fellow machinists at www.harveyperformance.com/in-the-loupe/.



How to Avoid Common Part Finish Problems



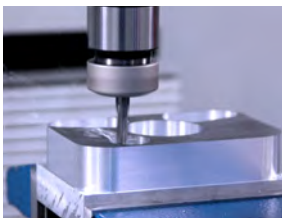
Optimize Roughing with Chipbreaker Tooling



Why Flute Count Matters



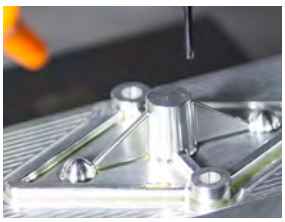
Titanium Machining Guide



How to Avoid 4 Major Types of Tool Wear



Ball Nose Milling Strategy



Corner Engagement: How to Machine Corners



Introduction to High Efficiency Milling

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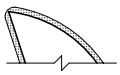
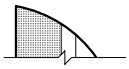
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COATINGS & SUBSTRATES CHART

Coating / Substrate:	TiN Titanium Nitride -C1	AlTiN Aluminum Titanium Nitride -C3	AlTiN Nano Aluminum Titanium Nitride Nano -C6
Application / Benefits:	• General purpose coating for machining ferrous materials.	• High performance coating in ferrous materials. • Excellent high temperature resistance and hardness. • Maintains high surface hardness at elevated temperatures improving tool life and allowing faster feed rates. • Produces aluminum oxide layer at high temperature which reduces thermal conductivity, transferring heat into the chip. • Excellent in dry machining, machining titanium alloys, inconel, stainless alloys and cast iron. • Not recommended for use in aluminum and aluminum alloys.	• Premium coating in ferrous materials. • Latest generation AlTiN coating mixed with silicon to produce a unique nanocomposite coating. This structure improves hardness, heat resistance, and toughness over traditional AlTiN coatings. • Superior results, extended tool life and reduced cycle times over traditional AlTiN coatings in demanding applications where setup minimizes runout and vibration. • Not recommended for use in aluminum and aluminum alloys.
Materials:	Ferrous Materials & Exotic Metals		
	General Purpose Ferrous Materials	Alloy steels, stainless steels, tool steels, titanium, inconel, nickel and other aerospace materials	Hardened steels, hardened stainless, nickel based alloys, tool steels, titanium alloys, inconel and other aerospace materials
Color:	Gold	Dark Gray / Black	Blue / Black
Structure:	Mono-layer	Multi-layer	Nano Composite Multi-layer
Hardness (HV 0.05):	2447 (24 GPa)	3569 (35 GPa)	4181 (41 GPa)
Coefficient of Friction:	.40	.70	.40
Coating Thickness (microns):	2 - 5	2 - 5	1 - 4
Max. Working Temp:	1000° F	1400° F	2100° F

PLEASE NOTE: Information and test results were compiled from multiple sources and testing methods. Data presented is intended to be a general application guideline for comparing various coatings / substrates.

COATINGS & SUBSTRATES CHART

ZrN Zirconium Nitride -C7	**TiB_2** Titanium Diboride -C8	**Amorphous Diamond** Diamond-Like Coating -C4	**CVD Diamond (4 µm)** Crystalline CVD Diamond	**CVD Diamond (9 µm)** Crystalline CVD Diamond	**PCD Diamond** Polycrystalline Diamond
• High hardness, lubricity and abrasion resistance. • Improves performance over uncoated carbide in a wide variety of non-ferrous materials. • Less expensive alternative to diamond.	• Primary benefit over other non-ferrous coatings is extremely low affinity to aluminum. • Prevents build-up on cutting edge, chip packing and extends tool life. • Recommended in Aluminum Alloys and Magnesium Alloys. • Not ideally suited for abrasive varieties of these alloys.	• A PVD amorphous diamond coating which improves lubricity and wear resistance in non-ferrous materials. • Coating is thin relative to CVD diamond, preventing edge rounding. • Sharp edges improve results (performance and finish) over CVD in certain abrasive, non-ferrous materials (copper, brass, high silicon aluminum). • Low temperature threshold makes diamond unsuitable for ferrous applications.  Thin coating maintains sharper edge.	• True Crystalline CVD diamond is grown directly into a carbide end mill. • Dramatically improves hardness. • Hardness improves abrasion resistance and allows higher feed rates than uncoated carbide. • Ideal for machining Graphite, Composites, Green Carbide, and Green Ceramics. • Thinner CVD layer yields a sharper cutting edge compared to the standard CVD coating and leaves a smoother finish on non-ferrous materials • Low temperature threshold makes diamond unsuitable for ferrous applications.  4 µm CVD diamond layer for a balance between wear resistance and edge sharpness.	• True Crystalline CVD diamond is grown directly into a carbide end mill. • Dramatically improves hardness. • Hardness improves abrasion resistance and allows higher feed rates than uncoated carbide. • Ideal for machining Graphite, Composites, Green Carbide, and Green Ceramics. • Diamond layer approx 5 times thicker than Amorphous Diamond, improving wear resistance. • Low temperature threshold makes diamond unsuitable for ferrous applications.  9 µm diamond layer for increased wear resistance.	• PCD diamond is manufactured as a carbide backed flat wafer. The wafer is brazed to a carbide body to form an end mill. • PCD has excellent hardness and abrasion resistance, and is the thickest diamond layer we offer. • Sharply ground cutting edges and thick diamond layer combine the sharp edge benefits of Amorphous Diamond with the abrasion resistance of CVD Diamond. • Low temperature threshold makes diamond unsuitable for ferrous applications.  Thickest diamond layer ground to sharp edge.
Non-Ferrous & Non-Metallic Materials					
Abrasive non-ferrous alloys such as Brass, Bronze, Copper and Abrasive Aluminum Alloys	Aluminum Alloys, Magnesium Alloys	Abrasive Plastics, Graphite, Carbon Fiber Materials, Composites, Aluminum, Copper, Brass, Bronze, Carbon, Gold, Silver, Magnesium, Zinc	Graphite, Composites, Green Carbide, Green Ceramics	Graphite, Composites, Green Carbide, Green Ceramics	Abrasive Plastics, Graphite, Carbon Fiber Materials, Composites, Aluminum, Copper, Brass, Bronze, Carbon, Gold, Silver, Magnesium, Zinc, Green Carbide, Green Ceramics
Light Gold / Champagne	Light Gray / Silver	Charcoal / Gray	Gray	Gray	Gray / Black
Mono-layer	Mono-layer	Mono-layer	True Crystalline CVD Multi-Layer	True Crystalline CVD Multi-Layer	Polycrystalline Diamond (Carbide Backed)
2243 (22 GPa)	2804 (27.5 GPa)	7954 - 8973 (78 - 88 GPa)	8973 - 9993 (88 - 98 GPa)	8973 - 9993 (88 - 98 GPa)	8973 - 9993 (88 - 98 GPa)
.40	.35	.10	.05 - .30	.05 - .30	.05 - .20
2 - 5	1 - 3	.5 - 2.5	3 - 5	8 - 10	.010" - .030" Solid PCD Layer
1100° F	900° F	750° F	1100° F	1100° F	1100° F

PLEASE NOTE: Information and test results were compiled from multiple sources and testing methods. Data presented is intended to be a general application guideline for comparing various coatings / substrates.

INDEX BY SERIES ID

SERIES	PG	SERIES	PG	SERIES	PG	SERIES	PG	SERIES	PG	SERIES	PG
10000	35	15400	269	19500	328	23400	461	27300	336	31100	109
10100	36	16000	380	20000	444	23500	352	27400	271	31200	34
10200	58	16100	381	20100	444	23600	321	27500	326	31300	34
10300	58	16200	326	20200	445	23700	321	27600	311	31400	102
10800	65	16400	386	20300	446	23800	392	27800	200	31500	104
11000	464	16500	387	20400	447	23900	393	27900	200	31600	370
11400	448	16600	388	20500	83	24000	80	28000	85	31700	374
11500	449	16700	388	20600	83	24100	198	28100	62	31800	15
11600	450	16800	389	20700	83	24200	198	28200	336	31900	19
11700	450	16900	478	20800	84	24300	165	28300	34	32000	102
12000	214	17000	370	20900	84	24400	167	28400	34	32100	104
12100	213	17100	374	21000	370	24500	40	28500	387	32200	44
12200	214	17200	375	21100	374	24600	40	28600	64	32300	46
12500	16	17300	479	21200	375	24700	60	29000	382	32400	66
12600	46	17400	34	21300	57	24800	57	29100	382	32600	88
12700	15	17500	34	21400	57	24900	57	29200	382	32800	369
12800	44	17600	81	21500	87	25000	303	29300	382	32900	365
12900	273	17700	57	21600	87	25100	303	29400	86	33000	108
13600	35	17800	57	21700	87	25200	310	29500	253	33100	109
13700	36	17900	464	21800	87	25300	310	29600	320	33200	25
13800	58	18000	293	21900	87	25400	463	29700	325	33300	31
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14300	274	18500	275	22500	342	26500	270	30300	311	33800	102
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14800	58	18700	275	22700	257	26700	34	30500	304	34000	44
14900	59	18800	57	22800	257	26800	328	30600	108	34100	46
15100	14	18900	57	22900	257	26900	311	30700	109	34200	50
15200	14	19000	156	23100	252	27000	385	30800	34	34300	55
15300	269	19100	327	23200	252	27100	84	30900	34	34400	88
15300-2	266	19200	328	23300	461	27200	61	31000	108	34600	25

INDEX BY SERIES ID (CONT.)

SERIES	PG
34700	31
34800	67
34900	15
35000	20
35100	44
35200	46
35300	88
35400	25
35500	31
35600	50
35700	55
35800	15
35900	20
36000	44
36100	46
36200	67
36300	204
36400	204
36500	209
36600	209
36700	484
36800	484
36900	157
37100	74
37200	77
37300	157
37400	157
37500	449
37700	157
37800	102
37900	104
38000	25
38100	32

SERIES	PG
38200	450
38300	74
38400	77
38500	157
38700	102
38800	104
38900	157
39000	158
39100	330
39200	158
39300	158
39400	74
39500	77
39700	252
39800	450
39900	451
40000	158
40100	50
40200	108
40300	109
40400	158
40500	158
40600	108
40700	109
40800	158
40900	158
41000	451
41100	86
41300	252
41400	466
41500	74
41600	77
41700	74

SERIES	PG
41800	77
41900	74
42000	77
42100	77
42200	78
42300	77
42400	78
42600	78
42700	75
42800	77
42900	75
43000	77
43100	75
43200	77
43300	363
43400	364
43500	337
43600	361
43700	338
43800	361
43900	339
44000	376
44100	377
44200	377
44300	362
44400	361
44500	361
44600	362
44700	61
44800	218
44900	218
45000	379
45100	327

SERIES	PG
45200	61
45300	370
45400	61
45500	62
45600	159
45700	161
45800	332
45900	369
46000	376
46100	377
46200	377
46300	377
46400	66
46500	272
46600	332
46700	67
46800	124
46900	128
47200	61
47300	326
47400	67
47500	307
47600	275
47700	320
47800	25
47900	50
48100	307
48300	320
48400	308
48500	275
48600	220
48700	221
48800	307

SERIES	PG
48900	25
49000	31
49100	308
49200	50
49300	55
49400	307
49500	228
49600	228
49700	307
49800	220
49900	221
50000	190
50100	192
50200	13
50300	13
50400	321
50600	275
50700	311
50800	308
50900	43
51000	43
51100	216
51200	216
51300	63
51400	216
51500	216
51600	63
51700	307
51800	216
51900	216
52000	349
52100	288
52200	124

SERIES	PG
52300	128
52400	216
52500	216
52600	159
52700	161
52800	252
52900	253
53000	190
53100	192
53300	165
53400	167
53500	288
53600	124
53700	128
53800	159
53900	161
54000	230
54100	230
54200	466
54300	378
54400	187
54500	187
54600	252
54700	288
54800	132
54900	134
55000	163
55100	164
55200	252
55300	378
55400	230
55500	230
55600	288

INDEX BY SERIES ID (CONT.)

SERIES	PG	SERIES	PG	SERIES	PG	SERIES	PG	SERIES	PG	SERIES	PG
55700	378	59100	139	62800	165	66100	325	69400	338	72700	307
55800	449	59200	380	62900	211	66200	212	69500	238	72800	68
55900	350	59300	307	63000	132	66300	389	69600	238	72900	65
56000	378	59400	50	63100	135	66400	212	69700	341	73000	10
56100	121	59500	55	63200	211	66500	211	69800	230	73100	13
56200	123	59700	380	63300	212	66600	157	69900	230	73900	65
56300	392	59800	380	63400	387	66700	196	70000	474	74000	40
56400	230	59900	308	63500	167	66800	197	70100	474	74100	43
56500	394	60000	294	63600	121	66900	157	70200	476	74200	65
56600	154	60100	380	63700	123	67000	157	70300	342	74300	40
56700	155	60200	220	63800	163	67100	196	70400	238	74400	43
56800	288	60300	221	63900	164	67200	197	70500	238	74500	68
56900	378	60400	380	64000	208	67300	157	70600	230	74600	43
57000	335	60500	307	64100	211	67400	370	70700	230	75000	298
57100	335	60600	380	64200	154	67500	363	70800	339	75100	299
57200	288	60700	21	64300	155	67600	370	70900	345	75200	66
57300	378	60800	21	64400	132	67700	363	71000	466	75500	65
57400	378	60900	380	64500	134	67800	372	71100	342	75800	65
57500	378	61000	207	64600	387	67900	363	71200	343	76000	207
57600	307	61100	208	64700	212	68000	370	71300	228	76200	22
57700	380	61500	385	64800	121	68100	374	71400	228	76300	23
57800	136	61600	211	64900	123	68200	375	71500	343	76400	22
57900	139	61700	190	65000	211	68300	363	71600	327	76500	23
58000	380	61800	192	65100	388	68400	363	71700	328	76600	48
58100	292	61900	211	65200	207	68500	165	71800	343	76700	49
58200	307	62000	207	65300	208	68600	168	71900	66	76800	48
58300	25	62100	208	65400	154	68700	138	72000	10	76900	49
58400	32	62200	211	65500	155	68800	140	72100	13	77000	20
58500	380	62300	386	65600	212	68900	166	72200	266	77100	46
58600	307	62400	163	65700	335	69000	168	72300	267	77800	374
58700	380	62500	164	65800	335	69100	137	72400	275	81200	294
58900	307	62600	136	65900	211	69200	140	72500	275	82400	487
59000	136	62700	139	66000	325	69300	230	72600	328	83000	485

INDEX BY SERIES ID (CONT.)

SERIES	PG	SERIES	PG	SERIES	PG	SERIES	PG	SERIES	PG	SERIES	PG
83200	485	762600	70	767100	230	771500	279	775400	253	779600	383
84100	486	762700	72	767300	161	771600	472	775600	146	779700	384
85500	488	762800	73	767500	230	771700	470	775800	226	780000	384
736700	233	762900	317	767700	230	771800	466	775900	226	780100	383
736800	233	763000	71	767800	249	771900	327	776000	35	780200	383
759300	72	763200	130	768000	52	772000	290	776100	36	780300	384
759400	73	763300	316	768100	55	772100	290	776200	57	780600	384
759500	359	763600	279	768200	210	772200	300	776300	57	780700	383
759600	160	763700	98	768400	75	772300	328	776400	355	780800	383
759900	328	763800	98	768500	77	772400	360	776500	354	780900	384
760000	213	763900	318	768700	230	772500	289	776600	334	781200	384
760100	395	764000	279	768900	230	772700	472	776700	354	781300	383
760200	379	764100	289	769000	178	772800	329	776800	354	781400	383
760400	95	764200	279	769100	178	772900	467	776900	168	781600	96
760600	38	764300	72	769200	52	773000	139	777000	356	781800	109
760700	38	764400	73	769300	55	773200	470	777100	354	781900	109
760800	86	764500	278	769500	254	773300	326	777200	57	782000	109
760900	128	764600	298	769600	231	773400	300	777300	57	782100	109
761000	194	764700	313	769700	231	773500	360	777400	337	782300	109
761100	195	764800	278	769800	233	773600	285	777500	279	782400	109
761300	96	765000	285	769900	233	773700	258	777600	278	782500	109
761400	469	765100	279	770000	181	773900	158	777800	91	782700	109
761500	98	765300	285	770200	231	774000	146	777900	331	782800	109
761600	98	765400	279	770300	231	774100	146	778000	334	782900	109
761700	38	765500	288	770500	371	774200	252	778100	57	783100	109
761800	38	765700	78	770600	215	774400	258	778300	166	783200	109
761900	84	765800	77	770700	215	774600	158	778500	166	783300	109
762000	72	766000	77	770800	18	774700	146	778700	161	783500	109
762100	73	766300	81	771000	328	774900	324	778800	119	783600	109
762200	71	766500	78	771100	360	775000	318	779000	313	783700	109
762300	327	766600	249	771200	300	775100	334	779100	384	783900	109
762400	317	766800	75	771300	11	775200	57	779400	384	784000	109
762500	318	766900	77	771400	14	775300	57	779500	383	784100	109

INDEX BY SERIES ID (CONT.)

SERIES	PG	SERIES	PG	SERIES	PG	SERIES	PG	SERIES	PG	SERIES	PG
784300	477	788700	289	792800	356	797300	127	801700	27	805700	49
784400	292	789000	285	792900	327	797500	121	801900	240	805800	49
784500	268	789200	32	793000	311	797600	123	802000	240	805900	375
784600	228	789300	39	793200	221	797700	99	802100	88	806000	373
784700	228	789400	93	793300	301	797800	99	802300	24	806100	370
784800	268	789500	93	793400	377	798000	96	802400	22	806200	344
784900	287	789600	198	793500	377	798100	93	802500	24	806300	342
785000	287	789800	253	793600	71	798200	93	802600	18	806400	340
785200	242	789900	255	793700	355	798400	241	802700	20	806500	339
785400	135	790000	283	793800	118	798500	241	802800	277	806600	337
785600	135	790100	118	793900	356	798600	215	803000	240	806700	391
785800	257	790200	278	794000	288	798700	215	803100	50	806800	391
785900	88	790300	279	794100	279	798800	244	803200	55	806900	328
786000	94	790400	476	794200	283	798900	244	803300	58	807000	327
786100	94	790500	113	794300	253	799000	242	803500	58	807100	327
786200	94	790700	113	794600	250	799200	86	803700	240	807200	328
786300	94	790900	278	794700	244	799300	86	803800	240	807300	328
786400	127	791000	327	794800	244	799400	86	803900	449	807400	327
786600	124	791100	185	794900	207	799500	205	804000	450	807600	327
786900	255	791200	186	795000	208	799600	206	804100	451	807800	328
787000	289	791300	115	795100	207	799700	201	804200	60	807900	328
787100	119	791500	240	795200	208	799800	202	804300	68	808000	326
787300	69	791600	240	795300	182	800000	77	804400	130	808100	283
787500	69	791700	279	795400	168	800200	77	804500	63	808200	283
787700	449	791800	302	795500	125	800300	74	804800	82	808300	261
787900	253	791900	328	795800	135	800500	74	804900	82	808500	259
788000	283	792000	327	795900	133	800700	96	805000	82	808600	258
788100	292	792100	179	796100	132	800800	71	805100	82	808700	237
788200	264	792200	181	796400	129	800900	69	805200	82	808800	237
788300	289	792300	161	796500	126	801100	69	805300	53	808900	246
788400	288	792500	143	796700	125	801300	50	805400	55	809000	246
788500	289	792600	144	796900	125	801400	55	805500	49	809100	246
788600	289	792700	302	797100	126	801500	44	805600	49	809200	246

INDEX BY SERIES ID (CONT.)

SERIES	PG
809300	245
809400	245
809500	245
809600	245
809700	278
809900	262
810000	444
810100	444
810200	445
810300	17
810500	67
810600	63
810800	67
810900	66
811000	49
811200	118
811300	120
811400	388
811500	318
811600	318
811700	318
811800	133
812100	132
812300	115
812500	98
812600	98
812700	98
812800	98
812900	102
813000	104
813100	102
813200	104
813500	95

SERIES	PG
813600	96
813800	146
813900	182
814000	183
814100	182
814200	183
814300	182
814400	183
814500	118
814700	313
814800	148
814900	149
815300	446
815400	447
815600	164
815700	164
815800	450
815900	451
816000	448
816100	449
816200	131
816400	129
816500	164
816600	164
816800	162
817000	308
817100	307
817200	271
817300	164
817400	319
817500	318
817600	318
817700	319

SERIES	PG
817900	318
818000	18
818100	20
818200	312
818300	309
818500	240
818600	205
818700	206
818800	312
818900	309
819000	92
819100	92
819300	210
819400	312
819600	479
819800	260
819900	260
820000	312
820100	309
820200	277
820300	466
820400	210
820600	465
820700	112
820800	317
820900	316
821000	316
821100	317
821200	316
821300	112
821400	466
821800	328
821900	288

SERIES	PG
822000	306
822100	327
822200	329
822400	330
822500	464
822600	328
822700	466
823000	10
823100	13
823200	260
823300	260
823400	40
823500	43
823600	311
823700	268
823800	268
823900	270
824000	270
824200	270
824400	271
824600	269
824700	313
824900	90
825000	91
825100	238
825200	238
825300	92
825400	92
825500	316
825600	289
825700	316
825800	316
825900	317

SERIES	PG
826000	330
826200	265
826300	226
826400	226
826500	469
826700	257
826800	15
826900	20
827100	78
827200	314
827300	314
827400	224
827500	225
827600	223
827700	223
827800	277
827900	389
828100	312
828200	309
828400	253
828500	315
828700	312
828800	309
828900	309
829000	81
829100	22
829200	24
829300	312
829400	196
829500	197
829700	192
829800	312
829900	309

SERIES	PG
830000	296
830100	62
830300	63
830500	330
830600	289
830700	322
830800	71
830900	71
831000	332
831200	192
831300	284
831400	322
831500	260
831600	260
831700	68
831800	67
831900	67
832000	66
832100	66
832300	389
832400	327
832500	284
832600	315
832700	315
832800	86
832900	66
833000	67
833100	275
833200	67
833300	66
833400	66
833500	329
833600	283

INDEX BY SERIES ID (CONT.)

SERIES	PG	SERIES	PG	SERIES	PG	SERIES	PG	SERIES	PG	SERIES	PG
833800	257	837200	353	841000	44	844800	321	848200	120	851500	115
833900	389	837300	258	841100	46	844900	81	848300	61	851700	95
834000	306	837500	316	841300	315	845000	307	848400	125	851800	96
834100	15	837600	353	841400	315	845100	388	848500	129	852000	234
834200	19	837700	278	841500	357	845200	100	848600	365	852100	95
834300	312	837800	16	841600	111	845300	100	848700	275	852200	96
834400	309	837900	20	841800	207	845400	130	848800	127	852400	192
834600	250	838000	356	841900	208	845500	44	848900	129	852700	96
834700	309	838100	316	842000	309	845600	46	849000	316	852800	96
834800	193	838300	192	842100	128	845700	471	849100	272	852900	111
834900	312	838400	288	842200	219	845800	316	849200	70	853100	317
835000	309	838500	358	842300	219	845900	179	849300	349	853200	96
835100	99	838600	22	842400	283	846000	289	849400	289	853300	96
835200	99	838700	24	842500	127	846100	22	849500	464	853400	65
835300	165	838800	327	842600	64	846200	24	849600	22	853500	303
835400	168	838900	314	842800	306	846300	335	849700	24	853600	125
835500	312	839000	314	842900	481	846400	335	849800	347	853800	88
835600	88	839100	358	843000	289	846600	254	849900	395	853900	289
835700	148	839200	275	843200	249	846700	137	850000	185	854000	305
835800	149	839300	29	843300	125	846800	26	850100	186	854100	61
835900	40	839400	32	843400	93	846900	32	850200	29	854200	61
836000	43	839500	450	843500	93	847000	450	850300	32	854400	324
836100	309	839600	450	843600	298	847100	324	850400	365	854500	305
836200	312	839700	357	843700	316	847200	307	850500	100	854600	233
836300	10	839900	78	843800	308	847300	214	850600	100	854700	233
836400	13	840000	278	843900	63	847400	328	850700	125	854800	99
836500	139	840200	78	844000	129	847500	134	850800	109	855000	305
836600	140	840300	357	844100	289	847600	135	850900	109	855200	210
836700	475	840400	88	844200	314	847700	263	851000	48	855300	67
836800	355	840600	129	844400	50	847800	125	851100	49	855400	288
836900	16	840700	191	844500	55	847900	129	851200	316	855500	303
837000	20	840800	192	844600	284	848000	111	851300	187	855600	346
837100	317	840900	357	844700	308	848100	118	851400	284	855700	327

INDEX BY SERIES ID (CONT.)

SERIES	PG
855900	218
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856300	46
856400	126
856500	299
856600	174
856700	175
856900	197
857000	305
857100	66
857200	179
857300	181
857400	174
857500	316
857600	130
857700	63
857800	327
857900	355
858000	102
858100	104
858200	174
858300	316
858400	179
858500	184
858600	184
858700	65
858900	214
859000	175
859100	175
859200	297
859300	316
859400	90
859500	91
859600	263
859700	285
859800	174
860000	316
860100	346
860200	127
860400	362
860500	285
860600	50
860700	55
860800	62
861000	194
861100	195
861200	48
861300	49
861400	44
861500	46
861600	25
861700	31
861800	230
861900	230
862100	210
862200	109
862400	230
862500	230
862600	297
862700	288
862800	143
862900	144
863100	230
863200	102
863300	104
863400	286
863500	67
863700	258
863800	278
863900	67
864000	395
864100	72
864200	73
864300	236
864400	236
864500	130
864600	63
864800	297
864900	72
865000	73
865100	62
865300	319
865400	265
865500	395
865600	67
865700	72
865800	73
865900	395
866000	78
866100	275
866200	223
866300	223
866400	331
866500	72
866600	72
866700	318
866800	134
866900	135
867000	35
867200	62
867300	359
867400	346
867500	292
867600	286
867700	252
867800	299
868000	101
868100	318
868200	50
868300	55
868400	319
868500	137
868600	140
868700	351
868800	279
868900	307
869000	126
869100	129
869300	232
869400	317
869500	219
869600	219
869700	289
869800	125
869900	129
870200	271
870300	109
870500	70
870600	127
870700	129
870800	288
870900	66
871000	279
871100	286
871200	201
871300	202
871400	128
871500	129
871600	231
871700	231
871800	277
871900	327
872000	65
872100	286
872300	146
872400	118
872500	263
872600	75
872700	95
872800	96
872900	362
873000	146
873100	146
873200	277
873300	316
873400	386
873500	179
873600	181
873800	236
873900	283
874000	65
874100	25
874200	32
874300	289
874400	297
874500	387
874600	146
874700	146
874800	221
874900	221
875000	286
875100	318
875200	72
875300	73
875400	111
875500	114
875600	296
875700	249
875800	249
875900	346
876000	72
876100	73
876200	194
876300	195
876400	275
876500	319
876600	35
876700	36
876800	72
876900	73
877000	307
877100	44
877200	46
877300	316
877400	395
877500	482
877600	72
877700	73

INDEX BY SERIES ID (CONT.)

SERIES	PG
877900	250
878100	235
878200	216
878300	216
878400	278
878500	191
878600	192
878700	220
878800	221
878900	359
879100	100
879200	182
879300	183
879400	187
879500	187
879600	318
879700	292
879800	87
879900	351
880100	146
880200	87
880300	277
880400	235
880500	235
880600	88
880700	115
880800	117
880900	319
881000	88
881100	264
881200	279
881300	137
881400	140

SERIES	PG
881500	102
881600	104
881700	103
881800	160
882000	318
882100	469
882300	100
882400	165
882500	168
882600	146
882700	146
882800	156
882900	103
883100	217
883200	261
883300	262
883500	100
883600	385
883800	217
883900	152
884000	153
884100	304
884200	69
884400	133
884600	395
884700	279
884900	240
885000	69
885200	90
885300	91
885400	146
885500	146
885600	130

SERIES	PG
885700	395
885800	70
886100	262
886200	111
886300	114
886400	150
886500	222
886600	70
886800	194
886900	195
887000	351
887100	150
887200	121
887300	123
887400	69
887600	200
887700	200
888000	111
888100	114
888200	69
888400	15
888500	19
888600	152
888700	153
888800	286
889000	70
889200	244
889400	192
889500	192
889600	318
889700	285
889800	70
890100	136

SERIES	PG
890200	140
890300	469
890500	146
890600	350
890700	332
890800	261
890900	262
891000	282
891100	292
891200	385
891300	346
891400	308
891500	201
891600	202
891700	348
891800	194
891900	195
892000	216
892100	47
892200	47
892300	318
892400	65
892500	318
892700	146
892800	192
892900	343
893000	118
893100	109
893200	109
893300	337
893500	258
893600	451
893700	451

SERIES	PG
893800	192
893900	192
894000	357
894100	333
894200	15
894300	19
894500	242
894600	95
894700	346
894800	200
894900	200
895000	359
895100	275
895200	363
895300	261
895500	115
895600	117
895700	44
895800	46
896200	184
896300	184
896400	473
896500	388
896600	482
896700	318
896800	22
897100	282
897200	285
897300	216
897400	216
897500	358
897700	258
897800	90

SERIES	PG
897900	15
898000	20
898100	223
898200	223
898300	292
898400	332
898500	364
898600	304
898700	22
898900	470
899000	285
899100	395
899200	264
899500	278
899600	261
899700	262
899800	349
899900	473
900000	354
900100	285
900200	277
900300	338
900400	179
900500	170
900600	170
900700	233
900800	233
901000	355
901100	336
901200	466
901300	115
901400	117
901500	190

INDEX BY SERIES ID (CONT.)

SERIES	PG
901600	193
901800	174
901900	75
902100	233
902200	233
902300	282
902400	85
902500	353
902600	134
902800	289
902900	323
903100	100
903200	100
903300	355
903400	160
903600	330
903700	85
903800	48
903900	356
904100	192
904200	192
904300	85
904400	48
904500	354
904600	190
904700	192
904800	63
904900	359
905000	115
905100	253
905200	357
905300	71
905400	71

SERIES	PG
905600	325
905700	320
905800	282
905900	355
906000	290
906100	290
906200	210
906300	210
906400	134
906500	135
906600	289
907000	359
907100	196
907200	159
907300	161
907400	90
907500	91
907600	194
907700	128
907800	39
907900	341
908000	243
908100	243
908300	185
908400	285
908500	356
908600	132
908700	135
908800	126
908900	129
909000	253
909100	353
909200	347

SERIES	PG
909300	74
909400	77
909500	171
909600	172
909700	322
909900	325
910000	357
910100	134
910200	135
910300	290
910400	290
910500	112
910600	353
910700	330
910800	100
910900	100
911000	288
911100	356
911200	332
911300	118
911400	115
911500	173
911600	173
911700	354
911900	250
912000	134
912200	84
912300	191
912400	192
912500	71
912600	71
912700	74
912800	77

SERIES	PG
912900	125
913000	129
913100	34
913200	34
913300	289
913400	355
913500	75
913700	61
913800	65
913900	161
914100	213
914300	322
914400	205
914500	206
914600	321
914700	211
914800	395
914900	350
915000	171
915100	172
915200	68
915300	133
915400	135
915500	196
915600	231
915700	231
915800	359
915900	90
916000	91
916100	88
916300	211
916400	176
916500	285

SERIES	PG
916600	354
916700	65
916800	355
917000	325
917100	71
917200	158
917300	132
917400	135
917500	348
917600	196
917700	197
917800	74
917900	77
918100	325
918200	288
918400	322
918500	357
918600	323
918800	239
919000	289
919100	102
919200	104
919300	182
919400	183
919500	86
919700	78
919800	133
919900	135
920100	239
920200	171
920300	172
920400	95
920500	96

SERIES	PG
920600	39
920800	327
920900	242
921000	242
921100	354
921200	323
921300	362
921400	77
921500	78
921700	325
921900	176
922000	336
922200	207
922300	158
922500	332
922600	85
922700	51
922800	55
922900	254
923000	179
923100	180
923200	75
923300	78
923500	333
923600	125
923700	129
923800	357
923900	320
924000	289
924100	109
924200	109
924300	78
924400	363

INDEX BY SERIES ID (CONT.)

SERIES	PG
924500	182
924600	183
924700	143
925000	188
925100	187
925200	187
925300	395
925500	326
925600	74
925700	77
925800	191
925900	192
926000	170
926100	356
926200	388
926300	322
926400	261
926500	262
926600	356
926800	249
926900	250
927100	182
927200	183
927300	171
927400	172
927500	156
927600	255
927700	354
927800	161
927900	161
928000	376
928100	377
928200	379

SERIES	PG
928400	387
928500	267
928700	332
928800	258
928900	338
929000	121
929100	123
929200	152
929300	128
929400	128
929500	356
929600	254
929700	218
929800	218
929900	376
930000	385
930200	78
930300	470
930500	332
930600	118
930700	120
930800	182
930900	183
931000	395
931100	150
931200	151
931300	160
931400	161
931500	252
931600	354
931700	126
931800	128
931900	332

SERIES	PG
932000	198
932100	199
932200	376
932300	385
932400	71
932500	132
932600	135
932700	448
932800	448
932900	467
933000	249
933100	344
933200	95
933300	96
933400	379
933500	379
933600	69
933700	355
933800	150
933900	151
934000	282
934100	258
934300	325
934400	110
934500	299
934700	332
934800	25
934900	31
935000	65
935100	176
935200	177
935300	218
935400	218

SERIES	PG
935500	198
935600	199
935700	115
935800	117
935900	165
936000	167
936100	150
936200	151
936300	298
936400	124
936500	128
936600	201
936700	202
936900	65
937000	25
937100	31
937200	304
937300	365
937500	326
937600	65
937700	353
937800	303
937900	67
938000	69
938100	71
938200	290
938300	137
938400	305
938500	210
938600	210
938700	108
938800	109
938900	220

SERIES	PG
939000	221
939100	308
939200	110
939300	76
939400	77
939500	207
939600	208
939700	321
939800	170
939900	170
940000	249
940100	250
940200	288
940400	307
940500	115
940600	117
940700	143
940800	144
940900	205
941000	206
941100	67
941200	233
941300	233
941400	65
941500	371
941600	374
941700	303
941800	136
941900	140
942000	210
942200	179
942300	180
942400	108

SERIES	PG
942600	365
942700	364
942800	111
942900	482
943000	203
943100	203
943200	39
943300	290
943400	290
943500	361
943600	249
943700	308
943800	128
943900	128
944100	208
944200	118
944300	120
944400	363
944500	22
944600	23
944700	244
944800	244
944900	76
945100	68
945300	150
945400	151
945500	25
945600	31
945700	170
945800	170
945900	148
946000	482
946100	136

INDEX BY SERIES ID (CONT.)

SERIES	PG
946300	109
946400	109
946500	307
946600	372
946700	375
946800	327
946900	328
947000	187
947100	187
947200	322
947300	308
947400	248
947500	339
947600	132
947700	135
947800	74
947900	77
948000	307
948100	320
948200	35
948300	36
948400	375
948500	288
948600	48
948700	49
948800	196
948900	197
949100	78
949200	364
949300	275
949400	266
949500	451
949600	194

SERIES	PG
949700	195
949800	69
949900	353
950000	173
950100	173
950200	48
950300	49
950500	273
950600	345
950700	125
950800	129
950900	71
951100	258
951200	258
951300	15
951400	108
951500	109
951600	19
951700	361
951800	143
951900	144
952000	22
952100	23
952300	250
952400	170
952500	482
952600	148
952700	149
952800	275
952900	307
953000	61
953100	109
953300	121

SERIES	PG
953500	75
953600	78
953700	74
953800	77
953900	363
954000	320
954100	311
954200	124
954300	129
954500	111
954600	305
954700	353
954800	66
954900	322
955000	311
955100	336
955200	295
955300	482
955400	210
955500	210
955600	359
955700	228
955800	228
955900	449
956000	307
956100	248
956200	338
956300	35
956400	36
956500	194
956600	194
956800	22
956900	23

SERIES	PG
957100	64
957200	44
957300	46
957400	108
957600	220
957700	221
957800	320
957900	307
958000	361
958100	185
958200	186
958300	102
958400	104
958500	148
958600	149
958700	322
958800	64
958900	342
959100	55
959200	126
959300	128
959400	341
959500	470
959600	69
959700	365
959800	308
959900	390
960100	139
960200	203
960300	203
960400	275
960500	37
960600	254

SERIES	PG
960700	353
960800	22
960900	23
961000	350
961100	451
961200	451
961300	194
961400	194
961500	227
961600	227
961800	78
961900	322
962000	351
962100	143
962200	144
962300	228
962400	228
962700	201
962800	202
962900	347
963000	152
963100	153
963200	323
963300	109
963400	109
963500	307
963600	327
963700	328
964000	64
964100	125
964200	128
964300	69
964400	71

SERIES	PG
964500	229
964600	229
964700	340
964800	308
964900	148
965000	149
965100	353
965200	448
965300	363
965400	365
965500	326
965600	75
965700	77
965800	124
965900	295
966000	50
966100	55
966200	224
966300	225
966400	63
966500	258
966600	283
966700	66
966800	322
966900	62
967000	111
967100	114
967200	361
967300	307
967400	323
967500	325
967600	136
967700	336

INDEX BY SERIES ID (CONT.)

SERIES	PG	SERIES	PG	SERIES	PG	SERIES	PG	SERIES	PG	SERIES	PG
967800	176	971300	175	974700	203	978000	163	981500	303	984800	385
967900	177	971400	363	974800	152	978100	275	981600	355	984900	325
968000	118	971500	132	974900	307	978200	115	981700	165	985000	381
968100	321	971600	257	975000	132	978300	116	981800	322	985100	381
968200	74	971700	304	975100	305	978400	31	981900	71	985200	344
968400	354	971800	152	975200	348	978500	55	982000	350	985300	115
968500	363	971900	153	975300	118	978600	303	982100	25	985400	116
968600	275	972000	26	975400	482	978800	78	982200	31	985500	267
968700	179	972100	359	975500	163	978900	224	982300	163	985600	159
968800	180	972200	22	975600	125	979000	225	982400	279	985700	482
968900	132	972300	23	975700	343	979100	249	982500	337	985800	326
969100	356	972400	176	975800	449	979200	249	982600	108	985900	353
969200	240	972500	177	975900	449	979300	124	982700	109	986000	386
969300	240	972600	354	976000	355	979400	386	982800	48	986100	339
969400	174	972700	74	976100	136	979500	154	982900	49	986200	190
969500	175	972900	345	976200	229	979600	482	983000	364	986300	65
969600	26	973000	379	976300	229	979700	227	983100	448	986400	231
969700	32	973100	388	976400	283	979800	227	983200	448	986500	231
969800	359	973200	102	976500	121	979900	299	983300	387	986600	470
969900	330	973300	104	976600	320	980000	338	983400	330	986700	163
970000	355	973400	341	976700	362	980100	165	983500	304	986800	308
970100	75	973500	190	976800	159	980200	66	983600	176	986900	275
970200	78	973600	32	976900	363	980300	174	983700	177	987000	310
970300	347	973700	111	977000	275	980400	175	983800	303	987100	480
970400	258	973800	114	977100	210	980500	261	983900	249	987200	355
970500	118	973900	351	977200	210	980600	262	984000	249	987300	132
970600	120	974000	121	977300	25	980700	132	984100	124	987400	320
970700	50	974100	321	977400	31	980800	295	984200	340	987500	61
970800	55	974200	252	977500	185	981000	326	984300	347	987600	322
970900	361	974300	253	977600	282	981100	354	984400	326	987700	355
971000	154	974400	326	977700	165	981200	275	984500	349	987800	323
971100	295	974500	136	977800	387	981300	121	984600	283	987900	448
971200	174	974600	203	977900	203	981400	69	984700	154	988000	449

INDEX BY SERIES ID (CONT.)

SERIES	PG
988100	271
988200	86
988300	154
988400	282
988600	332
988700	121
988800	482
988900	348
989000	227
989100	227
989200	385
989300	307
989400	330
989500	249
989600	84
989700	185
989800	186
989900	361
990000	310
990100	385
990200	34
990300	355
990400	84
990500	304
990600	249
990700	111

SERIES	PG
990800	114
990900	378
991000	84
991100	48
991200	49
991300	342
991400	385
991500	109
991700	266
991800	83
991900	37
992000	389
992100	85
992200	378
992300	231
992400	231
992500	22
992600	23
992700	83
992800	380
992900	381
993000	310
993100	470
993200	323
993300	85
993700	239

SERIES	PG
993800	61
993900	466
994000	292
994100	227
994200	227
994300	239
994400	239
994500	61
994600	378
994700	258
994800	288
994900	107
995000	239
995100	239
995200	388
995300	288
995400	85
995500	320
995600	189
995700	201
995800	201
995900	288
996000	189
996100	320
996200	84
996300	108

SERIES	PG
996400	109
996500	303
996600	189
996700	320
996800	288
996900	288
997000	83
997100	258
997200	289
997300	303
997400	107
997500	288
997700	239
997800	188
997900	62
998000	347
998100	303
998200	288
998300	282
998400	303
998500	224
998600	225
998700	106
998800	321
998900	288

SERIES	PG
999000	108
999100	109
999200	288
999300	205
999400	205
999500	289
999600	289
999700	303
999800	224
999900	225
ACD	442
ADS	408
ARY	398
AVA	421
AWS	435
BAA	435
BAF	421
BCF	433
BGN	398
BSW	437
BVT	408
CBG	421
CHT	408
CSG	398
CXZ	442

SERIES	PG
DDA	434
DHE	408
DQW	421
DXT	398
EFG	398
ERY	421
EXP	408
FBD	439
FBF	439
RRH	459
RSB	452
SAA	366
SAB	366
SAC	366
SAD	366
SAE	367
SAF	367
SAW	367
SNA	368
SNB	368
SNC	368
SND	368
SNE	368
SNF	368
SNG	368



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ALPHABETICAL INDEX

PRODUCT NAME	PG
45° Helix End Mills	198-200
Adjustable Chamfer Cutters	294
Aluminum Alloys	178-200
Arbor	486
Back Chamfer Cutters	290-291
Back Corner Rounding End Mills	380-381
Back Deburring Mills	335
Back Draft Cutters	383-384
Ball End Mills	40-60
Bevel Cutters	263-289
Boring Bars	382
Bull Nose End Mills	61-81
Burs	21, 47, 261-262, 292, 335
Center Drills	464
Chamfer Cutters	275-295
Chipbreaker Cutters	178, 240
Circuit Board Drills	444-447
Clearance Cutters	34,57
Cobalt Tools	274, 293
Collets	487-488
Combined Drill & Countersinks	464
Composite Cutting End Mills	238-244
Compression Cutters	239
Concave Radius End Mills	369
Convex Keyseat Cutters	363-365
Coolant Through Tools	442-443, 479
Corner Chamfer End Mills	82
Corner Radius End Mills	61-81
Corner Rounding End Mills	370-381
Counterbores	461-463
Countersinks	464
CVD Diamond End Mills	201-212
Deburring Tools	21, 47, 261-262, 292, 335
Deep Hole Drills	442-443
Diamond Tooling	201-214, 239-240, 242, 244, 433
Die Sink Cutters	298-300

PRODUCT NAME	PG
Double Angle Shank Cutters	325-334
Double-Ended	282-283, 287, 292, 305, 309, 312, 370-377, 394
Dovetail Cutters	385-395
Downcut End Mills	184, 218, 224-226, 235-236, 246
Drill/End Mills	263-274
Drills	398-451
Engraving Cutters	303-324
ER Collets	487-488
Exotic Alloys	111-147
Extended Reach Tool Holders	484
Extra Long Length End Mills	25-33, 37, 50-56, 59, 74-80
Finishing End Mills	102-110, 136-147, 165-169, 176-177, 196-197, 231-237, 244
Flat Bottom Counterbores	461-463
Free Machining Steels	170-177
Full Radius Keyseat Cutters	363-365
Graphite	201-214
Half-Round Engravers	303-305, 307-312, 314-315
Hardened Steels	90-110, 260, 316-319, 346
Herring Bone Cutter	239
Hexalobe End Mills	301-302
High Helix End Mills	198-200, 223, 226
High Helix Finishers	136-147, 165-168, 176-177, 196-197, 233-234, 236
High Performance Drills	398-443
Indexable Chamfer Cutters	294
Keyseat Cutters	336-365
Lollipop Cutters	248-262
Marking Cutters	316-324
Medium Alloy Steels	148-169
Miniature Drills	444-447
Miniature Reamers	452-460
Mold Cutters	156-158, 188-189
Mold Tool & Die	34, 57, 83-88, 156-158, 188-189, 298-300
Multi-Form Thread Mills	474-481
N.P.T. Threads	476-477
Nickel Alloys	90-147

ALPHABETICAL INDEX (CONT.)

PRODUCT NAME	PG
Parker Hannifin O-Ring Cutters	392-393
PCD Diamond End Mills	213-214
Picatinny Form Cutters	296-297
Plastic Cutting End Mills	215-237
Plate Chamfer Cutters	295
Reduced Shank End Mills	39, 60, 81, 248, 331, 349-351, 357-358, 360, 365
Retaining Ring Keyseat Cutters	352
Reverse Tapered End Mills	383-384
Rib Cutters	83-88
Routers	38, 216-222, 245-246
Runner Cutters	298-300
Saw Arbor	486
Sight Attachement Groove	391
Single Form Thread Mills	466-472
Slitting Saws	366-368
Spherical Ball End Mills	248-262
Spotting Drills	448-451

PRODUCT NAME	PG
Square End Mills	10-39
Staggered Tooth Keyseat Cutters	359-362
Straight Flute End Mills	238
Super Alloys	90-147
Tapered End Mills	83-88
Thread Milling Cutters	465-482
Thread Relief Cutters	482
Titanium Alloys	90-147
Tool Holders	484-488
Tri-Form Thread Mills	473
T-Slot Cutters	336-351
Undercutting End Mills	248-262
UN Threads	465-468, 470-471, 473-475, 479-480
Variable Helix End Mills	90-101, 111-155, 159-187, 190-195
Wood Cutters	245-246
Woodruff-Style Cutters	336-351

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