

Catalog v2020.1

ULTRATOOL®

High-Performance Solid Carbide Round Tools



ULTRATOOL®
PERFORMANCE
S E R I E S

American Made
American Designed
American Owned



Creating Value through Efficiency
by utilizing progressive Quality, Manufacturing,
Human Resource & Technological applications.

SmoothFlute

Patented Variable Helix
design for robust stability in
deep axial cuts

SmoothGrind®

Polished cutting surfaces
for extreme sharpness
and lubricity

SmoothContricity®

Precision grinding, tool holding,
and tolerances for minimized TIR

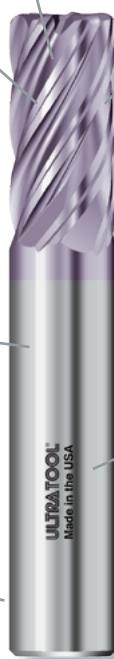
ULTRA-Grain®

The World's finest, purest
sub-micron tungsten
carbide powders



Tight tolerance shanks
with superior roundness
are shrink-fit ready

Process control ID# on
product label ensures
total traceability



SmoothCoat®

Sputter-based SuperNitride
PVD coating for superior surface
hardness & uniformity

SmoothEdge®

Surface and edge preparation
for lubricity and minimized
tool break-in

Laser etching for permanent
tool identification



Tool Alliance®

Sales offices in
Florida & California
Made in the USA for 45 years
Performance Guaranteed



ULTRATOOL®
sales@ultra-tool.com • (800) 854-2431



Next Day shipments on all pre-packaged Ultra-Tool products can be ordered until 6:00 PM EST.

Welcome to Ultra-Tool's Catalog Version 2020.

The diversity and selection of solid carbide cutting tools contained within this book is quite remarkable. A density of presentation allows us to display within 64 pages what others would use a multiple of that for.

There are few companies in the world offering such a comprehensive assortment. Countless fractional and metric sizes, rads, coatings, edge prep, carbide grades... the list goes on. And we stock and support it all.

Our product approach is actually quite simple; we select the finest materials one can purchase, engineer really great designs, use the best grinding methods, and apply the most advanced coatings available.

The result is a superb product at a great price. Rest assured the value contained within the package reflects a lean manufacturing and efficient operational culture, in contrast to the large, expensive, bureaucratic organizations and sales structures of our competitors.

Of particular interest, check out our expanded lineup of Monolith end mills. We now offer this incredible design in seven different geometries to meet demanding applications in almost any material.

At Ultra-Tool we take great pride in manufacturing solid carbide rotary cutting tools that our customers will want to use time and again. Our product is direct evidence of that. Please ask for it by name.

Sincerely,

David J. Povich
President

P.S. Make sure to try our other great Tool Alliance brands!



Manufactured in the USA
toolalliance.com



ULTRATOOL®



Team-Ultra Product Warranty:

Ultra-Tool International, Inc. warrants that products sold by it shall be free from defects in materials and workmanship. Ultra-Tool will replace, repair, or grant a credit for any product which does not comply with this warranty. Please see Terms & Conditions for additional warranty information.

Ultra-Tool® Catalog & Price List Version 2020

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Components of Guaranteed Quality

COMPONENT #1: Carbide Substrate From being the first Company to introduce MicroGrain carbide to the mass-market round tool industry through the present day, Tool Alliance® has consistently innovated new powder and grade combinations for demanding applications. We recognize that our material is the very first Significant Characteristic. By creating partnerships with a limited number of tungsten powder and cemented-carbide material suppliers, we are able to guarantee that our customers receive precision-tolerance tools ground from only the purest, finest grades available worldwide. The following photographs of Ultra-Carb® 1 and Ultra-Grain® 1 respectively demonstrate the complexity of the compound we commonly refer to as Cemented Carbide. Taken at magnification of 10,000X through an SEM (Scanning Electron Microscope), the visible grains are tungsten while the cobalt binder appears as dark shadows. The largest tungsten grains appearing in the Ultra-Carb photo are less than one micron in size. Note that these grades are two samples representing more than a dozen different substrates we use throughout our product lines, each having a particular application niche. Compared to other industry participants, you will find that Tool Alliance offers the best month-to-month and year-to-year consistency in carbide grain structure.



Ultra-Carb® 1
Cobalt Percentage: 6%
Grain Size (μm): ≤ 0.8
Hardness: 93.5 HRa
Fracture Toughness (K_{IC}): 6.6
TRS (GPa): 3.8
Density (gm/cc): 14.90

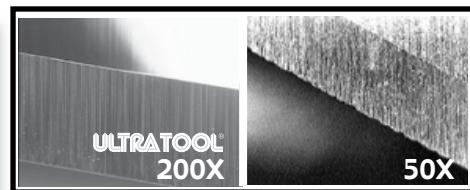
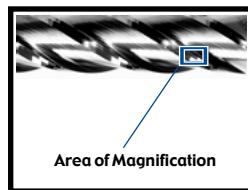


Ultra-Grain® 1
Cobalt Percentage: 10%
Grain Size (μm): ≤ 0.7
Hardness: 92.7 HRa
Fracture Toughness (K_{IC}): 7.9
TRS (GPa): 4.1
Density (gm/cc): 14.30



SmoothGrind®

COMPONENT #2: The Grinding Process After selecting the best material available, Tool Alliance has perfected the manufacturing technology to optimize 100% of its physical properties. We call this process SmoothGrind®. Years in development, SmoothGrind is the result of a proprietary combination of material, abrasive, coolant, machine-tool, software, and grinding method technologies that produce cutting tools with superior qualitative characteristics. Sharper and longer lasting cutting edges, enhanced work piece finishes, and much improved lubricity are just some of the benefits brought to you by the latest solid carbide rotary tooling advances from Tool Alliance. The two photos above display an Ultra-Tool end mill primary relief featuring SmoothGrind (left) versus a major competitor's product (right). To fully demonstrate the difference, the Ultra end mill is shown at double the magnification. Note the straight line of our end mill's primary relief in comparison to the jagged edge of the competing product. Keep in mind the competitive end mill is a very good product that has a large following, yet the difference is substantial.



SmoothGrind® Competitor's



SmoothContricity®



COMPONENT #3: The Tooling Process All the best physical ingredients are wasted unless they are all pulled together in a comprehensive system that maximizes their respective attributes. Tool Alliance calls this process SmoothContricity®. Our customer base represents the leading edge of machine tool utilization, and SmoothContricity ensures that optimum results can be obtained in a variety of ways; minimized run-out (TIR), industry-leading tolerances on diameter & radius, and 100% Shrink Fit Ready (SFR) shanks. Combined, these attributes allow our consumers to reach full machining potential and position the cutting tool as a systematic contributor to process consistency and repeatability.



Shrink Fit Ready



SmoothEdge®

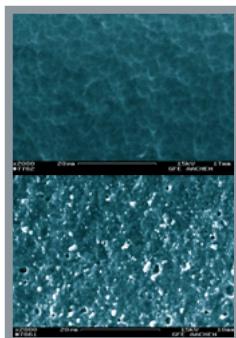
COMPONENT #4: The Edge Preparation Process

Our cutting edges are literally too sharp for certain materials. For our carbide inserts and now increasingly for our solid carbide round tools, proper edge preparation can yield huge productivity improvements to "out of the box" tool application. Using a treatment we call SmoothEdge® and performed on machine tools developed in our own R&D lab, we've taken the mystery out of tool "break-in" and provided a consistency that can be counted on time and again. The processes range from a microblasting treatment using extremely fine aluminum oxide powder to a diamond-lapping compound to brushes. All are application-specific to sound and run smooth from the first cut and protect your tooling investment from unnecessary potential for chipping during your initial tooling paths. Big productivity gains can be achieved in certain applications as well due to improved chip formation and evacuation. Learn more about SmoothEdge on Page #55.



.0001 SmoothEdge atop cylindrical margin atop primary relief.





Our coating @ 2,000X (top).
Everybody else's (bottom).

SmoothCoat®

COMPONENT #5: The Coating Process The challenge of finding a coating method to leverage 100% of the inherent assets of our carbide grade and grinding technologies was difficult. What we finally discovered was such a perfect fit and so logical for our product lines that we invested heavily into the process we now call SmoothCoat®. Much more than simply the standard arc-deposited PVD coating, SmoothCoat involves sputter multi-layering and a multi-step prep & post operation called Micro-Blasting. The advantages of this procedure include relieving of tensile stresses underneath the cutting edge, increased stability of the coating surface, and perhaps most importantly, elevating SmoothGrind even another notch by leveling and activating the cemented carbide substrate. The result is a smooth, shiny, tough, and durable surface that can withstand tomorrow's machining requirements and outlast competitive coatings. Additionally, we've made it a standard feature on thousands of our standard catalog items. Our coating services are performed within our own factories for quality & extremely quick turnaround times.

Coating Availability

Order by adding the suffix TA, TN, AT, TC, A1, D1, or D2 to the EDP #.



UnCoated



TiAIN



TiN

AlTiN HSN²

TiCN

TiB₂

PVD Diamond



CVD Diamond

Standard Coatings available at "Coated" List Price

Premium Coatings available

Material Hardness ↑



materials up to 70HRc including high-temp exotics, nickel based alloys, die & hardened steels

ideal for dry milling & high speed machining



materials up to 50HRc including steel, stainless steel, & cast iron

great choice for wide range of materials
wet & dry applications

general purpose in all materials
up to 30HRc

excellent lubricity & wear

aluminum, titanium,
& non-ferrous

tremendous lubricity /
reduced weld allows for
dry milling

aluminum, steel &
stainless steel

lower temp
applications



extreme hardness
for wearability in
graphites, plastics,
silicon alloys & other
abrasive materials



sharpest diamond
edge



extreme hardness for
long life (10–50x) in graphite,
carbon, composites & high
silicon aluminum

thickest diamond
coating

Multiple in-house coating systems
offer superb quality and service.



SmoothCoat®

Material Abrasiveness →

Patented SmoothFlute Series 323 Variable Helix End Mills by ULTRATOOL®



**Series 323 Patented SmoothFlute®
Four Flute Variable Helix End Mill
Square, Corner Radius & Ball**



Slot up to 150% x diameter: The Ultra-Tool® Series 323 is a revolutionary solid carbide end mill featuring our patented SmoothFlute® geometric design that can rough & finish at incredible speeds and feeds. SmoothFlute + SmoothEdge technology provides extended tool life and excellent work piece finishes by increasing stability and edge integrity. Series 323 is precision ground from Ultra-Grain® 1, a premium carbide substrate that couples high hardness with excellent chipping resistance. Choose from Square, Ball, or 7 different standard radii for your roughing or finishing requirements. Includes AT (AlTiN) coating.

**ULTRATOOL®
PERFORMANCE
SERIES**



Premium Series EM Specs:
Cutting Diam +.000/-0.002
Shank Diam -.0000/.0025
Radius ±.0005



SmoothFlute



| Diam | LOC | OAL | Shank | Square EDP# | .015R EDP# | .030R EDP# | .060R EDP# | .090R EDP# | .125R EDP# | .190R EDP# | .250R EDP# | Ball EDP# | AT Coated |
|------|-------|-------|-------|----------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|--------------|--------------|
| 1/8 | 3/8 | 1-1/2 | 1/8 | 23100AT | 23101AT | 23102AT | | | | | | 23105AT | \$12.90 |
| 3/16 | 7/16 | 2" | 3/16 | 23110AT | 23111AT | 23112AT | | | | | | 23115AT | \$17.10 |
| 1/4 | 3/8 | 2" | 1/4 | 23120AT | 23015AT | 23122AT | 23123AT | | | | | 23125AT | \$20.10 |
| 1/4 | 3/4 | 2-1/2 | 1/4 | 23130AT | 23016AT | 23132AT | 23133AT | | | | | 23135AT | \$22.70 |
| 5/16 | 13/16 | 2-1/2 | 5/16 | 23140AT | 23141AT | 23142AT | 23143AT | | | | | 23145AT | \$27.90 |
| 3/8 | 1/2 | 2-1/2 | 3/8 | 23150AT | 23151AT | 23152AT | 23153AT | 23246AT | 23154AT | | | 23155AT | \$29.30 |
| 3/8 | 1" | 2-1/2 | 3/8 | 23160AT | 23161AT | 23162AT | 23163AT | 23247AT | 23164AT | | | 23165AT | \$34.00 |
| 7/16 | 1" | 2-3/4 | 7/16 | 23170AT | 23171AT | 23172AT | 23173AT | 23248AT | 23174AT | | | 23175AT | \$45.00 |
| 1/2 | 5/8 | 2-1/2 | 1/2 | 23180AT | 23181AT | 23031AT | 23183AT | 23249AT | 23184AT | | | 23185AT | \$48.50 |
| 1/2 | 1" | 3" | 1/2 | 23190AT | 23191AT | 23192AT | 23193AT | 23250AT | 23194AT | | | 23195AT | \$54.00 |
| 1/2 | 1-1/4 | 3" | 1/2 | 23200AT | 23201AT | 23032AT | 23203AT | 23251AT | 23204AT | | | 23205AT | \$57.60 |
| 5/8 | 1-1/4 | 3-1/2 | 5/8 | 23210AT | 23211AT | 23040AT | 23213AT | 23252AT | 23214AT | | | 23215AT | \$101.80 |
| 5/8 | 2-5/8 | 5" | 5/8 | 27655AT | 27658AT | 27661AT | 27664AT | 27667AT | 27670AT | | | 27677AT | \$144.40 |
| 3/4 | 7/8 | 4" | 3/4 | 23220AT | 23221AT | 23047AT | 23223AT | 23253AT | 23224AT | 23256AT | 23259AT | 23225AT | \$129.70 |
| 3/4 | 1-1/2 | 4" | 3/4 | 23230AT | 23231AT | 23048AT | 23233AT | 23254AT | 23234AT | 23257AT | 23260AT | 23235AT | \$139.90 |
| 3/4 | 2-5/8 | 5" | 3/4 | 27656AT | 27659AT | 27662AT | 27665AT | 27668AT | 27671AT | 27673AT | 27675AT | 27678AT | \$216.20 |
| 3/4 | 4" | 7" | 3/4 | 27657AT | 27660AT | 27663AT | 27666AT | 27669AT | 27672AT | 27674AT | 27676AT | 27679AT | \$268.80 |
| 1" | 1-1/2 | 4" | 1" | 23240AT | 23241AT | 23064AT | 23243AT | 23255AT | 23244AT | 23258AT | 23261AT | 23245AT | \$220.00 |

new!

Additional Lengths and Radius sizes throughout the range!



The 323 & 365 are designed for maximizing Axial Depth of Cut, and optimizes geometry when used at approximately 75% LOC.

This product is manufactured under U.S. Patent No. 7,284,935. Please see high-performance Speeds & Feeds on page #58.



Metric Sizes: The Ultra-Tool® Series 323 is also available in a limited range of metric sizes, each provided with a popular sized radius. Please see catalog page #16.

SmoothFlute

SmoothFlute® is the latest technology to be integrated within our product line. It's so unique and important that we've not only obtained patent protection in the USA but additionally in all the major industrial countries of the World.

As incorporated into the Series 323, 323ML, 365, 365ML, and 395ML end mills, SmoothFlute allows for outstanding feed rates with incredibly quiet harmonics. The resultant stable and smooth cutting action leads to superb edge integrity for longer lasting tool life and enhanced work piece finishes.

Should you need a diameter, LOC, radius, or other characteristic not offered in our standard product line, SmoothFlute is also available for special tools on our tungstentoolworks.com website.

ULTRATOOL Patented SmoothFlute Series 323 Monolith™ Series End Mills

Monolith end mills by Ultra-Tool represent a culmination of decades of experience and craftsmanship in solid carbide grinding. Extended reach applications are notoriously difficult, but each respective Monolith Series combines the best of SmoothGrind, SmoothConicity, SmoothEdge and SmoothCoat to maximize success. The 323ML holds size and concentricity to a maximum of .0003 deviation, even at a 12" reach! All Monoliths feature SmoothEdge with standard AT hardcoating.



Series 323ML MONOLITH™

Solid Carbide Extended Reach End Mill
for Steels & Exotics • Four Flute • AT Coated

- Tight Tolerance
- Minimal TIR • Neck
- Corner Radius
- Variable Helix

This product is manufactured under
U.S. Patent No. 7,284,935



SmoothFlute

ULTRATOOL®
PERFORMANCE
S E R I E S

| Diam | LOC | LBS | OAL | Neck | Shank | .015 rad EDP# | .030 rad EDP# | .060 rad EDP# | .090 rad EDP# | .125 rad EDP# | .190 rad EDP# | .250 rad EDP# | Ball EDP# | AT Coated |
|-------|-------|-------|-----|------|-------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|--------------|--------------|
| 3/8 | 1/2 | 2-1/8 | 4" | .355 | 3/8 | 27000AT | 23021AT | 27001AT | 27002AT | | | | 27003AT | \$63.20 |
| 3/8 | 1/2 | 4-1/8 | 6" | .355 | 3/8 | 27004AT | 23022AT | 27005AT | 27006AT | | | | 27007AT | \$85.80 |
| 1/2 | 5/8 | 2-1/4 | 4" | .475 | 1/2 | 27008AT | 23033AT | 27009AT | 27010AT | 27011AT | | | 27012AT | \$93.60 |
| 1/2 | 5/8 | 4-1/8 | 6" | .475 | 1/2 | 27013AT | 23034AT | 27014AT | 27015AT | 27016AT | | | 27017AT | \$127.90 |
| 1/2 | 5/8 | 5-1/2 | 8" | .475 | 1/2 | 27018AT | 23035AT | 27019AT | 27020AT | 27021AT | | | 27022AT | \$167.20 |
| 5/8 | 3/4 | 2-3/8 | 4" | .593 | 5/8 | | 23041AT | 27023AT | 27024AT | 27025AT | | | 27026AT | \$136.40 |
| 5/8 | 3/4 | 4-1/8 | 6" | .593 | 5/8 | | 23042AT | 27027AT | 27028AT | 27029AT | | | 27030AT | \$185.80 |
| 5/8 | 3/4 | 5-1/2 | 8" | .593 | 5/8 | | 23043AT | 27031AT | 27032AT | 27033AT | | | 27034AT | \$245.10 |
| 3/4 | 1" | 3-1/4 | 5" | .712 | 3/4 | | 27627AT | 27631AT | 27635AT | 27639AT | 27643AT | 27647AT | 27651AT | \$230.70 |
| 3/4 | 1" | 4-1/8 | 6" | .712 | 3/4 | | 23049AT | 27035AT | 27036AT | 27037AT | 27038AT | 27039AT | 27040AT | \$255.20 |
| 3/4 | 1" | 5" | 7" | .712 | 3/4 | | 27628AT | 27632AT | 27636AT | 27640AT | 27644AT | 27648AT | 27652AT | \$284.40 |
| 3/4 | 1" | 5-1/2 | 8" | .712 | 3/4 | | 23050AT | 27041AT | 27042AT | 27043AT | 27044AT | 27045AT | 27046AT | \$333.70 |
| 3/4 | 1" | 8" | 12" | .712 | 3/4 | | 23051AT | 27047AT | 27048AT | 27049AT | 27050AT | 27051AT | 27052AT | \$458.00 |
| 1" | 1-1/4 | 3" | 5" | .950 | 1" | | 27629AT | 27633AT | 27637AT | 27641AT | 27645AT | 27649AT | 27653AT | \$377.10 |
| 1" | 1-1/4 | 4-1/8 | 6" | .950 | 1" | | 23065AT | 27053AT | 27054AT | 27055AT | 27056AT | 27057AT | 27058AT | \$392.60 |
| 1" | 1-1/4 | 5" | 7" | .950 | 1" | | 27630AT | 27634AT | 27638AT | 27642AT | 27646AT | 27650AT | 27654AT | \$436.60 |
| 1" | 1-1/4 | 5-1/2 | 8" | .950 | 1" | | 23066AT | 27059AT | 27060AT | 27061AT | 27062AT | 27063AT | 27064AT | \$513.70 |
| 1" | 1-1/4 | 8" | 12" | .950 | 1" | | 23067AT | 27065AT | 27066AT | 27067AT | 27068AT | 27069AT | 27070AT | \$719.70 |
| 1-1/4 | 1-1/2 | 4-1/8 | 6" | 1.20 | 1-1/4 | | 23068AT | | 27071AT | 27072AT | 27073AT | 27074AT | 27075AT | \$526.70 |
| 1-1/4 | 1-1/2 | 5-1/2 | 8" | 1.20 | 1-1/4 | | 23069AT | | 27076AT | 27077AT | 27078AT | 27079AT | 27080AT | \$673.90 |
| 1-1/4 | 1-1/2 | 8" | 12" | 1.20 | 1-1/4 | | 23070AT | | 27081AT | 27082AT | 27083AT | 27084AT | 27085AT | \$955.30 |
| 1-1/2 | 2" | - | 6" | - | 1-1/4 | | 23071AT | | | | | | 27086AT | \$634.60 |
| 1-1/2 | 2" | - | 8" | - | 1-1/4 | | 23072AT | | | | | | 27087AT | \$817.90 |
| 1-1/2 | 2" | - | 12" | - | 1-1/4 | | 23073AT | | | | | | 27088AT | \$1151.60 |

new!

Standard Radius sizes throughout the range!

ULTRATOOL®
PERFORMANCE
S E R I E S

MONOLITH™



Premium Series EM Specs:
Cutting Diam +.000/-002
Shank Diam -.0000/-0025
Radius ±.0005

About the Monolith configuration: Ultra-Tool® has taken the very best of all our technologies and consolidated them within our Monolith end mills. Ultra-Grain, patented and/or unique designs, SmoothGrind, SmoothConicity, SmoothEdge, SmoothFlute and SmoothCoat are all incorporated into a behemoth which showcases the attributes necessary for successful machining in challenging applications. Special blank prep procedures and toolholding guarantee incredible concentricity characteristics. The Monolith is now available within the 323, 365, 355, 395, 330AL, and 333AL Series (designated with the "ML" suffix). These are superb products; you'll find nothing else like them in the industry!

Please use heat-shrink holding for best results.



+ SmoothGrind® + SmoothConicity® + SmoothEdge® + SmoothCoat®

SmoothFlute

Our patented SmoothFlute is included on the 323, 323ML, 365, 365ML, and 395ML

Patented SmoothFlute Series 365 Variable Helix End Mills by **ULTRATOOL®**

Series 365 Patented SmoothFlute™
Six Flute Variable Helix End Mill
Square, Corner Radius & Ball
Stub, Standard or Long Length



High speed finishing: The Ultra-Tool® Series 365 is a revolutionary solid carbide end mill featuring our patented SmoothFlute™ geometric design that can finish and rough at incredible speeds and feeds. SmoothFlute + SmoothEdge technology provides extended tool life and excellent work piece finishes by increasing stability and edge integrity. Series 365 is precision ground from Ultra-Grain®1, a premium carbide substrate that couples high hardness with excellent chipping resistance. Choose from Square, Ball, or 7 different standard radii for your roughing or finishing requirements, plus standard AT (AlTiN) coating.

ULTRATOOL®
PERFORMANCE
S E R I E S



Premium Series EM Specs:
 Cutting Diam +000/-002
 Shank Diam -.0000/-00025
 Radius ±.0005

SmoothEdge®

SmoothFlute



| Diam | LOC | OAL | Shank | Square | .015R EDP# | .030R EDP# | .060R EDP# | .090R EDP# | .125R EDP# | .190R EDP# | .250R EDP# | Ball EDP# | AT Coated |
|------|-------|-------|-------|---------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|--------------|--------------|
| 1/4 | 3/8 | 2" | 1/4 | 31680AT | 31681AT | 31682AT | 31683AT | | | | | 31685AT | \$22.00 |
| 1/4 | 3/4 | 2-1/2 | 1/4 | 31690AT | 31691AT | 31692AT | 31693AT | | | | | 31695AT | \$25.70 |
| 1/4 | 1" | 4" | 1/4 | 31700AT | 31701AT | 31702AT | 31703AT | | | | | 31705AT | \$33.50 |
| 5/16 | 13/16 | 2-1/2 | 5/16 | 31710AT | 31711AT | 31712AT | 31713AT | | | | | 31715AT | \$30.40 |
| 3/8 | 1/2 | 2-1/2 | 3/8 | 31720AT | 31721AT | 31722AT | 31723AT | 27187AT | 31724AT | | | 31725AT | \$31.90 |
| 3/8 | 1" | 2-1/2 | 3/8 | 31730AT | 31731AT | 31732AT | 31733AT | 27188AT | 31734AT | | | 31735AT | \$36.50 |
| 3/8 | 1-1/2 | 4" | 3/8 | 31740AT | 31741AT | 31742AT | 31743AT | 27189AT | 31744AT | | | 31745AT | \$54.60 |
| 1/2 | 5/8 | 2-1/2 | 1/2 | 31750AT | 31751AT | 31752AT | 31753AT | 27190AT | 31754AT | | | 31755AT | \$51.70 |
| 1/2 | 1" | 3" | 1/2 | 31760AT | 31761AT | 31762AT | 31763AT | 27191AT | 31764AT | | | 31765AT | \$57.80 |
| 1/2 | 1-1/4 | 3" | 1/2 | 31920AT | 31921AT | 31922AT | 31923AT | 27192AT | 31924AT | | | 31925AT | \$62.70 |
| 1/2 | 1-3/4 | 4" | 1/2 | 31770AT | 31771AT | 31772AT | 31773AT | 27193AT | 31774AT | | | 31775AT | \$82.30 |
| 5/8 | 3/4 | 3-1/2 | 5/8 | 31780AT | 31781AT | 31782AT | 31783AT | 27194AT | 31784AT | | | 31785AT | \$96.40 |
| 5/8 | 1-1/4 | 3-1/2 | 5/8 | 31790AT | 31791AT | 31792AT | 31793AT | 27195AT | 31794AT | | | 31795AT | \$108.30 |
| 5/8 | 1-5/8 | 3-1/2 | 5/8 | 31650AT | 31651AT | 31652AT | 31653AT | 27196AT | 31654AT | | | 31655AT | \$112.90 |
| 5/8 | 2-1/4 | 5" | 5/8 | 31800AT | 31801AT | 31802AT | 31803AT | 27197AT | 31804AT | | | 31805AT | \$149.00 |
| 3/4 | 7/8 | 4" | 3/4 | 31810AT | 31811AT | 31812AT | 31813AT | 27198AT | 31814AT | 27205AT | 27212AT | 31815AT | \$138.90 |
| 3/4 | 1-1/2 | 4" | 3/4 | 31820AT | 31821AT | 31822AT | 31823AT | 27199AT | 31824AT | 27206AT | 27213AT | 31825AT | \$150.00 |
| 3/4 | 2-1/2 | 6" | 3/4 | 31830AT | 31831AT | 31832AT | 31833AT | 27200AT | 31834AT | 27207AT | 27214AT | 31835AT | \$224.70 |
| 3/4 | 3-1/4 | 6" | 3/4 | 31660AT | 31661AT | 31662AT | 31663AT | 27201AT | 31664AT | 27208AT | 27215AT | 31665AT | \$241.30 |
| 1" | 1-1/2 | 4" | 1" | 31840AT | 31841AT | 31842AT | 31843AT | 27202AT | 31844AT | 27209AT | 27216AT | 31845AT | \$224.50 |
| 1" | 2-1/2 | 6" | 1" | 31850AT | 31851AT | 31852AT | 31853AT | 27203AT | 31854AT | 27210AT | 27217AT | 31855AT | \$334.20 |
| 1" | 3-1/4 | 6" | 1" | 31670AT | 31671AT | 31672AT | 31673AT | 27204AT | 31674AT | 27211AT | 27218AT | 31675AT | \$365.30 |

new! Standard Radius sizes throughout the range!

Metric Sizes: The Ultra-Tool® Series 365 is also available in a limited range of metric sizes, each provided with a popular sized radius. Please see catalog page #16.



100%
American Designed
American Made
American Owned



The patented 365 Monolith™ end mill,
 Flagship of the industry.



High Efficiency Milling
 (HEM) ratio

ULTRATOOL® Patented SmoothFlute Series 365 Monolith™ Series End Mills

Monolith end mills by Ultra-Tool represent a culmination of decades of experience and craftsmanship in solid carbide grinding. Extended reach applications are notoriously difficult, but each respective Monolith Series combines the best of SmoothGrind, SmoothConicity, SmoothEdge and SmoothCoat to maximize success. The 365ML holds size and concentricity to a maximum of .0003 deviation, even at a 12" reach! All Monoliths feature SmoothEdge with standard AT hardcoating.



Series 365ML MONOLITH™

Solid Carbide Extended Reach End Mill

- Six Flute
- AT Coated
- Tight Tolerance
- Minimal TIR
- Clearance Neck
- Corner Radius
- Variable Helix

This product is manufactured under
U.S. Patent No. 7,284,935



| Diam | LOC | LBS | OAL | Neck | Shank | .015 rad EDP# | .030 rad EDP# | .060 rad EDP# | .090 rad EDP# | .125 rad EDP# | .190 rad EDP# | .250 rad EDP# | Ball EDP# | AT Coated |
|-------|-------|-------|-----|------|-------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|-----------|-----------|
| 3/8 | 1/2 | 2-1/8 | 4" | .355 | 3/8 | 31926AT | 31856AT | 31927AT | 31928AT | | | | 31929AT | \$68.90 |
| 3/8 | 1/2 | 4-1/8 | 6" | .355 | 3/8 | 31930AT | 31857AT | 31931AT | 31932AT | | | | 31933AT | \$91.20 |
| 1/2 | 5/8 | 2-1/4 | 4" | .475 | 1/2 | 31934AT | 31858AT | 31935AT | 31936AT | 31937AT | | | 31938AT | \$102.30 |
| 1/2 | 5/8 | 4-1/8 | 6" | .475 | 1/2 | 31939AT | 31859AT | 31940AT | 31941AT | 31942AT | | | 31943AT | \$136.30 |
| 1/2 | 5/8 | 5-1/2 | 8" | .475 | 1/2 | 31944AT | 31860AT | 31945AT | 31946AT | 31947AT | | | 31948AT | \$175.10 |
| 5/8 | 3/4 | 2-3/8 | 4" | .593 | 5/8 | | 31861AT | 31949AT | 31950AT | 31951AT | | | 31952AT | \$147.50 |
| 5/8 | 3/4 | 4-1/8 | 6" | .593 | 5/8 | | 31862AT | 31953AT | 31954AT | 31955AT | | | 31956AT | \$197.20 |
| 5/8 | 3/4 | 5-1/2 | 8" | .593 | 5/8 | | 31863AT | 31957AT | 31958AT | 31959AT | | | 31960AT | \$256.40 |
| 3/4 | 1" | 3-1/4 | 5" | .712 | 3/4 | | 27599AT | 27603AT | 27607AT | 27611AT | 27615AT | 27619AT | 27623AT | \$250.70 |
| 3/4 | 1" | 4-1/8 | 6" | .712 | 3/4 | | 31864AT | 31961AT | 31962AT | 31963AT | 31964AT | 31965AT | 31966AT | \$278.40 |
| 3/4 | 1" | 5" | 7" | .712 | 3/4 | | 27600AT | 27604AT | 27608AT | 27612AT | 27616AT | 27620AT | 27624AT | \$309.50 |
| 3/4 | 1" | 5-1/2 | 8" | .712 | 3/4 | | 31865AT | 31967AT | 31968AT | 31969AT | 31970AT | 31971AT | 31972AT | \$355.40 |
| 3/4 | 1" | 8" | 12" | .712 | 3/4 | | 31866AT | 31973AT | 31974AT | 31975AT | 31976AT | 31977AT | 31978AT | \$479.40 |
| 1" | 1-1/4 | 3" | 5" | .950 | 1" | | 27601AT | 27605AT | 27609AT | 27613AT | 27617AT | 27621AT | 27625AT | \$410.40 |
| 1" | 1-1/4 | 4-1/8 | 6" | .950 | 1" | | 31867AT | 31979AT | 31980AT | 31981AT | 31982AT | 31983AT | 31984AT | \$427.10 |
| 1" | 1-1/4 | 5" | 7" | .950 | 1" | | 27602AT | 27606AT | 27610AT | 27614AT | 27618AT | 27622AT | 27626AT | \$475.90 |
| 1" | 1-1/4 | 5-1/2 | 8" | .950 | 1" | | 31868AT | 31985AT | 31986AT | 31987AT | 31988AT | 31989AT | 31990AT | \$547.30 |
| 1" | 1-1/4 | 8" | 12" | .950 | 1" | | 31869AT | 31991AT | 31992AT | 31993AT | 31994AT | 31995AT | 31996AT | \$752.80 |
| 1-1/4 | 1-1/2 | 4-1/8 | 6" | 1.20 | 1-1/4 | | 31870AT | | 31997AT | 31998AT | 31999AT | 38988AT | 38989AT | \$573.90 |
| 1-1/4 | 1-1/2 | 5-1/2 | 8" | 1.20 | 1-1/4 | | 31871AT | | 38990AT | 38991AT | 38992AT | 38993AT | 38994AT | \$719.80 |
| 1-1/4 | 1-1/2 | 8" | 12" | 1.20 | 1-1/4 | | 31872AT | | 38995AT | 38996AT | 38997AT | 38998AT | 38999AT | \$998.20 |
| 1-1/2 | 2" | - | 6" | - | 1-1/4 | | 31873AT | | | | | | 31916AT | \$691.00 |
| 1-1/2 | 2" | - | 8" | - | 1-1/4 | | 31874AT | | | | | | 31917AT | \$873.30 |
| 1-1/2 | 2" | - | 12" | - | 1-1/4 | | 31875AT | | | | | | 31918AT | \$1203.70 |

new! Standard Radius sizes throughout the range!



MONOLITH™



Premium Series EM Specs:
Cutting Diam +.000/-002
Shank Diam -.0000/-00025
Radius ±.0005

About the Monolith configuration: Ultra-Tool® has taken the very best of all our technologies and consolidated them within our Monolith end mills. Ultra-Grain, patented and/or unique designs, SmoothGrind, SmoothConicity, SmoothEdge, SmoothFlute and SmoothCoat are all incorporated into a behemoth which showcases the attributes necessary for successful machining in challenging applications. Special blank prep procedures and toolholding guarantee incredible concentricity characteristics. The Monolith is now available within the 323, 365, 355, 395, 330AL, and 333AL Series (designated with the "ML" suffix). These are superb products; you'll find nothing else like them in the industry!

Please use heat-shrink holding for best results.



+ SmoothGrind® + SmoothConicity® + SmoothEdge® + SmoothCoat®



Our patented SmoothFlute is included on the 323, 323ML, 365, 365ML, and 395ML

ULTRATOOL® Series 355 and 377 Series End Mills

Series 355

- Ultra-Grain® Carbide End Mill**
- Five Flute • 45 Degree RH Spiral
 - SmoothEdge Honed • Coated

**new!** Standard Radius sizes throughout the range!

The Ultra-Tool® Series 355 End Mill is designed for the highest efficiency in the milling / finishing of steel, stainless, titanium and high temp alloys. Precision ground from Ultra-Grain®1 for top strength, the 355 features a proprietary OD hone to minimize tool break-in and the latest generation of SmoothCoat® ALTiN PVD coating. S&F's on page #58.


**ULTRATOOL®
PERFORMANCE
S-E-R-I-E-S**


High Efficiency Milling (HEM) ratio

| Diam | LOC | OAL | Shank | Square EDP# | .015R EDP# | .030R EDP# | .060R EDP# | .090R EDP# | .125R EDP# | .190R EDP# | .250R EDP# | Ball EDP# | AT Coated |
|------|-------|-------|-------|-------------|------------|------------|------------|------------|------------|------------|------------|-----------|-----------|
| 1/8 | 1/2 | 1-1/2 | 1/8 | 31550AT | 27108AT | 27114AT | | | | | | 27169AT | \$15.10 |
| 1/8 | 1" | 3" | 1/8 | 27100AT | 27109AT | 27115AT | | | | | | 27170AT | \$26.20 |
| 3/16 | 5/8 | 2" | 3/16 | 31551AT | 27110AT | 27116AT | | | | | | 27171AT | \$19.10 |
| 3/16 | 1-1/4 | 3" | 3/16 | 27101AT | 27111AT | 27117AT | | | | | | 27172AT | \$30.50 |
| 1/4 | 3/4 | 2-1/2 | 1/4 | 31552AT | 31562AT | 27118AT | | | | | | 27173AT | \$25.70 |
| 1/4 | 1" | 4" | 1/4 | 27102AT | 27112AT | 27119AT | | | | | | 27174AT | \$33.50 |
| 5/16 | 13/16 | 2-1/2 | 5/16 | 31553AT | 27113AT | 27120AT | | | | | | 27175AT | \$30.40 |
| 3/8 | 1" | 2-1/2 | 3/8 | 31554AT | 27502AT | 27121AT | 27128AT | 27139AT | 27150AT | | | 27176AT | \$36.50 |
| 3/8 | 2" | 4" | 3/8 | 27103AT | 27503AT | 27122AT | 27129AT | 27140AT | 27151AT | | | 27177AT | \$59.10 |
| 7/16 | 1" | 2-3/4 | 7/16 | 31555AT | 27504AT | 27123AT | 27130AT | 27141AT | 27152AT | | | 27178AT | \$47.00 |
| 1/2 | 1-1/4 | 3" | 1/2 | 27244AT | 27505AT | 27245AT | 27131AT | 27142AT | 27153AT | | | 27179AT | \$62.70 |
| 1/2 | 2" | 4" | 1/2 | 27104AT | 27506AT | 27124AT | 27132AT | 27143AT | 27154AT | | | 27180AT | \$86.50 |
| 5/8 | 1-1/2 | 3-1/2 | 5/8 | 31557AT | 27507AT | 31567AT | 27133AT | 27144AT | 27155AT | | | 27181AT | \$110.30 |
| 5/8 | 2-5/8 | 5" | 5/8 | 27105AT | 27508AT | 27125AT | 27134AT | 27145AT | 27156AT | | | 27182AT | \$151.60 |
| 3/4 | 1-5/8 | 4" | 3/4 | 27246AT | 27509AT | 27247AT | 27248AT | 27249AT | 27250AT | 27251AT | 27252AT | 27253AT | \$152.00 |
| 3/4 | 2-5/8 | 5" | 3/4 | 27254AT | 27510AT | 27256AT | 27258AT | 27260AT | 27262AT | 27264AT | 27266AT | 27268AT | \$224.70 |
| 3/4 | 4" | 7" | 3/4 | 27106AT | 27511AT | 27126AT | 27136AT | 27147AT | 27158AT | 27162AT | 27166AT | 27184AT | \$270.70 |
| 1" | 1-1/2 | 4" | 1" | 31559AT | 27512AT | 31569AT | 27137AT | 27148AT | 27159AT | 27163AT | 27167AT | 27185AT | \$224.50 |
| 1" | 2-5/8 | 5" | 1" | 27255AT | 27513AT | 27257AT | 27259AT | 27261AT | 27263AT | 27265AT | 27267AT | 27269AT | \$334.20 |
| 1" | 4" | 7" | 1" | 27107AT | 27514AT | 27127AT | 27138AT | 27149AT | 27160AT | 27164AT | 27168AT | 27186AT | \$412.30 |

- SmoothGrind®**
SmoothConicity®
SmoothEdge®
SmoothCoat®



Series 355/377 Geometry Enhancements

- Unequal indexing (variable pitch)
- Polished radial relief
- Unmeasurable runout
- Edge prep
- Special radius transition
- Opened free-cutting end cut

Series 377

- Ultra-Grain® Carbide End Mill**
- Seven Flute • 40 Degree RH Spiral
 - SmoothEdge Honed • Coated

**new!** Standard Radius sizes throughout the range!**new!** New 7-flute Series!

The Ultra-Tool® Series 377 End Mill targets the same materials as the 355, yet the seven flute design allows for faster metal removal rates. Precision ground from Ultra-Grain®1 for top strength, the 377 features a proprietary OD hone to minimize tool break-in and the latest generation of SmoothCoat® ALTiN PVD coating. S&F's on page #58.


**ULTRATOOL®
PERFORMANCE
S-E-R-I-E-S**


High Efficiency Milling (HEM) ratio

| Diam | LOC | OAL | Shank | Square EDP# | .015R EDP# | .030R EDP# | .060R EDP# | .090R EDP# | .125R EDP# | .190R EDP# | .250R EDP# | Ball EDP# | AT Coated |
|------|-------|-------|-------|-------------|------------|------------|------------|------------|------------|------------|------------|-----------|-----------|
| 1/4 | 3/4 | 2-1/2 | 1/4 | 27400AT | 27414AT | 27416AT | | | | | | | \$25.70 |
| 1/4 | 1" | 4" | 1/4 | 27401AT | 27415AT | 27417AT | | | | | | | \$33.50 |
| 3/8 | 1" | 2-1/2 | 3/8 | 27402AT | 27490AT | 27418AT | 27430AT | 27442AT | 27454AT | | | 27478AT | \$36.50 |
| 3/8 | 2" | 4" | 3/8 | 27403AT | 27491AT | 27419AT | 27431AT | 27443AT | 27455AT | | | 27479AT | \$59.10 |
| 1/2 | 1-1/4 | 3" | 1/2 | 27404AT | 27492AT | 27420AT | 27432AT | 27444AT | 27456AT | | | 27480AT | \$62.70 |
| 1/2 | 2" | 4" | 1/2 | 27405AT | 27493AT | 27421AT | 27433AT | 27445AT | 27457AT | | | 27481AT | \$86.50 |
| 5/8 | 1-1/2 | 3-1/2 | 5/8 | 27406AT | 27494AT | 27422AT | 27434AT | 27446AT | 27458AT | | | 27482AT | \$110.30 |
| 5/8 | 2-5/8 | 5" | 5/8 | 27407AT | 27495AT | 27423AT | 27435AT | 27447AT | 27459AT | | | 27483AT | \$151.60 |
| 3/4 | 1-5/8 | 4" | 3/4 | 27408AT | 27496AT | 27424AT | 27436AT | 27448AT | 27460AT | 27466AT | 27472AT | 27484AT | \$152.00 |
| 3/4 | 2-5/8 | 5" | 3/4 | 27409AT | 27497AT | 27425AT | 27437AT | 27449AT | 27461AT | 27467AT | 27473AT | 27485AT | \$224.70 |
| 3/4 | 4" | 7" | 3/4 | 27410AT | 27498AT | 27426AT | 27438AT | 27450AT | 27462AT | 27468AT | 27474AT | 27486AT | \$270.70 |
| 1" | 1-1/2 | 4" | 1" | 27411AT | 27499AT | 27427AT | 27439AT | 27451AT | 27463AT | 27469AT | 27475AT | 27487AT | \$224.50 |
| 1" | 2-5/8 | 5" | 1" | 27412AT | 27500AT | 27428AT | 27440AT | 27452AT | 27464AT | 27470AT | 27476AT | 27488AT | \$334.20 |
| 1" | 4" | 7" | 1" | 27413AT | 27501AT | 27429AT | 27441AT | 27453AT | 27465AT | 27471AT | 27477AT | 27489AT | \$412.30 |

ULTRATOOL® Series 355 and 377 Monolith™ Series End Mills

Monolith end mills by Ultra-Tool represent a culmination of decades of experience and craftsmanship in solid carbide grinding. Extended reach applications are notoriously difficult, but each respective Monolith Series combines the best of SmoothGrind, SmoothConicity, SmoothEdge and SmoothCoat to maximize success. The 365ML holds size and concentricity to a maximum of .0003 deviation, even at a 12" reach! All Monoliths feature SmoothEdge with standard AT hardcoating.



Series 355ML MONOLITH™

Solid Carbide Extended Reach End Mill

- Five Flute • AT Coated • Tight Tolerance
- Minimal TIR • Clearance Neck
- Expanded Radius Selection



new! Standard Radius sizes throughout the range!

| Diam | LOC | LBS | OAL | Neck | Shank | .015 rad EDP# | .030 rad EDP# | .060 rad EDP# | .090 rad EDP# | .125 rad EDP# | .190 rad EDP# | .250 rad EDP# | AT Coated |
|-------|-------|-------|------------|------|-------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|-----------|
| 3/8 | 1/2 | 2-1/8 | 4" | .355 | 3/8 | 27300AT | 31876AT | 27301AT | 27302AT | | | | \$68.90 |
| 3/8 | 1/2 | 4-1/8 | 6" | .355 | 3/8 | 27303AT | 31877AT | 27304AT | 27305AT | | | | \$91.20 |
| 1/2 | 5/8 | 2-1/4 | 4" | .475 | 1/2 | 27306AT | 31878AT | 27307AT | 27308AT | 27309AT | | | \$102.30 |
| 1/2 | 5/8 | 4-1/8 | 6" | .475 | 1/2 | 27310AT | 31879AT | 27311AT | 27312AT | 27313AT | | | \$136.30 |
| 1/2 | 5/8 | 5-1/2 | 8" | .475 | 1/2 | 27314AT | 31880AT | 27315AT | 27316AT | 27317AT | | | \$175.10 |
| 5/8 | 3/4 | 2-3/8 | 4" | .593 | 5/8 | | 31881AT | 27318AT | 27319AT | 27320AT | | | \$147.50 |
| 5/8 | 3/4 | 4-1/8 | 6" | .593 | 5/8 | | 31882AT | 27321AT | 27322AT | 27323AT | | | \$197.20 |
| 5/8 | 3/4 | 5-1/2 | 8" | .593 | 5/8 | | 31883AT | 27324AT | 27325AT | 27326AT | | | \$256.40 |
| 3/4 | 1" | 3-1/4 | 5" | .712 | 3/4 | | 27575AT | 27579AT | 27583AT | 27587AT | 27591AT | 27595AT | \$250.70 |
| 3/4 | 1" | 4-1/8 | 6" | .712 | 3/4 | | 31884AT | 27327AT | 27328AT | 27329AT | 27330AT | 27331AT | \$278.40 |
| 3/4 | 1" | 5" | 7" | .712 | 3/4 | | 27576AT | 27580AT | 27584AT | 27588AT | 27592AT | 27596AT | \$309.50 |
| 3/4 | 1" | 5-1/2 | 8" | .712 | 3/4 | | 31885AT | 27332AT | 27333AT | 27334AT | 27335AT | 27336AT | \$355.40 |
| 3/4 | 1" | 8" | 12" | .712 | 3/4 | | 31886AT | 27337AT | 27338AT | 27339AT | 27340AT | 27341AT | \$479.40 |
| 1" | 1-1/4 | 3" | 5" | .950 | 1" | | 27577AT | 27581AT | 27585AT | 27589AT | 27593AT | 27597AT | \$410.40 |
| 1" | 1-1/4 | 4-1/8 | 6" | .950 | 1" | | 31887AT | 27342AT | 27343AT | 27344AT | 27345AT | 27346AT | \$427.10 |
| 1" | 1-1/4 | 5" | 7" | .950 | 1" | | 27578AT | 27582AT | 27586AT | 27590AT | 27594AT | 27598AT | \$475.90 |
| 1" | 1-1/4 | 5-1/2 | 8" | .950 | 1" | | 31888AT | 27347AT | 27348AT | 27349AT | 27350AT | 27351AT | \$547.30 |
| 1" | 1-1/4 | 8" | 12" | .950 | 1" | | 31889AT | 27352AT | 27353AT | 27354AT | 27355AT | 27356AT | \$752.80 |
| 1-1/4 | 1-1/2 | 4-1/8 | 6" | 1.20 | 1-1/4 | | 31890AT | | 27357AT | 27358AT | 27359AT | 27360AT | \$573.90 |
| 1-1/4 | 1-1/2 | 5-1/2 | 8" | 1.20 | 1-1/4 | | 31891AT | | 27361AT | 27362AT | 27363AT | 27364AT | \$719.80 |
| 1-1/4 | 1-1/2 | 8" | 12" | 1.20 | 1-1/4 | | 31892AT | | 27365AT | 27366AT | 27367AT | 27368AT | \$998.20 |
| 1-1/2 | 2" | - | 6" | - | 1-1/4 | | 31893AT | | | | | | \$691.00 |
| 1-1/2 | 2" | - | 8" | - | 1-1/4 | | 31894AT | | | | | | \$873.30 |
| 1-1/2 | 2" | - | 12" | - | 1-1/4 | | 31895AT | | | | | | \$1203.70 |



+ SmoothGrind® + SmoothConicity® + SmoothEdge® + SmoothCoat®



Series 377ML MONOLITH™

Solid Carbide Extended Reach End Mill

- Seven Flute • AT Coated • Tight Tolerance
- Minimal TIR • Clearance Neck
- New Monolith Series



new! Standard Radius sizes throughout the range!

| Diam | LOC | LBS | OAL | Neck | Shank | .015 rad EDP# | .030 rad EDP# | .060 rad EDP# | .090 rad EDP# | .125 rad EDP# | .190 rad EDP# | .250 rad EDP# | AT Coated |
|------|-------|-------|------------|------|-------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|-----------|
| 3/4 | 1" | 3-1/4 | 5" | .712 | 3/4 | | 27515AT | 27525AT | 27535AT | 27545AT | 27555AT | 27565AT | \$250.70 |
| 3/4 | 1" | 4-1/8 | 6" | .712 | 3/4 | | 27516AT | 27526AT | 27536AT | 27546AT | 27556AT | 27566AT | \$278.40 |
| 3/4 | 1" | 5" | 7" | .712 | 3/4 | | 27517AT | 27527AT | 27537AT | 27547AT | 27557AT | 27567AT | \$309.50 |
| 3/4 | 1" | 5-1/2 | 8" | .712 | 3/4 | | 27518AT | 27528AT | 27538AT | 27548AT | 27558AT | 27568AT | \$355.40 |
| 3/4 | 1" | 8" | 12" | .712 | 3/4 | | 27519AT | 27529AT | 27539AT | 27549AT | 27559AT | 27569AT | \$479.40 |
| 1" | 1-1/4 | 3" | 5" | .950 | 1" | | 27520AT | 27530AT | 27540AT | 27550AT | 27560AT | 27570AT | \$410.40 |
| 1" | 1-1/4 | 4-1/8 | 6" | .950 | 1" | | 27521AT | 27531AT | 27541AT | 27551AT | 27561AT | 27571AT | \$427.10 |
| 1" | 1-1/4 | 5" | 7" | .950 | 1" | | 27522AT | 27532AT | 27542AT | 27552AT | 27562AT | 27572AT | \$475.90 |
| 1" | 1-1/4 | 5-1/2 | 8" | .950 | 1" | | 27523AT | 27533AT | 27543AT | 27553AT | 27563AT | 27573AT | \$547.30 |
| 1" | 1-1/4 | 8" | 12" | .950 | 1" | | 27524AT | 27534AT | 27544AT | 27554AT | 27564AT | 27574AT | \$752.80 |

ULTRATOOL® Solid Carbide Roughing End Mills for Steels & Exotics

Series 395
Sinusoidal Roughing End Mill
30 Degree RH Spiral • Four Flutes
ULTRATOOL®
PERFORMANCE
S E R I E S

The Ultra-Tool® Rougher Series 395 is a true roughing end mill featuring sinusoidal geometry & radial relief for optimal strength. Designed & engineered for maximum stock removal at very high operating speeds, the 395 is specifically targeted for medium to high tensile steels, stainless, and related high-temperature alloys. Cutting 45° corner chamfer is standard. Coated price includes your choice of TiCN, TiN, AlTiN, or TiAlN.

SFR Ultra-Tool 395 Specs:
Cutting Diam +.0000/-0.0035
Shank Diam +.0000/-0.0033



| Diam | LOC | OAL | Shank | EDP# | UnCoated Price | Coated Price |
|------|-------|-------|-------|-------|----------------|--------------|
| 1/4 | 3/8 | 2" | 1/4 | 39780 | \$21.80 | \$25.10 |
| 1/4 | 3/4 | 2-1/2 | 1/4 | 39703 | \$24.50 | \$28.60 |
| 5/16 | 7/16 | 2-1/2 | 5/16 | 39781 | \$28.10 | \$33.10 |
| 5/16 | 13/16 | 2-1/2 | 5/16 | 39704 | \$32.90 | \$37.80 |
| 3/8 | 1/2 | 2-1/2 | 3/8 | 39782 | \$33.80 | \$39.00 |
| 3/8 | 1" | 2-1/2 | 3/8 | 39705 | \$38.10 | \$43.40 |
| 1/2 | 5/8 | 2-1/2 | 1/2 | 39783 | \$54.20 | \$61.30 |
| 1/2 | 1" | 3" | 1/2 | 39706 | \$65.90 | \$73.00 |
| 1/2 | 2" | 4" | 1/2 | 39784 | \$102.30 | \$111.90 |
| 5/8 | 3/4 | 3-1/2 | 5/8 | 39785 | \$91.30 | \$102.30 |
| 5/8 | 1-1/2 | 3-1/2 | 5/8 | 39707 | \$112.80 | \$123.80 |
| 5/8 | 2-1/2 | 5" | 5/8 | 39786 | \$178.00 | \$195.20 |
| 3/4 | 7/8 | 4" | 3/4 | 39787 | \$123.30 | \$136.20 |
| 3/4 | 1-1/2 | 4" | 3/4 | 39708 | \$154.80 | \$167.70 |
| 3/4 | 2-1/2 | 5" | 3/4 | 39788 | \$241.30 | \$261.20 |
| 1" | 1-1/4 | 4" | 1" | 39709 | \$204.60 | \$223.10 |
| 1" | 2" | 4" | 1" | 39789 | \$275.40 | \$293.90 |
| 1" | 3-1/4 | 6" | 1" | 39790 | \$322.60 | \$348.70 |

| Diam | LOC | OAL | Shank | EDP# | UnCoated Price | Coated Price |
|--------|-----|-----|-------|-------|----------------|--------------|
| 6.0mm | 19 | 50 | 6.0 | 39791 | \$24.50 | \$28.60 |
| 8.0mm | 20 | 63 | 8.0 | 39792 | \$32.90 | \$37.80 |
| 10.0mm | 22 | 70 | 10.0 | 39793 | \$48.90 | \$55.70 |
| 12.0mm | 25 | 74 | 12.0 | 39794 | \$65.90 | \$73.00 |
| 16.0mm | 38 | 89 | 16.0 | 39795 | \$112.80 | \$123.80 |
| 20.0mm | 38 | 100 | 20.0 | 39796 | \$177.20 | \$192.00 |
| 25.0mm | 50 | 100 | 25.0 | 39797 | \$275.40 | \$293.90 |

Series 395ML MONOLITH™

Solid Carbide Extended Reach End Mill

for Steels & Exotics • Four Flute • AT Coated

new!

- Patented SmoothFlute Variable Helix
- Minimal TIR • 45° Chamfer • Neck



LBS = length below shank

SFR Ultra-Tool 395 Specs:
Cutting Diam +.0000/-0.0035
Shank Diam +.0000/-0.0033

SmoothFlute

| Diam | LOC | LBS | OAL | Neck | Cham | Shank | EDP# | AT Coated |
|-------|-------|-------|-----|------|------|-------|---------|-----------|
| 3/8 | 1/2 | 2-1/8 | 4" | .355 | 45° | 3/8 | 31896AT | \$68.90 |
| 3/8 | 1/2 | 4-1/8 | 6" | .355 | 45° | 3/8 | 31897AT | \$91.20 |
| 1/2 | 5/8 | 2-1/4 | 4" | .475 | 45° | 1/2 | 31898AT | \$102.30 |
| 1/2 | 5/8 | 4-1/8 | 6" | .475 | 45° | 1/2 | 31899AT | \$136.30 |
| 1/2 | 5/8 | 5-1/2 | 8" | .475 | 45° | 1/2 | 31900AT | \$175.10 |
| 5/8 | 3/4 | 2-3/8 | 4" | .593 | 45° | 5/8 | 31901AT | \$147.50 |
| 5/8 | 3/4 | 4-1/8 | 6" | .593 | 45° | 5/8 | 31902AT | \$197.20 |
| 5/8 | 3/4 | 5-1/2 | 8" | .593 | 45° | 5/8 | 31903AT | \$256.40 |
| 3/4 | 1" | 4-1/8 | 6" | .712 | 45° | 3/4 | 31904AT | \$278.40 |
| 3/4 | 1" | 5-1/2 | 8" | .712 | 45° | 3/4 | 31905AT | \$355.40 |
| 3/4 | 1" | 8" | 12" | .712 | 45° | 3/4 | 31906AT | \$479.40 |
| 1" | 1-1/4 | 4-1/8 | 6" | .950 | 45° | 1" | 31907AT | \$427.10 |
| 1" | 1-1/4 | 5-1/2 | 8" | .950 | 45° | 1" | 31908AT | \$547.30 |
| 1" | 1-1/4 | 8" | 12" | .950 | 45° | 1" | 31909AT | \$752.80 |
| 1-1/4 | 1-1/2 | 4-1/8 | 6" | 1.20 | 45° | 1-1/4 | 31910AT | \$573.90 |
| 1-1/4 | 1-1/2 | 5-1/2 | 8" | 1.20 | 45° | 1-1/4 | 31911AT | \$719.80 |
| 1-1/4 | 1-1/2 | 8" | 12" | 1.20 | 45° | 1-1/4 | 31912AT | \$998.20 |
| 1-1/2 | 2" | - | 6" | 1.25 | 45° | 1-1/4 | 31913AT | \$691.00 |
| 1-1/2 | 2" | - | 8" | 1.25 | 45° | 1-1/4 | 31914AT | \$873.30 |
| 1-1/2 | 2" | - | 12" | 1.25 | 45° | 1-1/4 | 31915AT | \$1203.70 |

SFR Ultra-Tool 395 Specs (Metric):
Cutting Diam +0.000/-0.089mm
Shank Diam +0.000/-0.007mm

ULTRATOOL® Three Flute High Helix End Mill

Series 320-60S
Three Flute • High 60 Degree RHS Helix


The high-helix design is ideal for all peripheral milling applications. In light depths of cut this tool can be used for all materials from aluminum to exotic alloys. The 60° helix will provide an excellent surface finish and reduce cutting loads.

Ultra-Tool® products are
Shrink Fit Ready (SFR).

SFR Ultra-Tool End Mill Specs:
Cutting Diam +.000/-0.002
Shank Diam +.0000/-0.0003



| Diam | LOC | OAL | Shank | Flutes | EDP# | UnCoated Price | Coated Price |
|------|-------|-------|-------|--------|-------|----------------|--------------|
| 1/8 | 1/2 | 1-1/2 | 1/8 | 3 | 31008 | \$14.70 | \$16.50 |
| 3/16 | 5/8 | 2" | 3/16 | 3 | 31012 | \$17.50 | \$19.60 |
| 1/4 | 3/4 | 2-1/2 | 1/4 | 3 | 31016 | \$22.80 | \$26.80 |
| 5/16 | 13/16 | 2-1/2 | 5/16 | 3 | 31020 | \$29.90 | \$34.90 |
| 3/8 | 7/8 | 2-1/2 | 3/8 | 3 | 31024 | \$36.80 | \$42.10 |
| 1/2 | 1" | 3" | 1/2 | 3 | 31032 | \$58.00 | \$65.00 |
| 5/8 | 1-1/2 | 3-1/2 | 5/8 | 3 | 31036 | \$114.60 | \$125.60 |
| 3/4 | 1-1/2 | 4" | 3/4 | 3 | 31040 | \$160.30 | \$173.30 |
| 1" | 1-1/2 | 4" | 1" | 3 | 31048 | \$265.00 | \$283.60 |

ULTRATOOL® Two & Three Flute Specialty End Mills for Aluminum

Series 330AL

Ultra-Grain® End Mill
Two Flute • 45 Degree RH Spiral

The Ultra-Tool® Series 330AL End Mill is designed specifically for the highest possible efficiency in the milling of aluminum. The 330AL will allow full machine capacity roughing and close tolerance finishing of aluminum and other non-ferrous materials. SmoothEdge now included with TC coating!



330AL Series End Mill Specs:
Cutting Diam +.0000/-0003
Shank Diam +.0000/-0003



Clearance neck
available via
Express Service

**ULTRATOOL®
PERFORMANCE
S E R V I C E S**

new!



Ultra-Tool offers 2 world class coatings
as standard for our aluminum tools!

Simply add a "TC" or "A1" suffix to
the EDP#. For UnCoated, either use no
suffix or add "UC."

SmoothEdge is included!

| Diam | LOC | OAL | Shank | Square | .010 Rad | .020 Rad | .030 Rad | .060 Rad | .090 Rad | .125 Rad | .190 Rad | .250 Rad | Ball | EDP# | EDP# | UnCoated | TC or A1 | |
|------|-------|-------|-------|--------|----------|----------|----------|----------|----------|----------|----------|----------|------|------|------|----------|----------|----------|
| 1/8 | 1/4 | 1-1/2 | 1/8 | 11104 | 11747 | | | | | | | | | | | | \$9.20 | \$11.50 |
| 1/8 | 1/2 | 1-1/2 | 1/8 | 11139 | 11748 | | | | | | | | | | | | \$9.30 | \$11.70 |
| 3/16 | 3/8 | 2" | 3/16 | 11107 | 11749 | | | | | | | | | | | | \$12.70 | \$15.80 |
| 3/16 | 5/8 | 2" | 3/16 | 11142 | 11750 | | | | | | | | | | | | \$13.00 | \$16.10 |
| 1/4 | 3/8 | 2-1/2 | 1/4 | 11110 | | 11751 | 11765 | 11781 | | | | | | | | | \$18.00 | \$23.60 |
| 1/4 | 1/2 | 2" | 1/4 | 39750 | | 11752 | 11766 | 11782 | | | | | | | | | \$17.10 | \$22.70 |
| 1/4 | 1" | 2-1/2 | 1/4 | 39710 | | 11753 | 11767 | 11783 | | | | | | | | | \$21.60 | \$27.10 |
| 1/4 | 2" | 4" | 1/4 | 39751 | | 11754 | 11768 | 11784 | | | | | | | | | \$36.30 | \$43.70 |
| 5/16 | 1/2 | 2-1/2 | 5/16 | 11113 | | 11755 | 11769 | | | | | | | | | | \$23.40 | \$30.80 |
| 5/16 | 3/4 | 2-1/2 | 5/16 | 11148 | | 11756 | 11770 | | | | | | | | | | \$24.00 | \$31.40 |
| 5/16 | 1-3/8 | 3" | 5/16 | 39752 | | 11757 | 11771 | | | | | | | | | | \$37.50 | \$44.80 |
| 3/8 | 5/8 | 2-1/2 | 3/8 | 11116 | | 11758 | 11772 | 11785 | | | | | | | | | \$25.40 | \$32.80 |
| 3/8 | 3/4 | 2-1/2 | 3/8 | 39753 | | 11759 | 11773 | 11786 | | | | | | | | | \$26.20 | \$33.60 |
| 3/8 | 1-1/8 | 2-1/2 | 3/8 | 39711 | | 11760 | 11774 | 11787 | | | | | | | | | \$29.70 | \$37.10 |
| 3/8 | 2" | 4" | 3/8 | 39754 | | 11761 | 11775 | 11788 | | | | | | | | | \$43.10 | \$54.20 |
| 1/2 | 3/4 | 3" | 1/2 | 39755 | | 11762 | 11776 | 11789 | | | | | | | | | \$42.60 | \$53.00 |
| 1/2 | 1-1/4 | 3" | 1/2 | 39712 | | 11763 | 11777 | 11790 | | | | | | | | | \$44.80 | \$55.30 |
| 1/2 | 2" | 4" | 1/2 | 39756 | | 11764 | 11778 | 11791 | | | | | | | | | \$66.60 | \$80.80 |
| 5/8 | 1-3/4 | 3-1/2 | 5/8 | 39713 | | 11779 | 11792 | 11798 | | | | | | | | | \$84.30 | \$101.00 |
| 5/8 | 3" | 6" | 5/8 | 39757 | | 11780 | 11793 | 11799 | | | | | | | | | \$130.40 | \$156.30 |
| 3/4 | 1-3/4 | 4" | 3/4 | 39714 | | 11794 | 11800 | 11804 | 27219 | 27223 | 11815 | | | | | | \$112.80 | \$131.30 |
| 3/4 | 3" | 6" | 3/4 | 39758 | | 11795 | 11801 | 11805 | 27220 | 27224 | | | | | | | \$182.80 | \$211.10 |
| 1" | 1-7/8 | 4" | 1" | 39715 | | 11796 | 11802 | 11806 | 27221 | 27225 | 11816 | | | | | | \$188.30 | \$216.10 |
| 1" | 3" | 6" | 1" | 39759 | | 11797 | 11803 | 11807 | 27222 | 27226 | | | | | | | \$291.80 | \$331.90 |

Series 333AL

Ultra-Grain® End Mill
Three Flute • 45 Degree RH Spiral

The Ultra-Tool® Series 333AL End Mill is designed specifically for the highest possible efficiency in the milling of aluminum. The 333AL will allow full machine capacity roughing and close tolerance finishing of aluminum and other non-ferrous materials. SmoothEdge now included with TC coating!



333AL Series End Mill Specs:
Cutting Diam +.0000/-0003
Shank Diam +.0000/-0003



Clearance neck
available via
Express Service



| Diam | LOC | OAL | Shank | Square | .010 Rad | .020 Rad | .030 Rad | .060 Rad | .090 Rad | .125 Rad | .190 Rad | .250 Rad | Ball | EDP# | EDP# | UnCoated | TC or A1 | |
|------|-------|-------|-------|--------|----------|----------|----------|----------|----------|----------|----------|----------|------|------|------|----------|----------|----------|
| 1/8 | 1/4 | 1-1/2 | 1/8 | 11544 | 11640 | | | | | | | | | | | | \$10.20 | \$12.50 |
| 1/8 | 1/2 | 1-1/2 | 1/8 | 11545 | 11641 | | | | | | | | | | | | \$10.30 | \$12.60 |
| 3/16 | 3/8 | 2" | 3/16 | 11546 | 11642 | | | | | | | | | | | | \$14.00 | \$17.10 |
| 3/16 | 5/8 | 2" | 3/16 | 11547 | 11643 | | | | | | | | | | | | \$14.30 | \$17.40 |
| 1/4 | 3/8 | 2-1/2 | 1/4 | 11548 | | 11644 | 11658 | 11674 | | | | | | | | | \$19.80 | \$25.40 |
| 1/4 | 1/2 | 2" | 1/4 | 11549 | | 11645 | 11659 | 11675 | | | | | | | | | \$18.90 | \$24.40 |
| 1/4 | 1" | 2-1/2 | 1/4 | 11550 | | 11646 | 11660 | 11676 | | | | | | | | | \$23.70 | \$29.30 |
| 1/4 | 2" | 4" | 1/4 | 11551 | | 11647 | 11661 | 11677 | | | | | | | | | \$39.90 | \$47.30 |
| 5/16 | 1/2 | 2-1/2 | 5/16 | 11552 | | 11648 | 11662 | | | | | | | | | | \$25.80 | \$33.20 |
| 5/16 | 3/4 | 2-1/2 | 5/16 | 11553 | | 11649 | 11663 | | | | | | | | | | \$26.30 | \$33.80 |
| 5/16 | 1-3/8 | 3" | 5/16 | 11554 | | 11650 | 11664 | | | | | | | | | | \$41.10 | \$48.50 |
| 3/8 | 5/8 | 2-1/2 | 3/8 | 11555 | | 11651 | 11665 | 11678 | | | | | | | | | \$27.90 | \$35.30 |
| 3/8 | 3/4 | 2-1/2 | 3/8 | 11556 | | 11652 | 11666 | 11679 | | | | | | | | | \$28.80 | \$36.20 |
| 3/8 | 1-1/8 | 2-1/2 | 3/8 | 11557 | | 11653 | 11667 | 11680 | | | | | | | | | \$32.60 | \$40.00 |
| 3/8 | 2" | 4" | 3/8 | 11558 | | 11654 | 11668 | 11681 | | | | | | | | | \$47.50 | \$58.50 |
| 1/2 | 3/4 | 3" | 1/2 | 11559 | | 11655 | 11669 | 11682 | | | | | | | | | \$46.70 | \$57.20 |
| 1/2 | 1-1/4 | 3" | 1/2 | 11560 | | 11656 | 11670 | 11683 | | | | | | | | | \$49.30 | \$59.80 |
| 1/2 | 2" | 4" | 1/2 | 11561 | | 11657 | 11671 | 11684 | | | | | | | | | \$73.10 | \$87.30 |
| 5/8 | 1-3/4 | 3-1/2 | 5/8 | 11562 | | 11672 | 11685 | 11691 | | | | | | | | | \$92.90 | \$109.50 |
| 5/8 | 3" | 6" | 5/8 | 11563 | | 11673 | 11686 | 11692 | | | | | | | | | \$143.40 | \$169.40 |
| 3/4 | 1-3/4 | 4" | 3/4 | 11564 | | 11687 | 11693 | 11697 | 27227 | 27231 | 27242 | | | | | | \$123.90 | \$142.40 |
| 3/4 | 3" | 6" | 3/4 | 11565 | | 11688 | 11694 | 11698 | 27228 | 27232 | | | | | | | \$201.20 | \$229.50 |
| 1" | 1-7/8 | 4" | 1" | 11566 | | 11689 | 11695 | 11699 | 27229 | 27233 | 27243 | | | | | | \$207.20 | \$235.00 |
| 1" | 3" | 6" | 1" | 11567 | | 11690 | 11696 | 11700 | 27230 | 27234 | | | | | | | \$321.20 | \$361.40 |

ULTRATOOL® Monolith™ Series End Mills for Aluminum

Monolith end mills by Ultra-Tool represent a culmination of decades of experience and craftsmanship in solid carbide grinding. Extended reach applications are notoriously difficult, but each respective Monolith Series combines the best of SmoothGrind, SmoothConicity, SmoothEdge and SmoothCoat to maximize success. The 330ML and 333ML hold size & concentricity to a max of .0003 deviation, even at a 12" reach! All AL Monoliths feature SE8, with optional TC or A1 hardcoating.

Series 330ML

Solid Carbide Ext. Reach End Mill for Aluminum

- Two Flutes
- Tight Tolerance
- Minimal TIR
- Available in Square or Ball End
- Standard Clearance Neck


 MONOLITH™

330AL Series End Mill Specs:
SFR Cutting Diam +.0000/-0003
Shank Diam +.0000/-0003



| Diam | LOC | LBS | OAL | Neck | Shank | Square EDP# | .015 rad EDP# | .030 rad EDP# | .060 rad EDP# | .090 rad EDP# | .125 rad EDP# | .190 rad EDP# | .250 rad EDP# | Ball EDP# | UnCoated | TC or A1 Coated |
|-------|-------|-------|-----|------|-------|-------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|-----------|-----------|-----------------|
| 3/8 | 1/2 | 2-1/8 | 4" | .355 | 3/8 | 11900 | | | | | | | | 11920 | \$62.80 | \$68.90 |
| 3/8 | 1/2 | 4-1/8 | 6" | .355 | 3/8 | 11901 | | | | | | | | 11921 | \$81.50 | \$91.20 |
| 1/2 | 5/8 | 2-1/4 | 4" | .475 | 1/2 | 11902 | | | | | | | | 11922 | \$93.70 | \$102.30 |
| 1/2 | 5/8 | 4-1/8 | 6" | .475 | 1/2 | 11903 | | | | | | | | 11923 | \$123.80 | \$136.30 |
| 1/2 | 5/8 | 5-1/2 | 8" | .475 | 1/2 | 11904 | | | | | | | | 11924 | \$155.60 | \$175.10 |
| 5/8 | 3/4 | 2-3/8 | 4" | .593 | 5/8 | 11905 | | | | | | | | 11925 | \$138.30 | \$147.50 |
| 5/8 | 3/4 | 4-1/8 | 6" | .593 | 5/8 | 11906 | | | | | | | | 11926 | \$182.10 | \$197.20 |
| 5/8 | 3/4 | 5-1/2 | 8" | .593 | 5/8 | 11907 | | | | | | | | 11927 | \$233.40 | \$256.40 |
| 3/4 | 1" | 3-1/4 | 5" | .712 | 3/4 | 27680 | | | | | | | | 27684 | \$234.40 | \$250.70 |
| 3/4 | 1" | 4-1/8 | 6" | .712 | 3/4 | 11908 | | | | | | | | 11928 | \$260.90 | \$278.40 |
| 3/4 | 1" | 5" | 7" | .712 | 3/4 | 27681 | | | | | | | | 27685 | \$285.80 | \$309.50 |
| 3/4 | 1" | 5-1/2 | 8" | .712 | 3/4 | 11909 | | | | | | | | 11929 | \$330.20 | \$355.40 |
| 3/4 | 1" | 8" | 12" | .712 | 3/4 | 11910 | | | | | | | | 11930 | \$441.60 | \$479.40 |
| 1" | 1-1/4 | 3" | 5" | .950 | 1" | 27682 | | | | | | | | 27686 | \$390.10 | \$410.40 |
| 1" | 1-1/4 | 4-1/8 | 6" | .950 | 1" | 11911 | | | | | | | | 11931 | \$405.80 | \$427.10 |
| 1" | 1-1/4 | 5" | 7" | .950 | 1" | 27683 | | | | | | | | 27687 | \$451.80 | \$475.90 |
| 1" | 1-1/4 | 5-1/2 | 8" | .950 | 1" | 11912 | | | | | | | | 11932 | \$517.50 | \$547.30 |
| 1" | 1-1/4 | 8" | 12" | .950 | 1" | 11913 | | | | | | | | 11933 | \$715.50 | \$752.80 |
| 1-1/4 | 1-1/2 | 4-1/8 | 6" | 1.20 | 1-1/4 | 11914 | | | | | | | | 11934 | \$541.20 | \$573.90 |
| 1-1/4 | 1-1/2 | 5-1/2 | 8" | 1.20 | 1-1/4 | 11915 | | | | | | | | 11935 | \$672.60 | \$719.80 |
| 1-1/4 | 1-1/2 | 8" | 12" | 1.20 | 1-1/4 | 11916 | | | | | | | | 11936 | \$941.00 | \$998.20 |
| 1-1/2 | 2" | - | 6" | - | 1-1/4 | 11917 | | | | | | | | 11937 | \$640.30 | \$691.00 |
| 1-1/2 | 2" | - | 8" | - | 1-1/4 | 11918 | | | | | | | | 11938 | \$812.70 | \$873.30 |
| 1-1/2 | 2" | - | 12" | - | 1-1/4 | 11919 | | | | | | | | 11939 | \$1119.80 | \$1203.70 |

All Rads for 330ML available as quick-turn specials; price on application.

new!



Ultra-Tool offers 2 world class coatings as standard for our aluminum tools!

Simply add a "TC" or "A1" suffix to the EDP#. For UnCoated, either use no suffix or add "UC".

SmoothEdge is included!

ULTRATOOL
PERFORMANCE
S E R I E S

There are lots of reasons...



ULTRA-Grain® + SmoothGrind® + SmoothConicity® + SmoothEdge® + SmoothCoat® + SmoothFlute®

why ours work better.

ULTRATOOL® Monolith™ Series End Mills for Aluminum

Monolith end mills by Ultra-Tool represent a culmination of decades of experience and craftsmanship in solid carbide grinding. Extended reach applications are notoriously difficult, but each respective Monolith Series combines the best of SmoothGrind, SmoothCentrity, SmoothEdge and SmoothCoat to maximize success. The 330ML and 333ML hold size & concentricity to a max of .0003 deviation, even at a 12" reach! All AL Monoliths feature SE8, with optional TC or A1 hardcoating.

Series 333ML**Solid Carbide Ext. Reach End Mill for Aluminum**

- Three Flutes
- Tight Tolerance
- Minimal TIR
- Square, Corner Rad, & Ball End
- Standard Clearance Neck

**MONOLITH™**

SFR 333AL Series End Mill Specs:
Cutting Diam +.0000/-0.0003
Shank Diam +.0000/-0.0003

**LBS = length below shank**

| Diam | LOC | LBS | OAL | Neck | Shank | Square EDP# | .015 rad EDP# | .030 rad EDP# | .060 rad EDP# | .090 rad EDP# | .125 rad EDP# | .190 rad EDP# | .250 rad EDP# | Ball EDP# | UnCoated | TC or A1 Coated |
|-------|-------|-------|------------|------|-------|-------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|-----------|------------------|-----------------|
| 3/8 | 1/2 | 2-1/8 | 4" | .355 | 3/8 | 11940 | 12000 | 11960 | 12001 | 12002 | | | | 12003 | \$62.80 | \$68.90 |
| 3/8 | 1/2 | 4-1/8 | 6" | .355 | 3/8 | 11941 | 12004 | 11961 | 12005 | 12006 | | | | 12007 | \$81.50 | \$91.20 |
| 1/2 | 5/8 | 2-1/4 | 4" | .475 | 1/2 | 11942 | 12008 | 11962 | 12009 | 12010 | 12011 | | | 12012 | \$93.70 | \$102.30 |
| 1/2 | 5/8 | 4-1/8 | 6" | .475 | 1/2 | 11943 | 12013 | 11963 | 12014 | 12015 | 12016 | | | 12017 | \$123.80 | \$136.30 |
| 1/2 | 5/8 | 5-1/2 | 8" | .475 | 1/2 | 11944 | 12018 | 11964 | 12019 | 12020 | 12021 | | | 12022 | \$155.60 | \$175.10 |
| 5/8 | 3/4 | 2-3/8 | 4" | .593 | 5/8 | 11945 | | 11965 | 12023 | 12024 | 12025 | | | 12026 | \$138.30 | \$147.50 |
| 5/8 | 3/4 | 4-1/8 | 6" | .593 | 5/8 | 11946 | | 11966 | 12027 | 12028 | 12029 | | | 12030 | \$182.10 | \$197.20 |
| 5/8 | 3/4 | 5-1/2 | 8" | .593 | 5/8 | 11947 | | 11967 | 12031 | 12032 | 12033 | | | 12034 | \$233.40 | \$256.40 |
| 3/4 | 1" | 3-1/4 | 5" | .712 | 3/4 | 27688 | | 27692 | 27696 | 27700 | 27704 | 27708 | 27712 | 27716 | \$234.40 | \$250.70 |
| 3/4 | 1" | 4-1/8 | 6" | .712 | 3/4 | 11948 | | 11968 | 12035 | 12036 | 12037 | 12038 | 12039 | 12040 | \$260.90 | \$278.40 |
| 3/4 | 1" | 5" | 7" | .712 | 3/4 | 27689 | | 27693 | 27697 | 27701 | 27705 | 27709 | 27713 | 27717 | \$285.80 | \$309.50 |
| 3/4 | 1" | 5-1/2 | 8" | .712 | 3/4 | 11949 | | 11969 | 12041 | 12042 | 12043 | 12044 | 12045 | 12046 | \$330.20 | \$355.40 |
| 3/4 | 1" | 8" | 12" | .712 | 3/4 | 11950 | | 11970 | 12047 | 12048 | 12049 | 12050 | 12051 | 12052 | \$441.60 | \$479.40 |
| 1" | 1-1/4 | 3" | 5" | .950 | 1" | 27690 | | 27694 | 27698 | 27702 | 27706 | 27710 | 27714 | 27718 | \$390.10 | \$410.40 |
| 1" | 1-1/4 | 4-1/8 | 6" | .950 | 1" | 11951 | | 11971 | 12053 | 12054 | 12055 | 12056 | 12057 | 12058 | \$405.80 | \$427.10 |
| 1" | 1-1/4 | 5" | 7" | .950 | 1" | 27691 | | 27695 | 27699 | 27703 | 27707 | 27711 | 27715 | 27719 | \$451.80 | \$475.90 |
| 1" | 1-1/4 | 5-1/2 | 8" | .950 | 1" | 11952 | | 11972 | 12059 | 12060 | 12061 | 12062 | 12063 | 12064 | \$517.50 | \$547.30 |
| 1" | 1-1/4 | 8" | 12" | .950 | 1" | 11953 | | 11973 | 12065 | 12066 | 12068 | 12069 | 12070 | 12070 | \$715.50 | \$752.80 |
| 1-1/4 | 1-1/2 | 4-1/8 | 6" | 1.20 | 1-1/4 | 11954 | | 11974 | | 12071 | 12072 | 12073 | 12074 | 12075 | \$541.20 | \$573.90 |
| 1-1/4 | 1-1/2 | 5-1/2 | 8" | 1.20 | 1-1/4 | 11955 | | 11975 | | 12076 | 12077 | 12078 | 12079 | 12080 | \$672.60 | \$719.80 |
| 1-1/4 | 1-1/2 | 8" | 12" | 1.20 | 1-1/4 | 11956 | | 11976 | | 12081 | 12082 | 12083 | 12084 | 12085 | \$941.00 | \$998.20 |
| 1-1/2 | 2" | - | 6" | - | 1-1/4 | 11957 | | 11977 | | | | | | 12086 | \$640.30 | \$691.00 |
| 1-1/2 | 2" | - | 8" | - | 1-1/4 | 11958 | | 11978 | | | | | | 12087 | \$812.70 | \$873.30 |
| 1-1/2 | 2" | - | 12" | - | 1-1/4 | 11959 | | 11979 | | | | | | 12088 | \$1119.80 | \$1203.70 |

new! Standard Radius sizes throughout the range!

ULTRATOOL®
PERFORMANCE
S-E-R-I-E-S



new!

Ultra-Tool offers 2 world class coatings as standard for our aluminum tools!

Simply add a "TC" or "A1" suffix to the EDP#. For UnCoated, either use no suffix or add "UC."

SmoothEdge is included!

The newest SmoothEdge® for our Aluminum end mills contributes to amazing surface finishes on milled parts.



Metric Performance Series' by ULTRATOOL®



Series 355 Ultra-Grain® Carbide End Mill
Five Flute • 45 Degree RH Spiral
with Square End or Corner Radius



355 Series Specs (Metric):
SFR Cutting Diam +0.000/-0.051mm
Shank Diam +0.000/-0.007mm

ULTRATOOL®
PERFORMANCE
S E E R O I D E S

Metric
Sizes

| Diam | LOC | OAL | Shank | Square# | Radius# | Rad | AT Coated |
|--------|-----|-----|-------|---------|---------|-----|-----------|
| 3.0mm | 12 | 38 | 3.0 | 31570AT | 31580AT | 0.2 | \$12.90 |
| 4.0mm | 14 | 50 | 4.0 | 31571AT | 31581AT | 0.2 | \$16.90 |
| 5.0mm | 16 | 50 | 5.0 | 31572AT | 31582AT | 0.3 | \$18.60 |
| 6.0mm | 19 | 50 | 6.0 | 31573AT | 31583AT | 0.3 | \$21.90 |
| 8.0mm | 20 | 63 | 8.0 | 31574AT | 31584AT | 0.3 | \$27.90 |
| 10.0mm | 22 | 70 | 10.0 | 31575AT | 31585AT | 0.5 | \$42.60 |
| 12.0mm | 25 | 74 | 12.0 | 31576AT | 31586AT | 0.5 | \$54.00 |
| 16.0mm | 38 | 89 | 16.0 | 31577AT | 31587AT | 0.5 | \$101.80 |
| 20.0mm | 38 | 100 | 20.0 | 31578AT | 31588AT | 0.5 | \$194.30 |
| 25.0mm | 38 | 100 | 25.0 | 31579AT | 31589AT | 0.5 | \$224.50 |



Series 323 Patented SmoothFlute®
Four Flute Variable Helix End Mill
with standard Corner Radius



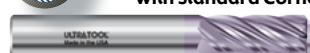
323 Series End Mill Specs (Metric):
SFR Cutting Diam +0.000/-0.051mm
Shank Diam +0.000/-0.007mm



| Diam | LOC | OAL | Shank | Radius | EDP# | AT Coated |
|--------|-----|-----|-------|--------|---------|-----------|
| 3.0mm | 12 | 38 | 3.0 | 0.2 | 23080AT | \$12.90 |
| 4.0mm | 14 | 50 | 4.0 | 0.2 | 23081AT | \$16.90 |
| 5.0mm | 16 | 50 | 5.0 | 0.3 | 23082AT | \$18.60 |
| 6.0mm | 19 | 50 | 6.0 | 0.3 | 23083AT | \$21.90 |
| 8.0mm | 20 | 63 | 8.0 | 0.3 | 23084AT | \$27.90 |
| 10.0mm | 22 | 70 | 10.0 | 0.5 | 23085AT | \$42.60 |
| 12.0mm | 16 | 74 | 12.0 | 0.5 | 23086AT | \$51.70 |
| 12.0mm | 30 | 74 | 12.0 | 0.5 | 23087AT | \$54.00 |
| 14.0mm | 32 | 89 | 14.0 | 0.5 | 23088AT | \$88.80 |
| 16.0mm | 38 | 89 | 16.0 | 0.5 | 23089AT | \$101.80 |
| 20.0mm | 38 | 100 | 20.0 | 0.5 | 23090AT | \$194.30 |
| 25.0mm | 38 | 100 | 25.0 | 0.5 | 23091AT | \$208.00 |



Series 365 Patented SmoothFlute®
Six Flute Variable Helix End Mill
with standard Corner Radius



365 Series End Mill Specs (Metric):
SFR Cutting Diam +0.000/-0.051mm
Shank Diam +0.000/-0.007mm

**new!**

| Diam | LOC | OAL | Shank | Radius | EDP# | AT Coated |
|--------|-----|-----|-------|--------|---------|-----------|
| 6.0mm | 10 | 50 | 6.0 | 0.25 | 27720AT | \$21.90 |
| 6.0mm | 19 | 63 | 6.0 | 0.5 | 27721AT | \$25.70 |
| 8.0mm | 20 | 63 | 8.0 | 0.5 | 27722AT | \$30.40 |
| 10.0mm | 16 | 70 | 10.0 | 0.5 | 27723AT | \$39.70 |
| 10.0mm | 22 | 70 | 10.0 | 1.0 | 27724AT | \$42.60 |
| 12.0mm | 16 | 74 | 12.0 | 0.5 | 27725AT | \$52.70 |
| 12.0mm | 30 | 74 | 12.0 | 1.0 | 27726AT | \$60.70 |
| 12.0mm | 45 | 100 | 12.0 | 2.0 | 27727AT | \$80.80 |
| 16.0mm | 38 | 89 | 16.0 | 0.5 | 27728AT | \$101.80 |
| 16.0mm | 57 | 125 | 16.0 | 1.0 | 27729AT | \$149.00 |
| 20.0mm | 38 | 100 | 20.0 | 1.0 | 27730AT | \$194.30 |
| 25.0mm | 38 | 100 | 25.0 | 1.0 | 27731AT | \$208.00 |

new!

Choose from UnCoated (UC), TiCN (TC), or TiB2 (A1) surface hardcoatings. Simply add the appropriate suffix, UC, TC, or A1, after the EDP#. SmoothEdge is included!

Series 330AL Aluminum End Mill
Two Flute • 45 Degree RH Spiral



Series 333AL Aluminum End Mill
Three Flute • 45 Degree RH Spiral



| Diam | LOC | OAL | Shank | 0.5mm Square EDP# | 1.0mm Rad EDP# | 3.0mm Rad EDP# | UnCoated | TC or A1 Coated | 0.5mm Square EDP# | 1.0mm Rad EDP# | 3.0mm Rad EDP# | UnCoated | TC or A1 Coated | |
|--------|-----|-----|-------|-------------------------|----------------------|----------------------|----------|--------------------|-------------------------|----------------------|----------------------|----------|--------------------|----------|
| 3.0mm | 6 | 38 | 3.0 | 11504 | 11701 | | | \$9.20 | 11568 | 11594 | | | \$10.20 | \$12.50 |
| 3.0mm | 12 | 38 | 3.0 | 11525 | 11702 | | | \$9.30 | 11569 | 11595 | | | \$10.30 | \$12.60 |
| 4.0mm | 9 | 50 | 4.0 | 11507 | 11703 | | | \$11.10 | 11570 | 11596 | | | \$12.30 | \$15.40 |
| 4.0mm | 12 | 50 | 4.0 | 11528 | 11704 | | | \$11.40 | 11571 | 11597 | | | \$12.70 | \$15.80 |
| 5.0mm | 9 | 50 | 5.0 | 11510 | 11705 | | | \$13.40 | 11572 | 11598 | | | \$14.60 | \$18.30 |
| 5.0mm | 14 | 50 | 5.0 | 11531 | 11706 | | | \$13.80 | 11573 | 11599 | | | \$15.10 | \$18.80 |
| 6.0mm | 12 | 63 | 6.0 | 11513 | 11707 | 11720 | | \$19.30 | 11574 | 11600 | 11613 | | \$21.30 | \$26.80 |
| 6.0mm | 25 | 63 | 6.0 | 39760 | 11708 | 11721 | | \$21.60 | 11575 | 11601 | 11614 | | \$23.70 | \$29.30 |
| 6.0mm | 50 | 100 | 6.0 | 39761 | 11709 | 11722 | | \$36.30 | 11576 | 11602 | 11615 | | \$39.90 | \$47.30 |
| 8.0mm | 14 | 63 | 8.0 | 11516 | 11710 | 11723 | | \$25.20 | 11577 | 11603 | 11616 | | \$27.80 | \$35.20 |
| 8.0mm | 25 | 63 | 8.0 | 39716 | 11711 | 11724 | | \$26.10 | 11578 | 11604 | 11617 | | \$28.80 | \$36.10 |
| 8.0mm | 50 | 100 | 8.0 | 39762 | 11712 | 11725 | | \$43.10 | 11579 | 11605 | 11618 | | \$47.50 | \$57.60 |
| 10.0mm | 16 | 70 | 10.0 | 11519 | 11713 | 11726 | | \$37.00 | 11580 | 11606 | 11619 | | \$40.70 | \$49.30 |
| 10.0mm | 30 | 70 | 10.0 | 39717 | 11714 | 11727 | | \$38.60 | 11581 | 11607 | 11620 | | \$42.60 | \$51.20 |
| 10.0mm | 50 | 100 | 10.0 | 39763 | 11715 | 11728 | | \$54.40 | 11582 | 11608 | 11621 | | \$59.80 | \$73.40 |
| 12.0mm | 19 | 74 | 12.0 | 11522 | 11716 | 11729 | | \$42.20 | 11583 | 11609 | 11622 | | \$46.50 | \$57.00 |
| 12.0mm | 32 | 74 | 12.0 | 39718 | 11717 | 11730 | | \$44.80 | 11584 | 11610 | 11623 | | \$49.30 | \$59.80 |
| 12.0mm | 50 | 100 | 12.0 | 39764 | 11718 | 11731 | | \$66.60 | 11585 | 11611 | 11624 | | \$73.10 | \$87.30 |
| 14.0mm | 44 | 89 | 14.0 | 39765 | 11719 | 11732 | | \$74.60 | 11586 | 11612 | 11625 | | \$81.40 | \$96.80 |
| 16.0mm | 44 | 89 | 16.0 | 39719 | | 11733 11740 | | \$84.30 | 11587 | | 11626 11633 | | \$92.90 | \$109.50 |
| 16.0mm | 64 | 125 | 16.0 | 39766 | | 11734 11741 | | \$130.40 | 11588 | | 11627 11634 | | \$143.40 | \$169.40 |
| 18.0mm | 50 | 100 | 18.0 | 39767 | | 11735 11742 | | \$129.20 | 11589 | | 11628 11635 | | \$142.40 | \$160.90 |
| 20.0mm | 50 | 100 | 20.0 | 39720 | | 11736 11743 | | \$142.80 | 11590 | | 11629 11636 | | \$157.20 | \$176.80 |
| 20.0mm | 76 | 150 | 20.0 | 39768 | | 11737 11744 | | \$229.60 | 11591 | | 11630 11637 | | \$252.60 | \$286.50 |
| 25.0mm | 50 | 100 | 25.0 | 39721 | | 11738 11745 | | \$188.30 | 11592 | | 11631 11638 | | \$207.20 | \$235.00 |
| 25.0mm | 76 | 150 | 25.0 | 39769 | | 11739 11746 | | \$291.80 | 11593 | | 11632 11639 | | \$321.20 | \$361.40 |

330AL Series Specs (Metric):
SFR Cutting Diam +0.000/-0.007mm
Shank Diam +0.000/-0.007mm

333AL Series Specs (Metric):
SFR Cutting Diam +0.000/-0.007mm
Shank Diam +0.000/-0.007mm

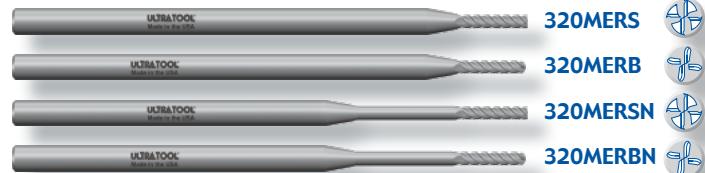
ULTRATOOL® Micro Extended Reach Four Flute End Mills

Leading off our incredible selection of micro tools are the 3" long, 4 flute 320 Micro Extended Reach Square (320MERS) and Ball (320MERB) end mills. Available UnCoated and with 3 different coatings (AT, D1 PVD Diamond, or D2 CVD Diamond) plus an optional clearance neck, these end mills are ideal for applications where precision and reach are important. Diameter tolerance $\pm .0003$ (except for D2 Diamond $+.0005/- .001$). 1/8" shank. Add "N" for extended clearance neck.

Series 320MERS & 320MERB

Solid Carbide Micro Extended Reach End Mill
Four Flutes • Tight Tolerance • LOC = 5X diameter
Square or Ball End • 3" OAL • 1/8" shank
Standard Clearance Neck with "N" selection

For coating selection add AT, D1,
or D2 suffix to EDP#.



35% tighter shank tolerance than h6!
Shrink-Fit Ready!



Diam LOC LBS OAL Shank

| Diam | LOC | LBS | OAL | Shank | Square EDP# | Ball EDP# | UnCoated Price | AT Price | D1 Price | D2 Price |
|--------|------|-------|-----|-------|-------------|-----------|----------------|----------|----------|----------|
| .015 | .075 | | 3" | 1/8 | 32450 | 32550 | \$25.40 | \$28.40 | \$32.40 | \$61.40 |
| .015N | .075 | .150 | 3" | 1/8 | 32451 | 32551 | \$31.80 | \$34.80 | \$38.80 | \$67.80 |
| .020 | .100 | | 3" | 1/8 | 32452 | 32552 | \$25.40 | \$28.40 | \$32.40 | \$61.40 |
| .020N | .100 | .200 | 3" | 1/8 | 32453 | 32553 | \$31.80 | \$34.80 | \$38.80 | \$67.80 |
| .025 | .125 | | 3" | 1/8 | 32454 | 32554 | \$25.40 | \$28.40 | \$32.40 | \$61.40 |
| .025N | .125 | .250 | 3" | 1/8 | 32455 | 32555 | \$31.80 | \$34.80 | \$38.80 | \$67.80 |
| .030 | .150 | | 3" | 1/8 | 32456 | 32556 | \$25.40 | \$28.40 | \$32.40 | \$61.40 |
| .030N | .150 | .300 | 3" | 1/8 | 32457 | 32557 | \$31.80 | \$34.80 | \$38.80 | \$67.80 |
| .031 | .155 | | 3" | 1/8 | 32458 | 32558 | \$25.40 | \$28.40 | \$32.40 | \$61.40 |
| .031N | .155 | .310 | 3" | 1/8 | 32459 | 32559 | \$31.80 | \$34.80 | \$38.80 | \$67.80 |
| .035 | .175 | | 3" | 1/8 | 32460 | 32560 | \$25.40 | \$28.40 | \$32.40 | \$61.40 |
| .035N | .175 | .350 | 3" | 1/8 | 32461 | 32561 | \$31.80 | \$34.80 | \$38.80 | \$67.80 |
| .040 | .200 | | 3" | 1/8 | 32462 | 32562 | \$25.40 | \$28.40 | \$32.40 | \$61.40 |
| .040N | .200 | .400 | 3" | 1/8 | 32463 | 32563 | \$31.80 | \$34.80 | \$38.80 | \$67.80 |
| .045 | .225 | | 3" | 1/8 | 32464 | 32564 | \$25.40 | \$28.40 | \$32.40 | \$61.40 |
| .045N | .225 | .450 | 3" | 1/8 | 32465 | 32565 | \$31.80 | \$34.80 | \$38.80 | \$67.80 |
| .047 | .235 | | 3" | 1/8 | 32466 | 32566 | \$25.40 | \$28.40 | \$32.40 | \$61.40 |
| .047N | .235 | .500 | 3" | 1/8 | 32467 | 32567 | \$31.80 | \$34.80 | \$38.80 | \$67.80 |
| .050 | .250 | | 3" | 1/8 | 32468 | 32568 | \$25.40 | \$28.40 | \$32.40 | \$61.40 |
| .050N | .250 | .500 | 3" | 1/8 | 32469 | 32569 | \$31.80 | \$34.80 | \$38.80 | \$67.80 |
| .060 | .300 | | 3" | 1/8 | 32470 | 32570 | \$25.40 | \$28.40 | \$32.40 | \$61.40 |
| .060N | .300 | 1.0" | 3" | 1/8 | 32471 | 32571 | \$31.80 | \$34.80 | \$38.80 | \$67.80 |
| .062 | .310 | | 3" | 1/8 | 32472 | 32572 | \$25.40 | \$28.40 | \$32.40 | \$61.40 |
| .062N | .310 | 1.0" | 3" | 1/8 | 32473 | 32573 | \$31.80 | \$34.80 | \$38.80 | \$67.80 |
| .075 | .375 | | 3" | 1/8 | 32474 | 32574 | \$25.40 | \$28.40 | \$32.40 | \$61.40 |
| .075N | .375 | 1.0" | 3" | 1/8 | 32475 | 32575 | \$31.80 | \$34.80 | \$38.80 | \$67.80 |
| .078 | .390 | | 3" | 1/8 | 32476 | 32576 | \$25.40 | \$28.40 | \$32.40 | \$61.40 |
| .078N | .390 | 1.0" | 3" | 1/8 | 32477 | 32577 | \$31.80 | \$34.80 | \$38.80 | \$67.80 |
| .090 | .450 | | 3" | 1/8 | 32478 | 32578 | \$25.40 | \$28.40 | \$32.40 | \$61.40 |
| .090N | .450 | 1.0" | 3" | 1/8 | 32479 | 32579 | \$31.80 | \$34.80 | \$38.80 | \$67.80 |
| .093 | .465 | | 3" | 1/8 | 32480 | 32580 | \$25.40 | \$28.40 | \$32.40 | \$61.40 |
| .093N | .465 | 1.25" | 3" | 1/8 | 32481 | 32581 | \$31.80 | \$34.80 | \$38.80 | \$67.80 |
| .1245 | .625 | | 3" | 1/8 | 32482 | 32582 | \$25.40 | \$28.40 | \$32.40 | \$61.40 |
| .1245N | .625 | 1.5" | 3" | 1/8 | 32483 | 32583 | \$31.80 | \$34.80 | \$38.80 | \$67.80 |



Specs (micro end mills
cutting diameter $< 1/8"$):
Cutting Diam $+.0003 / -.0003$
Shank Diam $+.0000 / -.0002$
Radius $\pm .00015$
SFR = Shrink Fit Ready

ULTRATOOL®
PERFORMANCE
S E R O I O E S

Solid Carbide Micro End Mills by ULTRATOOL®

The Ultra-Tool® selection of micro solid carbide end mills is unmatched in quality and range. Three different length of cut (LOC) to diameter ratios (**Micro = 1.5X**, **Micro Long = 3.0X**, & **Micro eXtra Long = 5.0X**), two & four flute, square & ball nose, plus coated & UnCoated. Square & Ball prices are identical. These tools match great carbide substrate with superb characteristics. 1/8" shank diameter x 1.5" OAL (metric sizes=3.0 x 38mm).

| | | Series 330MS / 330MB 2-flute 1.5X | | | | | Series 330MLS / 330MLB 2-flute 3X | | | | | Series 330MXLS / 330MLXB 2-flute 5X | | | | |
|-------|----------|-----------------------------------|---------|---------|---------|---------|-----------------------------------|---------|--------|-------|---------|-------------------------------------|---------|--------|-------|--------|
| | | Series 320MS / 320MB 4-flute 1.5X | | | | | Series 320MLS / 320MLB 4-flute 3X | | | | | Series 320MXLS / 320MLXB 4-flute 5X | | | | |
| LOC = | Diameter | ULTRATOOL | | | | | ULTRATOOL | | | | | ULTRATOOL | | | | |
| | | 1.5X | 2 sq | 2 ball | 4 sq | 4 ball | 3.0X | 2 sq | 2 ball | 4 sq | 4 ball | 5.0X | 2 sq | 2 ball | 4 sq | 4 ball |
| | | | price | coated | | | | price | coated | | | | price | coated | | |
| .005 | 30000 | 30648 | \$16.00 | \$17.00 | 30638 | 30639 | \$19.00 | \$20.00 | 30654 | 30655 | | \$22.00 | \$23.00 | | | |
| .006 | 30001 | 30649 | \$16.00 | \$17.00 | 30640 | 30641 | \$19.00 | \$20.00 | 30656 | 30657 | | \$22.00 | \$23.00 | | | |
| .007 | 30002 | 30650 | \$16.00 | \$17.00 | 30642 | 30643 | \$19.00 | \$20.00 | 30658 | 30659 | | \$22.00 | \$23.00 | | | |
| .008 | 30003 | 30651 | \$16.00 | \$17.00 | 30644 | 30645 | | | 30660 | 30661 | | \$22.00 | \$23.00 | | | |
| .009 | 30004 | 30652 | \$16.00 | \$17.00 | 30646 | 30647 | | | 30662 | 30663 | | \$22.00 | \$23.00 | | | |
| .010 | 33244 | 33344 | 30578 | 30608 | \$14.00 | \$15.00 | 30009 | 30048 | 30579 | 30609 | \$17.00 | \$18.00 | 30210 | 30310 | 30678 | 30679 |
| .011 | 33245 | 33345 | 30580 | 30610 | \$14.00 | \$15.00 | 30010 | 30049 | 30581 | 30611 | \$17.00 | \$18.00 | 30211 | 30311 | 30680 | 30681 |
| .012 | 33246 | 33346 | 30582 | 30612 | \$14.00 | \$15.00 | 30011 | 30050 | 30583 | 30613 | \$17.00 | \$18.00 | 30212 | 30312 | 30682 | 30683 |
| .013 | 33247 | 33347 | 30584 | 30614 | \$14.00 | \$15.00 | 30012 | 30051 | 30585 | 30615 | \$17.00 | \$18.00 | 30213 | 30313 | 30684 | 30685 |
| .014 | 33298 | 33398 | 30586 | 30616 | \$14.00 | \$15.00 | 30013 | 30052 | 30587 | 30617 | \$17.00 | \$18.00 | 30214 | 30314 | 30686 | 30687 |
| .015 | 33249 | 33349 | 30588 | 30618 | \$14.00 | \$15.00 | 30014 | 30053 | 30589 | 30619 | \$17.00 | \$18.00 | 30215 | 30315 | 30688 | 30689 |
| .016 | 33250 | 33350 | 30590 | 30620 | \$14.00 | \$15.00 | 30015 | 30054 | 30591 | 30621 | \$17.00 | \$18.00 | 30216 | 30316 | 30690 | 30691 |
| .017 | 33251 | 33351 | 30592 | 30622 | \$14.00 | \$15.00 | 30016 | 30055 | 30593 | 30623 | \$17.00 | \$18.00 | 30217 | 30317 | 30692 | 30693 |
| .018 | 33252 | 33352 | 30594 | 30624 | \$14.00 | \$15.00 | 30017 | 30056 | 30595 | 30625 | \$17.00 | \$18.00 | 30218 | 30318 | 30694 | 30695 |
| .019 | 33253 | 33353 | 30596 | 30626 | \$14.00 | \$15.00 | 30018 | 30057 | 30597 | 30627 | \$17.00 | \$18.00 | 30219 | 30319 | 30696 | 30697 |
| .020 | 33254 | 33354 | 30598 | 30628 | \$14.00 | \$15.00 | 30019 | 30040 | 30599 | 30629 | \$17.00 | \$18.00 | 30220 | 30320 | 30263 | 30363 |
| .021 | 33255 | 33355 | 30600 | 30630 | \$13.50 | \$14.50 | 30020 | 30058 | 30601 | 30631 | \$16.50 | \$17.50 | 30221 | 30321 | 30698 | 30699 |
| .022 | 33256 | 33356 | 30602 | 30632 | \$13.50 | \$14.50 | 30021 | 30059 | 30603 | 30633 | \$16.50 | \$17.50 | 30222 | 30322 | 30700 | 30701 |
| .023 | 33257 | 33357 | 30604 | 30634 | \$13.50 | \$14.50 | 30022 | 30060 | 30605 | 30635 | \$16.50 | \$17.50 | 30223 | 30323 | 30702 | 30703 |
| .024 | 33258 | 33358 | 30606 | 30636 | \$13.50 | \$14.50 | 30023 | 30061 | 30607 | 30637 | \$16.50 | \$17.50 | 30224 | 30324 | 30704 | 30705 |
| .025 | 33259 | 33359 | 32259 | 32359 | \$13.50 | \$14.50 | 30024 | 30041 | 30773 | 30090 | \$16.50 | \$17.50 | 30225 | 30325 | 30264 | 30364 |
| .026 | 33260 | 33360 | 32260 | 32360 | \$13.50 | \$14.50 | 30025 | 30062 | 30774 | 30091 | \$16.50 | \$17.50 | 30226 | 30326 | 30265 | 30365 |
| .027 | 33261 | 33361 | 32261 | 32361 | \$13.50 | \$14.50 | 30026 | 30063 | 30775 | 30092 | \$16.50 | \$17.50 | 30227 | 30327 | 30266 | 30366 |
| .028 | 33262 | 33362 | 32262 | 32362 | \$13.50 | \$14.50 | 30027 | 30064 | 30776 | 30093 | \$16.50 | \$17.50 | 30228 | 30328 | 30267 | 30367 |
| .029 | 33263 | 33363 | 32263 | 32363 | \$13.50 | \$14.50 | 30028 | 30065 | 30777 | 30094 | \$16.50 | \$17.50 | 30229 | 30329 | 30268 | 30368 |
| .030 | 33264 | 33364 | 32264 | 32364 | \$13.00 | \$14.00 | 30029 | 30042 | 30778 | 30095 | \$16.00 | \$17.00 | 30230 | 30330 | 30269 | 30369 |
| .031 | 33265 | 33365 | 32265 | 32365 | \$13.00 | \$14.00 | 30030 | 30043 | 30779 | 30096 | \$16.00 | \$17.00 | 30231 | 30331 | 30270 | 30370 |
| .032 | 30005 | 30574 | 30470 | 30570 | \$13.00 | \$14.00 | 30031 | 30066 | 30800 | 30097 | \$16.00 | \$17.00 | 30232 | 30332 | 30271 | 30371 |
| .033 | 30706 | 30796 | 30748 | 30838 | \$13.00 | \$14.00 | 30707 | 30797 | 30749 | 30839 | \$16.00 | \$17.00 | 30233 | 30333 | 30272 | 30372 |
| .034 | 30708 | 30798 | 30750 | 30840 | \$13.00 | \$14.00 | 30709 | 30799 | 30751 | 30841 | \$16.00 | \$17.00 | 30234 | 30334 | 30273 | 30373 |
| .035 | 33266 | 33366 | 32266 | 32366 | \$13.00 | \$14.00 | 30047 | 30067 | 30801 | 30098 | \$16.00 | \$17.00 | 30235 | 30335 | 30274 | 30374 |
| .036 | 30710 | 30800 | 30752 | 30842 | \$13.00 | \$14.00 | 30711 | 30801 | 30753 | 30843 | \$16.00 | \$17.00 | 30236 | 30336 | 30275 | 30375 |
| .037 | 30006 | 30575 | 30471 | 30571 | \$13.00 | \$14.00 | 30032 | 30068 | 30802 | 30099 | \$16.00 | \$17.00 | 30237 | 30337 | 30276 | 30376 |
| .038 | 30712 | 30802 | 30754 | 30844 | \$13.00 | \$14.00 | 30713 | 30803 | 30755 | 30845 | \$16.00 | \$17.00 | 30238 | 30338 | 30277 | 30377 |
| .039 | 30714 | 30804 | 30756 | 30846 | \$13.00 | \$14.00 | 30715 | 30805 | 30757 | 30847 | \$16.00 | \$17.00 | 30239 | 30339 | 30278 | 30378 |
| .040 | 33267 | 33367 | 32267 | 32367 | \$13.00 | \$14.00 | 30033 | 30044 | 30803 | 30100 | \$16.00 | \$17.00 | 30240 | 30340 | 30279 | 30379 |
| .041 | 30716 | 30806 | 30758 | 30848 | \$13.00 | \$14.00 | 30717 | 30807 | 30759 | 30849 | \$16.00 | \$17.00 | 30241 | 30341 | 30280 | 30380 |
| .042 | 30718 | 30808 | 30760 | 30850 | \$13.00 | \$14.00 | 30719 | 30809 | 30761 | 30851 | \$16.00 | \$17.00 | 30242 | 30342 | 30281 | 30381 |
| .043 | 30720 | 30810 | 30762 | 30852 | \$13.00 | \$14.00 | 30721 | 30811 | 30763 | 30853 | \$16.00 | \$17.00 | 30243 | 30343 | 30282 | 30382 |
| .044 | 30722 | 30812 | 30764 | 30854 | \$13.00 | \$14.00 | 30723 | 30813 | 30765 | 30855 | \$16.00 | \$17.00 | 30244 | 30344 | 30283 | 30383 |
| .045 | 30724 | 30814 | 30766 | 30856 | \$13.00 | \$14.00 | 30725 | 30815 | 30767 | 30857 | \$16.00 | \$17.00 | 30245 | 30345 | 30284 | 30384 |
| .046 | 30007 | 30576 | 30472 | 30572 | \$13.00 | \$14.00 | 30034 | 30069 | 30804 | 30101 | \$16.00 | \$17.00 | 30246 | 30346 | 30285 | 30385 |
| .047 | 33268 | 33368 | 32268 | 32368 | \$13.00 | \$14.00 | 30035 | 30045 | 30805 | 30108 | \$16.00 | \$17.00 | 30247 | 30347 | 30286 | 30386 |
| .048 | 30726 | 30816 | 30768 | 30858 | \$13.00 | \$14.00 | 30727 | 30817 | 30769 | 30859 | \$16.00 | \$17.00 | 30248 | 30348 | 30287 | 30387 |
| .049 | 30728 | 30818 | 30770 | 30860 | \$13.00 | \$14.00 | 30729 | 30819 | 30771 | 30861 | \$16.00 | \$17.00 | 30249 | 30349 | 30288 | 30388 |
| .050 | 33269 | 33369 | 32269 | 32369 | \$12.00 | \$13.00 | 30036 | 30070 | 30806 | 30109 | \$15.00 | \$16.00 | 30250 | 30350 | 30289 | 30389 |
| .051 | 30730 | 30820 | 30778 | 30862 | \$12.00 | \$13.00 | 30731 | 30821 | 30779 | 30863 | \$15.00 | \$16.00 | 30251 | 30351 | 30290 | 30390 |
| .052 | 30732 | 30822 | 30780 | 30864 | \$12.00 | \$13.00 | 30733 | 30823 | 30781 | 30865 | \$15.00 | \$16.00 | 30252 | 30352 | 30291 | 30391 |
| .053 | 30734 | 30824 | 30782 | 30866 | \$12.00 | \$13.00 | 30735 | 30825 | 30783 | 30867 | \$15.00 | \$16.00 | 30253 | 30353 | 30292 | 30392 |
| .054 | 30736 | 30826 | 30784 | 30868 | \$12.00 | \$13.00 | 30737 | 30827 | 30785 | 30869 | \$15.00 | \$16.00 | 30254 | 30354 | 30293 | 30393 |
| .055 | 33270 | 33370 | 32270 | 32370 | \$12.00 | \$13.00 | 30037 | 30046 | 30808 | 30110 | \$15.00 | \$16.00 | 30255 | 30355 | 30294 | 30394 |
| .056 | 30738 | 30828 | 30786 | 30870 | \$12.00 | \$13.00 | 30739 | 30829 | 30787 | 30871 | \$15.00 | \$16.00 | 30256 | 30356 | 30295 | 30395 |
| .057 | 30008 | 30577 | 30473 | 30573 | \$12.00 | \$13.00 | 30038 | 30071 | 30808 | 30111 | \$15.00 | \$16.00 | 30257 | 30357 | 30296 | 30396 |
| .058 | 30740 | 30830 | 30788 | 30878 | \$12.00 | \$13.00 | 30741 | 30831 | 30789 | 30879 | \$15.00 | \$16.00 | 30258 | 30358 | 30297 | 30397 |

Solid Carbide Micro End Mills by ULTRATOOL®

| Diam | Series 330MS / 330MB 2-flute 1.5X | | | | | | Series 330MLS / 330MLB 2-flute 3X | | | | | | Series 330MXLS / 330MXLB 2-flute 5X | | | | | | | | | |
|--------|-----------------------------------|--------|-------|--------|---------|---------|-----------------------------------|---------|--------|-------|--------|---------|-------------------------------------|---------|-------|--------|-------|--------|---------|---------|---------|---------|
| | 1.5X | | | | 3.0X | | | | 5.0X | | | | 5.0X | | | | 5.0X | | | | | |
| | 2 sq | 2 ball | 4 sq | 4 ball | UC | COAT | | 2 sq | 2 ball | 4 sq | 4 ball | UC | COAT | | 2 sq | 2 ball | 4 sq | 4 ball | UC | COAT | | |
| .059 | 30742 | 30832 | 30790 | 30880 | \$12.00 | \$13.00 | | 30743 | 30833 | 30791 | 30881 | \$15.00 | \$16.00 | | 30259 | 30359 | 30298 | 30398 | \$18.00 | \$19.00 | | |
| .060 | 33271 | 33371 | 32271 | 32371 | \$12.00 | \$13.00 | | 30039 | 30072 | 30089 | 30112 | \$15.00 | \$16.00 | | 30260 | 30360 | 30299 | 30399 | \$18.00 | \$19.00 | | |
| .061 | 30744 | 30834 | 30792 | 30882 | \$12.00 | \$13.00 | | 30745 | 30835 | 30793 | 30883 | \$15.00 | \$16.00 | | 30261 | 30361 | 30300 | 30400 | \$18.00 | \$19.00 | | |
| .062 | 30746 | 30836 | 30794 | 30884 | \$12.00 | \$13.00 | | 30747 | 30837 | 30795 | 30885 | \$15.00 | \$16.00 | | 30262 | 30362 | 30308 | 30408 | \$18.00 | \$19.00 | | |
| .065 | 30900 | 30915 | 30930 | 30945 | \$12.00 | \$13.00 | | 30960 | 31600 | 31615 | 31630 | \$15.00 | \$16.00 | | | | | | | | | |
| .070 | 30901 | 30916 | 30931 | 30946 | \$12.00 | \$13.00 | | 30961 | 31601 | 31616 | 31631 | \$15.00 | \$16.00 | | | | | | | | | |
| .075 | 30902 | 30917 | 30932 | 30947 | \$12.00 | \$13.00 | | 30962 | 31602 | 31617 | 31632 | \$15.00 | \$16.00 | | | | | | | | | |
| .078 | 30903 | 30918 | 30933 | 30948 | \$12.00 | \$13.00 | | 30963 | 31603 | 31618 | 31633 | \$15.00 | \$16.00 | | | | | | | | | |
| .080 | 30904 | 30919 | 30934 | 30949 | \$12.00 | \$13.00 | | 30964 | 31604 | 31619 | 31634 | \$15.00 | \$16.00 | | | | | | | | | |
| .085 | 30905 | 30920 | 30935 | 30950 | \$12.00 | \$13.00 | | 30965 | 31605 | 31620 | 31635 | \$15.00 | \$16.00 | | | | | | | | | |
| .090 | 30906 | 30921 | 30936 | 30951 | \$12.00 | \$13.00 | | 30966 | 31606 | 31621 | 31636 | \$15.00 | \$16.00 | | | | | | | | | |
| .093 | 30907 | 30922 | 30937 | 30952 | \$12.00 | \$13.00 | | 30967 | 31607 | 31622 | 31637 | \$15.00 | \$16.00 | | | | | | | | | |
| .095 | 30908 | 30923 | 30938 | 30953 | \$12.00 | \$13.00 | | 30968 | 31608 | 31623 | 31638 | \$15.00 | \$16.00 | | | | | | | | | |
| .100 | 30909 | 30924 | 30939 | 30954 | \$12.00 | \$13.00 | | 30969 | 31609 | 31624 | 31639 | \$15.00 | \$16.00 | | | | | | | | | |
| .105 | 30910 | 30925 | 30940 | 30955 | \$12.00 | \$13.00 | | 30970 | 31610 | 31625 | 31640 | \$15.00 | \$16.00 | | | | | | | | | |
| .110 | 30911 | 30926 | 30941 | 30956 | \$12.00 | \$13.00 | | 30971 | 31611 | 31626 | 31641 | \$15.00 | \$16.00 | | | | | | | | | |
| .115 | 30912 | 30927 | 30942 | 30957 | \$12.00 | \$13.00 | | 30895 | 31612 | 31627 | 31642 | \$15.00 | \$16.00 | | | | | | | | | |
| .118 | 30913 | 30928 | 30943 | 30958 | \$12.00 | \$13.00 | | 30896 | 31613 | 31628 | 31643 | \$15.00 | \$16.00 | | | | | | | | | |
| .120 | 30914 | 30929 | 30944 | 30959 | \$12.00 | \$13.00 | | 30897 | 31614 | 31629 | 31644 | \$15.00 | \$16.00 | | | | | | | | | |
| Diam | Metric Diameters: 1.5X | | | | | | Metric Diameters: 3.0X | | | | | | Metric Diameters: 5.0X | | | | | | UC | COAT | | |
| | 2 sq | 2 ball | 4 sq | 4 ball | UC | COAT | | 2 sq | 2 ball | 4 sq | 4 ball | UC | COAT | | 2 sq | 2 ball | 4 sq | 4 ball | UC | COAT | | |
| .10mm | 30477 | 30480 | | | | | \$22.00 | \$23.00 | 30201 | 30204 | | | \$25.00 | \$26.00 | | | | | | | | |
| .15mm | 30478 | 30481 | | | | | \$16.00 | \$17.00 | 30202 | 30205 | | | \$19.00 | \$20.00 | | | | | | | | |
| .20mm | 30479 | 30482 | | | | | \$16.00 | \$17.00 | 30203 | 30206 | | | \$19.00 | \$20.00 | | | | | | | | |
| .25mm | 33272 | 33372 | 30483 | 30492 | \$14.00 | \$15.00 | | 30113 | 30139 | 30501 | 30886 | \$17.00 | \$18.00 | | 30417 | 30517 | | | | | \$20.00 | \$21.00 |
| .30mm | 33273 | 33373 | 30484 | 30493 | \$14.00 | \$15.00 | | 30114 | 30140 | 30502 | 30887 | \$17.00 | \$18.00 | | 30418 | 30518 | | | | | \$20.00 | \$21.00 |
| .35mm | 33274 | 33374 | 30485 | 30494 | \$14.00 | \$15.00 | | 30115 | 30141 | 30503 | 30888 | \$17.00 | \$18.00 | | | | | | | | | |
| .40mm | 33275 | 33375 | 30486 | 30495 | \$14.00 | \$15.00 | | 30116 | 30142 | 30504 | 30889 | \$17.00 | \$18.00 | | 30419 | 30519 | | | | | \$20.00 | \$21.00 |
| .45mm | 33276 | 33376 | 30487 | 30496 | \$14.00 | \$15.00 | | 30117 | 30143 | 30505 | 30890 | \$17.00 | \$18.00 | | | | | | | | | |
| .50mm | 33277 | 33377 | 30488 | 30497 | \$14.00 | \$15.00 | | 30118 | 30144 | 30506 | 30891 | \$17.00 | \$18.00 | | 30420 | 30520 | 30445 | 30545 | \$20.00 | \$21.00 | | |
| .55mm | 33278 | 33378 | 30489 | 30498 | \$13.50 | \$14.50 | | 30119 | 30145 | 30507 | 30892 | \$16.50 | \$17.50 | | | | | | | | | |
| .60mm | 33279 | 33379 | 30490 | 30499 | \$13.50 | \$14.50 | | 30120 | 30146 | 30508 | 30893 | \$16.50 | \$17.50 | | 30421 | 30521 | 30446 | 30546 | \$19.50 | \$20.50 | | |
| .65mm | 33280 | 33380 | 30491 | 30500 | \$13.50 | \$14.50 | | 30121 | 30147 | 30509 | 30894 | \$16.50 | \$17.50 | | | | | | | | | |
| .70mm | 33281 | 33381 | 32281 | 32381 | \$13.50 | \$14.50 | | 30122 | 30148 | 30165 | 30182 | \$16.50 | \$17.50 | | 30422 | 30522 | 30447 | 30547 | \$19.50 | \$20.50 | | |
| .75mm | 33282 | 33382 | 32282 | 32382 | \$13.50 | \$14.50 | | 30123 | 30149 | 30166 | 30183 | \$16.50 | \$17.50 | | | | | | | | | |
| .80mm | 33283 | 33383 | 32283 | 32383 | \$13.00 | \$14.00 | | 30124 | 30150 | 30167 | 30184 | \$16.00 | \$17.00 | | 30423 | 30523 | 30448 | 30548 | \$19.00 | \$20.00 | | |
| .85mm | 33284 | 33384 | 32284 | 32384 | \$13.00 | \$14.00 | | 30125 | 30151 | 30168 | 30185 | \$16.00 | \$17.00 | | | | | | | | | |
| .90mm | 33285 | 33385 | 32285 | 32385 | \$13.00 | \$14.00 | | 30126 | 30152 | 30169 | 30186 | \$16.00 | \$17.00 | | 30424 | 30524 | 30449 | 30549 | \$19.00 | \$20.00 | | |
| .95mm | 33286 | 33386 | 32286 | 32386 | \$13.00 | \$14.00 | | 30127 | 30153 | 30170 | 30187 | \$16.00 | \$17.00 | | | | | | | | | |
| 1.00mm | 33287 | 33387 | 32287 | 32387 | \$13.00 | \$14.00 | | 30128 | 30154 | 30171 | 30188 | \$16.00 | \$17.00 | | 30425 | 30525 | 30450 | 30550 | \$19.00 | \$20.00 | | |
| 1.05mm | 33288 | 33388 | 32288 | 32388 | \$13.00 | \$14.00 | | 30129 | 30155 | 30172 | 30189 | \$16.00 | \$17.00 | | | | | | | | | |
| 1.10mm | 33289 | 33389 | 32289 | 32389 | \$13.00 | \$14.00 | | 30130 | 30156 | 30173 | 30190 | \$16.00 | \$17.00 | | 30426 | 30526 | 30451 | 30551 | \$19.00 | \$20.00 | | |
| 1.15mm | 33290 | 33390 | 32290 | 32390 | \$13.00 | \$14.00 | | 30131 | 30157 | 30174 | 30191 | \$16.00 | \$17.00 | | | | | | | | | |
| 1.20mm | 33291 | 33391 | 32291 | 32391 | \$13.00 | \$14.00 | | 30132 | 30158 | 30175 | 30192 | \$16.00 | \$17.00 | | 30427 | 30527 | 30452 | 30552 | \$19.00 | \$20.00 | | |
| 1.25mm | 33292 | 33392 | 32292 | 32392 | \$13.00 | \$14.00 | | 30133 | 30159 | 30176 | 30193 | \$16.00 | \$17.00 | | | | | | | | | |
| 1.30mm | 33293 | 33393 | 32293 | 32393 | \$12.00 | \$13.00 | | 30134 | 30160 | 30177 | 30194 | \$15.00 | \$16.00 | | 30428 | 30528 | 30453 | 30553 | \$18.00 | \$19.00 | | |
| 1.35mm | 33294 | 33394 | 32294 | 32394 | \$12.00 | \$13.00 | | 30135 | 30161 | 30178 | 30195 | \$15.00 | \$16.00 | | | | | | | | | |
| 1.40mm | 33295 | 33395 | 32295 | 32395 | \$12.00 | \$13.00 | | 30136 | 30162 | 30179 | 30196 | \$15.00 | \$16.00 | | 30429 | 30529 | 30454 | 30554 | \$18.00 | \$19.00 | | |
| 1.45mm | 33296 | 33396 | 32296 | 32396 | \$12.00 | \$13.00 | | 30137 | 30163 | 30180 | 30197 | \$15.00 | \$16.00 | | | | | | | | | |
| 1.50mm | 33297 | 33397 | 32297 | 32397 | \$12.00 | \$13.00 | | 30138 | 30164 | 30181 | 30198 | \$15.00 | \$16.00 | | 30430 | 30530 | 30455 | 30555 | \$18.00 | \$19.00 | | |

35% tighter shank tolerance than h6!
Micro End Mills have a 1/8" (3.0mm for metric) shank diameter.

Micro End Mills have a 1/8" (3.0mm for metric) shank diameter.



In addition to UnCoated (UC) our micro end mills are available with these standard coatings.

Fractional Corner Radius End Mills by ULTRATOOL®

The Ultra-Tool® Series 330R, 362R, and 320R are tough workhorses with Radii that can handle the vast majority of demanding applications. These tools are precision ground from Ultra-Grain®, a premium carbide substrate that couples high hardness with excellent chipping resistance. Choose from 8 different standard radii for your roughing or finishing requirements. Crank up the feed rates even more by adding one of our in-house SmoothCoat® PVD hardcoatings, and / or add SmoothEdge® to eliminate tool break-in. Note the new LOC's and OAL's on the 320R Series!

**ULTRATOOL®
PERFORMANCE**

Series 330R
Corner Radius End Mills
Two Flute • Standard Length

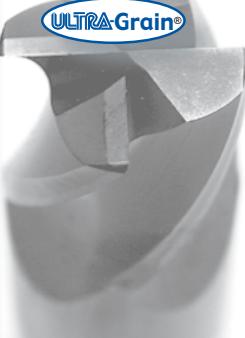

| Diam | LOC | OAL | Shank | .010" | .015" | .020" | .030" | .045" | .060" | .090" | .125" | UnCoated Price | Coated Price |
|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------------|--------------|
| | | | | EDP# | | |
| 1/8 | 1/2 | 1-1/2 | 1/8 | 31050 | 31164 | 31165 | 31166 | 31167 | | | | \$9.10 | \$10.80 |
| 3/16 | 5/8 | 2" | 3/16 | 31051 | 31168 | 31169 | 31170 | 31171 | 31172 | | | \$11.90 | \$14.00 |
| 1/4 | 3/4 | 2-1/2 | 1/4 | 31052 | 31173 | 31174 | 31175 | 31176 | 31177 | 31178 | | \$14.70 | \$18.70 |
| 5/16 | 13/16 | 2-1/2 | 5/16 | 31053 | 31179 | 31180 | 31181 | 31182 | 31183 | 31184 | 31185 | \$21.70 | \$26.70 |
| 3/8 | 1" | 2-1/2 | 3/8 | 31054 | 31186 | 31187 | 31188 | 31189 | 31190 | 31191 | 31192 | \$25.80 | \$31.10 |
| 1/2 | 1" | 3" | 1/2 | 31055 | 31193 | 31194 | 31195 | 31196 | 31197 | 31198 | 31199 | \$42.90 | \$50.00 |
| 5/8 | 1-1/2 | 3-1/2 | 5/8 | 31056 | 31200 | 31201 | 31202 | 31203 | 31204 | 31205 | 31206 | \$77.90 | \$88.90 |
| 3/4 | 1-1/2 | 4" | 3/4 | 31057 | 31207 | 31208 | 31209 | 31210 | 31211 | 31212 | 31213 | \$108.90 | \$121.80 |
| 1" | 1-1/2 | 4" | 1" | 31058 | 31214 | 31215 | 31217 | 31218 | 31219 | 31220 | 31221 | \$178.70 | \$197.20 |


Series 362R
Corner Radius End Mills
Three Flute • Standard Length


| Diam | LOC | OAL | Shank | .010" | .015" | .020" | .030" | .045" | .060" | .090" | .125" | UnCoated Price | Coated Price |
|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------------|--------------|
| | | | | EDP# | | |
| 1/8 | 1/2 | 1-1/2 | 1/8 | 31060 | 31419 | 31420 | 31421 | 31422 | | | | \$9.10 | \$10.80 |
| 3/16 | 5/8 | 2" | 3/16 | 31061 | 31423 | 31424 | 31425 | 31426 | 31427 | | | \$11.90 | \$14.00 |
| 1/4 | 3/4 | 2-1/2 | 1/4 | 31062 | 31428 | 31429 | 31430 | 31431 | 31432 | 31433 | | \$14.70 | \$18.70 |
| 5/16 | 13/16 | 2-1/2 | 5/16 | 31063 | 31434 | 31435 | 31436 | 31437 | 31438 | 31439 | 31440 | \$21.70 | \$26.70 |
| 3/8 | 1" | 2-1/2 | 3/8 | 31064 | 31441 | 31442 | 31443 | 31444 | 31445 | 31446 | 31447 | \$25.80 | \$31.10 |
| 1/2 | 1" | 3" | 1/2 | 31065 | 31448 | 31449 | 31450 | 31451 | 31452 | 31453 | 31454 | \$42.90 | \$50.00 |
| 5/8 | 1-1/2 | 3-1/2 | 5/8 | 31066 | 31456 | 31457 | 31458 | 31459 | 31460 | 31461 | 31462 | \$77.90 | \$88.90 |
| 3/4 | 1-1/2 | 4" | 3/4 | 31067 | 31463 | 31464 | 31465 | 31466 | 31467 | 31468 | 31469 | \$108.90 | \$121.80 |
| 1" | 1-1/2 | 4" | 1" | 31068 | 31470 | 31471 | 31472 | 31473 | 31474 | 31475 | 31476 | \$178.70 | \$197.20 |


Series 320R
Corner Radius End Mills
Four Flute • Std & Ext Length


| Diam | LOC | OAL | Shank | .010" | .015" | .020" | .030" | .045" | .060" | .090" | .125" | UnCoated Price | Coated Price |
|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------------|--------------|
| | | | | EDP# | | |
| 1/8 | 1/2 | 1-1/2 | 1/8 | 31070 | 31101 | 31110 | 31119 | 31128 | | | | \$9.10 | \$10.80 |
| 1/8 | 1" | 3" | 1/8 | 34101 | 34110 | 34119 | 34128 | 34137 | | | | \$17.60 | \$20.20 |
| 3/16 | 5/8 | 2" | 3/16 | 31071 | 31102 | 31111 | 31120 | 31129 | 31138 | | | \$11.90 | \$14.00 |
| 3/16 | 1-1/4 | 3" | 3/16 | 34102 | 34111 | 34120 | 34129 | 34138 | 34146 | | | \$19.90 | \$22.90 |
| 1/4 | 3/4 | 2-1/2 | 1/4 | 31072 | 31103 | 31112 | 31121 | 31130 | 31139 | 31148 | | \$14.70 | \$18.70 |
| 1/4 | 1-1/2 | 4" | 1/4 | 34103 | 34112 | 34121 | 34130 | 34139 | 34147 | 34154 | | \$25.20 | \$30.30 |
| 5/16 | 13/16 | 2-1/2 | 5/16 | 31073 | 31104 | 31113 | 31122 | 31131 | 31140 | 31149 | 31158 | \$21.70 | \$26.70 |
| 5/16 | 1-5/8 | 4" | 5/16 | 34104 | 34113 | 34122 | 34131 | 34140 | 34148 | 34155 | 34161 | \$36.40 | \$42.80 |
| 3/8 | 1" | 2-1/2 | 3/8 | 31074 | 31105 | 31114 | 31123 | 31132 | 31141 | 31150 | 31159 | \$25.80 | \$31.10 |
| 3/8 | 2" | 4" | 3/8 | 34105 | 34114 | 34123 | 34132 | 34141 | 34149 | 34156 | 34162 | \$40.90 | \$47.80 |
| 1/2 | 1" | 3" | 1/2 | 31075 | 31106 | 31115 | 31124 | 31133 | 31142 | 31151 | 31160 | \$42.90 | \$50.00 |
| 1/2 | 2" | 4" | 1/2 | 34106 | 34115 | 34124 | 34133 | 34142 | 34150 | 34157 | 34163 | \$59.10 | \$68.60 |
| 5/8 | 1-1/2 | 3-1/2 | 5/8 | 31076 | 31107 | 31116 | 31125 | 31134 | 31143 | 31152 | 31161 | \$77.90 | \$88.90 |
| 5/8 | 3" | 6" | 5/8 | 34107 | 34116 | 34125 | 34134 | 34143 | 34151 | 34158 | 34164 | \$116.60 | \$133.80 |
| 3/4 | 1-1/2 | 4" | 3/4 | 31077 | 31108 | 31117 | 31126 | 31135 | 31144 | 31153 | 31162 | \$108.90 | \$121.80 |
| 3/4 | 3" | 6" | 3/4 | 34108 | 34117 | 34126 | 34135 | 34144 | 34152 | 34159 | 34165 | \$188.70 | \$208.70 |
| 1" | 1-1/2 | 4" | 1" | 31078 | 31109 | 31118 | 31127 | 31136 | 31145 | 31154 | 31163 | \$178.70 | \$197.20 |
| 1" | 3" | 6" | 1" | 34109 | 34118 | 34127 | 34136 | 34145 | 34153 | 34160 | 34166 | \$327.30 | \$353.40 |

new!New LOC's and OAL's
in 320R Series!
 RAD Specifications:
Cutting Diam +.000/-002
Shank Diam +.0000/-0003
Radius ±.0005

 RAD Specifications:
Cutting Diam +.000/-002
Shank Diam +.0000/-0003
Radius ±.0005

 RAD Specifications:
Cutting Diam +.000/-002
Shank Diam +.0000/-0003
Radius ±.0005

 RAD Specifications:
Cutting Diam +.000/-002
Shank Diam +.0000/-0003
Radius ±.0005

Metric Corner Radius End Mills by ULTRATOOL®

ULTRATOOL®
PERFORMANCE

The Ultra-Tool® Series Metric 330R, 362R, and 320R are tough workhorses with Radii that can handle the vast majority of demanding applications. These tools are precision ground from Ultra-Grain®, a premium carbide substrate that couples high hardness with excellent chipping resistance. Choose from 8 different standard radii for your roughing or finishing requirements. Crank up the feed rates even more by adding one of our in-house SmoothCoat® PVD hardcoatings, and / or add SmoothEdge® to eliminate tool break-in.



Metric Series 330R

Corner Radius End Mills
Two Flute • Standard LengthULTRATOOL
Series 330Rad
Made in the USA

MRAD Specifications:
Cutting Diam +0.000/-0.051mm
Shank Diam +0.000/-0.007mm
Radius ±0.013mm



| Diam | LOC | OAL | Shank | 0.2mm EDP# | 0.3mm EDP# | 0.5mm EDP# | 1.0mm EDP# | 1.5mm EDP# | 2.0mm EDP# | 2.5mm EDP# | 3.0mm EDP# | UnCoated Price | Coated Price |
|--------|-----|-----|-------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|-------------------|-----------------|
| 3.0mm | 12 | 38 | 3.0 | 31292 | 31293 | 31294 | 31295 | | | | | \$9.10 | \$10.80 |
| 4.0mm | 14 | 50 | 4.0 | 31296 | 31297 | 31298 | 31299 | 31300 | | | | \$11.90 | \$14.00 |
| 5.0mm | 16 | 50 | 5.0 | 31301 | 31302 | 31303 | 31304 | 31305 | 31306 | | | \$12.80 | \$16.20 |
| 6.0mm | 19 | 50 | 6.0 | 31307 | 31308 | 31309 | 31310 | 31311 | 31312 | 31313 | | \$14.70 | \$18.00 |
| 8.0mm | 20 | 63 | 8.0 | 31314 | 31315 | 31316 | 31317 | 31318 | 31319 | 31320 | 31321 | \$21.70 | \$26.70 |
| 10.0mm | 22 | 70 | 10.0 | 31322 | 31323 | 31324 | 31325 | 31326 | 31327 | 31328 | 31329 | \$31.20 | \$38.10 |
| 12.0mm | 25 | 74 | 12.0 | 31330 | 31331 | 31332 | 31333 | 31334 | 31335 | 31336 | 31337 | \$42.90 | \$50.00 |
| 16.0mm | 38 | 89 | 16.0 | 31338 | 31339 | 31340 | 31341 | 31342 | 31343 | 31344 | 31345 | \$77.90 | \$88.90 |
| 20.0mm | 38 | 100 | 20.0 | 31346 | 31347 | 31348 | 31349 | 31350 | 31351 | 31352 | 31353 | \$142.90 | \$157.70 |
| 25.0mm | 38 | 100 | 25.0 | 31354 | 31355 | 31356 | 31357 | 31358 | 31359 | 31360 | 31361 | \$178.70 | \$197.20 |



Metric Series 362R

Corner Radius End Mills
Three Flute • Standard Length

MRAD Specifications:
Cutting Diam +0.000/-0.051mm
Shank Diam +0.000/-0.007mm
Radius ±0.013mm



| Diam | LOC | OAL | Shank | 0.2mm EDP# | 0.3mm EDP# | 0.5mm EDP# | 1.0mm EDP# | 1.5mm EDP# | 2.0mm EDP# | 2.5mm EDP# | 3.0mm EDP# | UnCoated Price | Coated Price |
|--------|-----|-----|-------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|-------------------|-----------------|
| 3.0mm | 12 | 38 | 3.0 | 31477 | 31478 | 31479 | 31480 | | | | | \$9.10 | \$10.80 |
| 4.0mm | 14 | 50 | 4.0 | 31481 | 31482 | 31483 | 31484 | 31485 | | | | \$11.90 | \$14.00 |
| 5.0mm | 16 | 50 | 5.0 | 31486 | 31487 | 31488 | 31489 | 31490 | 31491 | | | \$12.80 | \$16.20 |
| 6.0mm | 19 | 50 | 6.0 | 31492 | 31493 | 31494 | 31495 | 31496 | 31497 | 31498 | | \$14.70 | \$18.00 |
| 8.0mm | 20 | 63 | 8.0 | 31499 | 31500 | 31501 | 31502 | 31503 | 31504 | 31505 | 31506 | \$21.70 | \$26.70 |
| 10.0mm | 22 | 70 | 10.0 | 31507 | 31508 | 31509 | 31510 | 31511 | 31512 | 31513 | 31514 | \$31.20 | \$38.10 |
| 12.0mm | 25 | 74 | 12.0 | 31515 | 31516 | 31517 | 31518 | 31519 | 31520 | 31521 | 31522 | \$42.90 | \$50.00 |
| 16.0mm | 38 | 89 | 16.0 | 31523 | 31524 | 31525 | 31526 | 31527 | 31528 | 31529 | 31530 | \$77.90 | \$88.90 |
| 20.0mm | 38 | 100 | 20.0 | 31531 | 31532 | 31533 | 31534 | 31535 | 31536 | 31537 | 31538 | \$142.90 | \$157.70 |
| 25.0mm | 38 | 100 | 25.0 | 31539 | 31540 | 31541 | 31542 | 31543 | 31544 | 31545 | 31546 | \$178.70 | \$197.20 |



Metric Series 320R

Corner Radius End Mills
Four Flute • Standard Length

MRAD Specifications:
Cutting Diam +0.000/-0.051mm
Shank Diam +0.000/-0.007mm
Radius ±0.013mm



| Diam | LOC | OAL | Shank | 0.2mm EDP# | 0.3mm EDP# | 0.5mm EDP# | 1.0mm EDP# | 1.5mm EDP# | 2.0mm EDP# | 2.5mm EDP# | 3.0mm EDP# | UnCoated Price | Coated Price |
|--------|-----|-----|-------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|-------------------|-----------------|
| 3.0mm | 12 | 38 | 3.0 | 31222 | 31223 | 31224 | 31225 | | | | | \$9.10 | \$10.80 |
| 4.0mm | 14 | 50 | 4.0 | 31226 | 31227 | 31228 | 31229 | 31230 | | | | \$11.90 | \$14.00 |
| 5.0mm | 16 | 50 | 5.0 | 31231 | 31232 | 31233 | 31234 | 31235 | 31236 | | | \$12.80 | \$16.20 |
| 6.0mm | 19 | 50 | 6.0 | 31237 | 31238 | 31239 | 31240 | 31241 | 31242 | 31243 | | \$14.70 | \$18.00 |
| 8.0mm | 20 | 63 | 8.0 | 31244 | 31245 | 31246 | 31247 | 31248 | 31249 | 31250 | 31251 | \$21.70 | \$26.70 |
| 10.0mm | 22 | 70 | 10.0 | 31252 | 31253 | 31254 | 31255 | 31256 | 31257 | 31258 | 31259 | \$31.20 | \$38.10 |
| 12.0mm | 25 | 74 | 12.0 | 31260 | 31261 | 31262 | 31263 | 31264 | 31265 | 31266 | 31267 | \$42.90 | \$50.00 |
| 16.0mm | 38 | 89 | 16.0 | 31268 | 31269 | 31270 | 31271 | 31272 | 31273 | 31274 | 31275 | \$77.90 | \$88.90 |
| 20.0mm | 38 | 100 | 20.0 | 31276 | 31277 | 31278 | 31279 | 31280 | 31281 | 31282 | 31283 | \$142.90 | \$157.70 |
| 25.0mm | 38 | 100 | 25.0 | 31284 | 31285 | 31286 | 31287 | 31288 | 31289 | 31290 | 31291 | \$178.70 | \$197.20 |

Single End Standard Length End Mills by ULTRATOOL®

Series 330S Square End
330B Ball End • Two FluteSeries 362S Square End
362B Ball End • Three FluteSeries 320S Square End
320B Ball End • Four Flute

The Ultra-Tool® Series 330, 362, and 320 represents the industry's best value in a general purpose design. These end mills are more than capable of handling 75% of milling applications due to robust geometry, quality craftsmanship, and best-in-class carbide substrate. Most importantly, the Series 330, 362, and 320 all benefit from the Tool Alliance® duo of proprietary & value-added features: SmoothGrind® & SmoothCentricity®, with SmoothCoat® and SmoothEdge® available individually for an extra charge. Additionally, special radii and clearance necks can quickly be added to any size.

Detailed Speeds and Feeds instructions can be located on Page #59.

Standard features:

SmoothGrind® **SmoothCentricity®**

Available options:

SmoothCoat® **SmoothEdge®**



SFR Ultra-Tool End Mill Specs:
Cutting Diam +.000/.-002
Shank Diam +.0000/.-0003



| Diam | LOC | OAL | Shank | 330S EDP# | 330B EDP# | 362S EDP# | 362B EDP# | 320S EDP# | 320B EDP# | Square Price | Coated Square | Ball Price | Coated Ball |
|-------|-------|-------|-------|--------------|--------------|--------------|--------------|--------------|--------------|-----------------|------------------|---------------|----------------|
| 1/64 | 3/64 | 1-1/2 | 1/8 | 33001 | 33101 | 36201 | 36301 | 32001 | 32101 | \$10.90 | \$12.70 | \$13.90 | \$15.60 |
| 1/32 | 3/32 | 1-1/2 | 1/8 | 33002 | 33102 | 36202 | 36302 | 32002 | 32102 | \$8.20 | \$9.90 | \$10.40 | \$12.20 |
| 3/64 | 3/16 | 1-1/2 | 1/8 | 33003 | 33103 | 36203 | 36303 | 32003 | 32103 | \$8.20 | \$9.90 | \$10.40 | \$12.20 |
| 1/16 | 3/16 | 1-1/2 | 1/8 | 33004 | 33104 | 36204 | 36304 | 32004 | 32104 | \$7.50 | \$9.30 | \$9.80 | \$11.60 |
| 5/64 | 1/4 | 1-1/2 | 1/8 | 33005 | 33105 | 36205 | 36305 | 32005 | 32105 | \$7.50 | \$9.30 | \$9.80 | \$11.60 |
| 3/32 | 3/8 | 1-1/2 | 1/8 | 33006 | 33106 | 36206 | 36306 | 32006 | 32106 | \$7.40 | \$9.10 | \$9.60 | \$11.30 |
| 7/64 | 1/2 | 1-1/2 | 1/8 | 33007 | 33107 | 36207 | 36307 | 32007 | 32107 | \$7.40 | \$9.10 | \$9.60 | \$11.30 |
| 1/8 | 1/2 | 1-1/2 | 1/8 | 33008 | 33108 | 36208 | 36308 | 32008 | 32108 | \$6.70 | \$8.40 | \$8.70 | \$10.40 |
| 9/64 | 1/2 | 2" | 3/16 | 33009 | 33109 | 36209 | 36309 | 32009 | 32109 | \$10.20 | \$12.30 | \$12.80 | \$14.90 |
| 5/32 | 9/16 | 2" | 3/16 | 33010 | 33110 | 36210 | 36310 | 32010 | 32110 | \$10.20 | \$12.30 | \$12.80 | \$14.90 |
| 11/64 | 9/16 | 2" | 3/16 | 33011 | 33111 | 36211 | 36311 | 32011 | 32111 | \$10.20 | \$12.30 | \$12.80 | \$14.90 |
| 3/16 | 5/8 | 2" | 3/16 | 33012 | 33112 | 36212 | 36312 | 32012 | 32112 | \$9.50 | \$11.50 | \$12.10 | \$14.20 |
| 13/64 | 5/8 | 2-1/2 | 1/4 | 33013 | 33113 | 36213 | 36313 | 32013 | 32113 | \$12.80 | \$16.80 | \$16.00 | \$20.10 |
| 7/32 | 5/8 | 2-1/2 | 1/4 | 33014 | 33114 | 36214 | 36314 | 32014 | 32114 | \$12.80 | \$16.80 | \$16.00 | \$20.10 |
| 15/64 | 3/4 | 2-1/2 | 1/4 | 33015 | 33115 | 36215 | 36315 | 32015 | 32115 | \$12.80 | \$16.80 | \$16.00 | \$20.10 |
| 1/4 | 3/4 | 2-1/2 | 1/4 | 33016 | 33116 | 36216 | 36316 | 32016 | 32116 | \$11.30 | \$15.30 | \$14.50 | \$18.60 |
| 17/64 | 3/4 | 2-1/2 | 5/16 | 33017 | 33117 | 36217 | 36317 | 32017 | 32117 | \$17.80 | \$22.80 | \$22.20 | \$27.20 |
| 9/32 | 3/4 | 2-1/2 | 5/16 | 33018 | 33118 | 36218 | 36318 | 32018 | 32118 | \$17.80 | \$22.80 | \$22.20 | \$27.20 |
| 19/64 | 13/16 | 2-1/2 | 5/16 | 33019 | 33119 | 36219 | 36319 | 32019 | 32119 | \$17.80 | \$22.80 | \$22.20 | \$27.20 |
| 5/16 | 13/16 | 2-1/2 | 5/16 | 33020 | 33120 | 36220 | 36320 | 32020 | 32120 | \$17.40 | \$22.30 | \$22.20 | \$27.10 |
| 21/64 | 13/16 | 2-1/2 | 3/8 | 33021 | 33121 | 36221 | 36321 | 32021 | 32121 | \$24.00 | \$29.30 | \$29.80 | \$35.10 |
| 11/32 | 13/16 | 2-1/2 | 3/8 | 33022 | 33122 | 36222 | 36322 | 32022 | 32122 | \$24.00 | \$29.30 | \$29.80 | \$35.10 |
| 23/64 | 1" | 2-1/2 | 3/8 | 33023 | 33123 | 36223 | 36323 | 32023 | 32123 | \$24.00 | \$29.30 | \$29.80 | \$35.10 |
| 3/8 | 1" | 2-1/2 | 3/8 | 33024 | 33124 | 36224 | 36324 | 32024 | 32124 | \$20.70 | \$26.00 | \$26.40 | \$31.70 |
| 25/64 | 1" | 2-3/4 | 7/16 | 33025 | 33125 | 36225 | 36325 | 32025 | 32125 | \$31.80 | \$38.70 | \$39.90 | \$46.70 |
| 13/32 | 1" | 2-3/4 | 7/16 | 33026 | 33126 | 36226 | 36326 | 32026 | 32126 | \$31.80 | \$38.70 | \$39.90 | \$46.70 |
| 27/64 | 1" | 2-3/4 | 7/16 | 33027 | 33127 | 36227 | 36327 | 32027 | 32127 | \$31.80 | \$38.70 | \$39.90 | \$46.70 |
| 7/16 | 1" | 2-3/4 | 7/16 | 33028 | 33128 | 36228 | 36328 | 32028 | 32128 | \$29.30 | \$36.30 | \$37.40 | \$44.30 |
| 29/64 | 1" | 3" | 1/2 | 33029 | 33129 | 36229 | 36329 | 32029 | 32129 | \$36.80 | \$43.80 | \$45.80 | \$52.90 |
| 15/32 | 1" | 3" | 1/2 | 33030 | 33130 | 36230 | 36330 | 32030 | 32130 | \$36.80 | \$43.80 | \$45.80 | \$52.90 |
| 31/64 | 1" | 3" | 1/2 | 33031 | 33131 | 36231 | 36331 | 32031 | 32131 | \$36.80 | \$43.80 | \$45.80 | \$52.90 |
| 1/2 | 1" | 3" | 1/2 | 33032 | 33132 | 36232 | 36332 | 32032 | 32132 | \$34.10 | \$41.10 | \$43.10 | \$50.20 |
| 9/16 | 1-1/4 | 3-1/2 | 9/16 | 33034 | 33134 | 36234 | 36334 | 32034 | 32134 | \$58.80 | \$68.80 | \$73.90 | \$83.90 |
| 5/8 | 1-1/2 | 3-1/2 | 5/8 | 33036 | 33136 | 36236 | 36336 | 32036 | 32136 | \$65.00 | \$75.90 | \$81.20 | \$92.20 |
| 11/16 | 1-1/2 | 4" | 3/4 | 33038 | 33138 | 36238 | 36338 | 32038 | 32138 | \$97.90 | \$110.80 | \$122.60 | \$135.50 |
| 3/4 | 1-1/2 | 4" | 3/4 | 33040 | 33140 | 36240 | 36340 | 32040 | 32140 | \$90.70 | \$103.60 | \$113.40 | \$126.30 |
| 7/8 | 1-1/2 | 4" | 7/8 | 33044 | 33144 | 36244 | 36344 | 32044 | 32144 | \$143.30 | \$158.10 | \$178.30 | \$193.10 |
| 1" | 1-1/2 | 4" | 1" | 33048 | 33148 | 36248 | 36348 | 32048 | 32148 | \$149.40 | \$168.00 | \$186.60 | \$205.00 |
| 1-1/4 | 2" | 4-1/2 | 1-1/4 | 33080 | 33180 | 36280 | 36380 | 32080 | 32180 | \$345.50 | \$376.40 | \$414.60 | \$445.50 |

Long & Extra Long End Mills by ULTRATOOL®



Series 382S Square End 382B Ball End • Two Flute



Series 383S Square End 383B Ball End • Three Flute



Series 384S Square End 384B Ball End • Four Flute



The **Ultra-Tool®** Series 382, 383, and 384 represents the industry's best value in a extended length or extended reach design. These end mills are more than capable of handling 75% of milling applications due to robust geometry, quality craftsmanship, and best-in-class carbide substrate. Most importantly, the Series 382, 383, and 384 all benefit from the Tool Alliance® duo of proprietary & value-added features: SmoothGrind® & SmoothConicity®, with SmoothCoat® and SmoothEdge® available individually for an extra charge. Additionally, special radii and clearance necks can be quickly added to any size.

Detailed Speeds and Feeds instructions can be located on Page #59.

Standard features:

SmoothGrind®

SmoothContricity®

Available options:

SmoothEdge®



SFR Ultra-Tool End Mill Specs:
Cutting Diam +.000/-002
Shank Diam +.0000/-0003



| Diam | Loc | OAL | Shank | 382S EDP# | 382B EDP# | 383S EDP# | 383B EDP# | 384S EDP# | 384B EDP# | Square Price | Coated Square | Ball Price | Coated Ball |
|-------|-------|-----|-------|--------------|--------------|--------------|--------------|--------------|--------------|-----------------|------------------|---------------|----------------|
| 1/8 | 3/4 | 2" | 1/8 | 38207 | 38307 | 38007 | 38107 | 38407 | 38507 | \$10.20 | \$11.90 | \$12.00 | \$13.70 |
| 1/8 | 1" | 3" | 1/8 | 38208 | 38308 | 38008 | 38108 | 38408 | 38508 | \$14.10 | \$16.60 | \$17.60 | \$20.20 |
| 3/16 | 1-1/4 | 3" | 3/16 | 38212 | 38312 | 38012 | 38112 | 38412 | 38512 | \$15.80 | \$18.80 | \$19.90 | \$22.90 |
| 3/16 | 1" | 4" | 3/16 | 38213 | 38313 | 38013 | 38113 | 38413 | 38513 | \$18.90 | \$22.60 | \$21.80 | \$25.50 |
| 1/4 | 1-1/8 | 3" | 1/4 | 38215 | 38315 | 38015 | 38115 | 38415 | 38515 | \$19.90 | \$24.00 | \$23.40 | \$27.40 |
| 1/4 | 1" | 4" | 1/4 | 38218 | 38318 | 38018 | 38118 | 38418 | 38518 | \$20.70 | \$25.80 | \$24.80 | \$30.00 |
| 1/4 | 1-1/2 | 4" | 1/4 | 38216 | 38316 | 38016 | 38116 | 38416 | 38516 | \$21.10 | \$26.30 | \$25.20 | \$30.30 |
| 1/4 | 1-1/2 | 6" | 1/4 | 38217 | 38317 | 38017 | 38117 | 38417 | 38517 | \$28.40 | \$35.20 | \$31.90 | \$38.60 |
| 5/16 | 1-1/8 | 3" | 5/16 | 38219 | 38319 | 38019 | 38119 | 38419 | 38519 | \$27.00 | \$32.00 | \$31.80 | \$36.70 |
| 5/16 | 1-5/8 | 4" | 5/16 | 38220 | 38320 | 38020 | 38120 | 38420 | 38520 | \$30.20 | \$36.60 | \$36.40 | \$42.80 |
| 5/16 | 1-1/2 | 6" | 5/16 | 38221 | 38321 | 38021 | 38121 | 38421 | 38521 | \$44.80 | \$53.60 | \$52.70 | \$61.50 |
| 3/8 | 1-1/8 | 3" | 3/8 | 38223 | 38323 | 38023 | 38123 | 38423 | 38523 | \$30.40 | \$35.70 | \$35.80 | \$41.10 |
| 3/8 | 1" | 4" | 3/8 | 38222 | 38322 | 38022 | 38122 | 38422 | 38522 | \$33.10 | \$40.00 | \$40.40 | \$47.30 |
| 3/8 | 2" | 4" | 3/8 | 38224 | 38324 | 38024 | 38124 | 38424 | 38524 | \$33.50 | \$40.40 | \$40.90 | \$47.80 |
| 3/8 | 1-1/2 | 6" | 3/8 | 38225 | 38325 | 38025 | 38125 | 38425 | 38525 | \$46.90 | \$57.60 | \$52.80 | \$63.40 |
| 3/8 | 3" | 6" | 3/8 | 38226 | 38326 | 38026 | 38126 | 38426 | 38526 | \$48.70 | \$59.30 | \$54.60 | \$65.10 |
| 7/16 | 2" | 4" | 7/16 | 38228 | 38328 | 38028 | 38128 | 38428 | 38528 | \$49.10 | \$57.20 | \$51.20 | \$66.30 |
| 7/16 | 1-1/2 | 6" | 7/16 | 38229 | 38329 | 38029 | 38129 | 38429 | 38529 | \$61.20 | \$73.40 | \$70.30 | \$82.50 |
| 7/16 | 3" | 6" | 7/16 | 38249 | 38349 | 38049 | 38149 | 38449 | 38549 | \$63.50 | \$75.70 | \$73.90 | \$86.10 |
| 1/2 | 1" | 4" | 1/2 | 38230 | 38330 | 38030 | 38130 | 38430 | 38530 | \$47.80 | \$57.40 | \$55.20 | \$64.80 |
| 1/2 | 1-1/2 | 4" | 1/2 | 38231 | 38331 | 38031 | 38131 | 38431 | 38531 | \$48.70 | \$58.30 | \$57.80 | \$67.30 |
| 1/2 | 2" | 4" | 1/2 | 38232 | 38332 | 38032 | 38132 | 38432 | 38532 | \$49.50 | \$59.10 | \$59.10 | \$68.60 |
| 1/2 | 1-1/2 | 6" | 1/2 | 38233 | 38333 | 38033 | 38133 | 38433 | 38533 | \$69.20 | \$82.20 | \$77.90 | \$91.70 |
| 1/2 | 3" | 6" | 1/2 | 38250 | 38350 | 38050 | 38150 | 38450 | 38550 | \$70.50 | \$83.60 | \$86.00 | \$99.80 |
| 9/16 | 3" | 6" | 9/16 | 38235 | 38335 | 38035 | 38135 | 38435 | 38535 | \$92.70 | \$108.10 | \$109.10 | \$124.40 |
| 5/8 | 2-1/2 | 5" | 5/8 | 38236 | 38336 | 38036 | 38136 | 38436 | 38536 | \$98.20 | \$115.30 | \$114.20 | \$131.40 |
| 5/8 | 1-1/2 | 6" | 5/8 | 38237 | 38337 | 38037 | 38137 | 38437 | 38537 | \$99.00 | \$116.10 | \$115.00 | \$132.10 |
| 5/8 | 3" | 6" | 5/8 | 38251 | 38351 | 38051 | 38151 | 38451 | 38551 | \$100.60 | \$117.70 | \$116.60 | \$133.80 |
| 3/4 | 2-1/2 | 5" | 3/4 | 38240 | 38340 | 38040 | 38140 | 38440 | 38540 | \$148.40 | \$168.40 | \$176.80 | \$196.80 |
| 3/4 | 1-1/2 | 6" | 3/4 | 38241 | 38341 | 38041 | 38141 | 38441 | 38541 | \$156.70 | \$176.60 | \$185.10 | \$205.10 |
| 3/4 | 3" | 6" | 3/4 | 38252 | 38352 | 38052 | 38152 | 38452 | 38552 | \$160.30 | \$180.30 | \$188.70 | \$208.70 |
| 1" | 2-1/2 | 5" | 1" | 38245 | 38345 | 38045 | 38145 | 38445 | 38545 | \$255.50 | \$281.70 | \$307.40 | \$333.50 |
| 1" | 2" | 6" | 1" | 38246 | 38346 | 38046 | 38146 | 38446 | 38546 | \$263.70 | \$289.80 | \$320.90 | \$347.10 |
| 1" | 3" | 6" | 1" | 38248 | 38348 | 38048 | 38148 | 38448 | 38548 | \$267.90 | \$294.10 | \$327.30 | \$353.40 |
| 1" | 4" | 6" | 1" | 38253 | 38353 | 38053 | 38153 | 38453 | 38553 | \$287.20 | \$313.30 | \$352.20 | \$378.40 |
| 1" | 4" | 7" | 1" | 38254 | 38354 | 38054 | 38154 | 38454 | 38554 | \$362.20 | \$397.50 | \$420.30 | \$455.60 |
| 1" | 3" | 8" | 1" | 38255 | 38355 | 38055 | 38155 | 38455 | 38555 | \$420.70 | \$456.00 | \$471.70 | \$507.10 |
| 1-1/4 | 3" | 6" | 1-1/4 | 38280 | 38380 | 38080 | 38180 | 38480 | 38580 | \$460.70 | \$497.70 | \$552.80 | \$589.80 |

Metric Standard Length End Mills by ULTRATOOL®

Metric Series 330S Square End
330B Ball End • Two Flute

Detailed Speeds and Feeds instructions
can be located on Page #59.

 Ultra-Tool End Mill Specs (Metric):
Cutting Diam +0.000/-0.051mm
Shank Diam +0.000/-0.008mm

Metric Series 362S Square End
362B Ball End • Three FluteMetric Series 320S Square End
320B Ball End • Four Flute

| Diam | LOC | OAL | Shank | 330S EDP# | 330B EDP# | 362S EDP# | 362B EDP# | 320S EDP# | 320B EDP# | Square Price | Coated Square | Ball Price | Coated Ball |
|--------|-----|-----|-------|-----------|-----------|-----------|-----------|-----------|-----------|--------------|---------------|------------|-------------|
| 1.0mm | 3 | 38 | 3.0 | 33056 | 33156 | 36256 | 36356 | 32056 | 32156 | \$8.60 | \$10.30 | \$10.70 | \$12.40 |
| 1.5mm | 4.5 | 38 | 3.0 | 33058 | 33158 | 36258 | 36358 | 32058 | 32158 | \$8.00 | \$9.70 | \$10.00 | \$11.70 |
| 2.0mm | 6.3 | 38 | 3.0 | 33060 | 33160 | 36260 | 36360 | 32060 | 32160 | \$8.00 | \$9.70 | \$10.00 | \$11.70 |
| 2.5mm | 9.5 | 38 | 3.0 | 33062 | 33162 | 36262 | 36362 | 32062 | 32162 | \$7.50 | \$9.20 | \$9.50 | \$11.20 |
| 3.0mm | 12 | 38 | 3.0 | 33064 | 33164 | 36264 | 36364 | 32064 | 32164 | \$7.00 | \$8.70 | \$8.90 | \$10.60 |
| 3.5mm | 12 | 50 | 4.0 | 33065 | 33165 | 36265 | 36365 | 32065 | 32165 | \$10.70 | \$12.90 | \$13.40 | \$15.60 |
| 4.0mm | 14 | 50 | 4.0 | 33066 | 33166 | 36266 | 36366 | 32066 | 32166 | \$10.30 | \$12.40 | \$12.80 | \$14.90 |
| 4.5mm | 16 | 50 | 5.0 | 33067 | 33167 | 36267 | 36367 | 32067 | 32167 | \$12.10 | \$15.50 | \$15.20 | \$18.60 |
| 5.0mm | 16 | 50 | 5.0 | 33068 | 33168 | 36268 | 36368 | 32068 | 32168 | \$11.30 | \$14.60 | \$14.20 | \$17.60 |
| 6.0mm | 19 | 50 | 6.0 | 33070 | 33170 | 36270 | 36370 | 32070 | 32170 | \$11.70 | \$15.10 | \$14.70 | \$18.00 |
| 7.0mm | 20 | 60 | 7.0 | 30872 | 30972 | 36472 | 36572 | 30672 | 30772 | \$16.20 | \$21.10 | \$20.20 | \$25.20 |
| 8.0mm | 20 | 63 | 8.0 | 33074 | 33174 | 36274 | 36374 | 32074 | 32174 | \$18.00 | \$23.20 | \$22.50 | \$27.80 |
| 9.0mm | 22 | 63 | 9.0 | 30876 | 30976 | 36476 | 36576 | 30676 | 30776 | \$24.40 | \$29.70 | \$30.50 | \$35.80 |
| 10.0mm | 22 | 70 | 10.0 | 33078 | 33178 | 36278 | 36378 | 32078 | 32178 | \$28.90 | \$35.80 | \$36.80 | \$43.70 |
| 12.0mm | 25 | 74 | 12.0 | 33082 | 33182 | 36282 | 36382 | 32082 | 32182 | \$34.70 | \$41.80 | \$43.70 | \$50.70 |
| 14.0mm | 32 | 89 | 14.0 | 33086 | 33186 | 36286 | 36386 | 32086 | 32186 | \$61.50 | \$71.60 | \$76.80 | \$86.90 |
| 16.0mm | 38 | 89 | 16.0 | 33088 | 33188 | 36288 | 36388 | 32088 | 32188 | \$66.00 | \$78.80 | \$83.00 | \$96.00 |
| 18.0mm | 38 | 100 | 18.0 | 33090 | 33190 | 36290 | 36390 | 32090 | 32190 | \$109.20 | \$122.10 | \$136.50 | \$149.40 |
| 20.0mm | 38 | 100 | 20.0 | 33092 | 33192 | 36292 | 36392 | 32092 | 32192 | \$125.70 | \$140.60 | \$157.20 | \$172.00 |
| 22.0mm | 38 | 100 | 22.0 | 33094 | 33194 | 36294 | 36394 | 32094 | 32194 | \$155.00 | \$169.90 | \$195.10 | \$209.90 |
| 25.0mm | 38 | 100 | 25.0 | 33097 | 33197 | 36297 | 36397 | 32097 | 32197 | \$156.70 | \$175.20 | \$196.80 | \$215.30 |

Metric Extra Long End Mills by ULTRATOOL®

Metric Series 382S Square End
382B Ball End • Two Flute

 Ultra-Tool End Mill Specs (Metric):
Cutting Diam +0.000/-0.051mm
Shank Diam +0.000/-0.008mm

Metric Series 383S Square End
383B Ball End • Three FluteMetric Series 384S Square End
384B Ball End • Four Flute

| Diam | LOC | OAL | Shank | 382S EDP# | 382B EDP# | 383S EDP# | 383B EDP# | 384S EDP# | 384B EDP# | Square Price | Coated Square | Ball Price | Coated Ball |
|--------|-----|-----|-------|-----------|-----------|-----------|-----------|-----------|-----------|--------------|---------------|------------|-------------|
| 3.0mm | 25 | 75 | 3.0 | 82003 | 82103 | 83003 | 83103 | 81003 | 81103 | \$15.10 | \$17.50 | \$18.00 | \$20.50 |
| 4.0mm | 28 | 75 | 4.0 | 82004 | 82104 | 83004 | 83104 | 81004 | 81104 | \$17.30 | \$20.30 | \$20.70 | \$23.80 |
| 5.0mm | 32 | 75 | 5.0 | 82005 | 82105 | 83005 | 83105 | 81005 | 81105 | \$20.20 | \$24.20 | \$24.30 | \$28.30 |
| 6.0mm | 38 | 75 | 6.0 | 82006 | 82106 | 83006 | 83106 | 81006 | 81106 | \$21.10 | \$25.10 | \$25.30 | \$29.40 |
| 8.0mm | 40 | 100 | 8.0 | 82008 | 82108 | 83008 | 83108 | 81008 | 81108 | \$30.20 | \$37.10 | \$36.40 | \$43.20 |
| 10.0mm | 50 | 100 | 10.0 | 82010 | 82110 | 83010 | 83110 | 81010 | 81110 | \$47.50 | \$56.30 | \$56.90 | \$65.80 |
| 12.0mm | 50 | 100 | 12.0 | 82012 | 82112 | 83012 | 83112 | 81012 | 81112 | \$51.20 | \$60.70 | \$61.40 | \$70.90 |
| 12.0mm | 76 | 150 | 12.0 | 82013 | 82113 | 83013 | 83113 | 81013 | 81113 | \$72.20 | \$85.90 | \$87.70 | \$101.40 |
| 14.0mm | 76 | 150 | 14.0 | 82014 | 82114 | 83014 | 83114 | 81014 | 81114 | \$95.30 | \$110.60 | \$111.50 | \$126.90 |
| 16.0mm | 64 | 125 | 16.0 | 82016 | 82116 | 83016 | 83116 | 81016 | 81116 | \$112.60 | \$132.60 | \$135.00 | \$155.00 |
| 16.0mm | 76 | 150 | 16.0 | 82017 | 82117 | 83017 | 83117 | 81017 | 81117 | \$115.00 | \$135.00 | \$137.50 | \$157.50 |
| 18.0mm | 76 | 150 | 18.0 | 82018 | 82118 | 83018 | 83118 | 81018 | 81118 | \$160.30 | \$180.30 | \$188.70 | \$208.70 |
| 20.0mm | 76 | 150 | 20.0 | 82020 | 82120 | 83020 | 83120 | 81020 | 81120 | \$234.90 | \$257.90 | \$282.60 | \$305.60 |
| 25.0mm | 76 | 150 | 25.0 | 82025 | 82125 | 83025 | 83125 | 81025 | 81125 | \$276.40 | \$302.60 | \$331.90 | \$358.10 |

Slow Helix Upcut and Downcut Solid Carbide End Mills by ULTRATOOL®

Series 321S Square End
 Four Flute • Slow Helix
 Upcut Milling • Standard Length


Ultra's new Series 321 Slow Helix end mill is designed for materials that tear or shred when milling with a standard higher helix design, like composites and CFRP's. Accordingly, we offer this end mill with application specific coatings that are ideal for extending life in these abrasive materials.



Ultra-Tool End Mill Specs:
 SFR Cutting Diam +.000/-002
 Shank Diam +.0000/-0003



Diam

LOC

OAL

Shank

Square EDP#

UnCoated Price



UC



AT



D1



D2

AT Price

D1 Price

D2 Price

1/16

5/16

1-1/2

1/8

1/8

1-1/2

1/8

3/16

3/4

2"

3/16

1"

2-1/2

5/16

1"

2-1/2

3/8

1"

2-1/2

7/16

1"

3"

7/16

1-1/4

3"

1/2

1-3/8

3-1/2

5/8

1-3/8

4"

3/4

1-3/8

4"

1"

32925

\$15.90

\$17.40

\$20.40

\$44.90

32926

\$14.80

\$16.30

\$19.30

\$42.80

32927

\$22.30

\$24.30

\$27.30

\$67.80

32928

\$26.50

\$29.50

\$33.50

\$89.00

32929

\$33.90

\$37.90

\$41.90

\$116.90

32930

\$43.50

\$47.50

\$52.50

\$150.00

32931

\$63.60

\$69.60

\$75.60

\$182.10

32932

\$68.90

\$74.90

\$80.90

\$200.90

32933

\$114.50

\$126.50

\$136.50

\$276.00

32934

\$145.20

\$158.20

\$170.20

\$363.20

32935

\$222.60

\$242.60

\$256.60

\$722.60

Series 329S Square End
 Four Flute • Left Hand Helix / RHC
 Downcut Milling • Standard Length


Ultra's new Series 329 is for apps where the work piece needs to be "pushed down" during milling via a left hand spiral / right hand cut downcut design. Again, for composite materials and CFRP's, we've provided the ideal SmoothCoat options to extend tool life.



Ultra-Tool End Mill Specs:
 SFR Cutting Diam +.000/-002
 Shank Diam +.0000/-0003



Diam

LOC

OAL

Shank

Square EDP#

UnCoated Price



UC



AT



D1



D2

AT Price

D1 Price

D2 Price

1/16

5/16

1-1/2

1/8

1/8

1-1/2

3/16

3/4

2"

3/16

1"

2-1/2

5/16

1"

2-1/2

3/8

1"

2-1/2

7/16

1"

3"

7/16

1-1/4

3-1/2

5/8

1-3/8

4"

3/4

1-3/8

4"

1"

32936

\$15.90

\$17.40

\$20.40

\$44.90

32937

\$14.80

\$16.30

\$19.30

\$42.80

32938

\$22.30

\$24.30

\$27.30

\$67.80

32939

\$26.50

\$29.50

\$33.50

\$89.00

32940

\$33.90

\$37.90

\$41.90

\$116.90

32941

\$43.50

\$47.50

\$52.50

\$150.00

32942

\$63.60

\$69.60

\$75.60

\$182.10

32943

\$68.90

\$74.90

\$80.90

\$200.90

32944

\$114.50

\$126.50

\$136.50

\$276.00

32945

\$145.20

\$158.20

\$170.20

\$363.20

32946

\$222.60

\$242.60

\$256.60

\$722.60

Series 170S Square End
Series 170B Ball End
 N/C Tolerance +.001 / -.000
 Two Flute • Standard Length

Series 180S Square End
Series 180B Ball End
 N/C Tolerance +.001 / -.000
 Four Flute • Standard Length


| Diam | LOC | OAL | Shank | 170S EDP# | 170B EDP# | 180S EDP# | 180B EDP# | Square Price | Coated Square | Ball Price | Coated Ball | |
|------|------|-------|-------|-----------|-----------|-----------|-----------|--------------|---------------|------------|-------------|--|
| 1/32 | 3/32 | 1-1/2 | 1/8 | 17002 | 17102 | 18002 | 18102 | \$14.10 | \$15.90 | \$17.60 | \$19.50 | |
| 3/64 | 3/16 | 1-1/2 | 1/8 | 17003 | 17103 | 18003 | 18103 | \$14.10 | \$15.90 | \$17.60 | \$19.50 | |
| 1/16 | 3/16 | 1-1/2 | 1/8 | 17004 | 17104 | 18004 | 18104 | \$11.30 | \$13.00 | \$13.50 | \$15.30 | |
| 5/64 | 1/4 | 1-1/2 | 1/8 | 17005 | 17105 | 18005 | 18105 | \$11.30 | \$13.00 | \$13.50 | \$15.30 | |
| 3/32 | 3/8 | 1-1/2 | 1/8 | 17006 | 17106 | 18006 | 18106 | \$10.60 | \$12.40 | \$12.80 | \$14.50 | |
| 1/8 | 1/2 | 1-1/2 | 1/8 | 17008 | 17108 | 18008 | 18108 | \$10.40 | \$12.20 | \$12.40 | \$14.10 | |
| 5/32 | 9/16 | 2" | 3/16 | 17010 | 17110 | 18010 | 18110 | \$16.20 | \$18.30 | \$19.40 | \$21.50 | |
| 3/16 | 5/8 | 2" | 3/16 | 17012 | 17112 | 18012 | 18112 | \$13.80 | \$15.90 | \$16.50 | \$18.70 | |
| 7/32 | 5/8 | 2-1/2 | 1/4 | 17014 | 17114 | 18014 | 18114 | \$18.20 | \$22.20 | \$21.70 | \$25.80 | |
| 1/4 | 3/4 | 2-1/2 | 1/4 | 17016 | 17116 | 18016 | 18116 | \$15.80 | \$19.90 | \$1 | | |

Stub Length End Mills by ULTRATOOL®

Series 332S Square End
332B Ball End • Stub Two FluteSeries 322S Square End
322B Ball End • Stub Four FluteDetailed Speeds and Feeds instructions
can be located on Page #59.

SFR Ultra-Tool End Mill Specs:
Cutting Diam +000/-002
Shank Diam +0000/-0003

| Diam | LOC | OAL | Shank | 332S EDP# | 332B EDP# | 322S EDP# | 322B EDP# | Square Price | Coated Square | Ball Price | Coated Ball |
|------|------|-------|-------|--------------|--------------|--------------|--------------|-----------------|------------------|---------------|----------------|
| 1/32 | 1/16 | 1-1/2 | 1/8 | 33202 | 33302 | 32202 | 32302 | \$8.60 | \$10.30 | \$10.70 | \$12.40 |
| 3/64 | 1/8 | 1-1/2 | 1/8 | 33203 | 33303 | 32203 | 32303 | \$8.60 | \$10.30 | \$10.70 | \$12.40 |
| 1/16 | 1/8 | 1-1/2 | 1/8 | 33204 | 33304 | 32204 | 32304 | \$6.80 | \$8.60 | \$8.50 | \$10.20 |
| 5/64 | 1/8 | 1-1/2 | 1/8 | 33205 | 33305 | 32205 | 32305 | \$6.80 | \$8.60 | \$8.50 | \$10.20 |
| 3/32 | 3/16 | 1-1/2 | 1/8 | 33206 | 33306 | 32206 | 32306 | \$6.50 | \$8.20 | \$8.20 | \$9.90 |
| 7/64 | 3/16 | 1-1/2 | 1/8 | 33207 | 33307 | 32207 | 32307 | \$6.50 | \$8.20 | \$8.20 | \$9.90 |
| 1/8 | 1/4 | 1-1/2 | 1/8 | 33208 | 33308 | 32208 | 32308 | \$6.30 | \$8.10 | \$7.70 | \$9.50 |
| 5/32 | 3/8 | 2" | 3/16 | 33210 | 33310 | 32210 | 32310 | \$8.80 | \$10.90 | \$10.90 | \$13.10 |
| 3/16 | 3/8 | 2" | 3/16 | 33212 | 33312 | 32212 | 32312 | \$8.30 | \$10.50 | \$10.40 | \$12.50 |
| 7/32 | 7/16 | 2" | 1/4 | 33214 | 33314 | 32214 | 32314 | \$11.00 | \$14.40 | \$13.80 | \$17.10 |
| 1/4 | 1/2 | 2" | 1/4 | 33216 | 33316 | 32216 | 32316 | \$10.90 | \$14.20 | \$13.60 | \$16.90 |
| 5/16 | 1/2 | 2" | 5/16 | 33220 | 33320 | 32220 | 32320 | \$16.30 | \$20.20 | \$20.50 | \$24.40 |
| 3/8 | 5/8 | 2-1/2 | 3/8 | 33224 | 33324 | 32224 | 32324 | \$20.10 | \$25.40 | \$25.10 | \$30.40 |
| 7/16 | 3/4 | 2-1/2 | 7/16 | 33228 | 33328 | 32228 | 32328 | \$28.90 | \$35.80 | \$36.10 | \$43.00 |
| 1/2 | 3/4 | 2-1/2 | 1/2 | 33232 | 33332 | 32232 | 32332 | \$33.20 | \$40.30 | \$41.40 | \$48.40 |
| 5/8 | 3/4 | 3-1/2 | 5/8 | 33236 | 33336 | 32236 | 32336 | \$61.90 | \$72.80 | \$76.30 | \$87.20 |
| 3/4 | 1" | 4" | 3/4 | 33240 | 33340 | 32240 | 32340 | \$82.50 | \$95.40 | \$103.00 | \$115.90 |
| 1" | 1" | 4" | 1" | 33248 | 33348 | 32248 | 32348 | \$141.90 | \$160.50 | \$173.10 | \$191.70 |

Double End Stub Length End Mills by ULTRATOOL®

Series 336S Square End
336B Ball End • Stub Two Flute DESeries 326S Square End
326B Ball End • Stub Four Flute DEDetailed Speeds and Feeds instructions
can be located on Page #59.

SFR Ultra-Tool End Mill Specs:
Cutting Diam +000/-002
Shank Diam +0000/-0003

| Diam | LOC | OAL | Shank | 336S EDP# | 336B EDP# | 326S EDP# | 326B EDP# | Square Price | Coated Square | Ball Price | Coated Ball |
|-------|------|-------|-------|--------------|--------------|--------------|--------------|-----------------|------------------|---------------|----------------|
| 1/32 | 3/32 | 1-1/2 | 1/8 | 33602 | 33702 | 32602 | 32702 | \$15.30 | \$17.90 | \$19.20 | \$21.80 |
| 3/64 | 1/8 | 1-1/2 | 1/8 | 33603 | 33703 | 32603 | 32703 | \$15.30 | \$17.90 | \$19.20 | \$21.80 |
| 1/16 | 1/8 | 1-1/2 | 1/8 | 33604 | 33704 | 32604 | 32704 | \$15.30 | \$17.90 | \$19.20 | \$21.80 |
| 5/64 | 1/8 | 1-1/2 | 1/8 | 33605 | 33705 | 32605 | 32705 | \$15.30 | \$17.90 | \$19.20 | \$21.80 |
| 3/32 | 3/16 | 1-1/2 | 1/8 | 33606 | 33706 | 32606 | 32706 | \$15.30 | \$17.90 | \$19.20 | \$21.80 |
| 7/64 | 3/16 | 1-1/2 | 1/8 | 33607 | 33707 | 32607 | 32707 | \$15.30 | \$17.90 | \$19.20 | \$21.80 |
| 1/8 | 1/4 | 1-1/2 | 1/8 | 33608 | 33708 | 32608 | 32708 | \$9.50 | \$12.10 | \$12.00 | \$14.60 |
| 9/64 | 5/16 | 2" | 3/16 | 33609 | 33709 | 32609 | 32709 | \$16.90 | \$20.10 | \$21.10 | \$24.30 |
| 5/32 | 5/16 | 2" | 3/16 | 33610 | 33710 | 32610 | 32710 | \$16.90 | \$20.10 | \$21.10 | \$24.30 |
| 11/64 | 5/16 | 2" | 3/16 | 33611 | 33711 | 32611 | 32711 | \$16.90 | \$20.10 | \$21.10 | \$24.30 |
| 3/16 | 3/8 | 2" | 3/16 | 33612 | 33712 | 32612 | 32712 | \$13.90 | \$17.00 | \$17.30 | \$20.50 |
| 13/64 | 1/2 | 2-1/2 | 1/4 | 33613 | 33713 | 32613 | 32713 | \$19.70 | \$25.70 | \$24.60 | \$30.70 |
| 7/32 | 1/2 | 2-1/2 | 1/4 | 33614 | 33714 | 32614 | 32714 | \$19.70 | \$25.70 | \$24.60 | \$30.70 |
| 15/64 | 1/2 | 2-1/2 | 1/4 | 33615 | 33715 | 32615 | 32715 | \$19.70 | \$25.70 | \$24.60 | \$30.70 |
| 1/4 | 1/2 | 2-1/2 | 1/4 | 33616 | 33716 | 32616 | 32716 | \$17.90 | \$24.00 | \$22.50 | \$28.50 |
| 5/16 | 1/2 | 2-1/2 | 5/16 | 33620 | 33720 | 32620 | 32720 | \$24.50 | \$32.00 | \$30.60 | \$38.00 |
| 3/8 | 9/16 | 2-1/2 | 3/8 | 33624 | 33724 | 32624 | 32724 | \$26.10 | \$34.00 | \$32.60 | \$40.50 |
| 7/16 | 5/8 | 2-3/4 | 7/16 | 33628 | 33728 | 32628 | 32728 | \$37.50 | \$47.90 | \$47.00 | \$57.30 |
| 1/2 | 5/8 | 3" | 1/2 | 33632 | 33732 | 32632 | 32732 | \$44.20 | \$54.90 | \$55.20 | \$65.80 |
| 5/8 | 3/4 | 3-1/2 | 5/8 | 33636 | 33736 | 32636 | 32736 | \$82.50 | \$98.90 | \$103.00 | \$119.50 |
| 3/4 | 1" | 4" | 3/4 | 33640 | 33740 | 32640 | 32740 | \$115.40 | \$134.70 | \$144.30 | \$163.70 |

Double End Standard Length End Mills by ULTRATOOL®

Series 334S Square End • Standard Length
334B Ball End • Two Flute Double End

ULTRAGrain®

Ultra-Tool End Mill Specs:
Cutting Diam +.000/-0.002
Shank Diam +.0000/-0.0003

Series 324S Square End • Standard Length
324B Ball End • Four Flute Double End

| Diam | LOC | OAL | Shank | 334S EDP# | 334B EDP# | 324S EDP# | 324B EDP# | Square Price | Coated Square | Ball Price | Coated Ball |
|-------|-------|-----|-------|--------------|--------------|--------------|--------------|-----------------|------------------|---------------|----------------|
| 1/32 | 3/32 | 2" | 1/8 | 33402 | 33502 | 32402 | 32502 | \$18.20 | \$20.80 | \$22.60 | \$25.20 |
| 3/64 | 1/8 | 2" | 1/8 | 33403 | 33503 | 32403 | 32503 | \$18.20 | \$20.80 | \$22.60 | \$25.20 |
| 1/16 | 3/16 | 2" | 1/8 | 33404 | 33504 | 32404 | 32504 | \$18.20 | \$20.80 | \$22.60 | \$25.20 |
| 3/32 | 3/8 | 2" | 1/8 | 33406 | 33506 | 32406 | 32506 | \$18.20 | \$20.80 | \$22.60 | \$25.20 |
| 1/8 | 3/8 | 2" | 1/8 | 33408 | 33508 | 32408 | 32508 | \$13.20 | \$15.80 | \$16.40 | \$19.00 |
| 5/32 | 7/16 | 3" | 3/16 | 33410 | 33510 | 32410 | 32510 | \$18.90 | \$23.30 | \$23.40 | \$28.00 |
| 3/16 | 1/2 | 3" | 3/16 | 33412 | 33512 | 32412 | 32512 | \$16.20 | \$20.70 | \$20.20 | \$24.60 |
| 7/32 | 9/16 | 3" | 1/4 | 33414 | 33514 | 32414 | 32514 | \$22.20 | \$29.00 | \$27.70 | \$33.80 |
| 1/4 | 5/8 | 3" | 1/4 | 33416 | 33516 | 32416 | 32516 | \$20.90 | \$27.00 | \$26.10 | \$32.20 |
| 9/32 | 11/16 | 3" | 5/16 | 33418 | 33518 | 32418 | 32518 | \$28.90 | \$36.60 | \$36.10 | \$43.50 |
| 5/16 | 3/4 | 3" | 5/16 | 33420 | 33520 | 32420 | 32520 | \$27.30 | \$34.80 | \$34.10 | \$41.60 |
| 11/32 | 3/4 | 4" | 3/8 | 33422 | 33522 | 32422 | 32522 | \$42.30 | \$52.60 | \$53.70 | \$64.00 |
| 3/8 | 1" | 4" | 3/8 | 33424 | 33524 | 32424 | 32524 | \$36.40 | \$46.70 | \$45.40 | \$55.70 |
| 7/16 | 1" | 4" | 7/16 | 33428 | 33528 | 32428 | 32528 | \$50.10 | \$63.40 | \$62.60 | \$75.90 |
| 1/2 | 1" | 4" | 1/2 | 33432 | 33532 | 32432 | 32532 | \$56.30 | \$70.60 | \$70.40 | \$84.70 |
| 9/16 | 1-1/4 | 6" | 9/16 | 33434 | 33534 | 32434 | 32534 | \$103.00 | \$126.10 | \$121.60 | \$144.60 |
| 5/8 | 1-1/2 | 6" | 5/8 | 33436 | 33536 | 32436 | 32536 | \$132.20 | \$157.60 | \$156.70 | \$182.30 |
| 3/4 | 1-1/2 | 6" | 3/4 | 33440 | 33540 | 32440 | 32540 | \$185.50 | \$215.40 | \$218.50 | \$248.40 |
| 7/8 | 1-1/2 | 6" | 7/8 | 33444 | 33544 | 32444 | 32544 | \$305.00 | \$339.40 | \$354.40 | \$388.90 |
| 1" | 1-1/2 | 6" | 1" | 33448 | 33548 | 32448 | 32548 | \$325.40 | \$364.70 | \$379.10 | \$418.30 |

Double End 3/8" Shank End Mills by ULTRATOOL®

Series 338S Square End • Standard Length
338B Ball End • Two Flute Double End
3/8" common shank with flat

ULTRAGrain®

Ultra-Tool End Mill Specs:
Cutting Diam +.000/-0.002
Shank Diam +.0000/-0.0003

Series 328S Square End • Standard Length
328B Ball End • Four Flute Double End
3/8" common shank with flat

| Diam | LOC | OAL | Shank | 338S EDP# | 338B EDP# | 328S EDP# | 328B EDP# | Square Price | Coated Square | Ball Price | Coated Ball |
|-------|-------|-----|-------|--------------|--------------|--------------|--------------|-----------------|------------------|---------------|----------------|
| 1/8 | 3/8 | 3" | 3/8 | 33808 | 33908 | 32808 | 32908 | \$32.10 | \$39.10 | \$37.40 | \$44.30 |
| 5/32 | 7/16 | 3" | 3/8 | 33810 | 33910 | 32810 | 32910 | \$32.10 | \$39.10 | \$37.40 | \$44.30 |
| 3/16 | 1/2 | 3" | 3/8 | 33812 | 33912 | 32812 | 32912 | \$32.10 | \$39.10 | \$37.40 | \$44.30 |
| 7/32 | 9/16 | 3" | 3/8 | 33814 | 33914 | 32814 | 32914 | \$32.10 | \$39.10 | \$37.40 | \$44.30 |
| 1/4 | 5/8 | 3" | 3/8 | 33816 | 33916 | 32816 | 32916 | \$32.10 | \$39.10 | \$37.40 | \$44.30 |
| 9/32 | 11/16 | 4" | 3/8 | 33818 | 33918 | 32818 | 32918 | \$40.10 | \$48.40 | \$46.70 | \$55.00 |
| 5/16 | 3/4 | 4" | 3/8 | 33820 | 33920 | 32820 | 32920 | \$40.10 | \$48.40 | \$46.70 | \$55.00 |
| 11/32 | 3/4 | 4" | 3/8 | 33822 | 33922 | 32822 | 32922 | \$40.10 | \$48.40 | \$46.70 | \$55.00 |
| 3/8 | 3/4 | 4" | 3/8 | 33824 | 33924 | 32824 | 32924 | \$40.10 | \$48.40 | \$46.70 | \$55.00 |

Detailed Speeds and Feeds instructions
can be located on Page #59.

Standard features:

SmoothGrind®

SmoothCentricity®

Available options:

SmoothCoat®

SmoothEdge®



ULTRATOOL® Solid Carbide Chamfer Mills

Series 362CH

Three Flute Helical Chamfer Mill with Flat Tip **new!** New flute count, helical configuration, and flat end.
Solid Carbide • 5 included angles



PL = Length from tip diameter to theoretical Point

LOC = Length Of Cut

| Diam | OAL | Tip | 30° EDP# | 40° EDP# | 60° EDP# | 90° EDP# | 120° EDP# | UnCoated Price | TC Coated | AT Coated | D1 Coated | 30° LOC/PL | 40° LOC/PL | 60° LOC/PL | 90° LOC/PL | 120° LOC/PL |
|------|-------|------|----------|----------|----------|----------|-----------|----------------|-----------|-----------|-----------|------------|------------|------------|------------|-------------|
| 1/8 | 1-1/2 | .040 | 36600 | 36608 | 36616 | 36624 | 36632 | \$9.00 | \$10.70 | \$10.70 | \$13.70 | .159/.075 | .117/.055 | .074/.036 | .043/.021 | .025/.012 |
| 3/16 | 2" | .050 | 36601 | 36609 | 36617 | 36625 | 36633 | \$14.90 | \$16.90 | \$16.90 | \$19.90 | .257/.093 | .189/.069 | .119/.045 | .069/.026 | .040/.015 |
| 1/4 | 2-1/2 | .060 | 36602 | 36610 | 36618 | 36626 | 36634 | \$18.60 | \$22.60 | \$22.60 | \$26.60 | .355/.112 | .261/.082 | .165/.054 | .095/.031 | .055/.018 |
| 5/16 | 2-1/2 | .065 | 36603 | 36611 | 36619 | 36627 | 36635 | \$25.50 | \$30.40 | \$30.40 | \$34.40 | .462/.121 | .340/.089 | .214/.056 | .124/.033 | .071/.019 |
| 3/8 | 2-1/2 | .070 | 36604 | 36612 | 36620 | 36628 | 36636 | \$29.30 | \$34.60 | \$34.60 | \$39.60 | .569/.131 | .419/.096 | .264/.062 | .153/.036 | .088/.021 |
| 1/2 | 3" | .080 | 36605 | 36613 | 36621 | 36629 | 36637 | \$46.10 | \$53.10 | \$53.10 | \$59.10 | .784/.149 | .577/.110 | .364/.071 | .210/.041 | .121/.024 |
| 5/8 | 3-1/2 | .090 | 36606 | 36614 | 36622 | 36630 | 36638 | \$84.50 | \$95.40 | \$95.40 | \$105.40 | .998/.168 | .735/.124 | .463/.080 | .268/.046 | .154/.027 |
| 3/4 | 4" | .100 | 36607 | 36615 | 36623 | 36631 | 36639 | \$117.10 | \$130.00 | \$130.00 | \$142.00 | 1.213/.187 | .893/.137 | .563/.088 | .325/.051 | .188/.029 |

Series 330CH

Two Flute Solid Carbide Chamfer Mill
Pointed End w/web • 5 included angles



| Diam | OAL | 30° EDP# | 40° EDP# | 60° EDP# | 82° EDP# | 90° EDP# | 120° EDP# | UnCoated Price | Coated Price |
|---------------|-------|----------|----------|----------|----------|----------|-----------|----------------|--------------|
| 1/8 | 1-1/2 | 36137 | 36149 | 39259 | 39284 | 39289 | 36161 | \$8.20 | \$9.70 |
| 3/16 | 2" | 36138 | 36150 | 39260 | 39285 | 39290 | 36162 | \$13.60 | \$15.40 |
| 1/4 | 2-1/2 | 36139 | 36151 | 39261 | 39281 | 39291 | 36163 | \$16.90 | \$20.50 |
| 5/16 | 2-1/2 | 36140 | 36152 | 39264 | 39286 | 39294 | 36164 | \$23.20 | \$27.60 |
| 3/8 | 2-1/2 | 36141 | 36153 | 39262 | 39282 | 39292 | 36165 | \$26.50 | \$30.80 |
| 1/2 | 3" | 36142 | 36154 | 39263 | 39283 | 39293 | 36166 | \$41.90 | \$48.00 |
| Metric | | | | | | | | | |
| 3.0mm | 38 | 36143 | 36155 | 39265 | | 39295 | 36167 | \$8.20 | \$9.70 |
| 4.0mm | 50 | 36144 | 36156 | 39266 | | 39296 | 36168 | \$12.50 | \$14.60 |
| 6.0mm | 50 | 36145 | 36157 | 39267 | | 39297 | 36169 | \$15.50 | \$18.80 |
| 8.0mm | 63 | 36146 | 36158 | 39268 | | 39298 | 36170 | \$23.20 | \$27.60 |
| 10.0mm | 70 | 36147 | 36159 | 39269 | | 39299 | 36171 | \$30.60 | \$37.50 |
| 12.0mm | 74 | 36148 | 36160 | 39270 | | 39300 | 36172 | \$41.90 | \$48.00 |



Standard coating selections.



Series 320CH

Four Flute Solid Carbide Chamfer Mill
Pointed End w/web • 5 included angles



| Diam | OAL | 30° EDP# | 40° EDP# | 60° EDP# | 82° EDP# | 90° EDP# | 120° EDP# | UnCoated Price | Coated Price |
|---------------|-------|----------|----------|----------|----------|----------|-----------|----------------|--------------|
| 1/8 | 1-1/2 | 36173 | 36185 | 39459 | 39472 | 39489 | 36197 | \$8.20 | \$9.70 |
| 3/16 | 2" | 36174 | 36186 | 39460 | 39473 | 39490 | 36198 | \$13.60 | \$15.40 |
| 1/4 | 2-1/2 | 36175 | 36187 | 39461 | 39481 | 39491 | 36199 | \$16.90 | \$20.50 |
| 5/16 | 2-1/2 | 36176 | 36188 | 39464 | 39474 | 39494 | 36200 | \$23.20 | \$27.60 |
| 3/8 | 2-1/2 | 36177 | 36189 | 39462 | 39482 | 39492 | 36249 | \$26.50 | \$30.80 |
| 1/2 | 3" | 36178 | 36190 | 39463 | 39483 | 39493 | 36250 | \$41.90 | \$48.00 |
| Metric | | | | | | | | | |
| 3.0mm | 38 | 36179 | 36191 | 39465 | | 39495 | 36251 | \$8.20 | \$9.70 |
| 4.0mm | 50 | 36180 | 36192 | 39466 | | 39496 | 36252 | \$12.50 | \$14.60 |
| 6.0mm | 50 | 36181 | 36193 | 39467 | | 39497 | 36253 | \$15.50 | \$18.80 |
| 8.0mm | 63 | 36182 | 36194 | 39468 | | 39498 | 36254 | \$23.20 | \$27.60 |
| 10.0mm | 70 | 36183 | 36195 | 39469 | | 39499 | 36255 | \$30.60 | \$37.50 |
| 12.0mm | 74 | 36184 | 36196 | 39470 | | 39500 | 36257 | \$41.90 | \$48.00 |

ULTRATOOL®
Made in the USA

Solid Carbide Fiberglass Routers by ULTRATOOL®

Series 220
No End CutSeries 221
Burr Style EndSeries 222
End Mill StyleSeries 223
135° Drill PointSeries 224
Fish Tail Cut

| Diam | LOC | OAL | Shank | 220 EDP# | UnCoated Price | D1 Coated |
|------|-----|-------|-------|-------------|-------------------|--------------|
| 1/8 | 1/2 | 1-1/2 | 1/8 | 22001 | \$7.40 | \$12.30 |
| 3/16 | 5/8 | 2" | 3/16 | 22002 | \$10.90 | \$16.50 |
| 1/4 | 3/4 | 2-1/2 | 1/4 | 22003 | \$12.40 | \$19.50 |
| 1/4A | 1" | 3" | 1/4 | 22007 | \$15.60 | \$23.10 |
| 5/16 | 1" | 2-1/2 | 5/16 | 22004 | \$20.70 | \$29.20 |
| 3/8 | 1" | 2-1/2 | 3/8 | 22005 | \$24.20 | \$33.70 |
| 1/2 | 1" | 3" | 1/2 | 22006 | \$40.00 | \$51.80 |

Metric Diameters

| | | | | | | |
|--------|----|----|--------|-------|---------|---------|
| 6.0mm | 19 | 63 | 6.0mm | 22008 | \$12.40 | \$19.50 |
| 6.0mm | 25 | 75 | 6.0mm | 22009 | \$15.60 | \$23.10 |
| 8.0mm | 25 | 63 | 8.0mm | 22010 | \$20.70 | \$29.20 |
| 10.0mm | 25 | 70 | 10.0mm | 22011 | \$29.70 | \$42.10 |
| 12.0mm | 25 | 74 | 12.0mm | 22012 | \$40.00 | \$51.80 |

| Diam | LOC | OAL | Shank | 220 EDP# | UnCoated Price | D1 Coated |
|-------|-------|-------|-------|-------------|-------------------|--------------|
| 221 | EDP# | 222 | EDP# | 223 | EDP# | 224 |
| 22101 | 22201 | 22301 | 22401 | 22207 | 22307 | 22407 |
| 22102 | 22202 | 22302 | 22402 | 22204 | 22304 | 22404 |
| 22103 | 22203 | 22303 | 22403 | 22205 | 22305 | 22405 |
| 22105 | 22206 | 22306 | 22406 | 22208 | 22308 | 22408 |
| 22106 | 22209 | 22309 | 22409 | 22210 | 22310 | 22410 |
| 22108 | 22211 | 22311 | 22411 | 22212 | 22312 | 22412 |

Ultra's D1 PVD Diamond coating is the perfect compliment for routing abrasive materials with our 220 Series. The smoothness of our sputter based process helps evacuate the material up and out of the cut with superb lubricity. The hardness of D1's multi-layered surface lends outstanding wear characteristics when routing in the types of material for which the Series is designed. Add D1 as a suffix to the EDP #.



Router Specifications:
SFR Cutting Diam +000/-005
Shank Diam +0.000/-0.003

Router Specifications (Metric):
SFR Cutting Diam +0.000/-0.127mm
Shank Diam +0.000/-0.007

Solid Carbide Single Flute Plastic Routers by ULTRATOOL®

Series 301

Single Flute Upcut Router
Solid Carbide • RHS



Polished, high-shear RHS • RHC design for upcut plastic routing.

| Diam | LOC | OAL | Shank | Square EDP# | UnCoated Price | D1 Price |
|------|-------|-------|-------|----------------|-------------------|-------------|
| 1/8 | 5/8 | 2" | 1/8 | 34380 | \$17.40 | \$21.70 |
| 3/16 | 3/4 | 2" | 3/16 | 34381 | \$18.80 | \$23.80 |
| 1/4 | 3/4 | 2-1/2 | 1/4 | 34382 | \$20.80 | \$27.20 |
| 1/4L | 1-1/4 | 3" | 1/4 | 34383 | \$26.70 | \$33.40 |
| 3/8 | 1-1/8 | 3" | 3/8 | 34384 | \$41.00 | \$50.30 |
| 1/2 | 1-1/2 | 4" | 1/2 | 34385 | \$71.50 | \$86.20 |

Series 302

Single Flute Downcut Router
Solid Carbide • LHS



Polished, high-shear LHS • RHC design for downcut plastic routing.

| Diam | LOC | OAL | Shank | Square EDP# | UnCoated Price | D1 Price |
|------|-------|-------|-------|----------------|-------------------|-------------|
| 1/8 | 1/2 | 2" | 1/8 | 34390 | \$17.40 | \$21.70 |
| 3/16 | 5/8 | 2" | 3/16 | 34391 | \$18.80 | \$23.80 |
| 1/4 | 3/4 | 2-1/2 | 1/4 | 34392 | \$20.80 | \$27.20 |
| 1/4L | 1-1/4 | 3" | 1/4 | 34393 | \$26.70 | \$33.40 |
| 3/8 | 1-1/8 | 3" | 3/8 | 34394 | \$41.00 | \$50.30 |
| 1/2 | 1-1/2 | 4" | 1/2 | 34395 | \$71.50 | \$86.20 |

Solid Carbide Compression Routers by ULTRATOOL®



Series 2+2
Carbide Compression Router
Two Flute RH + Two Flute LH

ULTRA-Carb®

ULTRATOOL®
PERFORMANCE
S E R V I C E S

Series 4+4
Carbide Compression Router
Four Flute RH + Four Flute LH



Series 4+4
Carbide Compression Router
Four Flute RH + Four Flute LH

| Diam | Style | LOC | Upshear | OAL | Shank | Square EDP# | UnCoated Price | D1 Price | D2 Price |
|------|-------|-------|---------|-------|-------|----------------|-------------------|-------------|-------------|
| 1/4 | 2+2 | 3/4 | .285 | 2-1/2 | 1/4 | 34355 | \$37.10 | \$45.60 | \$99.60 |
| 1/4 | 2+2 | 1" | .285 | 2-1/2 | 1/4 | 34356 | \$40.30 | \$48.80 | \$102.80 |
| 1/4 | 4+4 | .905 | .250 | 2-1/2 | 1/4 | 34357 | \$41.30 | \$49.80 | \$103.80 |
| 1/4L | 4+4 | 1-1/4 | .250 | 2-1/2 | 1/4 | 34358 | \$44.50 | \$53.00 | \$107.00 |
| 3/8 | 2+2 | 1" | .435 | 3" | 3/8 | 34359 | \$55.10 | \$64.60 | \$160.60 |
| 3/8 | 2+2 | 1-1/8 | .435 | 3" | 3/8 | 34360 | \$55.10 | \$64.60 | \$160.60 |
| 1/2 | 2+2 | 1" | .435 | 3" | 1/2 | 34361 | \$62.00 | \$75.50 | \$193.00 |
| 1/2 | 2+2 | 1-1/8 | .435 | 3" | 1/2 | 34362 | \$63.10 | \$76.60 | \$194.10 |
| 1/2 | 2+2 | 1-1/8 | .435 | 4" | 1/2 | 34363 | \$78.40 | \$95.40 | \$208.40 |
| 1/2 | 2+2 | 1-3/8 | .435 | 3" | 1/2 | 34364 | \$65.20 | \$78.70 | \$196.20 |
| 1/2 | 2+2 | 1-3/8 | .435 | 4" | 1/2 | 34365 | \$81.60 | \$98.60 | \$211.60 |
| 1/2 | 2+2 | 1-5/8 | .435 | 4" | 1/2 | 34366 | \$83.70 | \$100.70 | \$287.70 |
| 5/8 | 2+2 | 1-5/8 | .735 | 4" | 5/8 | 34367 | \$154.20 | \$175.20 | \$407.70 |
| 5/8 | 2+2 | 1-7/8 | .735 | 5" | 5/8 | 34368 | \$171.70 | \$204.20 | \$424.70 |
| 5/8 | 2+2 | 2-1/4 | .735 | 5" | 5/8 | 34369 | \$179.70 | \$212.20 | \$432.70 |
| 3/4 | 2+2 | 1-5/8 | .860 | 4" | 3/4 | 34370 | \$174.90 | \$198.90 | \$522.90 |
| 3/4 | 2+2 | 2-1/2 | .985 | 5" | 3/4 | 34371 | \$218.40 | \$256.90 | \$566.40 |

These routers are designed for compression routing of a wide range of materials. Our polished SmoothGrind cutting edges shears the work piece with a super sharp primary relief. Use our thin, smooth, and hard D1 PVD diamond for plastics, woods, composites, CFRP's, honeycombs, and other abrasive materials. Use our hard & thick D2 CVD diamond for long-running jobs in the same materials.





ULTRATOOL® Corner Rounding End Mills



Series 233

Solid Carbide Radius Mills

Double-Ended • 3 Straight Flutes • RH Cutting



Radius Mill Specifications:
Radius ±.0005
Pilot Diameter ±.0005

Features 5° top & bottom flare-out to avoid workpiece contact.



| Radius Dec | Radius Frac/Metric | Pilot Diam | Shank Diam | OAL | EDP# | UnCoated Price | Coated Price |
|------------|--------------------|------------|------------|-------|-------|----------------|--------------|
| .010 | - | .100 | 1/8 | 2" | 23316 | \$24.90 | \$27.50 |
| .0156 | 1/64 | .090 | 1/8 | 2" | 23317 | \$24.90 | \$27.50 |
| .020 | - | .080 | 1/8 | 2" | 23318 | \$24.90 | \$27.50 |
| .025 | - | .070 | 1/8 | 2" | 23319 | \$24.90 | \$27.50 |
| .0312 | 1/32 | .060 | 1/8 | 2" | 23320 | \$24.90 | \$27.50 |
| .035 | - | .140 | 1/4 | 2-1/2 | 23321 | \$34.80 | \$40.90 |
| .0394 | 1.0mm | .140 | 1/4 | 2-1/2 | 23322 | \$34.80 | \$40.90 |
| .0469 | 3/64 | .140 | 1/4 | 2-1/2 | 23323 | \$34.80 | \$40.90 |
| .050 | - | .140 | 1/4 | 2-1/2 | 23324 | \$34.80 | \$40.90 |
| .055 | - | .090 | 1/4 | 2-1/2 | 23325 | \$34.80 | \$40.90 |
| .0591 | 1.5mm | .090 | 1/4 | 2-1/2 | 23326 | \$34.80 | \$40.90 |
| .0625 | 1/16 | .090 | 1/4 | 2-1/2 | 23327 | \$34.80 | \$40.90 |
| .070 | - | .090 | 1/4 | 2-1/2 | 23328 | \$34.80 | \$40.90 |
| .075 | - | .090 | 1/4 | 2-1/2 | 23329 | \$34.80 | \$40.90 |
| .0781 | 5/64 | .115 | 3/8 | 2-1/2 | 23330 | \$57.70 | \$65.60 |
| .0787 | 2.0mm | .115 | 3/8 | 2-1/2 | 23331 | \$57.70 | \$65.60 |
| .0938 | 3/32 | .115 | 3/8 | 2-1/2 | 23332 | \$57.70 | \$65.60 |
| .0984 | 2.5mm | .115 | 3/8 | 2-1/2 | 23333 | \$57.70 | \$65.60 |
| .1094 | 7/64 | .115 | 3/8 | 2-1/2 | 23334 | \$57.70 | \$65.60 |
| .1181 | 3.0mm | .115 | 3/8 | 2-1/2 | 23335 | \$57.70 | \$65.60 |
| .125 | 1/8 | .115 | 3/8 | 2-1/2 | 23336 | \$57.70 | \$65.60 |
| .1406 | 9/64 | .120 | 1/2 | 3" | 23337 | \$90.30 | \$100.90 |
| .1562 | 5/32 | .120 | 1/2 | 3" | 23338 | \$90.30 | \$100.90 |
| .1575 | 4.0mm | .120 | 1/2 | 3" | 23339 | \$90.30 | \$100.90 |
| .1718 | 11/64 | .120 | 1/2 | 3" | 23340 | \$90.30 | \$100.90 |
| .1875 | 3/16 | .120 | 1/2 | 3" | 23341 | \$90.30 | \$100.90 |
| .1969 | 5.0mm | .120 | 5/8 | 3-1/2 | 23342 | \$103.50 | \$119.90 |
| .2031 | 13/64 | .120 | 5/8 | 3-1/2 | 23343 | \$103.50 | \$119.90 |
| .2188 | 7/32 | .120 | 5/8 | 3-1/2 | 23344 | \$103.50 | \$119.90 |
| .2344 | 15/64 | .120 | 5/8 | 3-1/2 | 23345 | \$103.50 | \$119.90 |
| .2362 | 6.0mm | .120 | 5/8 | 3-1/2 | 23346 | \$103.50 | \$119.90 |
| .250 | 1/4 | .120 | 5/8 | 3-1/2 | 23347 | \$103.50 | \$119.90 |
| .2812 | 9/32 | .120 | 3/4 | 4" | 23348 | \$137.80 | \$157.20 |
| .2969 | 19/64 | .120 | 3/4 | 4" | 23349 | \$137.80 | \$157.20 |
| .3125 | 5/16 | .120 | 3/4 | 4" | 23350 | \$137.80 | \$157.20 |

Series 235

Carbide Radius Mills

Single End • 4 Straight Flutes • RH Cutting



Features 5° top and bottom flare-out to avoid workpiece contact.



| Radius Decimal | Radius Fract | Pilot Diam | Body Diam | Shank Diam | OAL | EDP# | UnCoated Price | Coated Price |
|----------------|--------------|------------|-----------|------------|-------|-------|----------------|--------------|
| .0312 | 1/32 | 1/8 | 3/16 | 3/16 | 2" | 23500 | \$28.20 | \$30.30 |
| .0625 | 1/16 | 1/8 | 1/4 | 1/4 | 2-1/2 | 23501 | \$33.70 | \$37.70 |
| .0938 | 3/32 | 3/16 | 3/8 | 3/8 | 2-1/2 | 23502 | \$53.50 | \$58.80 |
| .125 | 1/8 | 1/4 | 1/2 | 1/2 | 3" | 23503 | \$76.50 | \$83.60 |
| .1562* | 5/32 | 7/16 | 3/4 | 3/8 | 3" | 23514 | \$87.60 | \$98.60 |
| .1875* | 3/16 | 3/8 | 3/4 | 3/8 | 3" | 23504 | \$87.60 | \$98.60 |
| .250* | 1/4 | 1/2 | 1" | 1/2 | 3" | 23505 | \$107.00 | \$121.10 |
| .3125* | 5/16 | 3/8 | 1" | 1/2 | 3" | 23515 | \$107.00 | \$121.10 |
| .375* | 3/8 | 1/2 | 1-1/4 | 3/4 | 3" | 23506 | \$185.90 | \$207.10 |

*Two-piece brazed construction; solid-carbide head w/ steel shank.

Counterbores by ULTRATOOL®

new!

Series 232S

Solid Carbide Counterbores

Square Flat Bottom • 4 Slow Helix RHS Flutes • Center Cutting



These true counterbores have a cylindrical, non-cutting OD margin, center cutting flat bottom, and incredible OD tolerance of +.0000 / -.0003 (before coating). Use the 232S to spot face irregular surfaces, counter bore, mill a flat bottom, or straighten a misaligned hole. Available in all standard SmoothCoat's.

ULTRA-Grain®



| Diam | LOC | OAL | Shank | EDP# | Price | Coated |
|------|-------|-------|-------|-------|----------|----------|
| 1/8 | 1/2 | 1-1/2 | 1/8 | 32950 | \$7.70 | \$9.30 |
| 3/16 | 5/8 | 2" | 3/16 | 32951 | \$11.00 | \$13.00 |
| 1/4 | 3/4 | 2-1/2 | 1/4 | 32952 | \$13.00 | \$16.00 |
| 5/16 | 13/16 | 2-1/2 | 5/16 | 32953 | \$19.90 | \$24.50 |
| 3/8 | 1" | 2-1/2 | 3/8 | 32954 | \$23.70 | \$28.60 |
| 7/16 | 1" | 2-3/4 | 7/16 | 32955 | \$33.70 | \$40.10 |
| 1/2 | 1" | 3" | 1/2 | 32956 | \$39.20 | \$45.70 |
| 5/8 | 1-1/2 | 3-1/2 | 5/8 | 32957 | \$74.70 | \$84.80 |
| 3/4 | 1-1/2 | 4" | 3/4 | 32958 | \$104.40 | \$116.40 |
| 1" | 1-1/2 | 4" | 1" | 32959 | \$171.70 | \$188.90 |

SmoothFlute

SmoothFlute® is the latest technology to be integrated within our product line. It's so unique and important that we've not only obtained patent protection in the USA but additionally in all the major industrial countries of the World.

As incorporated into the Series 323, 323ML, 365, 365ML, and 395ML end mills, SmoothFlute allows for outstanding feed rates with incredibly quiet harmonics. The resultant stable and smooth cutting action leads to superb edge integrity for longer lasting tool life and enhanced work piece finishes.

Should you need a diameter, LOC, radius, or other characteristic not offered in our standard product line, SmoothFlute is also available for special tools on our tungstentoolworks.com website.



Japanese Patent issued for SmoothFlute® technology.



ULTRATOOL® Carbide Countersinks


Series 910
Carbide Six Flute Countersinks
For use in hardened materials


*Set 910 consists of 1/4, 3/8, 1/2, 5/8, and 3/4" sizes in a custom-made, reusable steel index.

| Diam | Shank | OAL | 60°EDP# | 82°EDP# | 90°EDP# | 100°EDP# | UnCoated | Coated |
|-------|---------|-------|---------|---------|---------|----------|----------|----------|
| 1/8 | 1/8 | 1-1/2 | 91008 | 91708 | 91808 | 91864 | \$8.50 | \$10.10 |
| 3/16 | 3/16 | 2" | 91012 | 91712 | 91812 | 91860 | \$9.00 | \$11.00 |
| 1/4 | 1/4 | 2" | 91016 | 91716 | 91816 | 91865 | \$12.40 | \$15.50 |
| 5/16 | 1/4 | 2-5/8 | 91020 | 91720 | 91820 | 91819 | \$17.40 | \$23.00 |
| 3/8 | 1/4 | 2-5/8 | 91024 | 91724 | 91824 | 91863 | \$20.10 | \$25.20 |
| 1/2 | 1/4 | 2-5/8 | 91032 | 91732 | 91832 | 91866 | \$28.60 | \$35.00 |
| 5/8 | 3/8 | 2-3/4 | 91036 | 91736 | 91836 | 91867 | \$42.40 | \$50.90 |
| 3/4 | 3/8 | 2-3/4 | 91040 | 91740 | 91840 | 91868 | \$56.70 | \$66.80 |
| 1" | 1/2 | 3" | 91048 | 91748 | 91848 | 91855 | \$90.60 | \$102.80 |
| 1-1/4 | 3/4 | 3-1/4 | 91050 | 91750 | 91850 | 91856 | \$180.80 | \$204.70 |
| 1-1/2 | 3/4 | 3-1/4 | 91054 | 91754 | 91854 | 91857 | \$249.10 | \$282.10 |
| Set* | 5-piece | | 80360 | 80382 | 80390 | 80392 | \$167.00 | \$197.50 |

Series 911
Carbide Single Flute Countersinks
For use in soft materials


*Set 911 consists of 1/4, 3/8, 1/2, 5/8, and 3/4" sizes in a custom-made, reusable steel index.

| Diam | Shank | OAL | 60°EDP# | 82°EDP# | 90°EDP# | 100°EDP# | UnCoated | Coated |
|-------|---------|-------|---------|---------|---------|----------|----------|----------|
| 1/8 | 1/8 | 1-1/2 | 91108 | 91508 | 91608 | 91869 | \$8.50 | \$10.10 |
| 3/16 | 3/16 | 2" | 91112 | 91512 | 91612 | 91870 | \$9.00 | \$11.00 |
| 1/4 | 1/4 | 2" | 91116 | 91516 | 91616 | 91871 | \$12.40 | \$15.50 |
| 5/16 | 1/4 | 2-5/8 | 91120 | 91520 | 91620 | 91818 | \$17.40 | \$23.00 |
| 3/8 | 1/4 | 2-5/8 | 91124 | 91524 | 91624 | 91872 | \$20.10 | \$25.20 |
| 1/2 | 1/4 | 2-5/8 | 91132 | 91532 | 91632 | 91873 | \$28.60 | \$35.00 |
| 5/8 | 3/8 | 2-3/4 | 91136 | 91536 | 91636 | 91874 | \$42.40 | \$50.90 |
| 3/4 | 3/8 | 2-3/4 | 91140 | 91540 | 91640 | 91875 | \$56.70 | \$66.80 |
| 1" | 1/2 | 3" | 91148 | 91548 | 91648 | 91876 | \$90.60 | \$102.80 |
| 1-1/4 | 3/4 | 3-1/4 | 91150 | 91550 | 91650 | 91877 | \$180.80 | \$204.70 |
| Set* | 5-piece | | 80460 | 80482 | 80490 | 80492 | \$167.00 | \$197.50 |

Series 912
Carbide Three Flute Countersinks
For use in general purpose materials


*Set 912 consists of 1/4, 3/8, 1/2, 5/8, and 3/4" sizes in a custom-made, reusable steel index.

| Diam | Shank | OAL | 60°EDP# | 82°EDP# | 90°EDP# | 100°EDP# | UnCoated | Coated |
|-------|---------|-------|---------|---------|---------|----------|----------|----------|
| 1/8 | 1/8 | 1-1/2 | 91208 | 91308 | 91408 | 91878 | \$8.50 | \$10.10 |
| 3/16 | 3/16 | 2" | 91212 | 91312 | 91412 | 91879 | \$9.00 | \$11.00 |
| 1/4 | 1/4 | 2" | 91216 | 91316 | 91416 | 91880 | \$12.40 | \$15.50 |
| 5/16 | 1/4 | 2-5/8 | 91220 | 91320 | 91420 | 91817 | \$17.40 | \$23.00 |
| 3/8 | 1/4 | 2-5/8 | 91224 | 91324 | 91424 | 91881 | \$20.10 | \$25.20 |
| 1/2 | 1/4 | 2-5/8 | 91232 | 91332 | 91432 | 91882 | \$28.60 | \$35.00 |
| 5/8 | 3/8 | 2-3/4 | 91236 | 91336 | 91436 | 91883 | \$42.40 | \$50.90 |
| 3/4 | 3/8 | 2-3/4 | 91240 | 91340 | 91440 | 91884 | \$56.70 | \$66.80 |
| 1" | 1/2 | 3" | 91248 | 91348 | 91448 | 91885 | \$90.60 | \$102.80 |
| 1-1/4 | 3/4 | 3-1/4 | 91250 | 91350 | 91450 | 91886 | \$180.80 | \$204.70 |
| Set* | 5-piece | | 80560 | 80582 | 80590 | 80592 | \$167.00 | \$197.50 |

All countersinks 5/16" and larger are two-piece construction; carbide head induction-brazed to hardened steel shank. Note OAL may vary slightly due to angle differences.

ULTRATOOL® Carbide Center Laps

Series 913
Carbide Center Laps w/60° Included Angle
High flute count for fine finishes

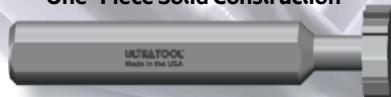

| Diam | Shank | OAL | Flutes | EDP# | UnCoated | Coated |
|------|-------|-------|--------|-------|----------|---------|
| 1/4 | 1/4 | 2" | 8 | 90016 | \$14.30 | \$17.40 |
| 5/16 | 1/4 | 2-5/8 | 8 | 90020 | \$19.10 | \$24.00 |
| 3/8 | 1/4 | 2-5/8 | 8 | 90024 | \$22.30 | \$27.40 |
| 1/2 | 1/4 | 2-5/8 | 8 | 90032 | \$31.80 | \$38.20 |
| 5/8 | 3/8 | 2-3/4 | 10 | 90040 | \$48.80 | \$57.30 |
| 3/4 | 3/8 | 2-3/4 | 10 | 90048 | \$66.20 | \$77.20 |

5/16" and larger are two-piece construction; solid carbide head w/ steel shank.



Ultra-Tool® countersink sets consist of 1/4" • 3/8" • 1/2" • 5/8" • 3/4" sizes in a custom-made index.

Solid Carbide ULTRATOOL® Keyseat Cutters

Series 610
 Carbide Keyseat Cutters
 One-Piece Solid Construction


Ultra's Series 610 Keyseat Cutter is all solid, all the time. Not only is there no braze joint to fail, but we use a premium carbide grade with superb Transverse Rupture Strength to mitigate breakage. Utilizing our Express Service, we offer special face widths, radii, extended necks, reduced shanks and more with extremely quick turnaround times. Plus, the Series 610 is now available with any of our SmoothCoat standard coatings at one low price.

FLAT



ULTRA-Grain®

| Diam | Face Width | Face Width | ASA# | Flutes | Neck Diam | OAL | EDP# | Price | Coated |
|------|------------|------------|------|--------|-----------|---------|-------|----------|----------|
| 3/8 | .0312 | 1/32 | - | 8 | 13/64 | 2-1/32 | 61030 | \$60.10 | \$67.20 |
| 3/8 | .0469 | 3/64 | - | 8 | 13/64 | 2-3/64 | 61031 | \$60.10 | \$67.20 |
| 3/8 | .0625 | 1/16 | 203 | 8 | 13/64 | 2-1/16 | 61029 | \$60.10 | \$67.20 |
| 3/8 | .0938 | 3/32 | 303 | 8 | 13/64 | 2-3/32 | 61001 | \$60.10 | \$67.20 |
| 3/8 | .1250 | 1/8 | 403 | 8 | 13/64 | 2-1/8 | 61002 | \$60.10 | \$67.20 |
| 1/2 | .0312 | 1/32 | - | 10 | 1/4 | 2-1/32 | 61032 | \$63.60 | \$70.70 |
| 1/2 | .0469 | 3/64 | - | 10 | 1/4 | 2-3/64 | 61033 | \$63.60 | \$70.70 |
| 1/2 | .0625 | 1/16 | 204 | 10 | 1/4 | 2-1/16 | 61034 | \$63.60 | \$70.70 |
| 1/2 | .0781 | 5/64 | - | 10 | 1/4 | 2-5/64 | 61035 | \$63.60 | \$70.70 |
| 1/2 | .0938 | 3/32 | 304 | 10 | 1/4 | 2-3/32 | 61003 | \$63.60 | \$70.70 |
| 1/2 | .1094 | 7/64 | - | 10 | 1/4 | 2-7/64 | 61036 | \$63.60 | \$70.70 |
| 1/2 | .1250 | 1/8 | 404 | 10 | 1/4 | 2-1/8 | 61004 | \$63.60 | \$70.70 |
| 5/8 | .0312 | 1/32 | - | 10 | 9/32 | 2-1/32 | 61037 | \$73.30 | \$82.70 |
| 5/8 | .0469 | 3/64 | - | 10 | 9/32 | 2-3/64 | 61038 | \$73.30 | \$82.70 |
| 5/8 | .0625 | 1/16 | - | 10 | 9/32 | 2-1/16 | 61039 | \$73.30 | \$82.70 |
| 5/8 | .0781 | 5/64 | - | 10 | 9/32 | 2-5/64 | 61040 | \$73.30 | \$82.70 |
| 5/8 | .0938 | 3/32 | 305 | 10 | 9/32 | 2-3/32 | 61005 | \$73.30 | \$82.70 |
| 5/8 | .1094 | 7/64 | - | 10 | 9/32 | 2-7/64 | 61041 | \$73.30 | \$82.70 |
| 5/8 | .1250 | 1/8 | 405 | 10 | 9/32 | 2-1/8 | 61006 | \$73.30 | \$82.70 |
| 5/8 | .1406 | 9/64 | - | 10 | 9/32 | 2-9/64 | 61042 | \$73.30 | \$82.70 |
| 5/8 | .1562 | 5/32 | 505 | 10 | 9/32 | 2-5/32 | 61007 | \$73.30 | \$82.70 |
| 5/8 | .1875 | 3/16 | 605 | 10 | 9/32 | 2-3/16 | 61008 | \$73.30 | \$82.70 |
| 3/4 | .0312 | 1/32 | - | 10 | 9/32 | 2-1/32 | 61043 | \$92.50 | \$103.70 |
| 3/4 | .0469 | 3/64 | - | 10 | 9/32 | 2-3/64 | 61044 | \$92.50 | \$103.70 |
| 3/4 | .0625 | 1/16 | - | 10 | 9/32 | 2-1/16 | 61045 | \$92.50 | \$103.70 |
| 3/4 | .0781 | 5/64 | - | 10 | 9/32 | 2-5/64 | 61046 | \$92.50 | \$103.70 |
| 3/4 | .0938 | 3/32 | - | 10 | 9/32 | 2-3/32 | 61047 | \$92.50 | \$103.70 |
| 3/4 | .1094 | 7/64 | - | 10 | 9/32 | 2-7/64 | 61048 | \$92.50 | \$103.70 |
| 3/4 | .1250 | 1/8 | 406 | 10 | 9/32 | 2-1/8 | 61009 | \$92.50 | \$103.70 |
| 3/4 | .1406 | 9/64 | - | 10 | 9/32 | 2-9/64 | 61049 | \$92.50 | \$103.70 |
| 3/4 | .1562 | 5/32 | 506 | 10 | 9/32 | 2-5/32 | 61010 | \$92.50 | \$103.70 |
| 3/4 | .1875 | 3/16 | 606 | 10 | 9/32 | 2-3/16 | 61011 | \$92.50 | \$103.70 |
| 3/4 | .2031 | 13/64 | - | 10 | 9/32 | 2-13/64 | 61050 | \$92.50 | \$103.70 |
| 3/4 | .2188 | 7/32 | - | 10 | 9/32 | 2-7/32 | 61051 | \$92.50 | \$103.70 |
| 3/4 | .2344 | 15/64 | - | 10 | 9/32 | 2-15/64 | 61052 | \$92.50 | \$103.70 |
| 3/4 | .2500 | 1/4 | 806 | 10 | 9/32 | 2-1/4 | 61012 | \$92.50 | \$103.70 |
| 7/8 | .0625 | 1/16 | - | 12 | 9/32 | 2-1/16 | 61053 | \$112.70 | \$125.20 |
| 7/8 | .1250 | 1/8 | - | 12 | 9/32 | 2-1/8 | 61054 | \$112.70 | \$125.20 |
| 7/8 | .1562 | 5/32 | 507 | 12 | 9/32 | 2-5/32 | 61013 | \$112.70 | \$125.20 |
| 7/8 | .1875 | 3/16 | 607 | 12 | 9/32 | 2-3/16 | 61014 | \$112.70 | \$125.20 |
| 7/8 | .2188 | 7/32 | 707 | 12 | 9/32 | 2-7/32 | 61015 | \$112.70 | \$125.20 |
| 7/8 | .2500 | 1/4 | 807 | 12 | 9/32 | 2-1/4 | 61016 | \$112.70 | \$125.20 |
| 1" | .0312 | 1/32 | - | 12 | 9/32 | 2-1/32 | 61055 | \$127.50 | \$141.80 |
| 1" | .0469 | 3/64 | - | 12 | 9/32 | 2-3/64 | 61056 | \$127.50 | \$141.80 |
| 1" | .0625 | 1/16 | - | 12 | 9/32 | 2-1/16 | 61057 | \$127.50 | \$141.80 |
| 1" | .0781 | 5/64 | - | 12 | 9/32 | 2-5/64 | 61058 | \$127.50 | \$141.80 |
| 1" | .0938 | 3/32 | - | 12 | 9/32 | 2-3/32 | 61059 | \$127.50 | \$141.80 |
| 1" | .1250 | 1/8 | - | 12 | 9/32 | 2-1/8 | 61060 | \$127.50 | \$141.80 |
| 1" | .1562 | 5/32 | - | 12 | 9/32 | 2-5/32 | 61061 | \$127.50 | \$141.80 |
| 1" | .1875 | 3/16 | 608 | 12 | 9/32 | 2-3/16 | 61017 | \$127.50 | \$141.80 |
| 1" | .2188 | 7/32 | 708 | 12 | 9/32 | 2-7/32 | 61018 | \$127.50 | \$141.80 |
| 1" | .2500 | 1/4 | 808 | 12 | 9/32 | 2-1/4 | 61019 | \$127.50 | \$141.80 |

Shank Diameter = 1/2" (12.7mm)

Neck length = 1/4" (6.3mm)

ULTRA-Grain®

| Diam | Face Width | Face Width | ASA# | Flutes | Neck Diam | OAL | EDP# | Price | Coated |
|-------|------------|------------|------|--------|-----------|--------|-------|----------|----------|
| 1-1/8 | .1250 | 1/8 | - | 14 | 9/32 | 2-1/8 | 61062 | \$161.50 | \$182.50 |
| 1-1/8 | .1875 | 3/16 | 609 | 14 | 9/32 | 2-3/16 | 61020 | \$161.50 | \$182.50 |
| 1-1/8 | .2188 | 7/32 | 709 | 14 | 9/32 | 2-7/32 | 61021 | \$161.50 | \$182.50 |
| 1-1/8 | .2500 | 1/4 | 809 | 14 | 9/32 | 2-1/4 | 61022 | \$161.50 | \$182.50 |
| 1-1/4 | .0312 | 1/32 | - | 14 | 9/32 | 2-1/32 | 61063 | \$169.50 | \$191.50 |
| 1-1/4 | .0625 | 1/16 | - | 14 | 9/32 | 2-1/16 | 61064 | \$169.50 | \$191.50 |
| 1-1/4 | .0938 | 3/32 | - | 14 | 9/32 | 2-3/32 | 61065 | \$169.50 | \$191.50 |
| 1-1/4 | .1250 | 1/8 | - | 14 | 9/32 | 2-1/8 | 61066 | \$169.50 | \$191.50 |
| 1-1/4 | .1562 | 5/32 | - | 14 | 9/32 | 2-5/32 | 61067 | \$169.50 | \$191.50 |
| 1-1/4 | .1875 | 3/16 | 610 | 14 | 9/32 | 2-3/16 | 61023 | \$169.50 | \$191.50 |
| 1-1/4 | .2188 | 7/32 | 710 | 14 | 9/32 | 2-7/32 | 61024 | \$169.50 | \$191.50 |
| 1-1/4 | .2500 | 1/4 | 810 | 14 | 9/32 | 2-1/4 | 61025 | \$169.50 | \$191.50 |
| 1-1/2 | .0312 | 1/32 | - | 16 | 5/16 | 2-1/32 | 61068 | \$210.50 | \$237.80 |
| 1-1/2 | .0625 | 1/16 | - | 16 | 5/16 | 2-1/16 | 61069 | \$210.50 | \$237.80 |
| 1-1/2 | .0938 | 3/32 | - | 16 | 5/16 | 2-3/32 | 61070 | \$210.50 | \$237.80 |
| 1-1/2 | .1250 | 1/8 | - | 16 | 5/16 | 2-1/8 | 61071 | \$210.50 | \$237.80 |
| 1-1/2 | .1875 | 3/16 | - | 16 | 5/16 | 2-3/16 | 61072 | \$210.50 | \$237.80 |
| 1-1/2 | .2500 | 1/4 | 812 | 16 | 5/16 | 2-1/4 | 61026 | \$210.50 | \$237.80 |
| 1-1/2 | .3125 | 5/16 | 1012 | 16 | 5/16 | 2-5/16 | 61027 | \$210.50 | \$237.80 |
| 1-1/2 | .3750 | 3/8 | 1212 | 16 | 5/16 | 2-3/8 | 61028 | \$210.50 | \$237.80 |

Metric Widths

| Diam | Face Width | Face Width | Flutes | Neck Diam | OAL | EDP# | Price | Coated |
|--------|------------|------------|--------|-----------|-----|-------|----------|----------|
| 9.5mm | 1.0mm | .0394 | 8 | 5.2 | 52 | 61100 | \$60.10 | \$67.20 |
| 9.5mm | 2.0mm | .0787 | 8 | 5.2 | 53 | 61104 | \$60.10 | \$67.20 |
| 9.5mm | 3.0mm | .1181 | 8 | 5.2 | 54 | 61108 | \$60.10 | \$67.20 |
| 12.7mm | 2.0mm | .0787 | 10 | 6.3 | 53 | 61112 | \$63.60 | \$70.70 |
| 12.7mm | 3.0mm | .1181 | 10 | 6.3 | 54 | 61116 | \$63.60 | \$70.70 |
| 15.9mm | 2.0mm | .0787 | 10 | 7.1 | 53 | 61120 | \$73.30 | \$82.70 |
| 15.9mm | 3.0mm | .1181 | 10 | 7.1 | 54 | 61124 | \$73.30 | \$82.70 |
| 15.9mm | 4.0mm | .1575 | 10 | 7.1 | 55 | 61128 | \$73.30 | \$82.70 |
| 19.1mm | 3.0mm | .1181 | 10 | 7.1 | 54 | 61132 | \$92.50 | \$103.70 |
| 19.1mm | 4.0mm | .1575 | 10 | 7.1 | 55 | 61136 | \$92.50 | \$103.70 |
| 19.1mm | 5.0mm | .1969 | 10 | 7.1 | 56 | 61140 | \$92.50 | \$103.70 |
| 19.1mm | 6.0mm | .2362 | 10 | 7.1 | 57 | 61144 | \$92.50 | \$103.70 |
| 22.2mm | 3.0mm | .1181 | 12 | 7.1 | 54 | 61148 | \$112.70 | \$125.20 |
| 22.2mm | 4.0mm | .1575 | 12 | 7.1 | 55 | 61152 | \$112.70 | \$125.20 |
| 22.2mm | 5.0mm | .1969 | 12 | 7.1 | 56 | 61156 | \$112.70 | \$125.20 |
| 22.2mm | 6.0mm | .2362 | 12 | 7.1 | 57 | 61160 | \$112.70 | \$125.20 |
| 25.4mm | 4.0mm | .1575 | 12 | 7.1 | 55 | 61164 | \$127.50 | \$141.80 |
| 25.4mm | 5.0mm | .1969 | 12 | 7.1 | 56 | 61168 | \$127.50 | \$141.80 |
| 25.4mm | 6.0mm | .2362 | 12 | 7.1 | 57 | 61172 | \$127.50 | \$141.80 |
| 28.6mm | 4.0mm | .1575 | 14 | 7.1 | 55 | 61176 | \$161.50 | \$182.50 |
| 28.6mm | 5.0mm | .1969 | 14 | 7.1 | 56 | 61180 | \$161.50 | \$182.50 |
| 28.6mm | 6.0mm | .2362 | 14 | 7.1 | 57 | 61184 | \$161.50 | \$182.50 |
| 31.8mm | 4.0mm | .1575 | 14 | 7.1 | 55 | 61188 | \$169.50 | \$191.50 |
| 31.8mm | 5.0mm | .1969 | 14 | 7.1 | 56 | 61192 | \$169.50 | \$191.50 |
| 31.8mm | 6.0mm | .2362 | 14 | 7.1 | 57 | 61196 | \$169.50 | \$191.50 |
| 38.1mm | 6.0mm | .2362 | 16 | 7.9 | 57 | 61200 | \$210.50 | \$237.80 |
| 38.1mm | 7.0mm | .2756 | 16 | 7.9 | 58 | 61204 | \$210.50 | \$237.80 |
| 38.1mm | 8.0mm | .3150 | 16 | 7.9 | 59 | 61208 | \$210.50 | \$237.80 |

Solid Carbide Saws by ULTRATOOL®

Ordering our Series 620 Solid Carbide Saws has never been easier. Size ranges and quantity breaks have been consolidated; simply note the semi-blank EDP# for the diameter of your need and specify the decimal thickness. Pricing inclusive of our in-house SmoothCoat® PVD hardcoating is also listed. All Ultra-Tool® saws are manufactured in our factories featuring 100% CNC generated fluting and relief angles. Available via Ultra's Express Service for fast delivery. Alterations for radii, chamfers, hubs, and angles also available. Special sizes, thicknesses, ID's, keyways, etc. are available upon quotation request.

Series 620 Solid Carbide Saws

ULTRA-Carb®



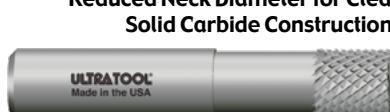
Saw Specifications:
Diameter ±.015 Thickness ±.00025
Hole (ID) +.0005/-0.000

| Diam | Thickness Range | ID | # Teeth | Blank EDP# | UnCoated Price | Coated Price |
|-------|-----------------|-----|---------|------------|----------------|--------------|
| 3/4 | .008 - .125 | 1/4 | 18 | 63001 | \$44.10 | \$48.10 |
| 1" | .010 - .125 | 3/8 | 20 | 62019 | \$57.30 | \$61.30 |
| 1-1/4 | .010 - .125 | 1/2 | 24 | 63005 | \$61.80 | \$65.40 |
| 1-1/2 | .010 - .125 | 1/2 | 36 | 62029 | \$66.50 | \$70.50 |
| 1-3/4 | .010 - .125 | 1/2 | 38 | 63010 | \$83.00 | \$87.00 |
| 2" | .010 - .125 | 1/2 | 40 | 62039 | \$97.40 | \$102.40 |
| 2" | .010 - .125 | 1" | 40 | 63015 | \$97.40 | \$102.40 |
| 2-1/4 | .010 - .125 | 5/8 | 44 | 63020 | \$108.80 | \$116.80 |
| 2-1/2 | .010 - .125 | 1" | 48 | 62049 | \$120.30 | \$129.30 |
| 2-3/4 | .010 - .125 | 1" | 60 | 63025 | \$166.00 | \$175.00 |
| 3" | .010 - .125 | 1" | 72 | 62059 | \$194.70 | \$206.70 |
| 3" | .126 - .250 | 1" | 72 | 62064 | \$269.10 | \$286.10 |
| 4" | .020 - .125 | 1" | 80 | 62069 | \$251.90 | \$266.90 |
| 4" | .126 - .250 | 1" | 80 | 62074 | \$383.60 | \$402.60 |

Metric Sizes

Saw Specifications (Metric):
Diameter ±0.38mm Thickness ±0.006mm
Hole (ID) +0.013/-0.000mm

| Diam | Thickness Range | ID | # Teeth | Blank EDP# | UnCoated Price | Coated Price |
|---------|-----------------|------|---------|------------|----------------|--------------|
| 20.0mm | 0.20 - 3.15 | 5.0 | 20 | 63050 | \$48.60 | \$52.60 |
| 25.0mm | 0.25 - 3.15 | 8.0 | 24 | 63055 | \$58.50 | \$61.50 |
| 32.0mm | 0.25 - 3.15 | 8.0 | 30 | 63060 | \$64.20 | \$68.20 |
| 40.0mm | 0.25 - 3.15 | 10.0 | 36 | 63065 | \$83.00 | \$87.00 |
| 50.0mm | 0.25 - 3.15 | 13.0 | 40 | 63070 | \$97.40 | \$102.40 |
| 63.0mm | 0.25 - 3.15 | 16.0 | 48 | 63075 | \$120.30 | \$129.30 |
| 80.0mm | 0.35 - 3.15 | 22.0 | 60 | 63080 | \$206.10 | \$218.10 |
| 100.0mm | 0.50 - 3.15 | 22.0 | 72 | 63085 | \$251.90 | \$266.90 |

ULTRATOOL® Carbide Grinding Tools

Series 290
45° Lead Chamfer & End-Cutting • RH Cut
Reduced Neck Diameter for Clearance
Solid Carbide Construction

| Diam | LOC | Shank | Neck Length | OAL | Tool# | EDP# | UnCoated Price | Coated Price |
|------|------|-------|-------------|-------|-------|-------|----------------|--------------|
| 1/16 | 3/32 | 1/8 | 3/8 | 1-1/2 | XA | 29001 | \$14.00 | \$15.70 |
| 3/32 | 3/32 | 1/8 | 3/8 | 1-1/2 | XB | 29002 | \$13.80 | \$15.50 |
| 1/8 | 1/8 | 1/8 | 1/2 | 1-1/2 | XC | 29003 | \$13.60 | \$15.30 |
| 5/32 | 3/16 | 5/16 | 5/8 | 2" | XD | 29004 | \$18.00 | \$20.20 |
| 3/16 | 3/16 | 5/16 | 5/8 | 2" | XF | 29005 | \$18.20 | \$20.30 |
| 7/32 | 7/32 | 1/4 | 3/4 | 2" | XH | 29006 | \$20.90 | \$24.30 |
| 1/4 | 1/4 | 1/4 | 3/4 | 2" | XE | 29007 | \$20.70 | \$24.10 |

ULTRATOOL® Carbide Boring Bars

Series 471
Solid Carbide Jig Boring Tool
Straight Flute • Straight Shank • RH Cut



| Tool # | Min Hole Dia | Max Hole Depth | OAL | Shank Dia | EDP# | UnCoated Price | Coated Price |
|--------|--------------|----------------|-------|-----------|-------|----------------|--------------|
| F-O | .090 | 1/2 | 1-1/2 | 1/8 | 47100 | \$14.40 | \$16.10 |
| F-1 | .120 | 5/8 | 1-1/2 | 1/8 | 47101 | \$14.40 | \$16.10 |
| F-2 | .150 | 3/4 | 2" | 3/16 | 47102 | \$19.80 | \$21.90 |
| F-3 | .180 | 1" | 2" | 3/16 | 47103 | \$19.90 | \$22.00 |
| F-4 | .210 | 1-1/4 | 2-1/2 | 1/4 | 47104 | \$23.40 | \$27.40 |
| F-5 | .240 | 1-1/4 | 2-1/2 | 1/4 | 47105 | \$24.00 | \$28.00 |
| F-6 | .270 | 1-1/4 | 2-1/2 | 5/16 | 47106 | \$32.90 | \$37.90 |
| F-7 | .300 | 1-1/4 | 2-1/2 | 5/16 | 47107 | \$33.50 | \$38.50 |
| F-8 | .330 | 1-1/2 | 2-1/2 | 3/8 | 47108 | \$35.70 | \$41.00 |
| F-9 | .360 | 1-1/2 | 2-1/2 | 3/8 | 47109 | \$36.30 | \$41.60 |

ULTRATOOL® Standard Length Solid Carbide Reamers

Series 410

Standard Length • Straight Flute • RH Cut



Series 410R

Standard Length • RH Spiral • RH Cut



Series 410L

Standard Length • LH Spiral • RH Cut



Now it's easier than ever to purchase the Ultra-Tool® line of precision carbide reamers (featuring the industry's tightest tolerances). We've eliminated all quantity breaks and published one low price. Best of all, finished UnCoated reamers are available to ship via Ultra Express Service as quick as the following business day. We've even added a pricing column for SmoothCoat TA, our most versatile TiAlN coating. Performed in-house, TA will add only 1 business day to delivery and includes SmoothEdge 1 edge prep.

Decimal Sizes



Metric Sizes



| Group | Diam Range | LOC | OAL | Flutes | Shank | Price | Coated | Shank | Flutes | OAL | LOC | Diam Range | Group |
|-------|---------------|-------|-------|--------|-------|----------|----------|--------|--------|-----|-----|-----------------|-------|
| 1 | .0312 - .0394 | 1/2 | 1-1/2 | 4 | .0312 | \$27.30 | \$29.10 | 0.7mm | 4 | 38 | 9 | 0.80 - 1.00mm | 1 |
| 2 | .0395 - .0484 | 1/2 | 1-1/2 | 4 | .0312 | \$28.10 | \$29.90 | 0.7mm | 4 | 38 | 9 | 1.01 - 1.23mm | 2 |
| 3 | .0485 - .0574 | 1/2 | 1-1/2 | 4 | .0469 | \$28.50 | \$30.40 | 1.0mm | 4 | 38 | 9 | 1.24 - 1.46mm | 3 |
| 4 | .0575 - .0654 | 1/2 | 1-1/2 | 4 | .0469 | \$28.90 | \$30.70 | 1.0mm | 4 | 38 | 9 | 1.47 - 1.66mm | 4 |
| 5 | .0655 - .0804 | 1/2 | 2" | 4 | .0625 | \$29.80 | \$31.90 | 1.5mm | 4 | 51 | 12 | 1.67 - 2.04mm | 5 |
| 6 | .0805 - .0964 | 1/2 | 2" | 4 | .0781 | \$30.40 | \$32.60 | 1.5mm | 4 | 51 | 12 | 2.05 - 2.45mm | 6 |
| 7 | .0965 - .1124 | 5/8 | 2-1/4 | 4 | .0938 | \$32.80 | \$35.20 | 2.2mm | 4 | 57 | 16 | 2.46 - 2.85mm | 7 |
| 8 | .1125 - .1284 | 5/8 | 2-1/4 | 4 | .1094 | \$34.00 | \$36.50 | 2.5mm | 4 | 57 | 16 | 2.86 - 3.26mm | 8 |
| 9 | .1285 - .1444 | 3/4 | 2-1/2 | 4 | .1250 | \$37.50 | \$40.50 | 3.0mm | 4 | 63 | 19 | 3.27 - 3.67mm | 9 |
| 10 | .1445 - .1594 | 3/4 | 2-1/2 | 4 | .1406 | \$39.40 | \$42.50 | 3.5mm | 4 | 63 | 19 | 3.68 - 4.05mm | 10 |
| 11 | .1595 - .1744 | 7/8 | 2-3/4 | 4 | .1562 | \$44.00 | \$47.10 | 3.5mm | 4 | 70 | 22 | 4.06 - 4.43mm | 11 |
| 12 | .1745 - .1914 | 7/8 | 2-3/4 | 4 | .1719 | \$46.30 | \$49.40 | 4.0mm | 4 | 70 | 22 | 4.44 - 4.86mm | 12 |
| 13 | .1915 - .2234 | 1" | 3" | 6 | .1875 | \$51.00 | \$55.40 | 4.5mm | 6 | 76 | 25 | 4.87 - 5.67mm | 13 |
| 14 | .2235 - .2544 | 1" | 3" | 6 | .2188 | \$53.30 | \$57.70 | 5.0mm | 6 | 76 | 25 | 5.68 - 6.46mm | 14 |
| 15 | .2545 - .2844 | 1-1/8 | 3-1/4 | 6 | .2500 | \$59.60 | \$63.90 | 6.3mm | 6 | 82 | 28 | 6.47 - 7.22mm | 15 |
| 16 | .2845 - .3164 | 1-1/8 | 3-1/4 | 6 | .2812 | \$69.00 | \$75.70 | 7.1mm | 6 | 82 | 28 | 7.23 - 8.04mm | 16 |
| 17 | .3165 - .3484 | 1-1/4 | 3-1/2 | 6 | .3125 | \$77.50 | \$84.30 | 7.1mm | 6 | 89 | 32 | 8.05 - 8.85mm | 17 |
| 18 | .3485 - .3794 | 1-1/4 | 3-1/2 | 6 | .3438 | \$86.30 | \$93.70 | 8.0mm | 6 | 89 | 32 | 8.86 - 9.64mm | 18 |
| 19 | .3795 - .4104 | 1-1/2 | 4" | 6 | .3750 | \$96.50 | \$103.90 | 8.0mm | 6 | 101 | 38 | 9.65 - 10.42mm | 19 |
| 20 | .4105 - .4414 | 1-1/2 | 4" | 6 | .4062 | \$102.80 | \$112.00 | 10.0mm | 6 | 101 | 38 | 10.43 - 11.21mm | 20 |
| 21 | .4415 - .4724 | 1-1/2 | 4" | 6 | .4375 | \$105.80 | \$115.70 | 10.0mm | 6 | 101 | 38 | 11.22 - 12.00mm | 21 |
| 22 | .4725 - .5054 | 1-1/2 | 4" | 6 | .4688 | \$115.10 | \$125.00 | 10.0mm | 6 | 101 | 38 | 12.01 - 12.84mm | 22 |

Group ranges 1-7 feature male-centers on both ends. Group ranges 8-22 feature female-centers on both ends.

Solid Carbide Economy Reamers by ULTRATOOL®

Series 411 • Decimal Sizes

Economy Reamers • Straight Flute • RH Cut
Oversized Shanks with Neck Clearance

LBS (length below shank)

The 411 Series is ground from an oversized, common shank diameter to offer superb reaming capabilities at a lower price point than typical "reduced shank" type reamers ground between centers. Solid carbide construction. Available with TA coating. Flute length equals one-half length of reach.

SFR 411 Reamer Specs: 45° Lead
Cutting Diam +.0002/-0.0000
Shank Diam +.0000/-0.0003



| Group | Diam Range | LBS | OAL | Flutes | Shank | Price | Coated |
|-------|---------------|-------|-------|--------|-------|---------|---------|
| 1 | .0470 - .0622 | 3/4 | 1-1/2 | 4 | 1/16 | \$20.50 | \$22.40 |
| 2 | .0623 - .0778 | 1" | 2" | 4 | 5/64 | \$20.90 | \$22.80 |
| 3 | .0779 - .0935 | 1-1/4 | 2-1/4 | 4 | 3/32 | \$21.30 | \$23.80 |
| 4 | .0936 - .1091 | 1-1/4 | 2-1/4 | 4 | 7/64 | \$22.50 | \$25.00 |
| 5 | .1092 - .1247 | 1-1/4 | 2-1/4 | 4 | 1/8 | \$24.60 | \$27.10 |
| 6 | .1248 - .1403 | 1-1/2 | 2-1/2 | 4 | 9/64 | \$26.60 | \$29.70 |
| 7 | .1404 - .1559 | 1-1/2 | 2-1/2 | 4 | 5/32 | \$28.00 | \$31.00 |
| 8 | .1560 - .1716 | 1-3/4 | 2-3/4 | 4 | 11/64 | \$31.00 | \$34.00 |
| 9 | .1717 - .1872 | 1-3/4 | 2-3/4 | 4 | 3/16 | \$32.30 | \$35.40 |
| 10 | .1873 - .2028 | 2" | 3" | 4 | 13/64 | \$35.50 | \$39.80 |
| 11 | .2029 - .2185 | 2" | 3" | 4 | 7/32 | \$37.90 | \$42.20 |
| 12 | .2186 - .2341 | 2" | 3" | 4 | 15/64 | \$39.70 | \$44.00 |
| 13 | .2342 - .2497 | 2" | 3" | 4 | 1/4 | \$42.70 | \$47.00 |
| 14 | .2498 - .2653 | 2-1/4 | 3-1/2 | 6 | 17/64 | \$43.90 | \$50.70 |
| 15 | .2654 - .2809 | 2-1/4 | 3-1/2 | 6 | 9/32 | \$46.70 | \$53.50 |

| Group | Diam Range | LBS | OAL | Flutes | Shank | Price | Coated |
|-------|---------------|-------|-------|--------|-------|----------|----------|
| 16 | .2810 - .2966 | 2-1/4 | 3-3/4 | 6 | 19/64 | \$50.90 | \$57.70 |
| 17 | .2967 - .3122 | 2-1/4 | 3-3/4 | 6 | 5/16 | \$53.20 | \$60.00 |
| 18 | .3123 - .3278 | 2-3/8 | 4" | 6 | 21/64 | \$55.00 | \$62.30 |
| 19 | .3279 - .3435 | 2-3/8 | 4" | 6 | 11/32 | \$59.20 | \$66.60 |
| 20 | .3436 - .3591 | 2-3/8 | 4" | 6 | 23/64 | \$62.60 | \$70.00 |
| 21 | .3592 - .3747 | 2-3/8 | 4" | 6 | 3/8 | \$67.00 | \$74.40 |
| 22 | .3748 - .3903 | 2-7/8 | 4" | 6 | 25/64 | \$75.00 | \$84.20 |
| 23 | .3904 - .4059 | 2-7/8 | 4" | 6 | 13/32 | \$84.00 | \$93.30 |
| 24 | .4060 - .4216 | 2-7/8 | 4" | 6 | 27/64 | \$90.60 | \$99.90 |
| 25 | .4217 - .4372 | 2-7/8 | 4" | 6 | 7/16 | \$92.90 | \$102.20 |
| 26 | .4373 - .4528 | 2-7/8 | 4" | 6 | 29/64 | \$96.80 | \$106.70 |
| 27 | .4529 - .4685 | 2-7/8 | 4" | 6 | 15/32 | \$97.60 | \$107.50 |
| 28 | .4686 - .4841 | 2-7/8 | 4" | 6 | 31/64 | \$99.80 | \$109.70 |
| 29 | .4842 - .4997 | 2-7/8 | 4" | 6 | 1/2 | \$100.70 | \$110.60 |

LOR equals flute length (1/2 LOR) plus neck clearance (1/2 LOR).

Long Length • Steel Shank / Carbide Head Reamers by ULTRATOOL®

Series 453

Long Length • Straight Flute • RH Cut



Series 453R

Long Length • RH Spiral • RH Cut



Series 453L

Long Length • LH Spiral • RH Cut



Now it's easier than ever to purchase the Ultra-Tool® line of precision carbide reamers (featuring the industry's tightest tolerances). We've eliminated all quantity breaks and published one low price. Best of all, finished UnCoated reamers are available to ship via Ultra Express Service as quick as the following business day. We've even added a pricing column for SmoothCoat TA, our most versatile TiAlN coating. Performed in-house, TA will add only 1 business day to delivery and includes SmoothEdge 1 edge prep.

Decimal Sizes



Reamer Specs: 45° Lead
Cutting Diam +.0002/-0.0000
Shank Diam +.0005/-0.0005



| Group | Diam Range | LOC | OAL | Flutes | Shank | Price | Coated |
|-------|---------------|-------|-------|--------|-------|----------|----------|
| 1* | .1105 - .1284 | 7/8 | 3-1/2 | 4 | .1094 | \$37.90 | \$41.00 |
| 2* | .1285 - .1444 | 7/8 | 4" | 4 | .1250 | \$41.30 | \$44.40 |
| 3* | .1445 - .1594 | 1" | 4" | 4 | .1406 | \$44.40 | \$48.40 |
| 4* | .1595 - .1744 | 1" | 4-1/2 | 4 | .1562 | \$48.60 | \$53.80 |
| 5* | .1745 - .1914 | 1" | 4-1/2 | 4 | .1719 | \$51.00 | \$56.30 |
| 6 | .1915 - .2234 | 1-1/4 | 5" | 6 | .1875 | \$57.20 | \$62.50 |
| 7 | .2235 - .2544 | 1-1/4 | 6" | 6 | .2188 | \$58.80 | \$65.60 |
| 8 | .2545 - .2844 | 1-1/4 | 6" | 6 | .2344 | \$65.00 | \$71.90 |
| 9 | .2845 - .3164 | 1-1/2 | 6" | 6 | .2500 | \$72.10 | \$78.90 |
| 10 | .3165 - .3484 | 1-1/2 | 6" | 6 | .2969 | \$84.40 | \$93.70 |
| 11 | .3485 - .3794 | 1-1/2 | 7" | 6 | .3125 | \$91.90 | \$104.20 |
| 12 | .3795 - .4104 | 1-3/4 | 7" | 6 | .3438 | \$102.80 | \$116.30 |
| 13 | .4105 - .4414 | 1-3/4 | 7" | 6 | .3750 | \$108.90 | \$122.50 |
| 14 | .4415 - .4724 | 1-3/4 | 8" | 6 | .4062 | \$115.10 | \$132.40 |
| 15 | .4725 - .5054 | 1-3/4 | 8" | 6 | .4375 | \$122.80 | \$140.10 |
| 16 | .5055 - .5670 | 1-7/8 | 9" | 6 | .4844 | \$135.40 | \$157.60 |
| 17 | .5671 - .6300 | 1-7/8 | 9" | 6 | .5312 | \$151.30 | \$177.30 |
| 18 | .6301 - .6930 | 2" | 9-1/2 | 6 | .5625 | \$184.70 | \$210.60 |
| 19 | .6931 - .7560 | 2" | 9-1/2 | 6 | .6250 | \$217.30 | \$244.50 |
| 20 | .7561 - .7870 | 2" | 10" | 8 | .6250 | \$264.80 | \$292.00 |
| 21 | .7871 - .8190 | 2" | 10" | 8 | .7500 | \$269.80 | \$300.60 |
| 22 | .8191 - .8500 | 2" | 10" | 8 | .7500 | \$272.50 | \$303.40 |
| 23 | .8501 - .8820 | 2" | 10" | 8 | .7500 | \$275.20 | \$309.10 |
| 24 | .8821 - .9120 | 2" | 10" | 8 | .7500 | \$322.60 | \$356.50 |
| 25 | .9121 - .9440 | 2" | 10" | 8 | .7500 | \$325.00 | \$362.00 |
| 26 | .9441 - .9760 | 2" | 10" | 8 | .7500 | \$328.50 | \$365.50 |
| 27 | .9761 - 1.010 | 2" | 10" | 8 | .7500 | \$330.40 | \$367.40 |

*Solid Carbide construction on these sizes only; All 453, 453R, & 453L Series feature female-centers on both ends.

ULTRATOOL® Extra-Long Small Diameter Solid Carbide Reamers

The Ultra-Tool® Series 453XL is a 6" overall extra-long reamer. Precision ground with 6 straight flutes, the 453XL allows increased reach and tight tolerances on smaller hole diameters. Available with TA coating.



Reamer Specs: 45° Lead
Cutting Diam +.0002/-0.0000
Shank Diam +.0005/-0.0005

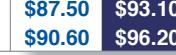
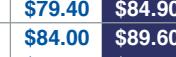
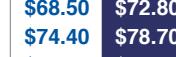
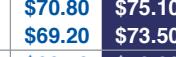
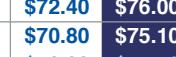


Series 453XL

Extra-Long Length • Straight Flute • RH Cut



| Decimal Sizes | | | | | |
|---------------|---------------|-------|-----|--------|-------|
| Group | Diam Range | LOC | OAL | Flutes | Shank |
| 1 | .0395 - .0484 | 7/8 | 6" | 6 | .0312 |
| 2 | .0485 - .0574 | 7/8 | 6" | 6 | .0469 |
| 3 | .0575 - .0654 | 7/8 | 6" | 6 | .0469 |
| 4 | .0655 - .0804 | 7/8 | 6" | 6 | .0625 |
| 5 | .0805 - .0964 | 7/8 | 6" | 6 | .0781 |
| 6 | .0965 - .1124 | 7/8 | 6" | 6 | .0938 |
| 7 | .1125 - .1284 | 7/8 | 6" | 6 | .1094 |
| 8 | .1285 - .1444 | 7/8 | 6" | 6 | .1250 |
| 9 | .1445 - .1594 | 1" | 6" | 6 | .1406 |
| 10 | .1595 - .1744 | 1" | 6" | 6 | .1562 |
| 11 | .1745 - .1914 | 1" | 6" | 6 | .1719 |
| 12 | .1915 - .2234 | 1-1/4 | 6" | 6 | .1875 |



| Metric Sizes | | | | | |
|--------------|--------|-----|-----|---------------|-------|
| Shank | Flutes | OAL | LOC | Diam Range | Group |
| 0.7mm | 6 | 152 | 22 | 1.00 - 1.23mm | 1 |
| 1.0mm | 6 | 152 | 22 | 1.24 - 1.45mm | 2 |
| 1.0mm | 6 | 152 | 22 | 1.46 - 1.66mm | 3 |
| 1.5mm | 6 | 152 | 22 | 1.67 - 2.04mm | 4 |
| 1.9mm | 6 | 152 | 22 | 2.05 - 2.45mm | 5 |
| 2.2mm | 6 | 152 | 22 | 2.46 - 2.85mm | 6 |
| 2.5mm | 6 | 152 | 22 | 2.86 - 3.26mm | 7 |
| 3.0mm | 6 | 152 | 22 | 3.27 - 3.66mm | 8 |
| 3.5mm | 6 | 152 | 25 | 3.67 - 4.05mm | 9 |
| 3.5mm | 6 | 152 | 25 | 4.06 - 4.43mm | 10 |
| 4.0mm | 6 | 152 | 25 | 4.44 - 4.86mm | 11 |
| 4.5mm | 6 | 152 | 32 | 4.87 - 5.67mm | 12 |

Solid carbide construction with male centers.

ULTRATOOL® Fractional & Metric-Sized Reamers

Series 400 • Fractional Sizes
 Standard Length • Straight Flute • RH Cut
 Solid Carbide

ULTRA-Carb®



| Diam | LOC | OAL | Flutes | Shank | EDP# | Price | Coated |
|-------|-------|-------|--------|-------|-------|----------|----------|
| 1/32 | 1/2 | 1-1/2 | 4 | 1/32 | 40002 | \$24.60 | \$26.50 |
| 3/64 | 1/2 | 1-1/2 | 4 | 1/32 | 40003 | \$25.20 | \$27.10 |
| 1/16 | 1/2 | 1-1/2 | 4 | 3/64 | 40004 | \$26.10 | \$27.90 |
| 5/64 | 1/2 | 2" | 4 | 1/16 | 40005 | \$26.70 | \$28.50 |
| 3/32 | 1/2 | 2" | 4 | 5/64 | 40006 | \$27.40 | \$29.20 |
| 7/64 | 5/8 | 2-1/4 | 4 | 3/32 | 40007 | \$29.40 | \$31.90 |
| 1/8 | 5/8 | 2-1/4 | 4 | 7/64 | 40008 | \$30.60 | \$33.00 |
| 9/64 | 3/4 | 2-1/2 | 4 | 1/8 | 40009 | \$33.70 | \$36.70 |
| 5/32 | 3/4 | 2-1/2 | 4 | 9/64 | 40010 | \$35.50 | \$38.60 |
| 11/64 | 7/8 | 2-3/4 | 4 | 5/32 | 40011 | \$39.70 | \$42.80 |
| 3/16 | 7/8 | 2-3/4 | 4 | 11/64 | 40012 | \$41.70 | \$44.80 |
| 13/64 | 1" | 3" | 6 | 3/16 | 40013 | \$46.00 | \$50.30 |
| 7/32 | 1" | 3" | 6 | 3/16 | 40014 | \$46.00 | \$50.30 |
| 15/64 | 1" | 3" | 6 | 7/32 | 40015 | \$47.90 | \$52.40 |
| 1/4 | 1" | 3" | 6 | 7/32 | 40016 | \$47.90 | \$52.40 |
| 17/64 | 1-1/8 | 3-1/4 | 6 | 1/4 | 40017 | \$53.60 | \$59.90 |
| 9/32 | 1-1/8 | 3-1/4 | 6 | 1/4 | 40018 | \$53.60 | \$59.90 |
| 19/64 | 1-1/8 | 3-1/4 | 6 | 9/32 | 40019 | \$62.20 | \$68.40 |
| 5/16 | 1-1/8 | 3-1/4 | 6 | 9/32 | 40020 | \$62.20 | \$68.40 |
| 21/64 | 1-1/4 | 3-1/2 | 6 | 5/16 | 40021 | \$69.60 | \$76.70 |
| 11/32 | 1-1/4 | 3-1/2 | 6 | 5/16 | 40022 | \$69.60 | \$76.70 |
| 23/64 | 1-1/4 | 3-1/2 | 6 | 11/32 | 40023 | \$77.80 | \$85.00 |
| 3/8 | 1-1/4 | 3-1/2 | 6 | 11/32 | 40024 | \$77.80 | \$85.00 |
| 25/64 | 1-1/2 | 4" | 6 | 3/8 | 40025 | \$86.80 | \$95.70 |
| 13/32 | 1-1/2 | 4" | 6 | 3/8 | 40026 | \$86.80 | \$95.70 |
| 27/64 | 1-1/2 | 4" | 6 | 13/32 | 40027 | \$92.40 | \$101.30 |
| 7/16 | 1-1/2 | 4" | 6 | 13/32 | 40028 | \$92.40 | \$101.30 |
| 29/64 | 1-1/2 | 4" | 6 | 7/16 | 40029 | \$95.30 | \$104.90 |
| 15/32 | 1-1/2 | 4" | 6 | 7/16 | 40030 | \$95.30 | \$104.90 |
| 31/64 | 1-1/2 | 4" | 6 | 15/32 | 40031 | \$103.50 | \$113.20 |
| 1/2 | 1-1/2 | 4" | 6 | 15/32 | 40032 | \$103.50 | \$113.20 |

Series 400 • Metric Sizes

| Diam | LOC | OAL | Flutes | Shank | EDP# | Price | Coated |
|--------|-----|-----|--------|--------|-------|----------|----------|
| 1.0mm | 12 | 38 | 4 | 0.7mm | 40050 | \$24.60 | \$26.50 |
| 1.5mm | 12 | 38 | 4 | 1.0mm | 40051 | \$26.10 | \$27.90 |
| 2.0mm | 12 | 51 | 4 | 1.5mm | 40052 | \$26.70 | \$28.50 |
| 2.5mm | 16 | 57 | 4 | 2.2mm | 40053 | \$29.40 | \$31.90 |
| 3.0mm | 16 | 57 | 4 | 2.5mm | 40054 | \$30.60 | \$33.00 |
| 3.5mm | 19 | 63 | 4 | 3.0mm | 40055 | \$33.70 | \$36.70 |
| 4.0mm | 19 | 63 | 4 | 3.5mm | 40056 | \$35.50 | \$38.60 |
| 4.5mm | 25 | 70 | 4 | 4.0mm | 40057 | \$41.70 | \$44.80 |
| 5.0mm | 25 | 76 | 6 | 4.5mm | 40058 | \$46.00 | \$50.30 |
| 5.5mm | 25 | 76 | 6 | 4.5mm | 40059 | \$46.00 | \$50.30 |
| 6.0mm | 25 | 76 | 6 | 5.0mm | 40060 | \$47.90 | \$52.40 |
| 6.5mm | 28 | 76 | 6 | 6.3mm | 40061 | \$53.60 | \$59.90 |
| 7.0mm | 28 | 82 | 6 | 6.3mm | 40062 | \$53.60 | \$59.90 |
| 7.5mm | 28 | 82 | 6 | 7.1mm | 40063 | \$62.20 | \$68.40 |
| 8.0mm | 28 | 82 | 6 | 7.1mm | 40064 | \$62.20 | \$68.40 |
| 8.5mm | 32 | 89 | 6 | 7.1mm | 40065 | \$69.60 | \$76.70 |
| 9.0mm | 32 | 89 | 6 | 8.0mm | 40066 | \$77.80 | \$85.00 |
| 9.5mm | 32 | 89 | 6 | 8.0mm | 40067 | \$77.80 | \$85.00 |
| 10.0mm | 38 | 101 | 6 | 8.0mm | 40068 | \$86.80 | \$95.70 |
| 10.5mm | 38 | 101 | 6 | 10.0mm | 40069 | \$92.40 | \$101.30 |
| 11.0mm | 38 | 101 | 6 | 10.0mm | 40070 | \$92.40 | \$101.30 |
| 11.5mm | 38 | 101 | 6 | 10.0mm | 40071 | \$95.30 | \$104.90 |
| 12.0mm | 38 | 101 | 6 | 10.0mm | 40072 | \$95.30 | \$104.90 |
| 12.5mm | 38 | 101 | 6 | 10.0mm | 40073 | \$103.50 | \$113.20 |

Series 450 • Fractional Sizes
 Long Length • Straight Flute • RH Cut
 Steel Shank w/Carbide Head
ULTRATOOL®
Made in the USA

| Diam | LOC | OAL | Flutes | Shank | EDP# | Price | Coated |
|--------|-------|-------|--------|-------|-------|----------|----------|
| 1/8* | 7/8 | 3-1/2 | 4 | 7/64 | 45008 | \$34.00 | \$37.10 |
| 9/64* | 7/8 | 4" | 4 | 1/8 | 45009 | \$37.10 | \$41.00 |
| 5/32* | 1" | 4" | 4 | 9/64 | 45010 | \$40.00 | \$43.90 |
| 11/64* | 1" | 4-1/2 | 4 | 5/32 | 45011 | \$43.90 | \$47.80 |
| 3/16* | 1" | 4-1/2 | 4 | 11/64 | 45012 | \$46.00 | \$49.90 |
| 13/64 | 1-1/4 | 5" | 6 | 3/16 | 45013 | \$51.60 | \$58.50 |
| 7/32 | 1-1/4 | 5" | 6 | 3/16 | 45014 | \$51.60 | \$58.50 |
| 15/64 | 1-1/4 | 6" | 6 | 7/32 | 45015 | \$53.00 | \$60.00 |
| 1/4 | 1-1/4 | 6" | 6 | 7/32 | 45016 | \$53.00 | \$60.00 |
| 17/64 | 1-1/4 | 6" | 6 | 15/64 | 45017 | \$58.60 | \$67.70 |
| 9/32 | 1-1/4 | 6" | 6 | 15/64 | 45018 | \$58.60 | \$67.70 |
| 19/64 | 1-1/2 | 6" | 6 | 1/4 | 45019 | \$64.90 | \$74.10 |
| 5/16 | 1-1/2 | 6" | 6 | 1/4 | 45020 | \$64.90 | \$74.10 |
| 21/64 | 1-1/2 | 6" | 6 | 19/64 | 45021 | \$76.10 | \$86.80 |
| 11/32 | 1-1/2 | 6" | 6 | 19/64 | 45022 | \$76.10 | \$86.80 |
| 23/64 | 1-1/2 | 7" | 6 | 5/16 | 45023 | \$82.60 | \$95.20 |
| 3/8 | 1-1/2 | 7" | 6 | 5/16 | 45024 | \$82.60 | \$95.20 |
| 25/64 | 1-3/4 | 7" | 6 | 11/32 | 45025 | \$92.40 | \$109.80 |
| 13/32 | 1-3/4 | 7" | 6 | 11/32 | 45026 | \$92.40 | \$109.80 |
| 27/64 | 1-3/4 | 7" | 6 | 3/8 | 45027 | \$98.00 | \$115.40 |
| 7/16 | 1-3/4 | 7" | 6 | 3/8 | 45028 | \$98.00 | \$115.40 |
| 29/64 | 1-3/4 | 8" | 6 | 13/32 | 45029 | \$103.50 | \$125.00 |
| 15/32 | 1-3/4 | 8" | 6 | 13/32 | 45030 | \$103.50 | \$125.00 |
| 31/64 | 1-3/4 | 8" | 6 | 7/16 | 45031 | \$110.60 | \$132.00 |
| 1/2 | 1-3/4 | 8" | 6 | 7/16 | 45032 | \$110.60 | \$132.00 |
| 9/16 | 1-7/8 | 9" | 6 | 31/64 | 45034 | \$121.90 | \$148.00 |
| 5/8 | 1-7/8 | 9" | 6 | 17/32 | 45036 | \$136.00 | \$162.90 |
| 11/16 | 2" | 9-1/2 | 6 | 9/16 | 45038 | \$166.30 | \$195.50 |
| 3/4 | 2" | 9-1/2 | 6 | 5/8 | 45040 | \$195.70 | \$224.80 |
| 7/8 | 2" | 10" | 8 | 3/4 | 45044 | \$247.80 | \$283.80 |
| 1" | 2" | 10" | 8 | 3/4 | 45048 | \$297.40 | \$333.60 |

Series 450 • Metric Sizes

| Diam | LOC | OAL | Flutes | Shank | EDP# | Price | Price |
|--------|-----|-----|--------|--------|-------|----------|----------|
| 3.0mm* | 22 | 89 | 4 | 2.5mm | 45049 | \$34.00 | \$37.10 |
| 4.0mm* | 25 | 101 | 4 | 3.5mm | 45050 | \$40.00 | \$43.90 |
| 5.0mm | 32 | 127 | 6 | 4.5mm | 45051 | \$51.60 | \$58.50 |
| 6.0mm | 32 | 152 | 6 | 5.5mm | 45052 | \$53.00 | \$60.00 |
| 7.0mm | 32 | 152 | 6 | 6.0mm | 45053 | \$58.60 | \$67.70 |
| 8.0mm | 38 | 152 | 6 | 6.0mm | 45054 | \$64.90 | \$74.10 |
| 9.0mm | 38 | 178 | 6 | 8.0mm | 45055 | \$82.60 | \$95.20 |
| 10.0mm | 44 | 178 | 6 | 8.0mm | 45056 | \$92.40 | \$109.80 |
| 11.0mm | 44 | 178 | 6 | 9.5mm | 45057 | \$92.40 | \$109.80 |
| 12.0mm | 44 | 203 | 6 | 10.0mm | 45058 | \$103.50 | \$125.00 |
| 14.0mm | 47 | 228 | 6 | 12.0mm | 45059 | \$121.90 | \$148.00 |
| 16.0mm | 47 | 228 | 6 | 13.5mm | 45060 | \$136.00 | \$162.90 |
| 18.0mm | 50 | 241 | 6 | 15.0mm | 45061 | \$195.70 | \$224.80 |
| 20.0mm | 50 | 254 | 8 | 18.0mm | 45062 | \$242.80 | \$278.80 |
| 25.0mm | 50 | 254 | 8 | 18.0mm | 45063 | \$297.40 | \$333.60 |

*Solid Carbide, one-piece construction



Reamer Specs: 45° Lead
 Cutting Diam +0.002/-0.000
 Shank Diam +0.005/-0.005



Reamer Specs (Metric): 45° Lead
 Cutting Diam +0.005/-0.000mm
 Shank Diam +0.013/-0.013mm

new!

Available with
TA coating!

ULTRATOOL® Spotting Drills

Series 525

Short Length • 25° RH Helix

82° • 90° • 120° • 140° • 150° included angles
Four Facet Point • Constant Web • No OD Clearance • Produces True Centers

new!

Additional sizes and included angles!



Drill Specifications:
Diameter +0.000/-0.003
Point Angle ±1°

Series 525
Metric Sizes

Drill Specifications (mm):
Diameter +0.000/-0.008mm
Point Angle ±1°

| Diam | LOF | OAL | 82° EDP# | 90° EDP# | 120° EDP# | 140° EDP# | 150° EDP# | UnCoated Price | Coated Price |
|------|-------|-------|-------------|-------------|--------------|--------------|--------------|-------------------|-----------------|
| 1/8 | 1/2 | 2" | 52135 | 52580 | 52581 | 52582 | 52143 | \$10.50 | \$12.30 |
| 3/16 | 5/8 | 2" | 52136 | 52585 | 52586 | 52587 | 52144 | \$13.10 | \$15.30 |
| 1/4 | 3/4 | 2-1/2 | 52137 | 52516 | 52515 | 52514 | 52145 | \$16.20 | \$20.30 |
| 5/16 | 3/4 | 2-1/2 | 52138 | 52590 | 52591 | 52592 | 52146 | \$21.60 | \$26.60 |
| 3/8 | 1" | 2-1/2 | 52139 | 52524 | 52525 | 52526 | 52147 | \$23.40 | \$28.70 |
| 1/2 | 1" | 3" | 52140 | 52532 | 52533 | 52534 | 52148 | \$40.40 | \$47.50 |
| 5/8 | 1-1/4 | 3-1/2 | 52141 | 52540 | 52541 | 52542 | 52149 | \$77.30 | \$88.30 |
| 3/4 | 1-1/2 | 4" | 52142 | 52548 | 52549 | 52550 | 52150 | \$122.30 | \$135.30 |

| Diam | LOF | OAL | 82° EDP# | 90° EDP# | 120° EDP# | 140° EDP# | 150° EDP# | UnCoated Price | Coated Price |
|--------|-----|-----|-------------|-------------|--------------|--------------|--------------|-------------------|-----------------|
| 3.0mm | 12 | 57 | 52151 | 52588 | 52589 | 52594 | 52159 | \$10.50 | \$12.30 |
| 5.0mm | 16 | 63 | 52152 | 52595 | 52596 | 52593 | 52160 | \$13.10 | \$15.30 |
| 6.0mm | 19 | 63 | 52153 | 52506 | 52507 | 52505 | 52161 | \$16.20 | \$20.30 |
| 8.0mm | 19 | 63 | 52154 | 52508 | 52509 | 52504 | 52162 | \$23.40 | \$28.70 |
| 10.0mm | 25 | 70 | 52155 | 52510 | 52511 | 52503 | 52163 | \$36.80 | \$43.70 |
| 12.0mm | 25 | 74 | 52156 | 52512 | 52513 | 52502 | 52164 | \$40.40 | \$47.50 |
| 16.0mm | 32 | 89 | 52157 | 52517 | 52518 | 52519 | 52165 | \$77.30 | \$88.30 |
| 20.0mm | 38 | 100 | 52158 | 52521 | 52522 | 52523 | 52166 | \$122.30 | \$135.30 |

Now Ultra-Tool offers 5 different angles of dedicated spotting drills. For true spot drilling, use a 525 with an angle slightly larger than the following finishing drill. The 525 Series can also be used for countersinking and is typically faster than traditional center drilling applications.

Combined Drill & Countersink Center Drills by ULTRATOOL®

Series 560

Combined Drill & Countersink
Double End • 60°/82°/90° Incl. Angle • RH Cut

The solid carbide Ultra-Tool® Series 560 Combined Drill & Countersink is the high-productivity alternative to equivalent HSS centerdrilling designs, featuring a slight helix for great chip evacuation. Available in 3 different angles.



| Tool | Body Diam | Drill Diam | OAL | 60° | 82° | 90° | UnCoated Price | Coated Price |
|------|-----------|------------|-------|-------|-------|-------|----------------|--------------|
| #00 | 1/8 | .025 | 1-1/2 | 56099 | 56199 | 56299 | \$13.70 | \$16.30 |
| #0 | 1/8 | 1/32 | 1-1/2 | 56000 | 56100 | 56200 | \$12.90 | \$15.50 |
| #1 | 1/8 | 3/64 | 1-1/2 | 56001 | 56101 | 56201 | \$12.10 | \$14.70 |
| #2 | 3/16 | 5/64 | 2" | 56002 | 56102 | 56202 | \$18.90 | \$22.10 |
| #3 | 1/4 | 7/64 | 2" | 56003 | 56103 | 56203 | \$21.20 | \$26.20 |
| #4 | 5/16 | 1/8 | 2-1/2 | 56004 | 56104 | 56204 | \$31.30 | \$37.80 |
| #5 | 7/16 | 3/16 | 2-3/4 | 56005 | 56105 | 56205 | \$45.60 | \$55.60 |
| #6 | 1/2 | 7/32 | 3" | 56006 | 56106 | 56206 | \$61.50 | \$72.00 |
| #7 | 5/8 | 1/4 | 3-1/2 | 56007 | 56107 | 56207 | \$100.70 | \$117.20 |
| #8 | 3/4 | 5/16 | 4" | 56008 | 56108 | 56208 | \$129.30 | \$148.80 |

The 560L is also solid carbide, double-ended, and features an extended overall length for reach applications. Choose from 3 different countersinking angle and either UnCoated or our standard SmoothCoat PVD hardcoatings.



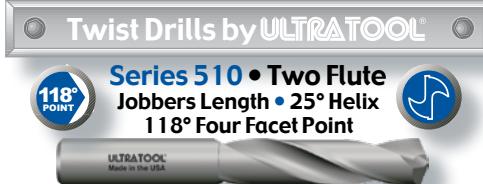
Series 560L

Long Length Combined Drill & Countersink
Double End • 60°/82°/90° Incl. Angle • RH Cut

Center Drill Specifications:
Body Diameter +0.000/-0.003
Drill Diameter +.003/.000
Point/C'sink Angle ±1°



| Tool | Body Diam | Drill Diam | OAL | 60° | 82° | 90° | UnCoated Price | Coated Price |
|------|-----------|------------|-----|-------|-------|-------|----------------|--------------|
| #00L | 1/8 | .025 | 4" | 55399 | 55199 | 55299 | \$19.30 | \$23.30 |
| #0L | 1/8 | 1/32 | 4" | 55300 | 55100 | 55200 | \$18.10 | \$22.10 |
| #1L | 1/8 | 3/64 | 4" | 55301 | 55101 | 55201 | \$17.00 | \$21.00 |
| #2L | 3/16 | 5/64 | 4" | 55302 | 55102 | 55202 | \$25.80 | \$30.70 |
| #3L | 1/4 | 7/64 | 4" | 55303 | 55103 | 55203 | \$30.10 | \$37.00 |
| #4L | 5/16 | 1/8 | 6" | 55304 | 55104 | 55204 | \$45.50 | \$57.40 |
| #5L | 7/16 | 3/16 | 6" | 55305 | 55105 | 55205 | \$66.60 | \$82.50 |
| #6L | 1/2 | 7/32 | 6" | 55306 | 55106 | 55206 | \$89.50 | \$106.60 |
| #7L | 5/8 | 1/4 | 6" | 55307 | 55107 | 55207 | \$141.10 | \$163.20 |
| #8L | 3/4 | 5/16 | 6" | 55308 | 55108 | 55208 | \$178.60 | \$204.50 |



Fractional

| Diam | LOF | OAL | EDP# | UnCoated Price | Coated Price |
|-------|-------|-------|-------|----------------|--------------|
| 1/64 | 1/4 | 1-1/4 | 51001 | \$15.20 | \$17.20 |
| 1/32 | 5/16 | 1-1/4 | 51002 | \$9.80 | \$11.20 |
| 3/64 | 3/4 | 1-1/2 | 51003 | \$9.80 | \$11.20 |
| 1/16 | 3/4 | 1-1/2 | 51004 | \$9.40 | \$10.80 |
| 5/64 | 7/8 | 1-3/4 | 51005 | \$9.70 | \$11.20 |
| 3/32 | 1" | 2" | 51006 | \$10.00 | \$11.40 |
| 7/64 | 1-1/4 | 2-1/4 | 51007 | \$11.20 | \$13.10 |
| 1/8 | 1-1/4 | 2-1/4 | 51008 | \$11.40 | \$13.40 |
| 9/64 | 1-3/8 | 2-1/2 | 51009 | \$13.00 | \$15.50 |
| 5/32 | 1-3/8 | 2-1/2 | 51010 | \$15.00 | \$17.50 |
| 11/64 | 1-5/8 | 2-3/4 | 51011 | \$16.60 | \$19.20 |
| 3/16 | 1-5/8 | 2-3/4 | 51012 | \$16.80 | \$19.30 |
| 13/64 | 1-3/4 | 3" | 51013 | \$19.80 | \$23.30 |
| 7/32 | 1-3/4 | 3" | 51014 | \$21.90 | \$25.50 |
| 15/64 | 2" | 3-1/4 | 51015 | \$23.60 | \$28.20 |
| 1/4 | 2" | 3-1/4 | 51016 | \$25.10 | \$29.80 |
| 17/64 | 2-1/8 | 3-1/2 | 51017 | \$29.30 | \$34.70 |
| 9/32 | 2-1/8 | 3-1/2 | 51018 | \$32.10 | \$37.50 |
| 19/64 | 2-3/8 | 3-3/4 | 51019 | \$34.20 | \$39.60 |
| 5/16 | 2-3/8 | 3-3/4 | 51020 | \$36.70 | \$42.10 |
| 21/64 | 2-1/2 | 4" | 51021 | \$39.50 | \$45.40 |
| 11/32 | 2-1/2 | 4" | 51022 | \$43.50 | \$49.40 |
| 23/64 | 2-3/4 | 4-1/4 | 51023 | \$48.20 | \$57.80 |
| 3/8 | 2-3/4 | 4-1/4 | 51024 | \$47.60 | \$57.20 |
| 25/64 | 2-7/8 | 4-1/2 | 51025 | \$60.70 | \$70.90 |
| 13/32 | 2-7/8 | 4-1/2 | 51026 | \$65.10 | \$75.20 |
| 27/64 | 2-7/8 | 4-1/2 | 51027 | \$71.40 | \$81.50 |
| 7/16 | 2-7/8 | 4-1/2 | 51028 | \$76.20 | \$87.10 |
| 29/64 | 3" | 4-3/4 | 51029 | \$83.40 | \$95.20 |
| 15/32 | 3" | 4-3/4 | 51030 | \$88.00 | \$99.80 |
| 31/64 | 3" | 4-3/4 | 51031 | \$91.90 | \$103.70 |
| 1/2 | 3" | 4-3/4 | 51032 | \$87.90 | \$99.70 |
| 17/32 | 4" | 6" | 51033 | \$142.30 | \$157.70 |
| 9/16 | 4" | 6" | 51034 | \$152.80 | \$168.20 |
| 19/32 | 4" | 6" | 51035 | \$175.40 | \$192.60 |
| 5/8 | 4" | 6" | 51036 | \$177.50 | \$194.60 |
| 21/32 | 4" | 6" | 51037 | \$200.70 | \$220.70 |
| 11/16 | 4" | 6" | 51038 | \$204.10 | \$224.10 |
| 3/4 | 4" | 6" | 51039 | \$238.20 | \$258.20 |
| 13/16 | 4" | 6" | 51181 | \$325.50 | \$348.40 |
| 7/8 | 4" | 6" | 51182 | \$345.00 | \$368.00 |
| 15/16 | 4" | 6" | 51183 | \$349.00 | \$371.90 |
| 1" | 4" | 6" | 51184 | \$320.50 | \$346.60 |

Wire Gage

| Diam | LOF | OAL | EDP# | UnCoated Price | Coated Price |
|------|-------|-------|-------|----------------|--------------|
| 1 | 1-3/4 | 3-1/4 | 51101 | \$24.50 | \$29.10 |
| 2 | 1-3/4 | 3" | 51102 | \$23.30 | \$26.90 |
| 3 | 1-3/4 | 3" | 51103 | \$21.90 | \$25.50 |
| 4 | 1-3/4 | 3" | 51104 | \$21.40 | \$25.00 |
| 5 | 1-3/4 | 3" | 51105 | \$20.90 | \$24.50 |
| 6 | 1-3/4 | 3" | 51106 | \$20.80 | \$24.30 |
| 7 | 1-3/4 | 3" | 51107 | \$19.90 | \$23.40 |
| 8 | 1-3/4 | 3" | 51108 | \$19.60 | \$23.20 |
| 9 | 1-3/4 | 3" | 51109 | \$19.20 | \$22.80 |
| 10 | 1-5/8 | 2-3/4 | 51110 | \$18.70 | \$22.30 |
| 11 | 1-5/8 | 2-3/4 | 51111 | \$18.60 | \$22.20 |
| 12 | 1-5/8 | 2-3/4 | 51112 | \$18.40 | \$21.90 |
| 13 | 1-5/8 | 2-3/4 | 51113 | \$17.90 | \$20.50 |

| | | | | | |
|----|-------|-------|-------|---------|---------|
| 14 | 1-5/8 | 2-3/4 | 51114 | \$17.80 | \$20.30 |
| 15 | 1-5/8 | 2-3/4 | 51115 | \$17.70 | \$20.20 |
| 16 | 1-5/8 | 2-3/4 | 51116 | \$17.50 | \$20.00 |
| 17 | 1-5/8 | 2-3/4 | 51117 | \$17.20 | \$19.80 |
| 18 | 1-5/8 | 2-3/4 | 51118 | \$16.90 | \$19.30 |
| 19 | 1-5/8 | 2-3/4 | 51119 | \$16.80 | \$19.30 |
| 20 | 1-3/8 | 2-1/2 | 51120 | \$16.40 | \$18.80 |
| 21 | 1-3/8 | 2-1/2 | 51121 | \$16.00 | \$18.50 |
| 22 | 1-3/8 | 2-1/2 | 51122 | \$15.90 | \$18.40 |
| 23 | 1-3/8 | 2-1/2 | 51123 | \$15.30 | \$17.80 |
| 24 | 1-3/8 | 2-1/2 | 51124 | \$14.80 | \$17.30 |
| 25 | 1-3/8 | 2-1/2 | 51125 | \$14.20 | \$16.70 |
| 26 | 1-3/8 | 2-1/2 | 51126 | \$14.00 | \$16.50 |
| 27 | 1-3/8 | 2-1/2 | 51127 | \$14.00 | \$16.50 |
| 28 | 1-3/8 | 2-1/2 | 51128 | \$13.60 | \$16.10 |
| 29 | 1-3/8 | 2-1/2 | 51129 | \$13.30 | \$15.80 |
| 30 | 1-3/8 | 2-1/2 | 51130 | \$12.40 | \$15.30 |
| 31 | 1-1/4 | 2-1/4 | 51131 | \$12.30 | \$14.60 |
| 32 | 1-1/4 | 2-1/4 | 51132 | \$12.00 | \$14.30 |
| 33 | 1-1/4 | 2-1/4 | 51133 | \$11.80 | \$14.00 |
| 34 | 1-1/4 | 2-1/4 | 51134 | \$11.80 | \$14.00 |
| 35 | 1-1/4 | 2-1/4 | 51135 | \$11.50 | \$13.80 |
| 36 | 1-1/4 | 2-1/4 | 51136 | \$11.40 | \$13.60 |
| 37 | 1-1/4 | 2-1/4 | 51137 | \$11.40 | \$13.60 |
| 38 | 1-1/4 | 2-1/4 | 51138 | \$11.40 | \$13.60 |
| 39 | 1-1/4 | 2-1/4 | 51139 | \$11.40 | \$13.60 |
| 40 | 1" | 2" | 51140 | \$10.70 | \$12.70 |
| 41 | 1" | 2" | 51141 | \$10.20 | \$11.90 |
| 42 | 1" | 2" | 51142 | \$10.20 | \$11.90 |
| 43 | 1" | 2" | 51143 | \$9.90 | \$11.70 |
| 44 | 1" | 2" | 51144 | \$9.90 | \$11.70 |
| 45 | 7/8 | 1-3/4 | 51145 | \$9.90 | \$11.70 |
| 46 | 7/8 | 1-3/4 | 51146 | \$9.90 | \$11.70 |
| 47 | 7/8 | 1-3/4 | 51147 | \$9.90 | \$11.70 |
| 48 | 7/8 | 1-3/4 | 51148 | \$9.70 | \$11.50 |
| 49 | 7/8 | 1-3/4 | 51149 | \$9.70 | \$11.50 |
| 50 | 7/8 | 1-3/4 | 51150 | \$10.00 | \$11.70 |
| 51 | 3/4 | 1-3/4 | 51151 | \$10.00 | \$11.50 |
| 52 | 3/4 | 1-1/2 | 51152 | \$10.00 | \$11.50 |
| 53 | 3/4 | 1-1/2 | 51153 | \$9.90 | \$11.30 |
| 54 | 3/4 | 1-1/2 | 51154 | \$9.90 | \$11.30 |
| 55 | 3/4 | 1-1/2 | 51155 | \$9.80 | \$11.20 |
| 56 | 3/4 | 1-1/2 | 51156 | \$9.80 | \$11.20 |
| 57 | 3/4 | 1-1/2 | 51157 | \$9.80 | \$11.20 |
| 58 | 3/4 | 1-1/2 | 51158 | \$9.80 | \$11.20 |
| 59 | 3/4 | 1-1/2 | 51159 | \$9.80 | \$11.20 |
| 60 | 3/4 | 1-1/2 | 51160 | \$9.80 | \$11.20 |
| 61 | 5/8 | 1-1/2 | 51161 | \$10.20 | \$11.50 |
| 62 | 5/8 | 1-1/2 | 51162 | \$10.40 | \$11.70 |
| 63 | 5/8 | 1-1/2 | 51163 | \$10.40 | \$11.70 |
| 64 | 5/8 | 1-1/2 | 51164 | \$10.40 | \$11.70 |
| 65 | 5/8 | 1-1/2 | 51165 | \$10.70 | \$12.00 |
| 66 | 5/16 | 1-1/4 | 51166 | \$10.70 | \$12.00 |
| 67 | 5/16 | 1-1/4 | 51167 | \$10.70 | \$12.00 |
| 68 | 5/16 | 1-1/4 | 51168 | \$10.70 | \$12.00 |
| 69 | 5/16 | 1-1/4 | 51169 | \$11.10 | \$12.50 |
| 70 | 5/16 | 1-1/4 | 51170 | \$13.80 | \$15.70 |
| 71 | 5/16 | 1-1/4 | 51171 | \$14.10 | \$16.00 |
| 72 | 5/16 | 1-1/4 | 51172 | \$14.10 | \$16.00 |
| 73 | 1/4 | 1-1/4 | 51173 | \$14.70 | \$16.70 |
| 74 | 1/4 | 1-1/4 | 51174 | \$14.70 | \$16.70 |
| 75 | 1/4 | 1-1/4 | 51175 | \$14.70 | \$16.70 |
| 76 | 1/4 | 1-1/4 | 51176 | \$14.70 | \$16.70 |
| 77 | 1/4 | 1-1/4 | 51177 | \$14.70 | \$16.70 |
| 78 | 1/4 | 1-1/4 | 51178 | \$15.20 | \$17.20 |
| 79 | 1/4 | 1-1/4 | 51179 | \$15.20 | \$17.20 |
| 80 | 1/4 | 1-1/4 | 51180 | \$15.20 | \$17.20 |

Letter Sizes

| Series 510 | Diam | LOF | OAL | EDP# | UnCoated Price | Coated Price |
|------------|-------|-------|-----|-------|----------------|--------------|
| A | 2" | 3-1/4 | | 51041 | \$26.30 | \$30.40 |
| B | 2" | 3-1/4 | | 51042 | \$26.60 | \$30.70 |
| C | 2" | 3-1/4 | | 51043 | \$27.20 | \$31.30 |
| D | 2" | 3-1/4 | | 51044 | \$27.80 | \$31.90 |
| E | 2" | 3-1/4 | | 51045 | \$28.70 | \$32.80 |
| F | 2" | 3-1/2 | | 51046 | \$30.50 | \$35.90 |
| G | 2-1/8 | 3-1/2 | | 51047 | \$30.50 | \$35.90 |
| H | 2-1/8 | 3-1/2 | | 51048 | \$31.70 | \$37.00 |
| I | 2-1/8 | 3-1/2 | | 51049 | \$32.20 | \$37.60 |
| J | 2-1/8 | 3-1/2 | | 51050 | \$33.10 | \$38.40 |
| K | 2-1/8 | 3-1/2 | | 51051 | \$33.20 | \$38.60 |
| L | 2-1/8 | 3-1/2 | | 51052 | \$34.40 | \$39.70 |
| M | 2-3/8 | 3-3/4 | | 51053 | \$35.30 | \$40.70 |
| N | 2-3/8 | 3-3/4 | | 51054 | \$37.90 | \$43.30 |
| O | 2-3/8 | 3-3/4 | | 51055 | \$40.00 | \$45.90 |
| P | 2-3/8 | 4" | | 51056 | \$40.60 | \$46.50 |
| Q | 2-1/2 | 4" | | 51085 | \$43.70 | \$49.50 |
| R | 2-1/2 | 4" | | 51086 | \$44.50 | \$50.40 |
| S | 2-1/2 | 4" | | 51087 | \$47.00 | \$52.90 |
| T | 2-3/4 | 4-1/4 | | 51088 | \$49.40 | \$59.00 |
| U | 2-3/4 | 4-1/4 | | 51089 | \$51.70 | \$61.30 |
| V | 2-3/4 | 4-1/4 | | 51090 | \$54.60 | \$65.80 |
| W | 2-7/8 | 4-1/2 | | 51057 | \$54.60 | \$65.80 |
| X | 2-7/8 | 4-1/2 | | 51058 | \$63.60 | \$74.70 |
| Y | 2-7/8 | 4-1/2 | | 51059 | \$63.60 | \$74.70 |
| Z | 2-7/8 | 4-1/2 | | 51060 | \$70.50 | \$81.80 |

Metric

| Series 510 | Diam | LOF | OAL | EDP# | UnCoated Price | Coated Price |
|------------|------|-----|-----|-------|----------------|--------------|
| 1.0mm | 13 | 38 | | 51061 | \$9.10 | \$10.90 |
| 1.5mm | 19 | 38 | | 51062 | \$8.80 | \$10.60 |
| 2.0mm | 22 | 44 | | 51063 | \$9.10 | \$11.00 |
| 2.5mm | 25 | 50 | | 51064 | \$9.90 | \$11.80 |
| 3.0mm | 32 | 57 | | 51065 | \$11.30 | \$13.80 |
| 3.5mm | 35 | 63 | | 51066 | \$12.40 | \$15.40 |
| 4.0mm | 35 | 63 | | 51067 | \$14.80 | \$17.80 |
| 4.5mm | 41 | 70 | | 51068 | \$16.50 | \$19.40 |
| 5.0mm | 44 | 76 | | 51069 | \$18.30 | \$22.40 |
| 5.5mm | 44 | 76 | | 51070 | \$20.80 | \$24.90 |
| 6.0mm | 50 | 82 | | 51071 | \$23.80 | \$28.90 |
| 6.5mm | 50 | 82 | </ | | | |

ULTRATOOL® Brad Point Drills**Series 510BR • Two Flute**Jobbers Length • 25° Helix w/ 140° Brad Point
for wood, plastics, composites, fiberglass**Fractional**

| Diam | LOF | OAL | EDP# | UnCoated Price | D1 Coated |
|-------|-------|-------|-------|----------------|-----------|
| 3/64 | 3/4 | 1-1/2 | 51203 | \$11.50 | \$15.90 |
| 1/16 | 3/4 | 1-1/2 | 51204 | \$11.50 | \$15.90 |
| 5/64 | 7/8 | 1-3/4 | 51205 | \$11.70 | \$16.20 |
| 3/32 | 1" | 2" | 51206 | \$12.10 | \$16.60 |
| 7/64 | 1-1/4 | 2-1/4 | 51207 | \$13.60 | \$18.90 |
| 1/8 | 1-1/4 | 2-1/4 | 51208 | \$14.00 | \$19.30 |
| 9/64 | 1-3/8 | 2-1/2 | 51209 | \$16.00 | \$21.90 |
| 5/32 | 1-3/8 | 2-1/2 | 51210 | \$18.60 | \$24.50 |
| 11/64 | 1-5/8 | 2-3/4 | 51211 | \$20.70 | \$26.60 |
| 3/16 | 1-5/8 | 2-3/4 | 51212 | \$20.90 | \$26.80 |
| 13/64 | 1-3/4 | 3" | 51213 | \$24.90 | \$33.70 |
| 7/32 | 1-3/4 | 3" | 51214 | \$27.60 | \$36.40 |
| 15/64 | 2" | 3-1/4 | 51215 | \$29.90 | \$38.70 |
| 1/4 | 2" | 3-1/4 | 51216 | \$31.80 | \$40.60 |
| 17/64 | 2-1/8 | 3-1/2 | 51217 | \$36.60 | \$46.90 |
| 9/32 | 2-1/8 | 3-1/2 | 51218 | \$40.10 | \$50.40 |
| 19/64 | 2-3/8 | 3-3/4 | 51219 | \$42.70 | \$53.60 |
| 5/16 | 2-3/8 | 3-3/4 | 51220 | \$46.10 | \$56.50 |
| 21/64 | 2-1/2 | 4" | 51221 | \$49.60 | \$63.40 |
| 11/32 | 2-1/2 | 4" | 51222 | \$54.90 | \$68.70 |
| 23/64 | 2-3/4 | 4-1/4 | 51223 | \$61.00 | \$74.80 |
| 3/8 | 2-3/4 | 4-1/4 | 51224 | \$60.10 | \$73.90 |
| 25/64 | 2-7/8 | 4-1/2 | 51225 | \$75.70 | \$92.90 |
| 13/32 | 2-7/8 | 4-1/2 | 51226 | \$81.40 | \$98.60 |
| 27/64 | 2-7/8 | 4-1/2 | 51227 | \$89.60 | \$106.80 |
| 7/16 | 2-7/8 | 4-1/2 | 51228 | \$95.60 | \$112.80 |
| 29/64 | 3" | 4-3/4 | 51229 | \$105.00 | \$127.90 |
| 15/32 | 3" | 4-3/4 | 51230 | \$111.10 | \$134.00 |
| 31/64 | 3" | 4-3/4 | 51231 | \$116.20 | \$139.10 |
| 1/2 | 3" | 4-3/4 | 51232 | \$113.00 | \$135.90 |
| 17/32 | 4" | 6" | 51233 | \$171.30 | \$202.80 |
| 9/16 | 4" | 6" | 51234 | \$183.80 | \$215.30 |
| 19/32 | 4" | 6" | 51235 | \$211.20 | \$242.70 |
| 5/8 | 4" | 6" | 51236 | \$213.60 | \$245.10 |
| 21/32 | 4" | 6" | 51237 | \$241.60 | \$281.60 |
| 11/16 | 4" | 6" | 51238 | \$245.80 | \$285.90 |
| 3/4 | 4" | 6" | 51239 | \$286.60 | \$326.70 |
| 13/16 | 4" | 6" | 51291 | \$391.60 | \$437.40 |
| 7/8 | 4" | 6" | 51292 | \$415.30 | \$461.10 |
| 15/16 | 4" | 6" | 51293 | \$420.00 | \$471.50 |
| 1" | 4" | 6" | 51294 | \$415.40 | \$466.90 |

Ultra's D1 PVD Diamond coating is the perfect compliment for drilling abrasive and soft materials with our special brad style point. The smoothness of our sputter based process helps evacuate the material up and out of the hole with superb lubricity. The hardness of D1's multi-layered surface lends outstanding wear characteristics when making holes in the types of material for which the brad point is designed. Add D1 as a suffix to the EDP #.

**Series 510BR • Wire Gage**

| Diam | LOF | OAL | EDP# | UnCoated Price | D1 Coated |
|------|-------|-------|-------|----------------|-----------|
| 1 | 1-3/4 | 3-1/4 | 51301 | \$30.20 | \$39.00 |
| 2 | 1-3/4 | 3" | 51302 | \$28.70 | \$37.50 |
| 3 | 1-3/4 | 3" | 51303 | \$26.90 | \$35.70 |
| 4 | 1-3/4 | 3" | 51304 | \$26.30 | \$35.10 |
| 5 | 1-3/4 | 3" | 51305 | \$25.50 | \$34.30 |
| 6 | 1-3/4 | 3" | 51306 | \$25.30 | \$34.10 |
| 7 | 1-3/4 | 3" | 51307 | \$24.20 | \$33.00 |
| 8 | 1-3/4 | 3" | 51308 | \$23.80 | \$32.60 |
| 9 | 1-3/4 | 3" | 51309 | \$23.20 | \$32.00 |
| 10 | 1-5/8 | 2-3/4 | 51310 | \$22.70 | \$31.50 |
| 11 | 1-5/8 | 2-3/4 | 51311 | \$22.60 | \$31.40 |
| 12 | 1-5/8 | 2-3/4 | 51312 | \$22.30 | \$31.10 |
| 13 | 1-5/8 | 2-3/4 | 51313 | \$21.60 | \$29.80 |
| 14 | 1-5/8 | 2-3/4 | 51314 | \$21.50 | \$29.70 |
| 15 | 1-5/8 | 2-3/4 | 51315 | \$21.30 | \$29.50 |
| 16 | 1-5/8 | 2-3/4 | 51316 | \$21.10 | \$29.30 |
| 17 | 1-5/8 | 2-3/4 | 51317 | \$20.90 | \$29.10 |
| 18 | 1-5/8 | 2-3/4 | 51318 | \$20.40 | \$28.60 |
| 19 | 1-5/8 | 2-3/4 | 51319 | \$20.20 | \$28.40 |
| 20 | 1-3/8 | 2-1/2 | 51320 | \$19.60 | \$27.80 |
| 21 | 1-3/8 | 2-1/2 | 51321 | \$19.30 | \$27.50 |
| 22 | 1-3/8 | 2-1/2 | 51322 | \$19.20 | \$27.40 |
| 23 | 1-3/8 | 2-1/2 | 51323 | \$18.40 | \$26.60 |
| 24 | 1-3/8 | 2-1/2 | 51324 | \$17.50 | \$25.70 |
| 25 | 1-3/8 | 2-1/2 | 51325 | \$17.10 | \$25.30 |
| 26 | 1-3/8 | 2-1/2 | 51326 | \$16.70 | \$24.90 |
| 27 | 1-3/8 | 2-1/2 | 51327 | \$16.70 | \$24.90 |
| 28 | 1-3/8 | 2-1/2 | 51328 | \$16.00 | \$24.20 |
| 29 | 1-3/8 | 2-1/2 | 51329 | \$15.80 | \$24.00 |
| 30 | 1-3/8 | 2-1/4 | 51330 | \$15.10 | \$23.30 |
| 31 | 1-1/4 | 2-1/4 | 51331 | \$14.80 | \$20.80 |
| 32 | 1-1/4 | 2-1/4 | 51332 | \$14.60 | \$20.50 |
| 33 | 1-1/4 | 2-1/4 | 51333 | \$14.10 | \$20.00 |
| 34 | 1-1/4 | 2-1/4 | 51334 | \$14.10 | \$20.00 |
| 35 | 1-1/4 | 2-1/4 | 51335 | \$13.80 | \$19.80 |
| 36 | 1-1/4 | 2-1/4 | 51336 | \$13.60 | \$19.50 |
| 37 | 1-1/4 | 2-1/4 | 51337 | \$13.60 | \$19.50 |
| 38 | 1-1/4 | 2-1/4 | 51338 | \$13.60 | \$19.50 |
| 39 | 1-1/4 | 2-1/4 | 51339 | \$13.60 | \$19.50 |
| 40 | 1" | 2" | 51340 | \$12.80 | \$17.30 |
| 41 | 1" | 2" | 51341 | \$12.10 | \$16.60 |
| 42 | 1" | 2" | 51342 | \$12.10 | \$16.60 |
| 43 | 1" | 2" | 51343 | \$11.70 | \$16.20 |
| 44 | 1" | 2" | 51344 | \$11.70 | \$16.20 |
| 45 | 7/8 | 1-3/4 | 51345 | \$11.70 | \$16.20 |
| 46 | 7/8 | 1-3/4 | 51346 | \$11.70 | \$16.20 |
| 47 | 7/8 | 1-3/4 | 51347 | \$11.70 | \$16.20 |
| 48 | 7/8 | 1-3/4 | 51348 | \$11.50 | \$15.90 |
| 49 | 7/8 | 1-3/4 | 51349 | \$11.50 | \$15.90 |
| 50 | 7/8 | 1-3/4 | 51350 | \$11.50 | \$15.90 |
| 51 | 3/4 | 1-3/4 | 51351 | \$11.50 | \$15.90 |
| 52 | 3/4 | 1-1/2 | 51352 | \$11.50 | \$15.90 |
| 53 | 3/4 | 1-1/2 | 51353 | \$11.50 | \$15.90 |
| 54 | 3/4 | 1-1/2 | 51354 | \$11.50 | \$15.90 |
| 55 | 3/4 | 1-1/2 | 51355 | \$11.50 | \$15.90 |
| 56 | 3/4 | 1-1/2 | 51356 | \$11.50 | \$15.90 |
| 57 | 3/4 | 1-1/2 | 51357 | \$11.50 | \$15.90 |
| 58 | 3/4 | 1-1/2 | 51358 | \$11.50 | \$15.90 |
| 59 | 3/4 | 1-1/2 | 51359 | \$11.50 | \$15.90 |
| 60 | 3/4 | 1-1/2 | 51360 | \$11.50 | \$15.90 |

Series 510BR • Letter Sizes

| Diam | LOF | OAL | EDP# | UnCoated Price | D1 Coated |
|------|-------|-------|-------|----------------|-----------|
| A | 2" | 3-1/4 | 51241 | \$30.90 | \$39.70 |
| B | 2" | 3-1/4 | 51242 | \$31.40 | \$40.20 |
| C | 2" | 3-1/4 | 51243 | \$32.20 | \$41.00 |
| D | 2" | 3-1/4 | 51244 | \$32.90 | \$41.70 |
| E | 2" | 3-1/4 | 51245 | \$34.20 | \$43.00 |
| F | 2" | 3-1/2 | 51246 | \$36.60 | \$46.90 |
| G | 2-1/8 | 3-1/2 | 51247 | \$36.60 | \$46.90 |
| H | 2-1/8 | 3-1/2 | 51248 | \$38.00 | \$48.40 |
| I | 2-1/8 | 3-1/2 | 51249 | \$38.70 | \$49.10 |
| J | 2-1/8 | 3-1/2 | 51250 | \$39.90 | \$50.30 |
| K | 2-1/8 | 3-1/2 | 51251 | \$40.10 | \$50.40 |
| L | 2-1/8 | 3-1/2 | 51252 | \$41.50 | \$51.90 |
| M | 2-3/8 | 3-3/4 | 51253 | \$42.70 | \$53.10 |
| N | 2-3/8 | 3-3/4 | 51254 | \$46.10 | \$56.50 |
| O | 2-3/8 | 3-3/4 | 51255 | \$48.90 | \$62.70 |
| P | 2-3/8 | 4" | 51256 | \$49.60 | \$63.40 |
| Q | 2-1/2 | 4" | 51285 | \$53.60 | \$67.40 |
| R | 2-1/2 | 4" | 51286 | \$54.90 | \$68.70 |
| S | 2-1/2 | 4" | 51287 | \$57.80 | \$71.60 |
| T | 2-3/4 | 4-1/4 | 51288 | \$61.00 | \$74.80 |
| U | 2-3/4 | 4-1/4 | 51289 | \$64.10 | \$77.90 |
| V | 2-3/4 | 4-1/4 | 51290 | \$67.70 | \$84.90 |
| W | 2-7/8 | 4-1/2 | 51257 | \$67.70 | \$84.90 |
| X | 2-7/8 | 4-1/2 | 51258 | \$79.40 | \$96.60 |
| Y | 2-7/8 | 4-1/2 | 51259 | \$79.40 | \$96.60 |
| Z | 2-7/8 | 4-1/2 | 51260 | \$88.30 | \$105.60 |

| Diam | LOF | OAL | EDP# | UnCoated Price | D1 Coated |
|--------|-----|-----|-------|----------------|-----------|
| 1.0mm | 13 | 38 | 51261 | \$11.50 | \$15.90 |
| 1.5mm | 19 | 38 | 51262 | \$11.50 | \$15.90 |
| 2.0mm | 22 | 44 | 51263 | \$11.70 | \$16.20 |
| 2.5mm | 25 | 50 | 51264 | \$12.80 | \$17.30 |
| 3.0mm | 32 | 57 | 51265 | \$14.60 | \$19.90 |
| 3.5mm | 35 | 63 | 51266 | \$16.00 | \$21.90 |
| 4.0mm | 35 | 63 | 51267 | \$19.20 | \$27.40 |
| 4.5mm | 41 | 70 | 51268 | \$21.10 | \$29.30 |
| 5.0mm | 44 | 76 | 51269 | \$23.60 | \$32.40 |
| 5.5mm | 44 | 76 | 51270 | \$26.90 | \$35.70 |
| 6.0mm | 50 | 82 | 51271 | \$30.90 | \$39.70 |
| 6.5mm | 50 | 82 | 51272 | \$36.40 | \$46.80 |
| 7.0mm | 54 | 89 | 51273 | \$39.80 | \$50.20 |
| 7.5mm | 60 | 95 | 51274 | \$42.70 | \$53.10 |
| 8.0mm | 60 | 95 | 51275 | \$48.90 | \$62.70 |
| 8.5mm | 63 | 101 | 51276 | \$53.60 | \$67.40 |
| 9.0mm | 70 | 108 | 51277 | \$57.80 | \$71.60 |
| 9.5mm | 70 | 108 | 51278 | \$64.10 | \$77.90 |
| 10.0mm | 73 | 114 | 51279 | \$75.70 | \$92.90 |
| 10.5mm | 73 | 114 | 51280 | \$88.30 | \$105.60 |
| 11.0mm | 73 | 114 | 51281 | \$89.60 | \$106.80 |
| 11.5mm | 76 | 120 | 51282 | \$105.00 | \$127.90 |
| 12.0mm | 76 | 120 | 51283 | \$116.20 | \$139.10 |
| 12.5mm | 76 | 120 | 51284 | \$118.30 | \$141.20 |

Drill Specifications (mm):
 Diameter +0.000/-0.008mm
 Point Angle ±1°



**Series 540**Three Flute • Jobbers Length
150° Drill Point • 30° RH Helix**Fractional**

| Diam | LOF | OAL | EDP# | UnCoated Price | Coated Price |
|-------|-------|-------|-------|----------------|--------------|
| 1/16 | 3/4 | 1-1/2 | 54004 | \$10.30 | \$11.40 |
| 5/64 | 7/8 | 1-3/4 | 54005 | \$10.60 | \$11.90 |
| 3/32 | 1" | 2" | 54006 | \$11.10 | \$12.50 |
| 7/64 | 1-1/4 | 2-1/4 | 54007 | \$12.10 | \$14.10 |
| 1/8 | 1-1/4 | 2-1/4 | 54008 | \$12.60 | \$14.60 |
| 9/64 | 1-3/8 | 2-1/2 | 54009 | \$14.30 | \$16.80 |
| 5/32 | 1-3/8 | 2-1/2 | 54010 | \$16.50 | \$19.00 |
| 11/64 | 1-5/8 | 2-3/4 | 54011 | \$18.30 | \$20.90 |
| 3/16 | 1-5/8 | 2-3/4 | 54012 | \$18.40 | \$21.00 |
| 13/64 | 1-3/4 | 3" | 54013 | \$21.90 | \$25.40 |
| 7/32 | 1-3/4 | 3" | 54014 | \$24.20 | \$27.80 |
| 15/64 | 2" | 3-1/4 | 54015 | \$26.10 | \$30.80 |
| 1/4 | 2" | 3-1/4 | 54016 | \$27.80 | \$32.40 |
| 17/64 | 2-1/8 | 3-1/2 | 54017 | \$32.40 | \$37.80 |
| 9/32 | 2-1/8 | 3-1/2 | 54018 | \$35.50 | \$40.80 |
| 19/64 | 2-3/8 | 3-3/4 | 54019 | \$37.70 | \$43.10 |
| 5/16 | 2-3/8 | 3-3/4 | 54020 | \$40.60 | \$46.00 |
| 21/64 | 2-1/2 | 4" | 54021 | \$43.70 | \$49.60 |
| 11/32 | 2-1/2 | 4" | 54022 | \$48.00 | \$53.80 |
| 23/64 | 2-3/4 | 4-1/4 | 54023 | \$53.30 | \$62.90 |
| 3/8 | 2-3/4 | 4-1/4 | 54024 | \$52.60 | \$62.20 |
| 25/64 | 2-7/8 | 4-1/2 | 54025 | \$67.00 | \$77.20 |
| 13/32 | 2-7/8 | 4-1/2 | 54026 | \$71.90 | \$82.00 |
| 27/64 | 2-7/8 | 4-1/2 | 54027 | \$78.80 | \$89.00 |
| 7/16 | 2-7/8 | 4-1/2 | 54028 | \$84.10 | \$94.30 |
| 29/64 | 3" | 4-3/4 | 54029 | \$92.20 | \$104.00 |
| 15/32 | 3" | 4-3/4 | 54030 | \$97.30 | \$109.10 |
| 31/64 | 3" | 4-3/4 | 54031 | \$101.60 | \$113.30 |
| 1/2 | 3" | 4-3/4 | 54032 | \$97.10 | \$108.90 |
| 17/32 | 4" | 6" | 54034 | \$157.60 | \$173.00 |
| 9/16 | 4" | 6" | 54036 | \$169.30 | \$184.60 |
| 19/32 | 4" | 6" | 54038 | \$194.50 | \$211.60 |
| 5/8 | 4" | 6" | 54040 | \$196.60 | \$213.70 |
| 21/32 | 4" | 6" | 54042 | \$222.50 | \$242.40 |
| 11/16 | 4" | 6" | 54044 | \$226.50 | \$246.40 |
| 3/4 | 4" | 6" | 54048 | \$263.90 | \$283.80 |
| 13/16 | 4" | 6" | 54052 | \$360.60 | \$383.50 |
| 7/8 | 4" | 6" | 54056 | \$382.20 | \$405.20 |
| 15/16 | 4" | 6" | 54060 | \$382.20 | \$408.40 |
| 1" | 4" | 6" | 54064 | \$355.20 | \$381.30 |


Drill Specifications:
Diameter +.0000-.0003
Point Angle ±1°
Series 540 • Wire Gage

| Diam | LOF | OAL | EDP# | UnCoated Price | Coated Price |
|------|-------|-------|-------|----------------|--------------|
| 1 | 1-3/4 | 3-1/4 | 54101 | \$26.90 | \$31.50 |
| 2 | 1-3/4 | 3" | 54102 | \$25.60 | \$29.20 |
| 3 | 1-3/4 | 3" | 54103 | \$24.20 | \$27.80 |
| 4 | 1-3/4 | 3" | 54104 | \$23.60 | \$27.20 |
| 5 | 1-3/4 | 3" | 54105 | \$23.10 | \$26.70 |
| 6 | 1-3/4 | 3" | 54106 | \$22.80 | \$26.40 |
| 7 | 1-3/4 | 3" | 54107 | \$21.90 | \$25.50 |
| 8 | 1-3/4 | 3" | 54108 | \$21.60 | \$25.20 |
| 9 | 1-3/4 | 3" | 54109 | \$21.10 | \$24.70 |
| 10 | 1-5/8 | 2-3/4 | 54110 | \$20.70 | \$24.30 |
| 11 | 1-5/8 | 2-3/4 | 54111 | \$20.50 | \$24.10 |
| 12 | 1-5/8 | 2-3/4 | 54112 | \$20.10 | \$23.70 |
| 13 | 1-5/8 | 2-3/4 | 54113 | \$19.80 | \$22.20 |
| 14 | 1-5/8 | 2-3/4 | 54114 | \$19.60 | \$22.10 |
| 15 | 1-5/8 | 2-3/4 | 54115 | \$19.50 | \$22.00 |
| 16 | 1-5/8 | 2-3/4 | 54116 | \$19.30 | \$21.70 |
| 17 | 1-5/8 | 2-3/4 | 54117 | \$19.00 | \$21.50 |
| 18 | 1-5/8 | 2-3/4 | 54118 | \$18.60 | \$21.10 |
| 19 | 1-5/8 | 2-3/4 | 54119 | \$18.40 | \$20.90 |
| 20 | 1-3/8 | 2-1/2 | 54120 | \$17.80 | \$20.30 |
| 21 | 1-3/8 | 2-1/2 | 54121 | \$17.70 | \$20.20 |
| 22 | 1-3/8 | 2-1/2 | 54122 | \$17.50 | \$19.90 |
| 23 | 1-3/8 | 2-1/2 | 54123 | \$16.90 | \$19.40 |
| 24 | 1-3/8 | 2-1/2 | 54124 | \$16.40 | \$18.80 |
| 25 | 1-3/8 | 2-1/2 | 54125 | \$15.70 | \$18.20 |
| 26 | 1-3/8 | 2-1/2 | 54126 | \$15.40 | \$17.90 |
| 27 | 1-3/8 | 2-1/2 | 54127 | \$15.40 | \$17.90 |
| 28 | 1-3/8 | 2-1/2 | 54128 | \$15.00 | \$17.50 |
| 29 | 1-3/8 | 2-1/2 | 54129 | \$14.70 | \$17.20 |
| 30 | 1-3/8 | 2-1/4 | 54130 | \$13.80 | \$16.60 |
| 31 | 1-1/4 | 2-1/4 | 54131 | \$13.80 | \$16.60 |
| 32 | 1-1/4 | 2-1/4 | 54132 | \$13.20 | \$15.50 |
| 33 | 1-1/4 | 2-1/4 | 54133 | \$13.00 | \$15.30 |
| 34 | 1-1/4 | 2-1/4 | 54134 | \$13.00 | \$15.30 |
| 35 | 1-1/4 | 2-1/4 | 54135 | \$12.70 | \$15.00 |
| 36 | 1-1/4 | 2-1/4 | 54136 | \$12.40 | \$14.70 |
| 37 | 1-1/4 | 2-1/4 | 54137 | \$12.40 | \$14.70 |
| 38 | 1-1/4 | 2-1/4 | 54138 | \$12.40 | \$14.70 |
| 39 | 1-1/4 | 2-1/4 | 54139 | \$12.40 | \$14.70 |
| 40 | 1" | 2" | 54140 | \$11.70 | \$13.20 |
| 41 | 1" | 2" | 54141 | \$11.70 | \$13.20 |
| 42 | 1" | 2" | 54142 | \$11.30 | \$12.80 |
| 43 | 1" | 2" | 54143 | \$10.80 | \$12.40 |
| 44 | 1" | 2" | 54144 | \$10.80 | \$12.40 |
| 45 | 7/8 | 1-3/4 | 54145 | \$10.80 | \$12.40 |
| 46 | 7/8 | 1-3/4 | 54146 | \$10.80 | \$12.40 |
| 47 | 7/8 | 1-3/4 | 54147 | \$10.80 | \$12.40 |
| 48 | 7/8 | 1-3/4 | 54148 | \$10.70 | \$12.20 |
| 49 | 7/8 | 1-3/4 | 54149 | \$10.70 | \$12.20 |
| 50 | 7/8 | 1-3/4 | 54150 | \$11.00 | \$12.20 |
| 51 | 3/4 | 1-3/4 | 54151 | \$11.00 | \$12.20 |
| 52 | 3/4 | 1-1/2 | 54152 | \$11.00 | \$12.20 |

Series 540 • Letter Sizes

| Diam | LOF | OAL | EDP# | UnCoated Price | Coated Price |
|------|-------|-------|-------|----------------|--------------|
| A | 2" | 3-1/4 | 54174 | \$28.80 | \$32.90 |
| B | 2" | 3-1/4 | 54175 | \$29.20 | \$33.40 |
| C | 2" | 3-1/4 | 54176 | \$30.00 | \$34.10 |
| D | 2" | 3-1/4 | 54177 | \$30.40 | \$34.50 |
| E | 2" | 3-1/4 | 54178 | \$31.40 | \$35.60 |
| F | 2" | 3-1/2 | 54179 | \$33.60 | \$39.00 |
| G | 2-1/8 | 3-1/2 | 54180 | \$33.60 | \$39.00 |
| H | 2-1/8 | 3-1/2 | 54181 | \$34.70 | \$40.10 |
| I | 2-1/8 | 3-1/2 | 54182 | \$35.50 | \$40.90 |
| J | 2-1/8 | 3-1/2 | 54183 | \$36.30 | \$41.70 |
| K | 2-1/8 | 3-1/2 | 54184 | \$36.60 | \$41.90 |
| L | 2-1/8 | 3-1/2 | 54185 | \$37.90 | \$43.30 |
| M | 2-3/8 | 3-3/4 | 54186 | \$38.80 | \$44.20 |
| N | 2-3/8 | 3-3/4 | 54187 | \$41.60 | \$47.00 |
| O | 2-3/8 | 3-3/4 | 54188 | \$44.00 | \$49.90 |
| P | 2-3/8 | 4" | 54189 | \$44.80 | \$50.70 |
| Q | 2-1/2 | 4" | 54190 | \$48.10 | \$54.30 |
| R | 2-1/2 | 4" | 54191 | \$49.20 | \$55.00 |
| S | 2-1/2 | 4" | 54192 | \$51.70 | \$57.60 |
| T | 2-3/4 | 4-1/4 | 54193 | \$54.50 | \$64.00 |
| U | 2-3/4 | 4-1/4 | 54194 | \$57.10 | \$66.70 |
| V | 2-3/4 | 4-1/4 | 54195 | \$60.10 | \$71.30 |
| W | 2-7/8 | 4-1/2 | 54196 | \$60.10 | \$71.30 |
| X | 2-7/8 | 4-1/2 | 54197 | \$70.30 | \$81.10 |
| Y | 2-7/8 | 4-1/2 | 54198 | \$70.30 | \$81.40 |
| Z | 2-7/8 | 4-1/2 | 54199 | \$77.90 | \$89.00 |

Series 540 • Metric

| | | | | | |
|---|----|-----|-------|----------|----------|
|  Drill Specifications (mm): Diameter +0.000/-0.008mm Point Angle ±1° | | | | | |
| 1.5mm | 19 | 38 | 54215 | \$9.70 | \$11.30 |
| 2.0mm | 22 | 44 | 54220 | \$10.00 | \$11.80 |
| 2.5mm | 25 | 50 | 54225 | \$11.00 | \$12.70 |
| 3.0mm | 32 | 57 | 54230 | \$12.40 | \$14.90 |
| 3.5mm | 35 | 63 | 54235 | \$13.80 | \$16.80 |
| 4.0mm | 35 | 63 | 54240 | \$16.50 | \$19.40 |
| 4.5mm | 41 | 70 | 54245 | \$18.10 | \$21.00 |
| 5.0mm | 44 | 76 | 54250 | \$20.20 | \$24.20 |
| 5.5mm | 44 | 76 | 54255 | \$23.10 | \$27.20 |
| 6.0mm | 50 | 82 | 54260 | \$26.50 | \$31.60 |
| 6.5mm | 50 | 82 | 54265 | \$31.20 | \$37.60 |
| 7.0mm | 54 | 89 | 54270 | \$33.90 | \$40.30 |
| 7.5mm | 60 | 95 | 54275 | \$36.60 | \$43.00 |
| 8.0mm | 60 | 95 | 54280 | \$41.70 | \$48.60 |
| 8.5mm | 63 | 101 | 54285 | \$45.80 | \$52.70 |
| 9.0mm | 70 | 108 | 54290 | \$49.40 | \$60.00 |
| 9.5mm | 70 | 108 | 54295 | \$54.80 | \$66.90 |
| 10.0mm | 73 | 114 | 54300 | \$64.70 | \$76.80 |
| 10.5mm | 73 | 114 | 54305 | \$75.70 | \$87.80 |
| 11.0mm | 73 | 114 | 54310 | \$76.50 | \$88.70 |
| 11.5mm | 76 | 120 | 54315 | \$89.90 | \$103.70 |
| 12.0mm | 76 | 120 | 54320 | \$99.30 | \$113.00 |
| 12.5mm | 76 | 120 | 54325 | \$101.20 | \$115.00 |

Solid Carbide Straight Flute Drills by ULTRATOOL®

Series 570

Two Flute Micro Hole Drill
135° Four Facet Point

ULTRA-Grain®



Fractional

| Diam | LOF | OAL | EDP# | UnCoated Price | Coated Price |
|-------|-------|-------|-------|----------------|--------------|
| 3/64 | 3/8 | 1-1/2 | 57003 | \$9.20 | \$10.80 |
| 1/16 | 3/8 | 1-1/2 | 57004 | \$8.60 | \$10.30 |
| 5/64 | 1/2 | 2" | 57005 | \$8.40 | \$10.20 |
| 3/32 | 1/2 | 2" | 57006 | \$8.60 | \$10.30 |
| 7/64 | 5/8 | 2-1/4 | 57007 | \$9.50 | \$11.90 |
| 1/8 | 5/8 | 2-1/4 | 57008 | \$10.50 | \$13.00 |
| 9/64 | 5/8 | 2-1/2 | 57009 | \$11.30 | \$14.40 |
| 5/32 | 3/4 | 2-1/2 | 57010 | \$11.90 | \$15.00 |
| 11/64 | 3/4 | 2-1/2 | 57011 | \$13.90 | \$16.90 |
| 3/16 | 3/4 | 2-1/2 | 57012 | \$14.70 | \$17.70 |
| 13/64 | 1" | 2-1/2 | 57013 | \$17.10 | \$21.20 |
| 7/32 | 1" | 2-1/2 | 57014 | \$17.60 | \$21.70 |
| 15/64 | 1" | 2-1/2 | 57015 | \$18.80 | \$22.80 |
| 1/4 | 1" | 2-1/2 | 57016 | \$21.10 | \$25.10 |
| 17/64 | 1" | 2-1/2 | 57017 | \$27.10 | \$32.10 |
| 9/32 | 1" | 2-1/2 | 57018 | \$28.30 | \$33.20 |
| 19/64 | 1-1/4 | 2-1/2 | 57019 | \$29.90 | \$34.90 |
| 5/16 | 1-1/4 | 2-1/2 | 57020 | \$31.10 | \$36.00 |
| 21/64 | 1-1/4 | 3" | 57021 | \$33.40 | \$38.70 |
| 11/32 | 1-1/4 | 3" | 57022 | \$36.90 | \$42.20 |
| 23/64 | 1-1/4 | 3" | 57023 | \$40.40 | \$45.70 |
| 3/8 | 1-1/4 | 3" | 57024 | \$42.00 | \$47.30 |
| 25/64 | 1-1/4 | 3" | 57025 | \$47.30 | \$54.20 |
| 13/32 | 1-1/4 | 3" | 57026 | \$52.50 | \$59.40 |
| 27/64 | 1-1/4 | 3" | 57027 | \$57.30 | \$64.20 |
| 7/16 | 1-1/4 | 3" | 57028 | \$57.30 | \$64.20 |
| 29/64 | 1-1/4 | 3" | 57029 | \$61.30 | \$68.30 |
| 15/32 | 1-1/4 | 3" | 57030 | \$62.00 | \$69.10 |
| 31/64 | 1-1/4 | 3" | 57031 | \$62.60 | \$69.60 |
| 1/2 | 1-1/4 | 3" | 57032 | \$63.60 | \$70.60 |
| 9/16 | 1-1/2 | 3-1/2 | 57034 | \$84.00 | \$94.10 |
| 5/8 | 1-1/2 | 3-1/2 | 57036 | \$93.40 | \$104.30 |
| 3/4 | 1-1/2 | 4" | 57040 | \$106.20 | \$119.70 |

SFR Drill Specifications:
Diameter +0.000/-0.003
Point Angle ±1°



Ultra-Tool® Drills are manufactured to a diameter tolerance 40% tighter than industry standards, feature unique high-productivity geometry with SmoothGrind® finishes, and are precision ground from an exclusive Ultra-Carb® material with superb wear characteristics .

Series 570 • Wire Gage

| Diam | LOF | OAL | EDP# | UnCoated Price | Coated Price |
|------|-----|-------|-------|----------------|--------------|
| 1 | 1" | 2-1/2 | 57101 | \$18.80 | \$22.80 |
| 2 | 1" | 2-1/2 | 57102 | \$18.80 | \$22.80 |
| 3 | 1" | 2-1/2 | 57103 | \$17.40 | \$21.50 |
| 4 | 1" | 2-1/2 | 57104 | \$17.40 | \$21.50 |
| 5 | 1" | 2-1/2 | 57105 | \$17.40 | \$21.50 |
| 6 | 1" | 2-1/2 | 57106 | \$17.40 | \$21.50 |
| 7 | 1" | 2-1/2 | 57107 | \$16.40 | \$20.40 |
| 8 | 1" | 2-1/2 | 57108 | \$16.40 | \$20.40 |
| 9 | 1" | 2-1/2 | 57109 | \$16.00 | \$20.10 |
| 10 | 3/4 | 2-1/2 | 57110 | \$16.00 | \$20.10 |
| 11 | 3/4 | 2-1/2 | 57111 | \$15.90 | \$20.00 |
| 12 | 3/4 | 2-1/2 | 57112 | \$15.90 | \$20.00 |
| 13 | 3/4 | 2-1/2 | 57113 | \$14.70 | \$17.70 |
| 14 | 3/4 | 2-1/2 | 57114 | \$14.70 | \$17.70 |
| 15 | 3/4 | 2-1/2 | 57115 | \$14.20 | \$17.20 |
| 16 | 3/4 | 2-1/2 | 57116 | \$14.20 | \$17.20 |
| 17 | 3/4 | 2-1/2 | 57117 | \$14.20 | \$17.20 |
| 18 | 3/4 | 2-1/2 | 57118 | \$13.90 | \$16.90 |
| 19 | 3/4 | 2-1/2 | 57119 | \$13.90 | \$16.90 |
| 20 | 3/4 | 2-1/2 | 57120 | \$13.60 | \$16.70 |
| 21 | 3/4 | 2-1/2 | 57121 | \$13.60 | \$16.70 |
| 22 | 3/4 | 2-1/2 | 57122 | \$13.00 | \$16.00 |
| 23 | 5/8 | 2-1/2 | 57123 | \$11.90 | \$15.00 |
| 24 | 5/8 | 2-1/2 | 57124 | \$11.90 | \$15.00 |
| 25 | 5/8 | 2-1/2 | 57125 | \$11.90 | \$15.00 |
| 26 | 5/8 | 2-1/2 | 57126 | \$11.90 | \$15.00 |
| 27 | 5/8 | 2-1/2 | 57127 | \$11.40 | \$14.50 |
| 28 | 5/8 | 2-1/2 | 57128 | \$11.30 | \$14.40 |
| 29 | 5/8 | 2-1/2 | 57129 | \$10.70 | \$13.70 |
| 30 | 5/8 | 2-1/4 | 57130 | \$10.70 | \$13.70 |
| 31 | 5/8 | 2-1/4 | 57131 | \$10.20 | \$12.70 |
| 32 | 5/8 | 2-1/4 | 57132 | \$9.60 | \$12.10 |
| 33 | 5/8 | 2-1/4 | 57133 | \$9.60 | \$12.10 |
| 34 | 5/8 | 2-1/4 | 57134 | \$9.60 | \$12.10 |
| 35 | 5/8 | 2-1/4 | 57135 | \$9.60 | \$12.10 |
| 36 | 5/8 | 2-1/4 | 57136 | \$9.50 | \$11.90 |
| 37 | 5/8 | 2-1/4 | 57137 | \$9.50 | \$11.90 |
| 38 | 5/8 | 2-1/4 | 57138 | \$9.50 | \$11.90 |
| 39 | 5/8 | 2-1/4 | 57139 | \$9.50 | \$11.90 |
| 40 | 1/2 | 2" | 57140 | \$9.50 | \$11.20 |
| 41 | 1/2 | 2" | 57141 | \$9.50 | \$11.20 |
| 42 | 1/2 | 2" | 57142 | \$8.60 | \$10.30 |
| 43 | 1/2 | 2" | 57143 | \$8.60 | \$10.30 |
| 44 | 1/2 | 2" | 57144 | \$8.60 | \$10.30 |
| 45 | 1/2 | 2" | 57145 | \$8.60 | \$10.30 |
| 46 | 1/2 | 2" | 57146 | \$8.60 | \$10.30 |
| 47 | 1/2 | 2" | 57147 | \$8.60 | \$10.30 |
| 48 | 1/2 | 2" | 57148 | \$8.50 | \$10.20 |
| 49 | 3/8 | 2" | 57149 | \$8.50 | \$10.20 |
| 50 | 3/8 | 2" | 57150 | \$8.50 | \$10.20 |
| 51 | 3/8 | 1-3/4 | 57151 | \$9.40 | \$11.00 |
| 52 | 3/8 | 1-1/2 | 57152 | \$9.40 | \$11.00 |
| 53 | 3/8 | 1-1/2 | 57153 | \$9.20 | \$10.80 |
| 54 | 3/8 | 1-1/2 | 57154 | \$9.20 | \$10.80 |
| 55 | 3/8 | 1-1/2 | 57155 | \$9.20 | \$10.80 |
| 56 | 3/8 | 1-1/2 | 57156 | \$9.20 | \$10.80 |
| 57 | 3/8 | 1-1/2 | 57157 | \$9.20 | \$10.80 |
| 58 | 3/8 | 1-1/2 | 57158 | \$9.20 | \$10.80 |
| 59 | 3/8 | 1-1/2 | 57159 | \$9.20 | \$10.80 |
| 60 | 3/8 | 1-1/2 | 57160 | \$9.20 | \$10.80 |

Series 570 • Letter Sizes

| Diam | LOF | OAL | EDP# | UnCoated Price | Coated Price |
|------|-------|-------|-------|----------------|--------------|
| A | 1" | 2-1/2 | 57161 | \$24.70 | \$28.70 |
| B | 1" | 2-1/2 | 57162 | \$25.80 | \$29.90 |
| C | 1" | 2-1/2 | 57163 | \$26.60 | \$30.70 |
| D | 1" | 2-1/2 | 57164 | \$27.00 | \$31.10 |
| E | 1" | 2-1/2 | 57165 | \$28.80 | \$32.90 |
| F | 1" | 2-1/2 | 57166 | \$30.40 | \$35.40 |
| G | 1" | 2-1/2 | 57167 | \$31.80 | \$36.70 |
| H | 1" | 2-1/2 | 57168 | \$32.20 | \$37.10 |
| I | 1" | 2-1/2 | 57169 | \$32.50 | \$37.50 |
| J | 1" | 2-1/2 | 57170 | \$33.00 | \$38.00 |
| K | 1" | 2-1/2 | 57171 | \$33.30 | \$38.30 |
| L | 1" | 2-1/2 | 57172 | \$34.30 | \$39.20 |
| M | 1" | 2-1/2 | 57173 | \$34.60 | \$39.60 |
| N | 1-1/4 | 2-1/2 | 57174 | \$35.60 | \$40.60 |
| O | 1-1/4 | 2-1/2 | 57175 | \$39.10 | \$44.40 |
| P | 1-1/4 | 2-1/2 | 57176 | \$39.50 | \$44.80 |
| Q | 1-1/4 | 3" | 57177 | \$42.10 | \$47.30 |
| R | 1-1/4 | 3" | 57178 | \$42.90 | \$48.20 |
| S | 1-1/4 | 3" | 57179 | \$45.20 | \$50.40 |
| T | 1-1/4 | 3" | 57180 | \$47.30 | \$52.60 |
| U | 1-1/4 | 3" | 57181 | \$49.80 | \$55.10 |
| V | 1-1/4 | 3" | 57182 | \$54.60 | \$61.50 |
| W | 1-1/4 | 3" | 57183 | \$56.80 | \$63.70 |
| X | 1-1/4 | 3" | 57184 | \$61.50 | \$68.40 |
| Y | 1-1/4 | 3" | 57185 | \$61.90 | \$68.80 |
| Z | 1-1/4 | 3" | 57186 | \$64.90 | \$71.80 |

Series 570 • Metric Sizes

| | | | |
|--------|---|-----|-------------------------|
| SFR | Drill Specifications (mm): Diameter +0.000/-0.008mm Point Angle ±1° | | |
| 1.0mm | 9.5 | 38 | 57061 \$9.20 \$10.80 |
| 1.5mm | 9.5 | 38 | 57062 \$8.20 \$9.80 |
| 2.0mm | 12 | 50 | 57063 \$8.60 \$10.30 |
| 2.5mm | 12 | 50 | 57064 \$9.50 \$11.20 |
| 3.0mm | 16 | 57 | 57065 \$10.20 \$12.70 |
| 3.5mm | 16 | 63 | 57066 \$11.30 \$14.40 |
| 4.0mm | 19 | 63 | 57067 \$13.00 \$16.00 |
| 4.5mm | 19 | 63 | 57068 \$14.20 \$17.20 |
| 5.0mm | 25 | 63 | 57069 \$16.40 \$20.40 |
| 5.5mm | 25 | 63 | 57070 \$17.60 \$21.70 |
| 6.0mm | 25 | 63 | 57071 \$21.10 \$25.10 |
| 6.5mm | 25 | 63 | 57072 \$27.10 \$32.10 |
| 7.0mm | 25 | 63 | 57073 \$28.30 \$33.20 |
| 7.5mm | 25 | 63 | 57074 \$29.90 \$34.90 |
| 8.0mm | 32 | 63 | 57075 \$31.10 \$36.40 |
| 8.5mm | 32 | 75 | 57076 \$36.90 \$42.20 |
| 9.0mm | 32 | 75 | 57077 \$39.10 \$44.40 |
| 9.5mm | 32 | 75 | 57078 \$42.00 \$47.30 |
| 10.0mm | 32 | 75 | 57079 \$51.80 \$58.70 |
| 10.5mm | 32 | 75 | 57080 \$57.10 \$64.00 |
| 11.0mm | 32 | 75 | 57081 \$57.30 \$64.20 |
| 11.5mm | 32 | 75 | 57082 \$59.00 \$66.00 |
| 12.0mm | 32 | 75 | 57083 \$62.60 \$69.60 |
| 12.5mm | 32 | 75 | 57084 \$63.60 \$70.60 |
| 14.0mm | 38 | 89 | 57085 \$84.00 \$94.10 |
| 16.0mm | 38 | 89 | 57086 \$93.40 \$104.30 |
| 20.0mm | 38 | 100 | 57088 \$123.60 \$138.50 |

Stub Length Drills**Series 520**Short Length • 25° RH Helix
Two Flute • 118° Four Facet Point

SFR
Drill Specifications:
Diameter +0.000/-0.003
Point Angle ±1°

| Diam | LOF | OAL | EDP# | UnCoated Price | Coated Price |
|-------|-------|-------|-------|----------------|--------------|
| 1/8 | 5/8 | 2" | 52008 | \$10.70 | \$12.50 |
| 9/64 | 5/8 | 2" | 52009 | \$12.40 | \$14.50 |
| 5/32 | 3/4 | 2-1/2 | 52010 | \$13.30 | \$16.30 |
| 11/64 | 3/4 | 2-1/2 | 52011 | \$14.60 | \$17.60 |
| 3/16 | 3/4 | 2-1/2 | 52012 | \$15.90 | \$18.80 |
| 13/64 | 3/4 | 2-1/2 | 52013 | \$17.90 | \$22.00 |
| 7/32 | 1" | 2-1/2 | 52014 | \$19.00 | \$23.00 |
| 15/64 | 1" | 2-1/2 | 52015 | \$19.70 | \$23.80 |
| 1/4 | 1" | 2-1/2 | 52016 | \$20.80 | \$24.90 |
| 17/64 | 1" | 2-1/2 | 52017 | \$22.20 | \$27.20 |
| 9/32 | 1" | 2-1/2 | 52018 | \$23.40 | \$28.40 |
| 19/64 | 1-1/4 | 2-3/4 | 52019 | \$26.40 | \$31.40 |
| 5/16 | 1-1/4 | 2-3/4 | 52020 | \$29.10 | \$34.10 |
| 21/64 | 1-1/4 | 2-3/4 | 52021 | \$31.40 | \$36.70 |
| 11/32 | 1-1/4 | 3" | 52022 | \$33.90 | \$39.20 |
| 23/64 | 1-1/4 | 3" | 52023 | \$36.60 | \$41.80 |
| 3/8 | 1-1/4 | 3" | 52024 | \$36.90 | \$42.20 |
| 25/64 | 1-1/4 | 3" | 52025 | \$40.60 | \$47.50 |
| 13/32 | 1-1/4 | 3" | 52026 | \$44.80 | \$51.70 |
| 27/64 | 1-1/4 | 3" | 52027 | \$47.10 | \$54.00 |
| 7/16 | 1-1/4 | 3" | 52028 | \$49.90 | \$56.80 |
| 29/64 | 1-1/4 | 3" | 52029 | \$53.80 | \$60.80 |
| 15/32 | 1-1/4 | 3" | 52030 | \$55.50 | \$62.60 |
| 31/64 | 1-1/4 | 3" | 52031 | \$57.70 | \$64.80 |
| 1/2 | 1-1/4 | 3" | 52032 | \$58.80 | \$65.90 |

Series 520 • Metric Sizes

SFR
Drill Specifications (mm):
Diameter +0.000/-0.008mm
Point Angle ±1°



| Diam | LOF | OAL | EDP# | UnCoated Price | Coated Price |
|--------|-----|-----|-------|----------------|--------------|
| 3.0mm | 16 | 50 | 52064 | \$11.90 | \$13.60 |
| 3.5mm | 16 | 50 | 52065 | \$12.90 | \$15.00 |
| 4.0mm | 19 | 63 | 52066 | \$14.60 | \$17.60 |
| 4.5mm | 19 | 63 | 52067 | \$15.90 | \$18.80 |
| 5.0mm | 19 | 63 | 52068 | \$17.90 | \$22.00 |
| 5.5mm | 19 | 63 | 52069 | \$19.00 | \$23.00 |
| 6.0mm | 25 | 63 | 52070 | \$20.80 | \$24.90 |
| 6.5mm | 25 | 63 | 52071 | \$22.20 | \$27.20 |
| 7.0mm | 25 | 63 | 52072 | \$23.40 | \$28.40 |
| 7.5mm | 32 | 70 | 52073 | \$26.40 | \$31.40 |
| 8.0mm | 32 | 70 | 52074 | \$31.40 | \$36.70 |
| 8.5mm | 32 | 70 | 52075 | \$33.90 | \$39.20 |
| 9.0mm | 32 | 75 | 52076 | \$36.60 | \$41.80 |
| 9.5mm | 32 | 75 | 52077 | \$36.90 | \$42.20 |
| 10.0mm | 32 | 75 | 52078 | \$40.60 | \$47.50 |
| 10.5mm | 32 | 75 | 52079 | \$47.10 | \$54.00 |
| 11.0mm | 32 | 75 | 52080 | \$49.90 | \$56.80 |
| 11.5mm | 32 | 75 | 52081 | \$53.80 | \$60.80 |
| 12.0mm | 32 | 75 | 52082 | \$55.50 | \$62.60 |
| 12.5mm | 32 | 75 | 52083 | \$59.00 | \$66.00 |

Specialty Drills**Series 530**Short Length • Flat Spade Drill
Two Flute • 118° Point

SFR
Drill Specifications:
Diameter +0.000/-0.003
Point Angle ±1°



| Diam | LOF | OAL | EDP# | UnCoated Price | Coated Price |
|-------|--------|-------|-------|----------------|--------------|
| 1/16 | 3/8 | 1-1/2 | 53004 | \$8.40 | \$10.10 |
| 3/32 | 7/16 | 1-1/2 | 53006 | \$8.40 | \$10.20 |
| 1/8 | 1/2 | 1-1/2 | 53008 | \$8.40 | \$10.20 |
| 5/32 | 9/16 | 2" | 53010 | \$10.70 | \$12.90 |
| 3/16 | 11/16 | 2" | 53012 | \$11.40 | \$13.60 |
| 7/32 | 11/16 | 2" | 53014 | \$13.40 | \$16.70 |
| 1/4 | 13/16 | 2" | 53016 | \$15.10 | \$18.40 |
| 9/32 | 7/8 | 2" | 53018 | \$18.40 | \$22.30 |
| 5/16 | 7/8 | 2-1/2 | 53020 | \$22.80 | \$27.80 |
| 11/32 | 15/16 | 2-1/2 | 53022 | \$27.20 | \$32.50 |
| 3/8 | 1-1/8 | 2-1/2 | 53024 | \$29.10 | \$34.40 |
| 13/32 | 1-1/8 | 2-1/2 | 53026 | \$32.90 | \$39.90 |
| 7/16 | 1-3/16 | 2-3/4 | 53028 | \$34.90 | \$41.80 |
| 15/32 | 1-3/16 | 3" | 53030 | \$38.10 | \$45.00 |
| 1/2 | 1-5/16 | 3" | 53032 | \$41.80 | \$48.90 |

Specialty Drills**Series 555**

Parabolic Drill

Two Flutes • 118° Four Facet Point • 33° Helix



| Diam | LOF | OAL | EDP# | UnCoated Price | Coated Price |
|-------|-------|-------|-------|----------------|--------------|
| 1/16 | 3/4 | 1-1/2 | 15501 | \$14.80 | \$16.40 |
| 3/32 | 1" | 2" | 15503 | \$15.50 | \$17.30 |
| 1/8 | 1-1/4 | 3" | 15505 | \$23.20 | \$25.60 |
| 5/32 | 1-1/2 | 3" | 15507 | \$27.60 | \$30.50 |
| 3/16 | 2" | 4" | 15509 | \$30.70 | \$34.40 |
| 7/32 | 2-1/2 | 4" | 15511 | \$34.10 | \$39.30 |
| 1/4 | 3" | 4-1/2 | 15513 | \$39.00 | \$45.70 |
| 9/32 | 3-1/4 | 4-1/2 | 15514 | \$45.70 | \$54.50 |
| 5/16 | 3-1/4 | 4-3/4 | 15515 | \$48.50 | \$57.30 |
| 11/32 | 4" | 6" | 15516 | \$79.60 | \$90.20 |
| 3/8 | 4" | 6" | 15517 | \$81.90 | \$92.60 |
| 13/32 | 4" | 6" | 15518 | \$108.80 | \$121.00 |
| 7/16 | 4" | 6" | 15519 | \$108.80 | \$121.00 |
| 15/32 | 4" | 6" | 15520 | \$114.40 | \$128.20 |
| 1/2 | 4" | 6" | 15521 | \$114.40 | \$128.20 |

The Ultra Series 555 Parabolic Drill is ideal for heavy feed drilling in most materials. The open fluting, thick web construction, and fast helix design makes for deep hole drilling results.

SFR
Drill Specifications (mm):
Diameter +0.000/-0.008mm
Point Angle ±1°

SFR
Drill Specifications:
Diameter +0.000/-0.003
Point Angle ±1°

Series 55015° Slow RH Helix • Thick Web
Two Flute • 135° Four Facet Point

| Diam | LOF | OAL | EDP# | UnCoated Price | Coated Price |
|-------|-------|-------|-------|----------------|--------------|
| 1/8 | 7/8 | 2" | 55008 | \$12.70 | \$14.50 |
| 9/64 | 7/8 | 2" | 55009 | \$13.00 | \$15.10 |
| 5/32 | 1" | 2" | 55010 | \$14.00 | \$16.10 |
| 11/64 | 1" | 2" | 55011 | \$15.40 | \$17.50 |
| 3/16 | 1-1/8 | 2-1/2 | 55012 | \$18.40 | \$21.30 |
| 13/64 | 1-1/8 | 2-1/2 | 55013 | \$20.60 | \$24.70 |
| 7/32 | 1-1/4 | 2-1/2 | 55014 | \$23.10 | \$27.20 |
| 15/64 | 1-1/4 | 2-1/2 | 55015 | \$25.20 | \$29.30 |
| 1/4 | 1-3/8 | 2-1/2 | 55016 | \$25.90 | \$30.00 |
| 9/32 | 1-1/2 | 3" | 55018 | \$29.70 | \$34.60 |
| 5/16 | 1-5/8 | 3" | 55020 | \$37.70 | \$42.60 |
| 11/32 | 1-3/4 | 3" | 55022 | \$43.10 | \$48.50 |
| 3/8 | 1-3/4 | 3" | 55024 | \$50.20 | \$55.40 |
| 13/32 | 2" | 3-1/2 | 55026 | \$62.00 | \$70.80 |
| 7/16 | 2-1/8 | 3-1/2 | 55028 | \$74.40 | \$83.30 |
| 15/32 | 2-1/8 | 4" | 55030 | \$85.30 | \$94.80 |
| 1/2 | 2-1/4 | 4" | 55032 | \$89.80 | \$99.40 |

Series 585

Quad Drill

Two Straight Flutes • Four Margins • 135° Point



| Diam | LOF | OAL | EDP# | UnCoated Price | Coated Price |
|-------|-------|-------|-------|----------------|--------------|
| 1/8 | 7/8 | 2" | 15852 | \$13.70 | \$15.40 |
| 5/32 | 1" | 2" | 15855 | \$16.60 | \$18.70 |
| 3/16 | 1" | 2-1/2 | 15858 | \$20.60 | \$23.60 |
| 7/32 | 1-1/4 | 2-1/2 | 15861 | \$24.50 | \$28.60 |
| 1/4 | 1-3/8 | 2-1/2 | 15865 | \$26.80 | \$30.90 |
| 9/32 | 1-1/2 | 3" | 15878 | \$40.70 | \$45.70 |
| 5/16 | 1-5/8 | 3" | 15881 | \$41.80 | \$46.80 |
| 11/32 | 1-3/4 | 3" | 15884 | \$52.00 | \$57.30 |
| 3/8 | 1-7/8 | 3" | 15887 | \$54.90 | \$60.20 |
| 13/32 | 2" | 3-1/2 | 15890 | \$71.40 | \$80.30 |
| 7/16 | 2-1/8 | 4" | 15893 | \$73.50 | \$82.30 |
| 15/32 | 2-1/8 | 4" | 15896 | \$76.70 | \$86.20 |
| 1/2 | 2-1/4 | 4" | 15899 | \$81.40 | \$91.00 |

The Ultra Series 585 Quad Drill features four lands that create a burnishing action for unsurpassed hole straightness and concentricity. Provided with a self-centering point designed for steel and cast iron.

SFR Drill-Mill Specifications:
Diameter +.000/-002
Point Angle ±1°

Series 535 Two Flute Drill Mill

Four Facet Point • 4 included angles



new!
Additional sizes and
included angles!

Series 536

Four Flute Drill Mill

Four Facet Point • 4 included angles



| Diam | LOF | OAL | 60° EDP# | 82° EDP# | 90° EDP# | 120° EDP# | UnCoated Price | Coated Price |
|------|-------|-------|----------|----------|----------|-----------|----------------|--------------|
| 1/8 | 1/2 | 1-1/2 | 53083 | 53091 | 53508 | 53099 | \$9.30 | \$11.00 |
| 3/16 | 5/8 | 2" | 53084 | 53092 | 53512 | 53100 | \$13.80 | \$15.60 |
| 1/4 | 3/4 | 2-1/2 | 53085 | 53093 | 53516 | 53101 | \$17.00 | \$20.60 |
| 5/16 | 13/16 | 2-1/2 | 53086 | 53094 | 53520 | 53102 | \$24.00 | \$28.40 |
| 3/8 | 1" | 2-1/2 | 53087 | 53095 | 53524 | 53103 | \$30.20 | \$34.50 |
| 1/2 | 1" | 3" | 53088 | 53096 | 53532 | 53104 | \$46.60 | \$52.70 |
| 5/8 | 1-1/2 | 3-1/2 | 53089 | 53097 | 53536 | 53105 | \$90.50 | \$99.50 |
| 3/4 | 1-1/2 | 4" | 53090 | 53098 | 53540 | 53106 | \$130.70 | \$141.60 |



| Diam | LOF | OAL | 60° EDP# | 82° EDP# | 90° EDP# | 120° EDP# | UnCoated Price | Coated Price |
|------|-------|-------|----------|----------|----------|-----------|----------------|--------------|
| 1/8 | 1/2 | 1-1/2 | 53107 | 53115 | 53608 | 53123 | \$9.30 | \$11.00 |
| 3/16 | 5/8 | 2" | 53108 | 53116 | 53612 | 53124 | \$13.80 | \$15.60 |
| 1/4 | 3/4 | 2-1/2 | 53109 | 53117 | 53616 | 53125 | \$17.00 | \$20.60 |
| 5/16 | 13/16 | 2-1/2 | 53110 | 53118 | 53620 | 53126 | \$24.00 | \$28.40 |
| 3/8 | 1" | 2-1/2 | 53111 | 53119 | 53624 | 53127 | \$30.20 | \$34.50 |
| 1/2 | 1" | 3" | 53112 | 53120 | 53632 | 53128 | \$46.60 | \$52.70 |
| 5/8 | 1-1/2 | 3-1/2 | 53113 | 53121 | 53636 | 53129 | \$90.50 | \$99.50 |
| 3/4 | 1-1/2 | 4" | 53114 | 53122 | 53640 | 53130 | \$130.70 | \$141.60 |



Our manufacturing system is designed to give our customers consistency in product from order to order, and application to application.

Coating Spotlight • SmoothCoat TA



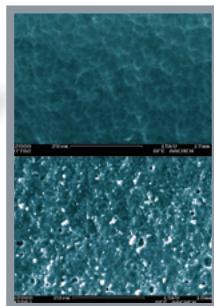
Ultra's TiAlN coating is the all-around workhorse of our SmoothCoat selections. First, a brief word regarding the two types of PVD coating, "sputter" and "arc." SmoothCoat is a sputter-based process and, unlike arc, the materials to be deposited on the tools are not melted down, but rather transferred directly from a solid to a gaseous state. This means that zero "droplets" (bead-shaped macro particles) form on the tool surface, leading to the smoothest surface possible. Why doesn't everyone use sputter technology? The answer is it takes longer (i.e. more expense, and toll coaters can't do as many loads in a day).

Classified as a Supernitride type of PVD, our TA nanocomposite coating has low residual stress which provides excellent adhesion and stability. Even with thickness of 3-4 microns, sharpness is retained on the cutting edge with corresponding low friction at the work piece material level. This true performance coating can withstand application temperatures of 1000°C, has a microhardness of over 3500HV, and can be used wet or dry over a wide variety of applications and materials. SmoothCoat TA is available standard on thousands of items in this catalog... try it today!



'SECRET MENU' ITEM: TA is so smooth with such great adhesion and low stress levels that we can effectively "double-up" the thickness level to 6-8 microns! We call this "A2" and use it in special applications, primarily within our Mil-Tec indexable carbide product line. However, with our SmoothGrind so sharp and our sputter technology so precise on layering the underlying tool, we can retain an amazingly precise cutting edge feature. Consider A2 in heavy wear apps and roughing cuts where chip load per tooth is maximized. Ask your inside sales rep for it by name.

SmoothCoat®



Our coating magnified to 2,000X (top). Everybody else's (bottom). Our sputter technology has no droplets and features a smooth, clean surface.

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Proven daily by the linear foot.™routco.com**About the technology partners of Tool Alliance®**

Our technology partners are second to none. We find premier firms, the technological leaders in their respective industries, throughout the world and work with them in progressive, win-win relationships to bring our customers the very finest components and characteristics that we build into our products. Constant reinvestment into our company-owned factory buildings and equipment base promise long-term stability & consistency in delivering Performance & Solutions to carbide rotary tooling consumers everywhere.

5-axis
VMC controlSubstrate, abrasive,
coolants & workholding

Grinding centers

Coating
systems

Robotics

CNC grinder
control

ULTRATOOL® Carbide Rotary Files (Burrs)



Cut Style #1

Standard Cut is a general purpose style designed for cast iron, steel, other ferrous materials. It will achieve very high material removal rates and good workpiece finishes. The second most popular style after Dura-Cut.

Stocked Inventory

#2

Fine Cut improves finishes on hardened steel, stainless steel, and cast iron. Operator control is improved. The excellent finish, however, comes with reduced stock removal rates.

Available by Special Order

#3

Coarse Cut is recommended for use on soft material such as copper, brass, aluminum, plastics, and rubber, where chip loading is a problem, and the rapid stock removal rates of Fast-Mill is not practical.

#4

Dura-Cut allows for rapid stock removal in harder materials. The addition of left hand flutes reduces the pulling action, allowing better operator control. It reduces the size of the chips and can be used at slower than normal speeds.

Stocked Inventory

#5

Coarse-Dura Cut is for fast stock removal in soft materials, with improved operator control over Coarse Cut. The addition of the left-hand Dura also reduces chip size.

#6

Fine-Dura Cut is very effective in heat treated and tough alloy steels. The Dura addition reduces the size of the chips and offers excellent operator control and surface finish.

#8

Diamond Cut is very effective in heat treated and tough alloy steels, making extremely small, powder-like chips. It offers very good operator control and stock removal at the sacrifice of some finish and tool life characteristics.

Available by Special Order



Only Ultra-Tool® offers a full range of cut styles for your specific application needs. Primary stocking styles are #1 Standard and #4 Dura-Cut; other styles available upon quotation / POA. All styles are precision CNC ground to the best quality standards for a truly high-end product. Now available with TA coating as standard.

ULTRATOOL® BURRS & SETS ALSO AVAILABLE IN METRIC CONFIGURATION:

Furnished on 6mm or 3mm shanks. Add 70000 to displayed EDP# (#04001 becomes #74001). Add "M" to Style description (SA-5 becomes MSA-5). Two-piece construction burrs retain fractional head diameters & LOC.

OAL Information for Series 40 thru 53: All burrs with body diameter of greater than 1/4" have Ultra-Carb heads brazed to a 1.75" or 2" hardened steel shank with a 1/4" or 6mm diameter unless otherwise noted. All burrs with a body diameter of 1/4" or less are manufactured from solid Ultra-Carb and are 2-inch (51 mm) overall length.

ULTRATOOL® Burr Sets



Series 600 • Burr Sets

12 Piece • Set contains 1 each

| | | | |
|-------|-------|-------|-------|
| SA-43 | SA-42 | SC-42 | SD-42 |
| SE-41 | SF-42 | SF-41 | SG-41 |
| SM-43 | SH-41 | SN-42 | SL-41 |

| Cut | EDP# | Price | Coated |
|-----|-------|---------|---------|
| #1 | 00001 | \$54.00 | \$66.00 |
| #4 | 00004 | \$56.70 | \$68.70 |

Series 601 • Burr Sets

9 Piece • Set contains 1 each

| | | |
|-------|-------|-------|
| SA-51 | SB-51 | SC-51 |
| SD-51 | SE-51 | SF-51 |
| SG-51 | SM-51 | SN-51 |

| Cut | EDP# | Price | Coated |
|-----|-------|---------|---------|
| #1 | 00101 | \$72.50 | \$84.20 |
| #4 | 00104 | \$76.10 | \$87.80 |

Series 604 • Burr Sets

10 Piece • Set contains 1 each

| | | | |
|-------|-------|------|------|
| SA-1 | SC-12 | SE-1 | SN-1 |
| SA-14 | SF-1 | SM-2 | |
| SC-1 | SG-1 | SL-1 | |

| Cut | EDP# | Price | Coated |
|-----|-------|---------|----------|
| #1 | 00401 | \$92.60 | \$115.60 |
| #4 | 00404 | \$97.20 | \$120.20 |

Series 605 • Burr Sets

9 Piece • Set contains 1 each

| | | |
|------|------|------|
| SA-1 | SC-1 | SF-1 |
| SA-3 | SC-3 | SF-3 |
| SA-5 | SC-5 | SF-5 |

| Cut | EDP# | Price | Coated |
|-----|-------|----------|----------|
| #1 | 00501 | \$114.40 | \$144.40 |
| #4 | 00504 | \$120.00 | \$150.00 |

Series 606 • Burr Sets

10 Piece • Set contains 1 each

| | | | |
|------|------|------|------|
| SA-5 | SF-5 | SG-3 | SD-5 |
| SC-5 | SF-3 | SE-3 | |
| SC-3 | SG-5 | SL-4 | |

| Cut | EDP# | Price | Coated |
|-----|-------|----------|----------|
| #1 | 00601 | \$152.50 | \$191.10 |
| #4 | 00604 | \$161.70 | \$200.30 |



ULTRATOOL® Carbide Rotary Files (Burrs)

Series 40



SB Style: Cylindrical Shape with End Cut

Burr Specifications:
Shank Diameter 1/4"
Add "M" for 6mm shank



#1



#4

| Tool Name | Diam | LOC | Standard EDP# | UnCoated Price | Coated Price | DuraCut EDP# | UnCoated Price | Coated Price |
|-----------|------|-------|---------------|----------------|--------------|--------------|----------------|--------------|
| SB-12 | 1/8 | 5/8 | 04001 | \$9.10 | \$11.40 | 04049 | \$9.50 | \$11.80 |
| SB-14 | 3/16 | 5/8 | 04002 | \$9.00 | \$11.30 | 04050 | \$9.40 | \$11.70 |
| SB-1 | 1/4 | 5/8 | 04003 | \$8.40 | \$10.70 | 04051 | \$8.80 | \$11.10 |
| SB-1A | 1/4 | 1" | 04004 | \$12.80 | \$15.10 | 04052 | \$13.40 | \$15.70 |
| SB-2 | 5/16 | 3/4 | 04005 | \$11.70 | \$14.90 | 04053 | \$12.30 | \$15.50 |
| SB-2A | 5/16 | 1" | 04006 | \$14.00 | \$17.20 | 04054 | \$14.70 | \$17.90 |
| SB-3 | 3/8 | 3/4 | 04007 | \$12.60 | \$15.80 | 04055 | \$13.20 | \$16.40 |
| SB-3A | 3/8 | 1" | 04008 | \$14.60 | \$17.80 | 04056 | \$15.30 | \$18.50 |
| SB-3B | 3/8 | 1-1/2 | 04009 | \$17.40 | \$20.60 | 04057 | \$18.30 | \$21.50 |
| SB-4 | 7/16 | 1" | 04010 | \$18.30 | \$22.60 | 04058 | \$19.20 | \$23.50 |
| SB-5 | 1/2 | 1" | 04011 | \$19.10 | \$23.40 | 04059 | \$21.60 | \$25.90 |
| SB-6 | 5/8 | 1" | 04012 | \$26.10 | \$32.20 | 04060 | \$27.50 | \$33.60 |
| SB-15 | 3/4 | 1/2 | 04013 | \$37.00 | \$44.10 | 04061 | \$38.90 | \$46.00 |
| SB-16 | 3/4 | 3/4 | 04014 | \$39.00 | \$46.10 | 04062 | \$41.00 | \$48.10 |
| SB-7 | 3/4 | 1" | 04015 | \$39.40 | \$46.50 | 04063 | \$41.40 | \$48.50 |
| SB-9 | 1" | 1" | 04016 | \$54.50 | \$63.80 | 04064 | \$57.30 | \$66.60 |

Series 41



SA Style: Cylindrical Shape

Burr Specifications:
Shank Diameter 1/4"
Add "M" for 6mm shank



#1



#4

| Tool Name | Diam | LOC | Standard EDP# | UnCoated Price | Coated Price | DuraCut EDP# | UnCoated Price | Coated Price |
|-----------|------|-------|---------------|----------------|--------------|--------------|----------------|--------------|
| SA-12 | 1/8 | 5/8 | 04101 | \$8.10 | \$10.40 | 04149 | \$8.60 | \$10.90 |
| SA-14 | 3/16 | 5/8 | 04102 | \$7.90 | \$10.20 | 04150 | \$8.30 | \$10.60 |
| SA-1 | 1/4 | 5/8 | 04103 | \$7.00 | \$9.30 | 04151 | \$7.40 | \$9.70 |
| SA-1A | 1/4 | 1" | 04104 | \$10.80 | \$13.10 | 04152 | \$11.30 | \$13.60 |
| SA-2 | 5/16 | 3/4 | 04105 | \$9.90 | \$13.10 | 04153 | \$10.40 | \$13.60 |
| SA-2A | 5/16 | 1" | 04106 | \$11.90 | \$15.10 | 04154 | \$12.50 | \$15.70 |
| SA-3 | 3/8 | 3/4 | 04107 | \$10.60 | \$13.80 | 04155 | \$11.20 | \$14.40 |
| SA-3A | 3/8 | 1" | 04108 | \$12.40 | \$15.60 | 04156 | \$13.00 | \$16.20 |
| SA-3B | 3/8 | 1-1/2 | 04109 | \$14.70 | \$17.90 | 04157 | \$15.50 | \$18.70 |
| SA-4 | 7/16 | 1" | 04110 | \$14.10 | \$18.40 | 04158 | \$15.20 | \$19.50 |
| SA-5 | 1/2 | 1" | 04111 | \$14.80 | \$19.10 | 04159 | \$15.50 | \$19.80 |
| SA-6 | 5/8 | 1" | 04112 | \$20.80 | \$26.90 | 04160 | \$22.20 | \$28.30 |
| SA-15 | 3/4 | 1/2 | 04113 | \$31.20 | \$38.30 | 04161 | \$33.70 | \$40.80 |
| SA-16 | 3/4 | 3/4 | 04114 | \$33.00 | \$40.10 | 04162 | \$35.70 | \$42.80 |
| SA-7 | 3/4 | 1" | 04115 | \$34.00 | \$41.00 | 04163 | \$36.70 | \$43.80 |
| SA-9 | 1" | 1" | 04116 | \$41.80 | \$51.10 | 04164 | \$43.60 | \$52.90 |

Series 42



SC Style: Cylindrical Ball Nose Shape

Burr Specifications:
Shank Diameter 1/4"
Add "M" for 6mm shank



#1



#4

| Tool Name | Diam | LOC | Standard EDP# | UnCoated Price | Coated Price | DuraCut EDP# | UnCoated Price | Coated Price |
|-----------|------|-------|---------------|----------------|--------------|--------------|----------------|--------------|
| SC-12 | 1/8 | 5/8 | 04201 | \$9.00 | \$11.30 | 04249 | \$9.40 | \$11.70 |
| SC-14 | 3/16 | 5/8 | 04202 | \$9.00 | \$11.30 | 04250 | \$9.40 | \$11.70 |
| SC-1 | 1/4 | 5/8 | 04203 | \$8.70 | \$11.00 | 04251 | \$9.20 | \$11.50 |
| SC-1A | 1/4 | 1" | 04204 | \$11.80 | \$14.10 | 04252 | \$12.30 | \$14.60 |
| SC-2 | 5/16 | 3/4 | 04205 | \$10.90 | \$14.10 | 04253 | \$11.40 | \$14.60 |
| SC-2A | 5/16 | 1" | 04206 | \$13.20 | \$16.40 | 04254 | \$13.80 | \$17.00 |
| SC-3 | 3/8 | 3/4 | 04207 | \$12.00 | \$15.20 | 04255 | \$12.50 | \$15.70 |
| SC-3A | 3/8 | 1" | 04208 | \$13.70 | \$16.90 | 04256 | \$14.30 | \$17.50 |
| SC-3B | 3/8 | 1-1/2 | 04209 | \$14.40 | \$17.60 | 04257 | \$15.20 | \$18.40 |
| SC-4 | 7/16 | 1" | 04210 | \$17.20 | \$21.50 | 04258 | \$18.10 | \$22.40 |
| SC-5 | 1/2 | 1" | 04211 | \$18.70 | \$23.00 | 04259 | \$19.60 | \$23.90 |
| SC-6 | 5/8 | 1" | 04212 | \$25.80 | \$31.90 | 04260 | \$27.00 | \$33.10 |
| SC-7 | 3/4 | 1" | 04215 | \$36.40 | \$43.50 | 04263 | \$38.30 | \$45.40 |

Series 43



SD Style: Ball Shape

Burr Specifications:
Shank Diameter 1/4"
Add "M" for 6mm shank



#1



#4

| Tool Name | Diam | LOC | Standard EDP# | UnCoated Price | Coated Price | DuraCut EDP# | UnCoated Price | Coated Price |
|-----------|------|-------|---------------|----------------|--------------|--------------|----------------|--------------|
| SD-12 | 1/8 | 7/64 | 04301 | \$8.50 | \$10.80 | 04349 | \$8.90 | \$11.20 |
| SD-14 | 3/16 | 11/64 | 04302 | \$8.40 | \$10.70 | 04350 | \$8.80 | \$11.10 |
| SD-1 | 1/4 | 7/32 | 04303 | \$8.20 | \$10.50 | 04351 | \$8.60 | \$10.90 |
| SD-2 | 5/16 | 17/64 | 04305 | \$8.70 | \$11.90 | 04353 | \$9.20 | \$12.40 |
| SD-3 | 3/8 | 5/16 | 04307 | \$10.30 | \$13.50 | 04355 | \$10.80 | \$14.00 |
| SD-4 | 7/16 | 3/8 | 04310 | \$12.70 | \$17.00 | 04358 | \$13.40 | \$17.70 |
| SD-5 | 1/2 | 7/16 | 04311 | \$13.90 | \$18.20 | 04359 | \$14.60 | \$18.90 |
| SD-6 | 5/8 | 17/32 | 04312 | \$18.70 | \$24.80 | 04360 | \$19.70 | \$25.80 |
| SD-7 | 3/4 | 21/32 | 04315 | \$26.10 | \$33.20 | 04363 | \$27.40 | \$34.50 |
| SD-9 | 1" | 29/32 | 04316 | \$44.80 | \$54.10 | 04364 | \$47.00 | \$56.30 |

Series 44



SE Style: Egg Shape

Burr Specifications:
Shank Diameter 1/4"
Add "M" for 6mm shank



#1



#4

| Tool Name | Diam | LOC | Standard EDP# | UnCoated Price | Coated Price | DuraCut EDP# | UnCoated Price | Coated Price |
|-----------|------|------|---------------|----------------|--------------|--------------|----------------|--------------|
| SE-11 | 3/16 | 5/16 | 04402 | \$10.20 | \$12.50 | 04450 | \$10.70 | \$13.00 |
| SE-1 | 1/4 | 3/8 | 04403 | \$10.00 | \$12.30 | 04451 | \$10.50 | \$12.80 |
| SE-3 | 3/8 | 5/8 | 04407 | \$12.10 | \$15.30 | 04455 | \$12.60 | \$15.80 |
| SE-5 | 1/2 | 7/8 | 04411 | \$18.30 | \$22.60 | 04459 | \$19.20 | \$23.50 |
| SE-6 | 5/8 | 1" | 04412 | \$25.60 | \$31.70 | 04460 | \$26.80 | \$32.90 |
| SE-7 | 3/4 | 1" | 04415 | \$34.20 | \$41.30 | 04463 | \$35.80 | \$42.90 |

Series 45



SF Style: Round Tree Shape

Burr Specifications:
Shank Diameter 1/4"
Add "M" for 6mm shank



#1



#4

| Tool Name | Diam | LOC | Standard EDP# | UnCoated Price | Coated Price | DuraCut EDP# | UnCoated Price | Coated Price |
|-----------|------|-------|---------------|----------------|--------------|--------------|----------------|--------------|
| SF-1 | 1/4 | 5/8 | 04503 | \$9.30 | \$11.60 | 04551 | \$9.70 | \$12.00 |
| SF-3 | 3/8 | 3/4 | 04507 | \$11.80 | \$15.00 | 04555 | \$12.30 | \$15.50 |
| SF-13 | 1/2 | 3/4 | 04510 | \$17.30 | \$21.60 | 04558 | \$18.20 | \$22.50 |
| SF-5 | 1/2 | 1" | 04511 | \$18.10 | \$22.40 | 04559 | \$19.00 | \$23.30 |
| SF-6 | 5/8 | 1" | 04512 | \$25.00 | \$31.10 | 04560 | \$26.20 | \$32.30 |
| SF-7 | 3/4 | 1" | 04515 | \$30.90 | \$38.00 | 04563 | \$32.40 | \$39.50 |
| SF-14 | 3/4 | 1-1/4 | 04516 | \$37.10 | \$44.20 | 04564 | \$39.00 | \$46.10 |
| SF-15 | 3/4 | 1-1/2 | 04517 | \$47.60 | \$54.70 | 04565 | \$49.90 | \$57.00 |

Series 46**SG Style: Pointed Tree Shape**

Burr Specifications:
Shank Diameter 1/4"
Add "M" for 6mm shank

#1



#4



| Tool Name | Diam | LOC | Standard EDP# | UnCoated Price | Coated Price | DuraCut EDP# | UnCoated Price | Coated Price |
|-----------|------|-------|---------------|----------------|--------------|--------------|----------------|--------------|
| SG-1 | 1/4 | 5/8 | 04603 | \$9.30 | \$11.60 | 04651 | \$9.70 | \$12.00 |
| SG-2 | 5/16 | 3/4 | 04605 | \$10.90 | \$14.10 | 04653 | \$11.40 | \$14.60 |
| SG-3 | 3/8 | 5/8 | 04607 | \$11.80 | \$15.00 | 04655 | \$12.30 | \$15.50 |
| SG-13 | 1/2 | 3/4 | 04610 | \$17.30 | \$21.60 | 04658 | \$18.20 | \$22.50 |
| SG-5 | 1/2 | 1" | 04611 | \$18.10 | \$22.40 | 04659 | \$19.00 | \$23.30 |
| SG-6 | 5/8 | 1" | 04612 | \$25.10 | \$31.20 | 04660 | \$26.30 | \$32.40 |
| SG-7 | 3/4 | 1" | 04615 | \$33.00 | \$40.10 | 04663 | \$34.70 | \$41.80 |
| SG-15 | 3/4 | 1-1/2 | 04617 | \$47.60 | \$54.70 | 04665 | \$49.90 | \$57.00 |

Series 47**SM Style: Cone Shape**

Burr Specifications:
Shank Diameter 1/4"
Add "M" for 6mm shank

#1



#4



| Tool Name | Diam | Inc Ang | LOC | Standard EDP# | UnCoated Price | Coated Price | DuraCut EDP# | UnCoated Price | Coated Price |
|-----------|------|---------|-------|---------------|----------------|--------------|--------------|----------------|--------------|
| SM-1 | 1/4 | 22° | 1/2 | 04703 | \$9.00 | \$11.30 | 04751 | \$9.40 | \$11.70 |
| SM-2 | 1/4 | 14° | 3/4 | 04705 | \$9.40 | \$11.70 | 04753 | \$9.90 | \$12.20 |
| SM-3 | 1/4 | 10° | 1" | 04707 | \$10.90 | \$13.20 | 04755 | \$11.40 | \$13.70 |
| SM-3A | 1/4 | 8° | 1-1/4 | 04710 | \$12.40 | \$14.70 | 04758 | \$13.00 | \$15.30 |
| SM-4 | 3/8 | 28° | 5/8 | 04711 | \$15.00 | \$18.20 | 04759 | \$15.70 | \$18.90 |
| SM-5 | 1/2 | 28° | 7/8 | 04712 | \$19.70 | \$24.00 | 04760 | \$20.70 | \$25.00 |
| SM-6 | 5/8 | 31° | 1" | 04715 | \$26.90 | \$33.00 | 04763 | \$28.30 | \$34.40 |

Series 48**SL Style: 14° Included Angle Shape**

Burr Specifications:
Shank Diameter 1/4"
Add "M" for 6mm shank

#1



#4



| Tool Name | Diam | LOC | Standard EDP# | UnCoated Price | Coated Price | DuraCut EDP# | UnCoated Price | Coated Price |
|-----------|------|--------|---------------|----------------|--------------|--------------|----------------|--------------|
| SL-1 | 1/4 | 5/8 | 04802 | \$9.40 | \$11.70 | 04850 | \$9.90 | \$12.20 |
| SL-2 | 5/16 | 7/8 | 04803 | \$12.50 | \$15.70 | 04851 | \$13.10 | \$16.30 |
| SL-3 | 3/8 | 1-1/16 | 04807 | \$14.90 | \$18.10 | 04855 | \$15.60 | \$18.80 |
| SL-4 | 1/2 | 1-1/8 | 04811 | \$18.60 | \$22.90 | 04859 | \$19.50 | \$23.80 |
| SL-6 | 5/8 | 1-5/16 | 04812 | \$34.20 | \$40.30 | 04860 | \$35.80 | \$41.90 |
| SL-7 | 3/4 | 1-1/2 | 04815 | \$49.70 | \$56.80 | 04863 | \$52.20 | \$59.30 |

Series 49**SH Style: Flame Shape**

Burr Specifications:
Shank Diameter 1/4"
Add "M" for 6mm shank

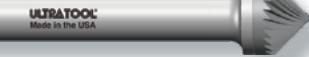
#1



#4



| Tool Name | Diam | LOC | Standard EDP# | UnCoated Price | Coated Price | DuraCut EDP# | UnCoated Price | Coated Price |
|-----------|------|--------|---------------|----------------|--------------|--------------|----------------|--------------|
| SH-1 | 1/4 | 5/8 | 04902 | \$10.90 | \$13.20 | 04950 | \$11.40 | \$13.70 |
| SH-2 | 5/16 | 3/4 | 04903 | \$12.40 | \$15.60 | 04951 | \$13.00 | \$16.20 |
| SH-5 | 1/2 | 1-1/4 | 04907 | \$26.10 | \$30.40 | 04955 | \$27.50 | \$31.80 |
| SH-6 | 5/8 | 1-7/16 | 04911 | \$36.20 | \$42.30 | 04959 | \$38.10 | \$44.20 |
| SH-7 | 3/4 | 1-5/8 | 04912 | \$49.90 | \$57.00 | 04960 | \$52.40 | \$59.50 |

Series 50**SK Style: 90° Included Angle Shape**

Burr Specifications:
Shank Diameter 1/4"
Add "M" for 6mm shank

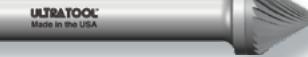
#1



#4



| Tool Name | Diam | LOC | Standard EDP# | UnCoated Price | Coated Price | DuraCut EDP# | UnCoated Price | Coated Price |
|-----------|------|------|---------------|----------------|--------------|--------------|----------------|--------------|
| SK-1 | 1/4 | 1/8 | 05003 | \$8.70 | \$11.00 | 05051 | \$9.10 | \$11.40 |
| SK-2 | 5/16 | 5/32 | 05005 | \$10.80 | \$14.00 | 05053 | \$11.30 | \$14.50 |
| SK-3 | 3/8 | 3/16 | 05007 | \$11.20 | \$14.40 | 05055 | \$11.80 | \$15.00 |
| SK-5 | 1/2 | 1/4 | 05010 | \$14.40 | \$18.70 | 05058 | \$15.10 | \$19.40 |
| SK-6 | 5/8 | 5/16 | 05011 | \$19.00 | \$25.10 | 05059 | \$19.90 | \$26.00 |
| SK-7 | 3/4 | 3/8 | 05012 | \$25.10 | \$32.20 | 05060 | \$26.30 | \$33.40 |
| SK-8 | 7/8 | 7/16 | 05015 | \$33.10 | \$42.40 | 05063 | \$34.70 | \$44.00 |
| SK-9 | 1" | 1/2 | 05017 | \$40.00 | \$49.30 | 05065 | \$42.00 | \$51.30 |

Series 51**SJ Style: 60° Included Angle Shape**

Burr Specifications:
Shank Diameter 1/4"
Add "M" for 6mm shank

#1



#4



| Tool Name | Diam | LOC | Standard EDP# | UnCoated Price | Coated Price | DuraCut EDP# | UnCoated Price | Coated Price |
|-----------|------|------|---------------|----------------|--------------|--------------|----------------|--------------|
| SJ-1 | 1/4 | 3/16 | 05103 | \$8.70 | \$11.00 | 05151 | \$9.10 | \$11.40 |
| SJ-2 | 5/16 | 1/4 | 05105 | \$10.80 | \$14.00 | 05153 | \$11.30 | \$14.50 |
| SJ-3 | 3/8 | 1/4 | 05107 | \$11.20 | \$14.40 | 05155 | \$11.80 | \$15.00 |
| SJ-5 | 1/2 | 7/16 | 05110 | \$14.40 | \$18.70 | 05158 | \$15.10 | \$19.40 |
| SJ-6 | 5/8 | 1/2 | 05111 | \$19.00 | \$25.10 | 05159 | \$19.90 | \$26.00 |
| SJ-7 | 3/4 | 5/8 | 05112 | \$25.10 | \$32.20 | 05160 | \$26.30 | \$33.40 |
| SJ-8 | 7/8 | 3/4 | 05115 | \$33.10 | \$42.40 | 05163 | \$34.70 | \$44.00 |
| SJ-9 | 1" | 3/4 | 05117 | \$40.00 | \$49.30 | 05165 | \$42.00 | \$51.30 |

Series 52**SN Style: Inverted Cone Shape**

Burr Specifications:
Shank Diameter 1/4"
Add "M" for 6mm shank

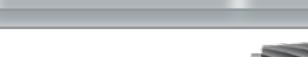
#1



#4



| Tool Name | Diam | LOC | Standard EDP# | UnCoated Price | Coated Price | DuraCut EDP# | UnCoated Price | Coated Price |
|-----------|------|------|---------------|----------------|--------------|--------------|----------------|--------------|
| SN-1 | 1/4 | 5/16 | 05202 | \$10.00 | \$12.30 | 05250 | \$10.50 | \$12.80 |
| SN-2 | 3/8 | 3/8 | 05203 | \$14.50 | \$17.70 | 05251 | \$15.20 | \$18.40 |
| SN-3 | 1/2 | 1/2 | 05207 | \$20.70 | \$25.00 | 05255 | \$21.60 | \$25.90 |
| SN-6 | 5/8 | 3/4 | 05211 | \$26.00 | \$32.10 | 05259 | \$27.30 | \$33.40 |
| SN-7 | 3/4 | 5/8 | 05212 | \$32.70 | \$39.80 | 05260 | \$34.30 | \$41.40 |

Series 53**SN-E Style: Inverted Cone Shape with End Cut**

Burr Specifications:
Shank Diameter 1/4"
Add "M" for 6mm shank

#1



#4



| Tool Name | Diam | LOC | Standard EDP# | UnCoated Price | Coated Price | DuraCut EDP# | UnCoated Price | Coated Price |
|-----------|------|------|---------------|----------------|--------------|--------------|----------------|--------------|
| SN-1E | 1/4 | 5/16 | 05302 | \$11.00 | \$13.30 | 05350 | \$11.60 | \$13.90 |
| SN-2E | 3/8 | 3/8 | 05303 | \$15.40 | \$18.60 | 05351 | \$16.20 | \$19.40 |
| SN-3E | 1/2 | 1/2 | 05307 | \$23.60 | \$27.90 | 05355 | \$24.80 | \$29.10 |
| SN-6E | 5/8 | 3/4 | 05311 | \$29.20 | \$35.30 | 05359 | \$30.60 | \$36.70 |
| SN-7E | 3/4 | 5/8 | 05312 | \$37.70 | \$44.80 | 05360 | \$39.60 | \$46.70 |

ULTRATOOL® Solid Carbide Construction Burrs • 1/16 to 3/16" Diameter**Series 59 Solid Carbide Construction • 1-1/2" OAL • 1/8" Diameter Shank**

For Metric sizing (1.5mm - 3.0mm Diam, 38mm OAL, 3mm shank), add 70000 to displayed EDP.



Burr Specifications:
Shank Diameter 1/8"
Add "M" for 3mm shank

SA-43 • 1/8x9/16

| Cut | EDP# | Price | Coated |
|-----|-------|--------|--------|
| #1 | 05901 | \$3.80 | \$4.80 |
| #4 | 05904 | \$4.30 | \$5.30 |

SD-42 • 1/8 Ball

| Cut | EDP# | Price | Coated |
|-----|-------|--------|--------|
| #1 | 05949 | \$4.30 | \$5.30 |
| #4 | 05952 | \$4.80 | \$5.80 |

SF-42 • 1/8x1/2

| Cut | EDP# | Price | Coated |
|-----|-------|--------|--------|
| #1 | 05997 | \$4.30 | \$5.30 |
| #4 | 15901 | \$4.80 | \$5.80 |

SM-42 • 1/8x7/16 14°IncTaper

| Cut | EDP# | Price | Coated |
|-----|-------|--------|--------|
| #1 | 15946 | \$4.30 | \$5.30 |
| #4 | 15949 | \$4.80 | \$5.80 |

SA-42 • 3/32x7/16

| Cut | EDP# | Price | Coated |
|-----|-------|--------|--------|
| #1 | 05909 | \$3.80 | \$4.80 |
| #4 | 05912 | \$4.30 | \$5.30 |

SD-41 • 3/32 Ball

| Cut | EDP# | Price | Coated |
|-----|-------|--------|--------|
| #1 | 05957 | \$4.30 | \$5.30 |
| #4 | 05960 | \$4.80 | \$5.80 |

SF-41 • 1/8x1/4

| Cut | EDP# | Price | Coated |
|-----|-------|--------|--------|
| #1 | 15906 | \$4.30 | \$5.30 |
| #4 | 15909 | \$4.80 | \$5.80 |

SM-43 • 1/8x5/8 7°IncTaper

| Cut | EDP# | Price | Coated |
|-----|-------|--------|--------|
| #1 | 15954 | \$4.30 | \$5.30 |
| #4 | 15957 | \$4.80 | \$5.80 |

SA-41 • 1/16x1/4

| Cut | EDP# | Price | Coated |
|-----|-------|--------|--------|
| #1 | 05917 | \$4.30 | \$5.30 |
| #4 | 05920 | \$4.80 | \$5.80 |

SE-41 • 1/8x1/4

| Cut | EDP# | Price | Coated |
|-----|-------|--------|--------|
| #1 | 05965 | \$4.30 | \$5.30 |
| #4 | 05968 | \$4.80 | \$5.80 |

SG-44 • 1/8x1/2

| Cut | EDP# | Price | Coated |
|-----|-------|--------|--------|
| #1 | 15914 | \$4.30 | \$5.30 |
| #4 | 15917 | \$4.80 | \$5.80 |

SL-41 • 1/8x3/8 8°IncTaper

| Cut | EDP# | Price | Coated |
|-----|-------|--------|--------|
| #1 | 15962 | \$4.30 | \$5.30 |
| #4 | 15965 | \$4.80 | \$5.80 |

SB-41 • 1/8

| Cut | EDP# | Price | Coated |
|-----|-------|--------|--------|
| #1 | 05925 | \$4.30 | \$5.30 |

SH-41 • 1/8x1/4

| Cut | EDP# | Price | Coated |
|-----|-------|--------|--------|
| #1 | 05973 | \$4.30 | \$5.30 |
| #4 | 05976 | \$4.80 | \$5.80 |

SG-43 • 1/8x3/8

| Cut | EDP# | Price | Coated |
|-----|-------|--------|--------|
| #1 | 15922 | \$4.30 | \$5.30 |
| #4 | 15925 | \$4.80 | \$5.80 |

SL-42 • 1/8x1/2 8°IncTaper

| Cut | EDP# | Price | Coated |
|-----|-------|--------|--------|
| #1 | 15970 | \$4.30 | \$5.30 |
| #4 | 15973 | \$4.80 | \$5.80 |

SC-42 • 1/8x9/16

| Cut | EDP# | Price | Coated |
|-----|-------|--------|--------|
| #1 | 05933 | \$4.30 | \$5.30 |
| #4 | 05936 | \$4.80 | \$5.80 |

SN-42 • 1/8x3/16

| Cut | EDP# | Price | Coated |
|-----|-------|--------|--------|
| #1 | 05981 | \$4.30 | \$5.30 |
| #4 | 05984 | \$4.80 | \$5.80 |

SG-41 • 1/8x1/4

| Cut | EDP# | Price | Coated |
|-----|-------|--------|--------|
| #1 | 15930 | \$4.30 | \$5.30 |
| #4 | 15933 | \$4.80 | \$5.80 |

SC-41 • 3/32x7/16

| Cut | EDP# | Price | Coated |
|-----|-------|--------|--------|
| #1 | 05941 | \$4.30 | \$5.30 |
| #4 | 05944 | \$4.80 | \$5.80 |

SN-41 • 3/32x1/8

| Cut | EDP# | Price | Coated |
|-----|-------|--------|--------|
| #1 | 05989 | \$4.30 | \$5.30 |
| #4 | 05992 | \$4.80 | \$5.80 |

SM-41 • 1/8x11/32 12°IncTaper

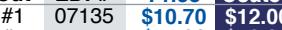
| Cut | EDP# | Price | Coated |
|-----|-------|--------|--------|
| #1 | 15938 | \$4.30 | \$5.30 |
| #4 | 15941 | \$4.80 | \$5.80 |

SJ-42 • 1/8 60° Inc Taper

| Cut | EDP# | Price | Coated |
|-----|-------|--------|--------|
| #1 | 15986 | \$4.30 | \$5.30 |
| #4 | 15989 | \$4.80 | \$5.80 |

SA-52 • 5/32x1/2" LOC

| Cut | EDP# | Price | Coated |
|-----|-------|---------|---------|
| #1 | 07109 | \$10.70 | \$12.00 |
| #4 | 07122 | \$11.90 | \$13.20 |

SC-53 • 3/16x1/2" LOC

| Cut | EDP# | Price | Coated |
|-----|-------|---------|---------|
| #1 | 07143 | \$10.70 | \$12.00 |
| #4 | 07146 | \$11.90 | \$13.20 |

SM-53 • 3/16x1/2 16°IncTaper

| Cut | EDP# | Price | Coated |
|-----|-------|---------|---------|
| #1 | 07167 | \$10.70 | \$12.00 |
| #4 | 07170 | \$11.90 | \$13.20 |

SE-53 • 3/16x9/32" LOC

ULTRATOOL® Carbide Rotary Files (Burrs)

SA-51 • 1/2" LOC



| Cut | EDP# | Price | Coated |
|-----|-------|--------|--------|
| #1 | 07001 | \$7.70 | \$9.00 |
| #4 | 07004 | \$8.60 | \$9.90 |

SB-51 • 3/16" LOC



| Cut | EDP# | Price | Coated |
|-----|-------|--------|--------|
| #1 | 07009 | \$7.70 | \$9.00 |
| #4 | 07022 | \$8.60 | \$9.90 |

SD-51 • 1/4" LOC



| Cut | EDP# | Price | Coated |
|-----|-------|--------|--------|
| #1 | 07027 | \$7.70 | \$9.00 |
| #4 | 07030 | \$8.60 | \$9.90 |

Series 70 1/4" Diameter Carbide Head • 1/8" Steel Shank • 2" max OAL

For Metric sizing, add 70000 to displayed EDP#. Diameter = 6.4mm, 3.0mm Shank, 38mm Shank Length



Burr Specifications:
Shank Diameter 1/8"
Add "M" for 3mm shank

All Cut Styles available with TA coating.

SC-51 • 1/2" LOC



| Cut | EDP# | Price | Coated |
|-----|-------|--------|--------|
| #1 | 07035 | \$7.70 | \$9.00 |
| #4 | 07038 | \$8.60 | \$9.90 |

SG-51 • 1/2" LOC



| Cut | EDP# | Price | Coated |
|-----|-------|--------|--------|
| #1 | 07051 | \$7.70 | \$9.00 |
| #4 | 07054 | \$8.60 | \$9.90 |

SE-51 • 3/8" LOC



| Cut | EDP# | Price | Coated |
|-----|-------|--------|--------|
| #1 | 07067 | \$7.70 | \$9.00 |
| #4 | 07070 | \$8.60 | \$9.90 |

SF-51 • 1/2" LOC



| Cut | EDP# | Price | Coated |
|-----|-------|--------|--------|
| #1 | 07043 | \$7.70 | \$9.00 |
| #4 | 07046 | \$8.60 | \$9.90 |

SM-51 • 1/2" LOC 22°



| Cut | EDP# | Price | Coated |
|-----|-------|--------|--------|
| #1 | 07059 | \$7.70 | \$9.00 |
| #4 | 07062 | \$8.60 | \$9.90 |

SN-51 • 1/4" LOC 10°



| Cut | EDP# | Price | Coated |
|-----|-------|--------|--------|
| #1 | 07075 | \$7.70 | \$9.00 |
| #4 | 07078 | \$8.60 | \$9.90 |

ULTRATOOL® Fast Mill Non-Ferrous Cut Carbide Rotary Files (Burrs)

Cut #7 Non-Ferrous Cut Style • 1/4" Shank

For Metric sizing, add 70000 to displayed EDP#, shank diameter = 6.0mm.

Fast-Mill is designed specifically for use on non-ferrous and non-metal materials. Designed for rapid stock removal with minimum chip load. The best selection for rapid removal of aluminum. These tools more resemble form tools than traditional burrs; each is CNC ground with high precision, tight tolerances, and superb surface finishes.

Our #7 Fast Mill non-ferrous cut is available with TC (or A1 upon request) coating.

Burr Specifications:
Shank Diameter 1/4"
Add "M" for 6mm shank

| # flutes | Style | FastMill EDP# | UnCoated Price | Coated Price |
|----------|------------|---------------|----------------|--------------|
| | | #7 cut | UC | TC |
| 6 | SA-1 #7 | 04199 | \$10.50 | \$13.50 |
| 6 | SA-3 #7 | 14104 | \$15.00 | \$19.80 |
| 8 | SA-5 #7 | 14108 | \$22.60 | \$28.60 |
| 6 | SB-1 #7 | 04099 | \$11.70 | \$14.70 |
| 6 | SB-3 #7 | 14004 | \$17.60 | \$22.40 |
| 8 | SB-5 #7 | 14008 | \$28.80 | \$34.80 |
| 6 | SC-1 #7 | 04299 | \$12.20 | \$15.20 |
| 6 | SC-3 #7 | 14204 | \$16.70 | \$21.50 |
| 8 | SC-5 #7 | 14208 | \$26.10 | \$32.10 |
| 6 | SD-1 #7 | 04399 | \$11.60 | \$14.60 |
| 6 | SD-3 #7 | 14303 | \$14.40 | \$19.20 |
| 8 | SD-5 #7 | 14308 | \$19.50 | \$25.50 |
| 6 | SE-3 #7 | 14403 | \$16.80 | \$21.60 |
| 8 | SE-5 #7 | 14408 | \$25.50 | \$31.50 |
| 6 | SF-1 #7 | 04599 | \$13.00 | \$16.00 |
| 6 | SF-3 #7 | 14503 | \$16.40 | \$21.20 |
| 8 | SF-5 #7 | 14508 | \$25.30 | \$31.30 |
| 6 | SF-5 #7spl | 14506 | \$25.30 | \$31.30 |
| 12 | SF-14 #7 | 14513 | \$51.90 | \$61.90 |
| 6 | SL-3 #7 | 14803 | \$20.80 | \$25.60 |
| 8 | SL-4 #7 | 14808 | \$26.10 | \$32.10 |

ULTRATOOL® BURRS & SETS ALSO AVAILABLE IN METRIC CONFIGURATION:

Furnished on 6mm or 3mm shanks. Add 70000 to displayed EDP# (#04001 becomes #74001). Add "M" to Style description (SA-5 becomes MSA-5). Two-piece construction burrs retain fractional head diameters & LOC.

Extended Length ULTRATOOL® Burrs

SB, SA, SC, SD, SE, SF, SG, SH & SL Styles with 6" Extended Length Shanks

Series 54

ULTRATOOL
Made in the USA

Our most popular burr shapes & cut styles are now offered with 6" long shanks for extended reach.
Also available with 6mm diameter metric shanks (add 70000 to displayed EDP# or "M" to tool name).



Burr Specifications:
Shank Diameter 1/4"
Add "M" for 6mm shank



#1



#4



#8



Tool

Name

Diam

LOC

Standard

EDP#

UnCoated

Price

Coated

Price

DuraC

EDP#

UnCoated

Price

Coated

Price

Diamond

EDP#

UnCoated

Price

Coated

Price

| Tool Name | Diam | LOC | Standard EDP# | UnCoated Price | Coated Price | DuraC EDP# | UnCoated Price | Coated Price | Diamond EDP# | UnCoated Price | Coated Price |
|-----------|------|--------|---------------|----------------|--------------|------------|----------------|--------------|--------------|----------------|--------------|
| SB-1L6 | 1/4 | 1/2 | 03024 | \$17.00 | \$22.00 | 03050 | \$17.80 | \$22.80 | 03076 | \$20.40 | \$25.40 |
| SB-3L6 | 3/8 | 3/4 | 03025 | \$21.60 | \$28.50 | 03051 | \$22.70 | \$29.50 | 03077 | \$25.90 | \$32.70 |
| SB-5L6 | 1/2 | 1" | 03026 | \$28.20 | \$35.70 | 03052 | \$29.60 | \$37.00 | 03078 | \$33.90 | \$41.30 |
| SA-1L6 | 1/4 | 1/2 | 03001 | \$14.80 | \$19.80 | 03027 | \$15.50 | \$20.50 | 03053 | \$17.70 | \$22.70 |
| SA-3L6 | 3/8 | 3/4 | 03002 | \$18.80 | \$25.60 | 03028 | \$19.80 | \$26.50 | 03054 | \$22.60 | \$29.40 |
| SA-5L6 | 1/2 | 1" | 03003 | \$24.60 | \$32.00 | 03029 | \$25.80 | \$33.20 | 03055 | \$29.40 | \$36.80 |
| SC-1L6 | 1/4 | 1/2 | 03004 | \$14.80 | \$19.80 | 03030 | \$15.50 | \$20.50 | 03056 | \$17.70 | \$22.70 |
| SC-3L6 | 3/8 | 3/4 | 03005 | \$18.80 | \$25.60 | 03031 | \$19.80 | \$26.50 | 03057 | \$22.60 | \$29.40 |
| SC-5L6 | 1/2 | 1" | 03006 | \$26.70 | \$34.20 | 03032 | \$28.10 | \$35.50 | 03058 | \$32.10 | \$39.50 |
| SD-1L6 | 1/4 | 7/32 | 03007 | \$14.80 | \$19.80 | 03033 | \$15.50 | \$20.50 | 03059 | \$17.70 | \$22.70 |
| SD-3L6 | 3/8 | 5/16 | 03008 | \$18.80 | \$25.60 | 03034 | \$19.80 | \$26.50 | 03060 | \$22.60 | \$29.40 |
| SD-5L6 | 1/2 | 7/16 | 03009 | \$24.60 | \$32.00 | 03035 | \$25.80 | \$33.20 | 03061 | \$29.40 | \$36.80 |
| SE-1L6 | 1/4 | 3/8 | 03010 | \$15.30 | \$20.30 | 03036 | \$16.10 | \$21.10 | 03062 | \$18.40 | \$23.40 |
| SE-3L6 | 3/8 | 5/8 | 03011 | \$18.80 | \$25.60 | 03037 | \$19.80 | \$26.50 | 03063 | \$22.60 | \$29.40 |
| SE-5L6 | 1/2 | 7/8 | 03012 | \$27.20 | \$34.60 | 03038 | \$28.50 | \$35.90 | 03064 | \$32.60 | \$40.00 |
| SF-1L6 | 1/4 | 1/2 | 03013 | \$15.90 | \$20.90 | 03039 | \$16.70 | \$21.70 | 03065 | \$19.10 | \$24.10 |
| SF-3L6 | 3/8 | 3/4 | 03014 | \$18.80 | \$25.60 | 03040 | \$19.80 | \$26.50 | 03066 | \$22.60 | \$29.40 |
| SF-5L6 | 1/2 | 1" | 03015 | \$25.30 | \$32.70 | 03041 | \$26.50 | \$34.00 | 03067 | \$30.30 | \$37.70 |
| SG-1L6 | 1/4 | 1/2 | 03016 | \$14.80 | \$19.80 | 03042 | \$15.50 | \$20.50 | 03068 | \$17.70 | \$22.70 |
| SG-3L6 | 3/8 | 3/4 | 03017 | \$18.80 | \$25.60 | 03043 | \$19.80 | \$26.50 | 03069 | \$22.60 | \$29.40 |
| SG-5L6 | 1/2 | 1" | 03018 | \$26.00 | \$33.40 | 03044 | \$27.30 | \$34.70 | 03070 | \$31.20 | \$38.60 |
| SH-2L6 | 5/16 | 3/4 | 03019 | \$18.80 | \$25.60 | 03045 | \$19.80 | \$26.50 | 03071 | \$22.60 | \$29.40 |
| SH-5L6 | 1/2 | 1-1/4 | 03020 | \$36.10 | \$43.50 | 03046 | \$37.90 | \$45.30 | 03072 | \$43.30 | \$50.70 |
| SL-1L6 | 1/4 | 5/8 | 03021 | \$15.90 | \$20.90 | 03047 | \$16.70 | \$21.70 | 03073 | \$19.10 | \$24.10 |
| SL-3L6 | 3/8 | 1-1/16 | 03022 | \$28.50 | \$35.30 | 03048 | \$29.90 | \$36.70 | 03074 | \$34.10 | \$40.90 |
| SL-4L6 | 1/2 | 1-1/8 | 03023 | \$30.30 | \$37.70 | 03049 | \$31.90 | \$39.30 | 03075 | \$36.40 | \$43.80 |

Solid Carbide ULTRATOOL® Piloted Die Trimmers

new!

Series 341

Solid Carbide Piloted Die Trimmers

Double "Dura-Cut" Style • Right Hand Cut • Non-Cutting Pilot



These die trimming burrs have a cylindrical, non-cutting pilot with OD tolerance of +.0000 / -.0003 (before coating) to prevent scoring of the die beyond the intended work area. The double Dura-Cut style allows for easy operator control and rapid material removal. Available UnCoated (UC) or with TA SmoothCoat.



| Diam | LOC | Pilot Lgth | OAL | Shank | EDP# | Price | Coated |
|------|-----|------------|-------|-------|-------|---------|---------|
| 1/8 | 1" | 1/2 | 2-1/2 | 1/8 | 34168 | \$30.70 | \$33.00 |
| 3/16 | 1" | 1/2 | 2-1/2 | 3/16 | 34169 | \$33.20 | \$36.10 |
| 1/4 | 1" | 1/2 | 2-1/2 | 1/4 | 34170 | \$35.00 | \$38.80 |
| 1/4 | 1" | 1/2 | 3" | 1/4 | 34171 | \$37.10 | \$40.90 |
| 3/8 | 1" | 1/2 | 2-1/2 | 3/8 | 34172 | \$47.10 | \$52.20 |
| 1/2 | 1" | 1/2 | 2-1/2 | 1/2 | 34173 | \$66.50 | \$73.40 |

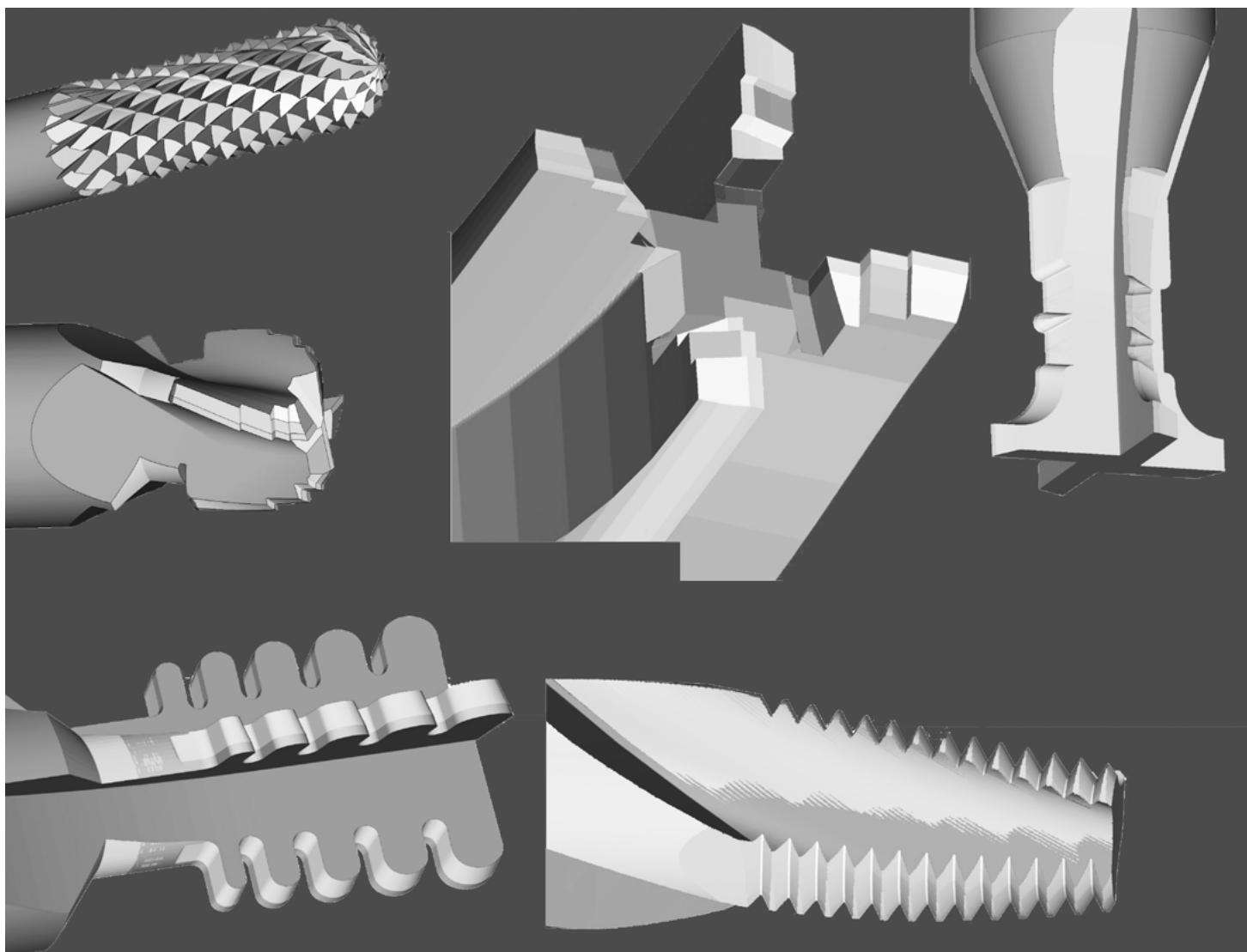
| Diam | LOC | Pilot Lgth | OAL | Shank | EDP# | Price | Coated |
|--------|-----|------------|-----|-------|-------|---------|---------|
| 3.0mm | 25 | 12 | 63 | 3.0 | 34174 | \$30.70 | \$33.00 |
| 4.0mm | 25 | 12 | 63 | 4.0 | 34175 | \$32.50 | \$35.10 |
| 5.0mm | 25 | 12 | 63 | 5.0 | 34176 | \$33.20 | \$36.10 |
| 6.0mm | 25 | 12 | 63 | 6.0 | 34177 | \$35.00 | \$38.80 |
| 8.0mm | 25 | 12 | 63 | 8.0 | 34178 | \$43.40 | \$47.80 |
| 10.0mm | 25 | 12 | 70 | 10.0 | 34179 | \$60.50 | \$67.20 |



ULTRATOOL®

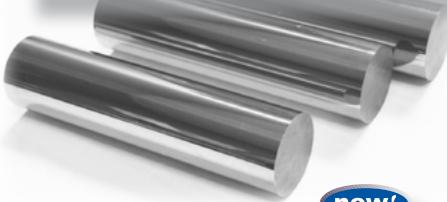
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Solid Carbide Specials**

Looking for a solid carbide special? If it can be ground, Ultra-Tool can do it. We use the world's most advanced design and grinding software, combined with precision equipment maintained in impeccable condition, all carried out by an experienced team of professional craftsmen. And always manufactured at our factories in Florida or California. Contact our sales desk for more information or to talk to a specialist.





ULTRATOOL® Precision Ground & Polished Solid Carbide Blanks



ULTRAGrain®

new!
Series 650
 Solid Carbide Blanks

| Diam | Dec. | OAL | EDP# | Price |
|------|-------|-------|-------|--------|
| #69 | .0292 | 1-1/4 | 65301 | \$4.70 |
| #68 | .0310 | 1-1/4 | 65302 | \$4.70 |
| 1/32 | .0312 | 1-1/4 | 65303 | \$4.70 |
| #67 | .0320 | 1-1/4 | 65304 | \$4.70 |
| #66 | .0330 | 1-1/4 | 65305 | \$4.50 |
| #65 | .0350 | 1-1/2 | 65306 | \$4.50 |
| #64 | .0360 | 1-1/2 | 65307 | \$4.50 |
| #63 | .0370 | 1-1/2 | 65308 | \$4.50 |
| #62 | .0380 | 1-1/2 | 65309 | \$4.50 |
| #61 | .0390 | 1-1/2 | 65310 | \$4.40 |
| #60 | .0400 | 1-1/2 | 65312 | \$4.40 |
| #59 | .0410 | 1-1/2 | 65313 | \$4.40 |
| #58 | .0420 | 1-1/2 | 65314 | \$4.40 |
| #57 | .0430 | 1-1/2 | 65315 | \$4.40 |
| #56 | .0465 | 1-1/2 | 65316 | \$4.40 |
| 3/64 | .0469 | 1-1/2 | 65317 | \$4.40 |
| #55 | .0520 | 1-1/2 | 65318 | \$4.40 |
| #54 | .0550 | 1-1/2 | 65319 | \$4.40 |
| #53 | .0595 | 1-1/2 | 65321 | \$4.40 |
| 1/16 | .0625 | 1-1/2 | 65001 | \$4.10 |
| #52 | .0635 | 1-1/2 | 65322 | \$4.20 |
| #51 | .0670 | 1-3/4 | 65323 | \$4.20 |
| #50 | .0700 | 1-3/4 | 65325 | \$4.20 |
| #50 | .0700 | 2" | 65324 | \$4.50 |
| #49 | .0730 | 1-3/4 | 65327 | \$4.20 |
| #49 | .0730 | 2" | 65326 | \$4.50 |
| #48 | .0760 | 1-3/4 | 65329 | \$4.20 |
| #48 | .0760 | 2" | 65328 | \$4.50 |
| 5/64 | .0781 | 1-3/4 | 65331 | \$4.20 |
| 5/64 | .0781 | 2" | 65330 | \$4.50 |
| #47 | .0785 | 1-3/4 | 65333 | \$4.20 |
| #47 | .0785 | 2" | 65332 | \$4.50 |
| #46 | .0810 | 1-3/4 | 65337 | \$4.20 |
| #46 | .0810 | 2" | 65336 | \$4.50 |
| #45 | .0820 | 1-3/4 | 65339 | \$4.20 |
| #45 | .0820 | 2" | 65338 | \$4.50 |
| #44 | .0860 | 2" | 65340 | \$4.50 |
| #43 | .0890 | 2" | 65341 | \$4.50 |
| #42 | .0935 | 2" | 65342 | \$4.50 |
| 3/32 | .0938 | 2" | 65002 | \$4.50 |
| #41 | .0960 | 2" | 65343 | \$4.50 |
| #40 | .0980 | 2" | 65344 | \$4.50 |
| #39 | .0995 | 2-1/4 | 65346 | \$5.00 |
| #38 | .1015 | 2-1/4 | 65347 | \$5.00 |
| #37 | .1040 | 2-1/4 | 65348 | \$5.00 |
| #36 | .1065 | 2-1/4 | 65349 | \$5.00 |
| 7/64 | .1094 | 2-1/4 | 65036 | \$5.00 |
| #35 | .1100 | 2-1/4 | 65350 | \$5.00 |
| #34 | .1110 | 2-1/4 | 65351 | \$5.00 |
| #33 | .1130 | 2-1/4 | 65352 | \$5.00 |
| #32 | .1160 | 2-1/4 | 65353 | \$5.00 |
| #31 | .1200 | 2-1/4 | 65355 | \$5.00 |
| 1/8 | .1250 | 1-1/2 | 65003 | \$2.30 |

| Diam | Dec. | OAL | EDP# | Price |
|-------|-------|-------|-------|---------|
| 1/8 | .1250 | 2" | 65004 | \$3.40 |
| 1/8 | .1250 | 2-1/4 | 65037 | \$4.10 |
| 1/8 | .1250 | 3" | 65005 | \$4.20 |
| 1/8 | .1250 | 4" | 65006 | \$6.40 |
| 1/8 | .1250 | 6" | 65007 | \$9.90 |
| 1/8 | .1250 | 12" | 65038 | \$21.90 |
| #30 | .1285 | 2-1/4 | 65356 | \$5.70 |
| #29 | .1360 | 2-1/2 | 65357 | \$5.70 |
| #28 | .1405 | 2-1/2 | 65359 | \$5.70 |
| 9/64 | .1406 | 2-1/2 | 65039 | \$5.70 |
| #27 | .1440 | 2-1/2 | 65360 | \$6.70 |
| #26 | .1470 | 2-1/2 | 65361 | \$6.70 |
| #25 | .1495 | 2-1/2 | 65362 | \$6.70 |
| #24 | .1520 | 2-1/2 | 65363 | \$6.70 |
| #23 | .1540 | 2-1/2 | 65364 | \$6.70 |
| 5/32 | .1562 | 2-1/2 | 65040 | \$6.70 |
| #22 | .1570 | 2-1/2 | 65365 | \$7.00 |
| #21 | .1590 | 2-1/2 | 65367 | \$7.00 |
| #20 | .1610 | 2-1/2 | 65368 | \$7.00 |
| #19 | .1660 | 2-3/4 | 65369 | \$7.40 |
| #18 | .1695 | 2-3/4 | 65370 | \$7.40 |
| 11/64 | .1719 | 2-1/2 | 65372 | \$7.30 |
| 11/64 | .1719 | 2-3/4 | 65041 | \$7.40 |
| #17 | .1730 | 2-3/4 | 65373 | \$7.40 |
| #16 | .1770 | 2-3/4 | 65374 | \$7.80 |
| #15 | .1800 | 2-1/2 | 65450 | \$7.20 |
| #15 | .1800 | 2-3/4 | 65376 | \$7.80 |
| #14 | .1820 | 2-1/2 | 65451 | \$7.20 |
| #14 | .1820 | 2-3/4 | 65377 | \$7.80 |
| #13 | .1850 | 2-1/2 | 65452 | \$7.20 |
| #13 | .1850 | 2-3/4 | 65378 | \$7.80 |
| 3/16 | .1875 | 2" | 65008 | \$4.20 |
| 3/16 | .1875 | 2-1/2 | 65042 | \$7.20 |
| 3/16 | .1875 | 2-3/4 | 65043 | \$7.80 |
| 3/16 | .1875 | 3" | 65009 | \$8.20 |
| 3/16 | .1875 | 4" | 65010 | \$9.90 |
| 3/16 | .1875 | 6" | 65011 | \$14.80 |
| 3/16 | .1875 | 12" | 65044 | \$32.40 |
| #12 | .1890 | 2-1/2 | 65453 | \$8.60 |
| #12 | .1890 | 2-3/4 | 65379 | \$8.70 |
| #11 | .1910 | 2-1/2 | 65454 | \$8.60 |
| #11 | .1910 | 2-3/4 | 65380 | \$8.70 |
| #10 | .1935 | 2-3/4 | 65381 | \$8.70 |
| #9 | .1960 | 3" | 65382 | \$8.90 |
| #8 | .1990 | 3" | 65384 | \$8.90 |
| #7 | .2010 | 3" | 65385 | \$8.90 |
| 13/64 | .2031 | 2-1/2 | 65386 | \$8.70 |
| 13/64 | .2031 | 3" | 65045 | \$8.90 |
| #6 | .2040 | 3" | 65387 | \$10.20 |
| #5 | .2055 | 3" | 65388 | \$10.20 |
| #4 | .2090 | 3" | 65389 | \$10.20 |
| #3 | .2130 | 3" | 65390 | \$10.20 |
| 7/32 | .2188 | 2-1/2 | 65392 | \$9.80 |
| 7/32 | .2188 | 3" | 65046 | \$10.20 |
| #2 | .2210 | 3" | 65393 | \$10.70 |
| #1 | .2280 | 3-1/4 | 65394 | \$10.90 |
| A | .2340 | 2-1/2 | 65482 | \$10.50 |
| A | .2340 | 3-1/4 | 65395 | \$10.90 |
| 15/64 | .2344 | 2-1/2 | 65396 | \$10.50 |
| 15/64 | .2344 | 3-1/4 | 65047 | \$10.90 |
| B | .2380 | 2-1/2 | 65483 | \$10.90 |
| B | .2380 | 3-1/4 | 65399 | \$11.30 |

| Diam | Dec. | OAL | EDP# | Price |
|-------|-------|-------|-------|---------|
| C | .2420 | 2-1/2 | 65484 | \$10.90 |
| C | .2420 | 3-1/4 | 65400 | \$11.30 |
| D | .2460 | 2-1/2 | 65485 | \$10.90 |
| D | .2460 | 3-1/4 | 65401 | \$11.30 |
| 1/4 | .2500 | 2" | 65012 | \$5.60 |
| 1/4 | .2500 | 2-1/2 | 65013 | \$6.60 |
| 1/4 | .2500 | 3" | 65014 | \$9.90 |
| 1/4 | .2500 | 3-1/4 | 65048 | \$11.30 |
| 1/4 | .2500 | 4" | 65015 | \$15.20 |
| 1/4 | .2500 | 6" | 65016 | \$22.40 |
| 1/4 | .2500 | 12" | 65049 | \$48.70 |
| F | .2570 | 2-1/2 | 65487 | \$12.10 |
| F | .2570 | 3-1/2 | 65403 | \$13.60 |
| G | .2610 | 2-1/2 | 65488 | \$12.10 |
| G | .2610 | 3-1/2 | 65404 | \$13.60 |
| 17/64 | .2656 | 2-1/2 | 65405 | \$12.10 |
| 17/64 | .2656 | 3-1/2 | 65050 | \$13.60 |
| H | .2660 | 2-1/2 | 65489 | \$12.10 |
| H | .2660 | 3-1/2 | 65406 | \$13.60 |
| I | .2720 | 2-1/2 | 65490 | \$13.80 |
| I | .2720 | 3-1/2 | 65407 | \$15.90 |
| J | .2770 | 2-1/2 | 65491 | \$13.80 |
| J | .2770 | 3-1/2 | 65409 | \$15.90 |
| K | .2810 | 2-1/2 | 65492 | \$13.80 |
| K | .2810 | 3-1/2 | 65410 | \$15.90 |
| 9/32 | .2812 | 2-1/2 | 65411 | \$13.80 |
| 9/32 | .2812 | 3-1/2 | 65051 | \$15.90 |
| L | .2900 | 2-1/2 | 65493 | \$14.10 |
| L | .2900 | 3-3/4 | 65412 | \$16.20 |
| M | .2950 | 2-1/2 | 65494 | \$14.10 |
| M | .2950 | 3-3/4 | 65413 | \$16.20 |
| 19/64 | .2969 | 2-1/2 | 65415 | \$14.10 |
| 19/64 | .2969 | 3-3/4 | 65052 | \$16.20 |
| N | .3020 | 2-1/2 | 65495 | \$15.90 |
| N | .3020 | 3-3/4 | 65416 | \$18.00 |
| 5/16 | .3125 | 2-1/2 | 65017 | \$10.40 |
| 5/16 | .3125 | 2-3/4 | 65417 | \$15.50 |
| 5/16 | .3125 | 3" | 65018 | \$16.60 |
| 5/16 | .3125 | 3-3/4 | 65053 | \$18.00 |
| 5/16 | .3125 | 4" | 65019 | \$20.20 |
| 5/16 | .3125 | 6" | 65020 | \$31.70 |
| 5/16 | .3125 | 12" | 65054 | \$66.20 |
| O | .3160 | 2-1/2 | 65496 | \$17.40 |
| O | .3160 | 3-3/4 | 65420 | \$22.40 |
| P | .3230 | 2-1/2 | 65497 | \$17.40 |
| P | .3230 | 4" | 65421 | \$22.40 |
| 21/64 | .3281 | 3" | 65508 | \$18.00 |
| 21/64 | .3281 | 4" | 65055 | \$22.40 |
| Q | .3320 | 3" | 65498 | \$18.80 |
| Q | .3320 | 4" | 65422 | \$24.50 |
| R | .3390 | 3" | 65499 | \$18.80 |
| R | .3390 | 4" | 65424 | \$24.50 |
| 11/32 | .3438 | 3" | 65425 | \$18.80 |
| 11/32 | .3438 | 4" | 65056 | \$24.50 |
| S | .3480 | 3" | 65500 | \$19.50 |
| S | .3480 | 4" | 65426 | \$25.20 |
| T | .3580 | 3" | 65501 | \$19.50 |
| T | .3580 | 4-1/4 | 65428 | \$26.00 |
| 23/64 | .3594 | 4-1/4 | 65057 | \$26.00 |
| U | .3680 | 3" | 65502 | \$21.00 |
| U | .3680 | 4-1/4 | 65429 | \$27.80 |
| 3/8 | .3750 | 2-1/2 | 65021 | \$13.80 |

ULTRATOOL® Precision Ground & Polished Solid Carbide Blanks

| Diam | Dec. | OAL | EDP# | Price |
|-------|-------|-------|-------|----------|
| 3/8 | .3750 | 3" | 65022 | \$18.80 |
| 3/8 | .3750 | 4" | 65023 | \$25.20 |
| 3/8 | .3750 | 4-1/4 | 65058 | \$27.80 |
| 3/8 | .3750 | 6" | 65024 | \$40.40 |
| 3/8 | .3750 | 12" | 65059 | \$90.00 |
| V | .3770 | 3" | 65503 | \$21.60 |
| V | .3770 | 4-1/4 | 65431 | \$31.40 |
| W | .3860 | 3" | 65504 | \$21.60 |
| W | .3860 | 4-1/2 | 65432 | \$31.40 |
| 25/64 | .3906 | 3" | 65433 | \$21.60 |
| 25/64 | .3906 | 4-1/2 | 65060 | \$31.40 |
| X | .3970 | 3" | 65505 | \$23.10 |
| X | .3970 | 4-1/2 | 65436 | \$33.10 |
| Y | .4040 | 3" | 65506 | \$23.10 |
| Y | .4040 | 4-1/2 | 65437 | \$33.10 |
| 13/32 | .4062 | 3" | 65438 | \$23.10 |
| 13/32 | .4062 | 4-1/2 | 65061 | \$33.10 |
| Z | .4130 | 3" | 65507 | \$24.50 |
| Z | .4130 | 4-1/2 | 65439 | \$35.60 |
| 27/64 | .4219 | 4-1/2 | 65062 | \$35.60 |
| 7/16 | .4375 | 2-3/4 | 65025 | \$21.60 |
| 7/16 | .4375 | 3" | 65026 | \$23.80 |
| 7/16 | .4375 | 4" | 65027 | \$33.20 |
| 7/16 | .4375 | 4-1/2 | 65063 | \$37.80 |
| 7/16 | .4375 | 6" | 65028 | \$50.50 |
| 7/16 | .4375 | 12" | 65064 | \$108.00 |
| 29/64 | .4531 | 3" | 65443 | \$29.60 |
| 29/64 | .4531 | 4-3/4 | 65065 | \$44.70 |
| 15/32 | .4688 | 4-3/4 | 65066 | \$46.40 |
| 31/64 | .4844 | 4-3/4 | 65445 | \$46.90 |
| 1/2 | .5000 | 2-1/2 | 65105 | \$21.60 |
| 1/2 | .5000 | 3" | 65029 | \$23.40 |
| 1/2 | .5000 | 4" | 65030 | \$33.20 |
| 1/2 | .5000 | 4-3/4 | 65067 | \$46.90 |
| 1/2 | .5000 | 6" | 65031 | \$57.70 |
| 1/2 | .5000 | 12" | 65068 | \$122.30 |
| 17/32 | .5312 | 6" | 65509 | \$90.00 |
| 9/16 | .5625 | 3-1/2 | 65032 | \$46.10 |
| 9/16 | .5625 | 6" | 65110 | \$93.60 |
| 9/16 | .5625 | 12" | 65111 | \$208.70 |
| 19/32 | .5938 | 6" | 65510 | \$97.20 |
| 5/8 | .6250 | 3-1/2 | 65033 | \$50.50 |
| 5/8 | .6250 | 5" | 65106 | \$87.10 |
| 5/8 | .6250 | 6" | 65069 | \$100.80 |
| 5/8 | .6250 | 12" | 65070 | \$230.30 |
| 21/32 | .6562 | 6" | 65511 | \$122.30 |
| 11/16 | .6875 | 6" | 65512 | \$125.90 |
| 3/4 | .7500 | 4" | 65034 | \$75.60 |
| 3/4 | .7500 | 5" | 65107 | \$115.20 |
| 3/4 | .7500 | 6" | 65071 | \$129.60 |
| 3/4 | .7500 | 12" | 65072 | \$273.60 |
| 13/16 | .8125 | 6" | 65513 | \$201.50 |
| 7/8 | .8750 | 4" | 65075 | \$122.30 |
| 7/8 | .8750 | 6" | 65449 | \$215.90 |
| 7/8 | .8750 | 12" | 65514 | \$467.80 |
| 15/16 | .9375 | 6" | 65515 | \$223.10 |
| 1" | 1.000 | 4" | 65035 | \$133.20 |
| 1" | 1.000 | 5" | 65108 | \$201.50 |
| 1" | 1.000 | 6" | 65073 | \$223.10 |
| 1" | 1.000 | 12" | 65074 | \$485.80 |

| Diam | Dec. | OAL | EDP# | Price |
|--------|-------|-----|-------|----------|
| 1.0mm | .0394 | 38 | 65311 | \$4.40 |
| 1.5mm | .0591 | 38 | 65320 | \$4.40 |
| 2.0mm | .0787 | 44 | 65335 | \$4.20 |
| 2.0mm | .0787 | 50 | 65334 | \$4.50 |
| 2.5mm | .0984 | 50 | 65345 | \$4.50 |
| 3.0mm | .1181 | 38 | 65076 | \$2.30 |
| 3.0mm | .1181 | 57 | 65354 | \$4.10 |
| 3.0mm | .1181 | 75 | 65077 | \$4.20 |
| 3.0mm | .1181 | 100 | 65109 | \$6.40 |
| 3.0mm | .1181 | 305 | 65516 | \$21.90 |
| 3.5mm | .1378 | 63 | 65358 | \$5.70 |
| 3.5mm | .1378 | 305 | 65517 | \$28.80 |
| 4.0mm | .1575 | 50 | 65078 | \$4.30 |
| 4.0mm | .1575 | 63 | 65366 | \$7.00 |
| 4.0mm | .1575 | 75 | 65079 | \$8.60 |
| 4.0mm | .1575 | 100 | 65480 | \$10.90 |
| 4.0mm | .1575 | 305 | 65518 | \$31.10 |
| 4.5mm | .1772 | 63 | 65475 | \$7.20 |
| 4.5mm | .1772 | 70 | 65375 | \$7.80 |
| 4.5mm | .1772 | 305 | 65519 | \$35.30 |
| 5.0mm | .1969 | 50 | 65080 | \$4.80 |
| 5.0mm | .1969 | 63 | 65383 | \$8.70 |
| 5.0mm | .1969 | 75 | 65081 | \$8.90 |
| 5.0mm | .1969 | 100 | 65481 | \$13.10 |
| 5.0mm | .1969 | 305 | 65520 | \$39.60 |
| 5.5mm | .2165 | 75 | 65391 | \$10.20 |
| 5.5mm | .2165 | 305 | 65521 | \$43.20 |
| 6.0mm | .2362 | 50 | 65082 | \$5.60 |
| 6.0mm | .2362 | 63 | 65398 | \$6.60 |
| 6.0mm | .2362 | 75 | 65083 | \$9.90 |
| 6.0mm | .2362 | 82 | 65397 | \$11.30 |
| 6.0mm | .2362 | 100 | 65448 | \$15.20 |
| 6.0mm | .2362 | 305 | 65522 | \$48.70 |
| 6.5mm | .2559 | 82 | 65402 | \$13.60 |
| 6.5mm | .2559 | 305 | 65523 | \$54.80 |
| 7.0mm | .2756 | 60 | 65084 | \$10.20 |
| 7.0mm | .2756 | 89 | 65408 | \$15.90 |
| 7.0mm | .2756 | 100 | 65524 | \$19.80 |
| 7.0mm | .2756 | 305 | 65525 | \$59.00 |
| 7.5mm | .2953 | 95 | 65414 | \$16.20 |
| 7.5mm | .2953 | 305 | 65526 | \$64.10 |
| 8.0mm | .3150 | 63 | 65085 | \$10.40 |
| 8.0mm | .3150 | 70 | 65419 | \$15.50 |
| 8.0mm | .3150 | 95 | 65418 | \$18.00 |
| 8.0mm | .3150 | 100 | 65086 | \$20.20 |
| 8.0mm | .3150 | 305 | 65527 | \$66.20 |
| 8.5mm | .3346 | 100 | 65423 | \$25.20 |
| 8.5mm | .3346 | 305 | 65528 | \$77.80 |
| 9.0mm | .3543 | 63 | 65087 | \$15.20 |
| 9.0mm | .3543 | 100 | 65529 | \$25.50 |
| 9.0mm | .3543 | 108 | 65427 | \$26.00 |
| 9.0mm | .3543 | 305 | 65530 | \$86.40 |
| 9.5mm | .3740 | 108 | 65430 | \$27.80 |
| 10.0mm | .3937 | 70 | 65088 | \$21.60 |
| 10.0mm | .3937 | 75 | 65435 | \$23.80 |
| 10.0mm | .3937 | 100 | 65089 | \$31.10 |
| 10.0mm | .3937 | 114 | 65434 | \$33.10 |
| 10.0mm | .3937 | 305 | 65531 | \$102.20 |
| 10.5mm | .4134 | 114 | 65440 | \$35.60 |
| 11.0mm | .4331 | 114 | 65441 | \$37.80 |
| 11.0mm | .4331 | 305 | 65541 | \$118.80 |
| 11.5mm | .4528 | 120 | 65442 | \$44.70 |

| Diam | Dec. | OAL | EDP# | Price |
|--------|-------|-----|-------|----------|
| 12.0mm | .4724 | 74 | 65090 | \$23.40 |
| 12.0mm | .4724 | 100 | 65091 | \$33.20 |
| 12.0mm | .4724 | 120 | 65444 | \$46.90 |
| 12.0mm | .4724 | 150 | 65101 | \$57.70 |
| 12.0mm | .4724 | 305 | 65532 | \$122.30 |
| 12.5mm | .4921 | 120 | 65446 | \$48.20 |
| 14.0mm | .5512 | 89 | 65092 | \$46.10 |
| 14.0mm | .5512 | 100 | 65533 | \$63.40 |
| 14.0mm | .5512 | 150 | 65102 | \$93.60 |
| 14.0mm | .5512 | 305 | 65534 | \$208.70 |
| 16.0mm | .6299 | 89 | 65093 | \$50.50 |
| 16.0mm | .6299 | 100 | 65535 | \$70.60 |
| 16.0mm | .6299 | 125 | 65094 | \$87.10 |
| 16.0mm | .6299 | 150 | 65103 | \$100.80 |
| 16.0mm | .6299 | 305 | 65536 | \$230.30 |
| 18.0mm | .7087 | 100 | 65095 | \$93.60 |
| 18.0mm | .7087 | 150 | 65104 | \$128.20 |
| 18.0mm | .7087 | 305 | 65537 | \$270.00 |
| 20.0mm | .7874 | 100 | 65096 | \$102.80 |
| 20.0mm | .7874 | 150 | 65097 | \$151.20 |
| 20.0mm | .7874 | 305 | 65538 | \$298.70 |
| 22.0mm | .8661 | 100 | 65098 | \$147.60 |
| 22.0mm | .8661 | 305 | 65539 | \$460.70 |
| 25.0mm | .9843 | 100 | 65099 | \$133.20 |
| 25.0mm | .9843 | 150 | 65100 | \$223.10 |
| 25.0mm | .9843 | 305 | 65540 | \$485.80 |

**ULTRATOOL®**Industry Class ISO K20, USA C2
Blended ratings may vary slightly based on diameter and length.**Ultra-Grain® 1**

Cobalt Percentage: 10%

Grain Size (µm): ≤ 0.7

Hardness: 92.7 HRa, 1680 HV

Fracture Toughness (K1c): 7.9

TRS (GPa): 4.1

Density (gm/cc): 14.30

SFR Ground Cyl Specs (Metric):
Diameter +0.000/-0.007mm
OAL ± 0.52mm

SFR Ground Cylinder Specs:
Diameter +0.000/-0.003mm
OAL ± 0.60

Diameter tolerance is .0005 on lengths of 6" and longer. Lengths of 12" (305 mm) are uncut and will have greater OAL plus + tolerance. Series 650 may have chamfer on one end dependent upon size.

ULTRATOOL® Solid Carbide Engraving Tools

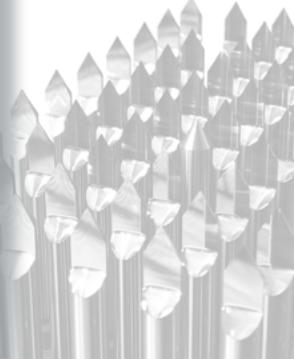
new!

Series 651
Single End Half Round
Right Hand Engraving Cutters
 Engraving Blank Specs:
Split +.001/-000 over center
Diam +.0000/-0003 OAL ±.060

Diam **Flat** **Split Length** **OAL** **Shank**


Use these half round style cutters for engraving in a wide application range featuring 6 end styles, 3 included angles, and matched with 3 coatings for extended wear.

| | | 30° EDP# | 60° EDP# | 90° EDP# | UnCoated Price | TA Price | A1 Price | D1 Price |
|------|---------|-------------|-------------|-------------|-------------------|-------------|-------------|-------------|
| 1/8 | .000(P) | 3/8 | 1-1/2 | 1/8 | 65122 | 65141 | 65179 | \$12.00 |
| 1/8 | .005 | 3/8 | 1-1/2 | 1/8 | 65124 | 65142 | 65181 | \$12.00 |
| 1/8 | .010 | 3/8 | 1-1/2 | 1/8 | 65125 | 65143 | 65182 | \$12.00 |
| 1/8 | .015 | 3/8 | 1-1/2 | 1/8 | 65126 | 65144 | 65183 | \$12.00 |
| 1/8 | .020 | 3/8 | 1-1/2 | 1/8 | 65127 | 65145 | 65184 | \$12.00 |
| 1/8 | .030 | 3/8 | 1-1/2 | 1/8 | 65128 | 65146 | 65185 | \$12.00 |
| 3/16 | .000(P) | 3/8 | 2" | 3/16 | 65129 | 65147 | 65186 | \$16.30 |
| 3/16 | .005 | 3/8 | 2" | 3/16 | 65130 | 65148 | 65187 | \$16.30 |
| 3/16 | .010 | 3/8 | 2" | 3/16 | 65131 | 65149 | 65188 | \$16.30 |
| 3/16 | .015 | 3/8 | 2" | 3/16 | 65132 | 65153 | 65189 | \$16.30 |
| 3/16 | .020 | 3/8 | 2" | 3/16 | 65133 | 65154 | 65190 | \$16.30 |
| 3/16 | .030 | 3/8 | 2" | 3/16 | 65134 | 65155 | 65191 | \$16.30 |
| 1/4 | .000(P) | 3/8 | 2-1/2 | 1/4 | 65135 | 65162 | 65192 | \$20.30 |
| 1/4 | .005 | 3/8 | 2-1/2 | 1/4 | 65136 | 65174 | 65193 | \$20.30 |
| 1/4 | .010 | 3/8 | 2-1/2 | 1/4 | 65137 | 65175 | 65194 | \$20.30 |
| 1/4 | .015 | 3/8 | 2-1/2 | 1/4 | 65138 | 65176 | 65195 | \$20.30 |
| 1/4 | .020 | 3/8 | 2-1/2 | 1/4 | 65139 | 65177 | 65196 | \$20.30 |
| 1/4 | .030 | 3/8 | 2-1/2 | 1/4 | 65140 | 65178 | 65197 | \$20.30 |
| | | | | | | | | \$22.80 |
| | | | | | | | | \$24.10 |
| | | | | | | | | \$26.40 |



ULTRATOOL® Solid Carbide Engraving Blanks

Series 652
Ground & Polished Carbide Round
Banks • Split Both Ends

Use these precision ground double-ended half round split blanks for modification into special cutters. Featuring pure Ultra-Grain for extended wear and chipping resistance.


 Engraving Blank Specs:
Split +.001/-000 over center
Diam +.0000/-0003 OAL ±.060


| Diam | OAL | Split | EDP# | Price |
|-------------|------------|--------------|-------------|--------------|
| 1/8 | 1-1/2 | 1/4 | 65203 | \$4.20 |
| 1/8 | 2" | 1/4 | 65204 | \$5.10 |
| 1/8 | 3" | 1/4 | 65205 | \$10.00 |
| 1/8 | 4" | 1/4 | 65206 | \$13.20 |
| 1/8 | 6" | 1/4 | 65207 | \$17.80 |
| 3/16 | 2" | 1/4 | 65208 | \$8.50 |
| 3/16 | 3" | 1/4 | 65209 | \$11.00 |
| 3/16 | 4" | 1/4 | 65210 | \$15.30 |
| 3/16 | 6" | 1/4 | 65211 | \$21.90 |
| 1/4 | 2" | 3/8 | 65212 | \$12.30 |
| 1/4 | 2-1/2 | 3/8 | 65213 | \$14.40 |
| 1/4 | 3" | 3/8 | 65214 | \$17.60 |
| 1/4 | 4" | 3/8 | 65215 | \$23.10 |
| 1/4 | 6" | 3/8 | 65216 | \$32.60 |
| 5/16 | 2-1/2 | 3/8 | 65217 | \$21.30 |
| 5/16 | 3" | 3/8 | 65218 | \$23.50 |
| 5/16 | 4" | 3/8 | 65219 | \$30.20 |
| 5/16 | 6" | 3/8 | 65220 | \$37.20 |
| 3/8 | 2-1/2 | 1/2 | 65221 | \$27.10 |
| 3/8 | 3" | 1/2 | 65222 | \$31.60 |
| 3/8 | 4" | 1/2 | 65223 | \$42.10 |
| 3/8 | 6" | 1/2 | 65224 | \$47.50 |
| 7/16 | 2-3/4 | 1/2 | 65225 | \$40.10 |
| 7/16 | 3" | 1/2 | 65226 | \$40.90 |
| 7/16 | 4" | 1/2 | 65227 | \$51.50 |
| 7/16 | 6" | 1/2 | 65228 | \$73.00 |
| 1/2 | 3" | 1/2 | 65229 | \$41.30 |
| 1/2 | 4" | 1/2 | 65230 | \$54.10 |
| 1/2 | 6" | 1/2 | 65231 | \$74.60 |

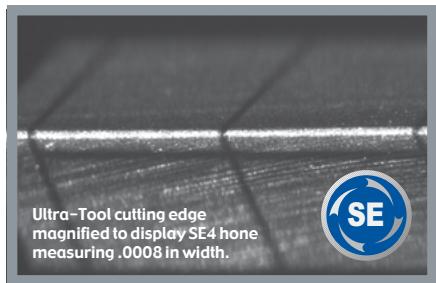
 Engraving Blank Specs (Metric):
Split +.025/-0.00mm over center
Diam +.000/-0.007mm
OAL ±1.52mm

ULTRATOOL® Technical Data

SmoothEdge®

The Edge Preparation Process

Our cutting edges are literally too sharp for certain materials. For our carbide inserts and now increasingly for our solid carbide round tools, proper edge preparation can yield huge productivity improvements to "out of the box" tool application. Using a process we call SmoothEdge® and performed on machine tools developed in our own R&D lab, we've taken the mystery out of tool "break-in" and provided a consistency that can be counted on time and again. All five types of SmoothEdge will yield different benefits dependent upon application. SmoothEdge will make your tools sound and run smooth from the first cut and protect your tooling investment from unnecessary potential for chipping during initial tool paths.



Combine SmoothEdge with our other value added features to design the ultimate cutting solution.



Primary SmoothCoat recommendations:



A1 for SE2



TA for SE4



AT for SE5

Our newest technology can achieve incredible productivity increases in specific applications. Many of our new Series include SmoothEdge as a standard feature, while on others it can be added as a same day post treatment for a small charge. Ask your Inside Sales representative about SmoothEdge today!



Uses: Highly recommended for most milling and drilling applications.



Uses: Highly recommended for milling and drilling of aluminum and other non-ferrous applications using UnCoated, A1, or TC coated tools.



Uses: Highly recommended for a wide range of general purpose machining applications using coated tools.



Uses: Highly recommended for milling and drilling applications involving general steels, stainless, and cast iron.



Uses: Highly recommended for milling and drilling applications involving stainless, high-temp alloys, and exotics.

ULTRATOOL® Technical Data

With so many variables present in the machining process, it is essential to optimize every possible factor to achieve world-class efficiency. Your choice of a genuine Ultra-Tool® Solid Carbide product is an excellent first step in the process. Ultra-Tool® Solid Carbide products are high-performance tools that will perform best in a machining environment characterized by rigid fixturing and minimal spindle runout. Attention to proper speed and feed will eliminate vibration, chatter, and overheating as well as extending tool life. Generally speaking, the peripheral speed of solid carbide tools will vary with the hardness of the material being cut. The harder the material, the slower the speed. High speed and insufficient feed will cause work surface glazing and poor tool life. Chipping of cutting edges is an indication of chatter which can be caused by too high of speed, too light of cut, or improper support of the tool or workpiece. Handling is also very important; sharpened cutting edges should never be allowed to come into contact with any hard object (or another tool) in a non-machining environment as they will chip easily. Keep your Ultra-Tool® products in their original protective packaging until ready for use.

The guidelines on the following pages are generalities designed to demonstrate the operating window within which you may experience the best results. The charts and information provided should prove valuable in longer tool life with greatly reduced operational costs. This information is for uncoated product: SmoothCoat products will have significantly higher speed and feed rates. For more information contact an Ultra-Tool® Factory Engineer, Sales Manager or consult our websites at ultra-tool.com and toolalliance.com. eMails can be sent to technical@toolalliance.com.

Ultra-Tool International, Inc. is constantly striving to improve its processes, specifications, and tolerances. As such, products are subject to change without prior notice.

WARNING: Grinding or other use of this tool may produce hazardous dust and fumes which may endanger health. Grinding or modification should be done by professionals only. To avoid adverse health effects, read the material safety data sheet for this product. Utilize adequate ventilation and appropriate protection. Cutting tools may shatter when broken; eye protection in vicinity of use is strongly advised. MSDS available at www.ultra-tool.com.

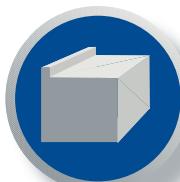
**Commonly Used Formulas:**

Surface Feet Minute (SFM)=RPM x Diam. x .262
Revolutions Per Minute (RPM)=3.82 x (SFM / Diam.)
Feed Rate (IPM)=IPT x #teeth x RPM
Drilling (IPM)=IPR x RPM
Feed Per Tooth (IPT)=IPM / (#teeth x RPM)
Convert Inches to millimeters: Multiply by 25.4
Convert millimeters to Inches: Multiply by .03937

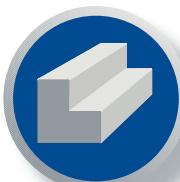
Tech Help Call, eMail us at technical@toolalliance.com, or copy / fax us this page for detailed assistance beyond what printed materials can provide. Please have the following information available to assure we can promptly process a response.

Checklist: **Tool Description**

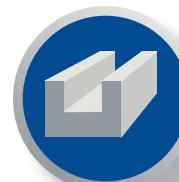
- Application Description
- Work Piece Material
- Hardness (HRc)
- Current Speed (RPM or SFPM)
- Current Feed (CPT or IPM or FPR)
- Axial DOC
- Radial DOC
- Hole Depth (drilling)
- Machine Tool



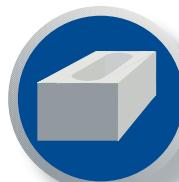
Face Milling



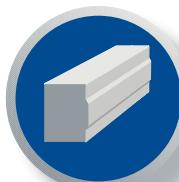
End Milling



Slot Milling



Pocket Milling



Peripheral Milling

Application Tips for ULTRATOOL® Solid Carbide Products

Trouble Shooting for Ultra-Tool® Carbide End Mills

| Problem | Cause | Solution |
|-------------------------------|---|---|
| Chipping | <ul style="list-style-type: none"> Feed rate too high Up milling (conventional) Cutting edge too sharp Chattering Loose tool Workpiece rigidity Tool rigidity Low cutting speed Loose toolholder | <ul style="list-style-type: none"> Reduce feed rate Change to down milling (climb) Hone cutting edge or allow break-in Reduce RPM Remove, clean, and retighten Tighten workpiece holding method Shorten LOC, place shank further up holder Increase RPM Remove from spindle, clean and replace |
| Wear | <ul style="list-style-type: none"> High cutting speed Low feed rate Up milling (conventional) Hard material Poor chip evacuation Improper cutter helix Poor coolant | <ul style="list-style-type: none"> Reduce RPM Increase feed rate Change to down milling (climb) Use coated tool Reposition coolant lines, use air blasting Change to recommended helix angle Replace coolant or correct mixture |
| Breakage | <ul style="list-style-type: none"> Feed rate too high Depth of cut too large Poor tool rigidity Tool wear Poor chip evacuation | <ul style="list-style-type: none"> Reduce feed rate Reduce depth of cut Shorten LOC, place shank further up holder Replace/regrind sooner Reposition coolant lines, use air blasting |
| Chattering | <ul style="list-style-type: none"> Speed and feed too high Poor toolholder rigidity Poor spindle rigidity Workpiece rigidity Relief angle too high Depth of cut too large Poor tool rigidity | <ul style="list-style-type: none"> Reduce feed rate Replace with shorter/more rigid holder Use larger spindle or different machine tool Tighten workpiece holding method Regrade with smaller relief angle Reduce depth of cut Shorten LOC, place shank further up holder |
| Short Life | <ul style="list-style-type: none"> Cutter/workpiece friction Hard material Poor material condition Improper cutter angle Poor coolant | <ul style="list-style-type: none"> Use coated tool Use coated tool Use coated tool, clean material surface Regrade with proper primary relief angle Replace coolant or correct mixture |
| Chip Packing | <ul style="list-style-type: none"> Feed rate too high Low cutting speed Insufficient chip room Insufficient coolant | <ul style="list-style-type: none"> Reduce feed rate or increase speed Increase RPM or reduce feed rate Use tool with less flutes, increase helix Increase volume of coolant |
| Poor Surface Finish | <ul style="list-style-type: none"> Feed rate too high Low cutting speed Tool wear Edge build up Depth of cut too large Chip welding | <ul style="list-style-type: none"> Reduce feed rate Increase RPM Replace or regrind tool Increase RPM, switch to higher helix tool Reduce depth of cut Increase volume of coolant |
| Burring or Workpiece Chipping | <ul style="list-style-type: none"> Tool wear Improper helix angle Feed rate too high Depth of cut too large | <ul style="list-style-type: none"> Replace or regrind tool Change to recommended helix angle Reduce feed rate Reduce depth of cut |
| Workpiece Inaccuracy | <ul style="list-style-type: none"> Loose/worn toolholder Poor toolholder rigidity Poor spindle rigidity Insufficient number of flutes Tool deflection | <ul style="list-style-type: none"> Repair or replace Replace with shorter/more rigid toolholder Use larger spindle or different machine tool Use tool with higher flute quantity Shorten LOC, place shank further up holder |

Trouble Shooting for Ultra-Tool® Carbide Drills

| Problem | Cause | Solution (see key below) |
|--------------------------------|--|---|
| Heavy Wear at Outer Edge | <ul style="list-style-type: none"> Insufficient coolant Incorrect speed & feed | <ul style="list-style-type: none"> 5, 6 1, 2, 8 |
| Chipping at Outer Cutting Edge | <ul style="list-style-type: none"> Loose tool, tool movement Workpiece movement Poor coolant conditions Incorrect speed & feed | <ul style="list-style-type: none"> 8, 10, 11, 12, 14, 16, 17, 21 8, 12, 13, 21 5, 6 1, 2, 3, 4 |
| Drill Point Chipping | <ul style="list-style-type: none"> Loose tool, tool movement Incorrect speed & feed Drill centering | <ul style="list-style-type: none"> 10, 11, 12, 14 1, 2, 3, 4 8, 10, 11, 12, 21 |
| Margin Wear | <ul style="list-style-type: none"> Drill margin rubbing wall Poor chip evacuation Poor coolant conditions Workpiece movement | <ul style="list-style-type: none"> 20 (check drill for backtaper) 5, 6, 8, 20 5, 6 8, 13, 21 |
| Tool Breakage | <ul style="list-style-type: none"> Loose tool, tool movement Workpiece movement Wrong drill type Poor coolant conditions Incorrect speed & feed | <ul style="list-style-type: none"> 8, 10, 11, 12, 14, 16, 17, 21 8, 12, 13, 21 9, 15, 16, 18, 19, 20 5, 6 1, 2, 3, 4 |
| Poor Tool Life | <ul style="list-style-type: none"> Incorrect speed & feed Poor coolant conditions Wrong drill point | <ul style="list-style-type: none"> 1, 2, 3, 4 5, 6 8, 21 |
| Drill Walk | <ul style="list-style-type: none"> Incorrect speed & feed Tool wear Wrong drill point Material condition | <ul style="list-style-type: none"> 1, 2 7, 8, 21 8, 10, 11, 21 11, 12, 15, 16, 17 |
| Chip Welding | <ul style="list-style-type: none"> Poor coolant conditions Wrong drill type | <ul style="list-style-type: none"> 5, 6 19, 20 |
| Hole Size Inaccuracy | <ul style="list-style-type: none"> Incorrect speed & feed Poor coolant conditions Loose tool Wrong drill type | <ul style="list-style-type: none"> 1, 2, 3, 4 5, 6 14 9, 18 |
| Non-Cylindrical Hole | <ul style="list-style-type: none"> Loose tool, tool movement Workpiece movement Incorrect speed & feed Wrong drill type | <ul style="list-style-type: none"> 8, 10, 11, 12, 14, 16, 17 13 1, 2 18, 21 |
| Heavy Burr | <ul style="list-style-type: none"> Incorrect speed & feed Incorrect drill point | <ul style="list-style-type: none"> 1, 2 8, 21 |
| Blue Chips | <ul style="list-style-type: none"> Poor coolant conditions Tool wear | <ul style="list-style-type: none"> 5, 6 7, 8 |
| Long Chips | <ul style="list-style-type: none"> Poor point grind Incorrect speed & feed | <ul style="list-style-type: none"> 8 1, 2 |
| Solutions Key for Drills | <p>1) Reduce RPM 8) Repoint drill 15) Use straight flute 2) Increase feed 9) Correct drill type/size 16) Use stub length 3) Increase RPM 10) Use self-centering drill 17) Place further up holder 4) Reduce feed 11) Spot/center drill 18) Use three-flute 5) Increase coolant 12) Clean surface 19) Use slower helix 6) Increase mixture 13) Improve rigidity/clamp 20) Use parabolic design 7) Add negative hone 14) Tighten holder 21) Change point style</p> | |

Trouble Shooting for Ultra-Tool® Carbide Reamers

| Problem | Cause | Solution |
|----------------------|--|---|
| Chatter | <ul style="list-style-type: none"> High cutting speed Feed rate too low Workpiece movement Toolholder rigidity Tool rigidity | <ul style="list-style-type: none"> Lower RPM or increase feed rate Increase feed rate Tighten workpiece rigidity Tighten toolholder or reduce float Use shorter tool, place further up holder |
| Tool Wear / Chipping | <ul style="list-style-type: none"> Incorrect feed rate Incorrect speed Poor hole condition Abrasive material Poor chip evacuation Poor coolant Insufficient coolant Workpiece alignment Excessive stock removal | <ul style="list-style-type: none"> Increase feed rate (typically) Reduce speed (typically) Work-hardened hole; change drilling type Use proper coolant, coated reamer Use/increase coolant, use helical reamer Replace coolant or correct mixture Increase coolant volume Use bushing, floating holder, lead chamfer Use larger diameter starter drill |
| Tool Breakage | <ul style="list-style-type: none"> Incorrect feed rate Incorrect speed Tool wear Bottoming of hole Coolant conditions Insufficient stock removal Poor set up Excessive stock removal | <ul style="list-style-type: none"> Increase feed rate (typically) Reduce speed (typically) Sharpen or replace reamer Adjust stop depth, check preset Increase, replace, or correct coolant Use smaller diameter starter drill Use bushing, floating toolholder Use larger diameter starter drill |

| Problem | Cause | Solution |
|----------------|--|--|
| Poor Finish | <ul style="list-style-type: none"> Feed rate too low Insufficient stock removal Poor hole condition Poor coolant Insufficient coolant | <ul style="list-style-type: none"> Increase feed rate Use smaller diameter starter drill Work-hardened hole; change drilling type Replace/correct coolant mixture Increase coolant volume |
| Hole Tolerance | <ul style="list-style-type: none"> Workpiece alignment Incorrect tool size Material shrinkage Tool wear Toolholder runout | <ul style="list-style-type: none"> Use bushing, floating toolholder Check diameter of tool Adjust diameter for shrinkage; more coolant Sharpen or replace tool Adjust or replace toolholder |

Application Data for High Performance Series 323, 355, 377, & 365 Series ULTRATOOL® End Mills

The milling data presented below is for the **323, 355, 377**, and **365** Series of Ultra end mills. When using SmoothCoat & SmoothEdge surface treatments, Surface Feet or Meters Per Minute can be increased from the stated levels by at least 25%.

Do not use a radial DOC exceeding more than 25% of diameter for Series 355 only.



Peripheral Milling data based on axial depth \leq 100% of tool diameter & radial depth of \leq 25% of tool diameter.



Slot Milling data based on axial depth of cut = 50% of tool diameter.

End Mill Specifications:

Diameter: $+.000/-0.002$

Shank Diameter: $+.0000/-0.0003$

LOC: $+.060/-0.000$

OAL: $\pm .060$

Helix: $\pm 2^\circ$

Milling;
Fractional

| Material | SFPM | SFPM | 1/8" | 3/16" | 1/4" | 5/16" | 3/8" | 7/16" | 1/2" | 5/8" | 3/4" | 1" |
|-------------------------|-------------------|-----------------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Steel | Peripheral | Slotting | | | | | | | | | | |
| 1018 / 1020 | 300 to 600 | 200 to 400 | .0007 | .0012 | .0015 | .0018 | .0020 | .0025 | .0030 | .0035 | .0040 | .0045 |
| 4140 / 4340 / P20 | 250 to 500 | 200 to 350 | .00065 | .0010 | .0012 | .0015 | .0018 | .0022 | .0025 | .0030 | .0035 | .0040 |
| Stainless Steel | | | | | | | | | | | | |
| 303 / 304 / 316 | 250 to 400 | 200 to 350 | .0006 | .0008 | .0010 | .0012 | .0018 | .0022 | .0025 | .0030 | .0035 | .0038 |
| 410 / 420 / 440C | 200 to 300 | 150 to 250 | .0006 | .0008 | .0010 | .0012 | .0018 | .0022 | .0025 | .0030 | .0035 | .0038 |
| 15-5-17-4 \leq 32HRc | 200 to 350 | 150 to 300 | .0006 | .0008 | .0010 | .0012 | .0018 | .0022 | .0025 | .0030 | .0035 | .0038 |
| 15-5-17-4 \geq 32HRc | 150 to 250 | 150 to 250 | .0004 | .0006 | .0008 | .0010 | .0015 | .0020 | .0020 | .0025 | .0030 | .0035 |
| Tool Steel | | | | | | | | | | | | |
| A2/D2/H13 \leq 32HRc | 200 to 300 | 150 to 250 | .0005 | .0008 | .0010 | .0012 | .0018 | .0022 | .0025 | .0030 | .0035 | .0035 |
| A2/D2/H13 \geq 32HRc | 150 to 250 | 100 to 200 | .0004 | .0006 | .0008 | .0010 | .0015 | .0020 | .0020 | .0025 | .0030 | .0035 |
| Titanium | | | | | | | | | | | | |
| 6Al-4V | 150 to 300 | 125 to 225 | .0005 | .0008 | .0010 | .0010 | .0012 | .0020 | .0025 | .0025 | .0030 | .0040 |
| High Temp Alloys | | | | | | | | | | | | |
| Inconel 625 | 100 to 150 | 75 to 125 | .0005 | .0007 | .0010 | .0012 | .0012 | .0018 | .0020 | .0020 | .0025 | .0030 |
| Inconel 718 | 70 to 150 | 50 to 100 | .0005 | .0007 | .0008 | .0009 | .0012 | .0018 | .0020 | .0020 | .0030 | .0040 |
| Cast Iron | | | | | | | | | | | | |
| Gray Iron \leq 32HRc | 150 to 400 | 150 to 300 | .0005 | .0007 | .0010 | .0012 | .0015 | .0018 | .0020 | .0030 | .0040 | .0045 |

Application Data for Series 323, 355, 377, and 365 High Performance End Mills (continued); **Peel Milling**



Recommendations are based upon a **radial cut depth of 10%** of the end mill's diameter and **axial cut depth of 50-85%** of the tool's LOC.

Peel milling can be performed wet or dry (with AT coating); please consult technical@toolalliance.com for specific application data.



See it run now!

Scan the Quick Code and watch the Series 365 milling various materials on the Tool Alliance YouTube channel.

| Material | SFPM | 1/8" | 3/16" | 1/4" | 5/16" | 3/8" | 7/16" | 1/2" | 5/8" | 3/4" | 1" |
|-------------------------|-------------------|------------|------------|------------|------------|------------|-----------|-----------|-----------|------------|------------|
| Steel | Peripheral | | | | | | | | | | |
| 1018 / 1020 | 400 to 600 | .001-.003 | .001-.004 | .0015-.005 | .002-.008 | .002-.008 | .003-.010 | .003-.010 | .003-.010 | .004-.012 | .004-.012 |
| 4140 / 4340 / P20 | 350 to 500 | .001-.002 | .001-.003 | .001-.004 | .0015-.006 | .0015-.006 | .002-.007 | .002-.007 | .002-.007 | .0025-.008 | .0025-.008 |
| Stainless Steel | | | | | | | | | | | |
| 303 / 304 / 316 | 300 to 500 | .001-.002 | .001-.003 | .0015-.004 | .002-.006 | .002-.006 | .003-.008 | .003-.008 | .003-.008 | .003-.010 | .003-.010 |
| 410 / 420 / 440C | 250 to 400 | .001-.002 | .001-.003 | .0015-.004 | .002-.006 | .002-.006 | .003-.008 | .003-.008 | .003-.008 | .003-.010 | .003-.010 |
| 15-5-17-4 \leq 32HRc | 300 to 500 | .001-.002 | .001-.003 | .0015-.004 | .002-.006 | .002-.006 | .003-.008 | .003-.008 | .003-.008 | .003-.010 | .003-.010 |
| 15-5-17-4 \geq 32HRc | 200 to 300 | .0005-.002 | .0005-.002 | .001-.003 | .0015-.005 | .0015-.005 | .002-.006 | .002-.006 | .002-.006 | .003-.008 | .003-.008 |
| Tool Steel | | | | | | | | | | | |
| A2/D2/H13 \leq 32HRc | 250 to 350 | .001-.002 | .001-.003 | .0015-.004 | .002-.006 | .002-.006 | .003-.008 | .003-.008 | .003-.008 | .003-.010 | .003-.010 |
| A2/D2/H13 \geq 32HRc | 200 to 300 | .001-.002 | .001-.003 | .0015-.004 | .002-.006 | .002-.006 | .003-.008 | .003-.008 | .003-.008 | .003-.010 | .003-.010 |
| Titanium | | | | | | | | | | | |
| 6Al-4V | 250 to 300 | .001-.002 | .001-.003 | .0015-.004 | .002-.006 | .002-.006 | .003-.008 | .003-.008 | .003-.008 | .003-.010 | .003-.010 |
| High Temp Alloys | | | | | | | | | | | |
| Inconel 625 | 125 to 200 | .0005-.002 | .0005-.002 | .001-.003 | .0015-.005 | .0015-.005 | .002-.006 | .002-.006 | .002-.006 | .002-.006 | .003-.008 |
| Inconel 718 | 100 to 150 | .0005-.002 | .0005-.002 | .001-.003 | .0015-.005 | .0015-.005 | .002-.006 | .002-.006 | .002-.006 | .002-.006 | .003-.008 |
| Cast Iron | | | | | | | | | | | |
| Gray Iron \leq 32HRc | 250 to 500 | .001-.002 | .001-.003 | .001-.004 | .0015-.006 | .0015-.006 | .002-.007 | .002-.007 | .002-.007 | .0025-.008 | .0025-.008 |

Application Data for Standard ULTRATOOL® End Mills

The milling data presented below is for all "standard" Series of Ultra end mills (data is presented separately on each respective product page for our application-specific high performance designs). Note: When using SmoothCoat & SmoothEdge surface treatments, Surface Feet or Meters Per Minute can be increased from the stated levels by at least 25%.

End Mill Specifications:

Diameter: +.000 / -.002

Shank Diameter: +.0000 / -.0003

LOC: +.060 / -.000

OAL: ± .060

Helix: ± 2°

Milling;
Fractional

Peripheral Milling data based
on axial depth ≤ 100% of tool
diameter & radial depth of
≤ 25% of tool diameter.



Slot Milling data based on
axial depth of cut = 50%
of tool diameter.

| Material | SFPM | SFPM | 1/8" | 3/16" | 1/4" | 5/16" | 3/8" | 7/16" | 1/2" | 5/8" | 3/4" | 1" |
|---|--------------------------|------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Steel 1018 / 1020 | Peripheral 150 to 350 | Slotting 150 to 300 | .0005 | .0010 | .0015 | .0018 | .0020 | .0025 | .0030 | .0035 | .0040 | .0045 |
| 4140 / 4340 / P20 | 150 to 300 | 125 to 225 | .0005 | .0007 | .0010 | .0012 | .0015 | .0018 | .0020 | .0025 | .0030 | .0040 |
| Stainless Steel 303 / 304 / 316 | 150 to 300 | 125 to 250 | .0005 | .0007 | .0010 | .0012 | .0015 | .0018 | .0020 | .0030 | .0040 | .0040 |
| 410 / 420 / 440C | 150 to 300 | 125 to 250 | .0005 | .0007 | .0010 | .0012 | .0015 | .0018 | .0020 | .0025 | .0035 | .0038 |
| 15-5/17-4 ≤ 32HRc | 125 to 250 | 100 to 225 | .0005 | .0007 | .0010 | .0012 | .0015 | .0018 | .0020 | .0025 | .0030 | .0038 |
| 15-5/17-4 ≥ 32HRc | 100 to 150 | 100 to 150 | .0003 | .0005 | .0010 | .0012 | .0015 | .0015 | .0015 | .0020 | .0030 | .0038 |
| 13-8 / 316L | 125 to 300 | 125 to 250 | .0005 | .0007 | .0010 | .0012 | .0015 | .0018 | .0020 | .0030 | .0040 | .0040 |
| Tool Steel A2/D2/H13 ≤ 32HRc | 125 to 250 | 100 to 200 | .0005 | .0007 | .0010 | .0012 | .0015 | .0018 | .0020 | .0025 | .0030 | .0035 |
| A2/D2/H13 ≥ 32HRc | 100 to 150 | 100 to 125 | .0003 | .0005 | .0010 | .0012 | .0015 | .0015 | .0015 | .0020 | .0030 | .0035 |
| Titanium 6Al-4V | 120 to 250 | 100 to 175 | .0005 | .0007 | .0010 | .0012 | .0012 | .0018 | .0020 | .0020 | .0030 | .0040 |
| High Temp Alloys Inconel 625 | 50 to 150 | 50 to 125 | .0005 | .0007 | .0010 | .0012 | .0012 | .0018 | .0020 | .0020 | .0025 | .0030 |
| Inconel 718 | 50 to 150 | 50 to 125 | .0003 | .0005 | .0010 | .0012 | .0012 | .0015 | .0015 | .0020 | .0025 | .0025 |
| Cast Iron Gray Iron ≤ 32HRc | 150 to 350 | 125 to 300 | .0005 | .0007 | .0010 | .0012 | .0015 | .0018 | .0020 | .0030 | .0040 | .0045 |
| Ductile Iron | 150 to 300 | 125 to 250 | .0005 | .0007 | .0010 | .0012 | .0015 | .0018 | .0020 | .0025 | .0035 | .0045 |
| Non-Ferrous 6061 T6 Aluminum | up to 2000 | up to 1500 | .0010 | .0020 | .0020 | .0025 | .0030 | .0035 | .0040 | .0050 | .0060 | .0070 |
| Copper,Brass,Bronze | up to 1200 | up to 1000 | .0010 | .0010 | .0020 | .0022 | .0025 | .0028 | .0030 | .0040 | .0040 | .0050 |
| Plastic | up to 2000 | up to 1500 | .0010 | .0020 | .0030 | .0035 | .0040 | .0050 | .0060 | .0080 | .0100 | .0120 |

| Metric End Mill Specifications: | Metric | | | | | | | | | | | |
|---|-------------------------|----------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Material | SMPM | SMPM | 2 mm | 3 mm | 4 mm | 6 mm | 8 mm | 10 mm | 12 mm | 16 mm | 20 mm | 25 mm |
| Steel 1018 / 1020 | Peripheral 45 to 110 | Slotting 45 to 90 | 0.010 | 0.012 | 0.025 | 0.038 | 0.045 | 0.050 | 0.080 | 0.090 | 0.100 | 0.120 |
| 4140 / 4340 / P20 | 45 to 90 | 40 to 70 | 0.010 | 0.012 | 0.018 | 0.025 | 0.030 | 0.038 | 0.050 | 0.065 | 0.080 | 0.100 |
| Stainless Steel 303 / 304 / 316 | 45 to 90 | 40 to 75 | 0.010 | 0.012 | 0.018 | 0.025 | 0.030 | 0.038 | 0.050 | 0.080 | 0.100 | 0.100 |
| 410 / 420 / 440C | 45 to 90 | 40 to 75 | 0.010 | 0.012 | 0.018 | 0.025 | 0.030 | 0.038 | 0.050 | 0.065 | 0.080 | 0.100 |
| 15-5/17-4 ≤ 32HRc | 38 to 75 | 30 to 70 | 0.010 | 0.012 | 0.018 | 0.025 | 0.030 | 0.038 | 0.050 | 0.065 | 0.080 | 0.100 |
| 15-5/17-4 ≥ 32HRc | 30 to 45 | 30 to 45 | 0.005 | 0.007 | 0.012 | 0.025 | 0.030 | 0.038 | 0.038 | 0.050 | 0.080 | 0.100 |
| 13-8 / 316L | 38 to 90 | 40 to 75 | 0.010 | 0.012 | 0.018 | 0.025 | 0.030 | 0.038 | 0.050 | 0.080 | 0.100 | 0.100 |
| Tool Steel A2/D2/H13 ≤ 32HRc | 38 to 75 | 30 to 60 | 0.010 | 0.012 | 0.018 | 0.025 | 0.030 | 0.038 | 0.050 | 0.065 | 0.080 | 0.090 |
| A2/D2/H13 ≥ 32HRc | 30 to 45 | 30 to 40 | 0.005 | 0.007 | 0.012 | 0.025 | 0.030 | 0.038 | 0.038 | 0.050 | 0.080 | 0.090 |
| Titanium 6Al-4V | 35 to 75 | 30 to 53 | 0.010 | 0.012 | 0.018 | 0.025 | 0.030 | 0.038 | 0.050 | 0.065 | 0.080 | 0.100 |
| High Temp Alloys Inconel 625 | 15 to 45 | 15 to 38 | 0.010 | 0.012 | 0.018 | 0.025 | 0.030 | 0.038 | 0.050 | 0.050 | 0.065 | 0.070 |
| Inconel 718 | 15 to 45 | 15 to 38 | 0.005 | 0.007 | 0.012 | 0.025 | 0.030 | 0.038 | 0.038 | 0.050 | 0.065 | 0.065 |
| Cast Iron Gray Iron ≤ 32HRc | 45 to 110 | 40 to 90 | 0.010 | 0.012 | 0.018 | 0.025 | 0.030 | 0.038 | 0.050 | 0.080 | 0.100 | 0.120 |
| Ductile Iron | 45 to 90 | 40 to 75 | 0.010 | 0.012 | 0.018 | 0.025 | 0.030 | 0.038 | 0.050 | 0.065 | 0.090 | 0.120 |
| Non-Ferrous 6061 T6 Aluminum | up to 600 | up to 450 | 0.020 | 0.025 | 0.050 | 0.050 | 0.064 | 0.080 | 0.100 | 0.130 | 0.150 | 0.180 |
| Copper,Brass,Bronze | up to 365 | up to 300 | 0.020 | 0.025 | 0.025 | 0.050 | 0.056 | 0.065 | 0.080 | 0.100 | 0.100 | 0.130 |
| Plastic | up to 600 | up to 450 | 0.020 | 0.025 | 0.050 | 0.080 | 0.089 | 0.100 | 0.150 | 0.200 | 0.250 | 0.300 |

Application Data for ULTRATOOL® Reamers



Spiral flutes produce the best hole finish. Right-hand spiral should be used for blind holes, while left-hand spiral is excellent for thru-hole applications. Straight flute is appropriate for all general reaming requirements.



**Reaming;
Fractional**

| Material | SFPM | SFPM | 1/16" | 1/8" | 3/16" | 1/4" | 5/16" | 3/8" | 7/16" | 1/2" | 5/8" | 3/4" |
|-------------------------|-----------------|-------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Steel | UnCoated | SmoothCoat | | | | | | | | | | |
| 1018/1020 | 50 to 125 | 50 to 150 | .0040 | .0050 | .0050 | .0060 | .0070 | .0080 | .0090 | .0100 | .0100 | .0100 |
| 4140/4340/P20 | 40 to 120 | 40 to 140 | .0040 | .0040 | .0040 | .0040 | .0050 | .0050 | .0050 | .0060 | .0060 | .0060 |
| Stainless Steel | | | | | | | | | | | | |
| 303/304/316 | 30 to 120 | 30 to 140 | .0040 | .0050 | .0050 | .0060 | .0070 | .0080 | .0090 | .0100 | .0100 | .0100 |
| 410/420/440C | 20 to 80 | 20 to 100 | .0040 | .0050 | .0050 | .0060 | .0070 | .0080 | .0090 | .0100 | .0100 | .0120 |
| 15-5-17-4 ≤ 32HRc | 40 to 140 | 40 to 160 | .0040 | .0040 | .0040 | .0040 | .0050 | .0050 | .0050 | .0060 | .0070 | .0080 |
| 15-5-17-4 ≥ 32HRc | 25 to 100 | 25 to 120 | .0020 | .0020 | .0030 | .0030 | .0040 | .0040 | .0050 | .0050 | .0060 | .0060 |
| 13-8/316L | 30 to 120 | 30 to 140 | .0040 | .0050 | .0050 | .0060 | .0070 | .0080 | .0090 | .0100 | .0100 | .0100 |
| Tool Steel | | | | | | | | | | | | |
| A2/D2/H13 ≤ 32HRc | 30 to 120 | 30 to 120 | .0040 | .0040 | .0040 | .0040 | .0050 | .0050 | .0050 | .0060 | .0070 | .0080 |
| A2/D2/H13 ≥ 32HRc | 20 to 80 | 20 to 100 | .0020 | .0020 | .0030 | .0030 | .0040 | .0040 | .0050 | .0050 | .0060 | .0060 |
| Titanium | | | | | | | | | | | | |
| 6Al-4V | 20 to 100 | 20 to 120 | .0020 | .0020 | .0030 | .0030 | .0040 | .0040 | .0060 | .0060 | .0080 | .0100 |
| High Temp Alloys | | | | | | | | | | | | |
| Inconel 625 | 20 to 60 | 20 to 80 | .0020 | .0020 | .0030 | .0030 | .0040 | .0040 | .0050 | .0050 | .0060 | .0060 |
| Inconel 718 | 20 to 50 | 20 to 70 | .0020 | .0020 | .0030 | .0030 | .0040 | .0040 | .0050 | .0050 | .0060 | .0060 |
| Cast Iron | | | | | | | | | | | | |
| Gray Iron ≤ 32HRc | 80 to 200 | 80 to 250 | .0060 | .0060 | .0060 | .0060 | .0070 | .0080 | .0100 | .0120 | .0140 | .0150 |
| Ductile Iron | 80 to 200 | 80 to 250 | .0060 | .0060 | .0060 | .0070 | .0080 | .0100 | .0100 | .0100 | .0100 | .0120 |
| Non-Ferrous | | | | | | | | | | | | |
| 6061 T6 Aluminum | 100 to 300 | 100 to 375 | .0050 | .0050 | .0060 | .0060 | .0070 | .0080 | .0100 | .0120 | .0140 | .0150 |
| Copper,Brass,Bronze | 75 to 200 | 75 to 250 | .0050 | .0050 | .0060 | .0060 | .0070 | .0080 | .0100 | .0120 | .0140 | .0150 |
| Plastic | 100 to 350 | 100 to 350 | .0050 | .0050 | .0060 | .0060 | .0070 | .0080 | .0100 | .0120 | .0140 | .0150 |

Total Stock Removal:

Minimum and Maximum amounts of stock removal should be adhered to for proper reaming action. This is the amount the reamer should be oversized relative to the drilled hole.

Up to 1/16" .003 - .005
1/16 to 1/8" .004 - .008
1/8 to 1/4" .006 - .012
1/4 to 3/8" .008 - .014
3/8 to 1/2" .010 - .015
1/2 to 1" .012 - .020

All Ultra-Tool® reamer products are manufactured from Ultra-Carb®. Carbide reamers constructed with steel shank are induction-brazed (using controlled-frequency amplification) and slow-cooled in our own factory for maximum strength. All products are manufactured with centers (male, female, or both) for high concentricity characteristics and resharpening capabilities. Also, shanks are ground to the next smallest common fractional diameter for effective tool-holding and practicality. Note: Series 411 has oversized shank with clearance neck and does not feature centers.

Reamer Specifications (decimal):

Cutting Diameter: +.0002 / -.00

Shank Diameter: ±.0005

LOC: ±.030

OAL: ±.060

Helix (RH & LH): 12°

Lead Angle: 45°



Now available with TA coating!

Application Data for ULTRATOOL® Slitting Saws

All Ultra-Tool® Saw products are manufactured from Ultra-Carb®. Use a higher RPM and lower feed ratios than in most cutting tool applications. Use light viscosity coolants at most; dry running is acceptable and/or preferred. Concentricity is the single most determining factor in an efficient slotting operation.

new! Now available with standard SmoothCoat!

Saw Specifications:

Diameter: ±.015

Hole (ID): +.0005 / -.0000

Thickness: ±.00025

| Material Group | Speed SPM |
|------------------------------|-----------|
| Aluminum/Related Alloys | 700-1000 |
| Brass/Bronze | 450-750 |
| Cast Iron (soft) | 250-450 |
| Cast Iron (medium) | 150-350 |
| Cast Iron (hard) | 100-200 |
| Magnesium | 800-1200 |
| Monel/Nickel Alloys | 150-225 |
| Steel-Heat Treated (35-40Rc) | 150-250 |
| Steel-Heat Treated (40-45Rc) | 100-200 |
| Steel-Heat Treated (45+Rc) | 75-135 |
| Steel-Low Carbon | 250-425 |
| Stainless-Soft | 200-300 |
| Stainless-Hard | 100-200 |
| Titanium Alloys | 150-275 |

Feed Rate: Chip Load from .0001 per tooth (hardest materials) to .0015 (easiest machinability).

Application Data for ULTRATOOL® Drills



Drilling speeds and feeds are based upon hole depth of up to 3X diameter. For deeper hole ratios reduce speeds and feeds by 10% to 25%.



Drilling;
Fractional

| Material | SFPM | SFPM | 1/16" | 1/8" | 3/16" | 1/4" | 5/16" | 3/8" | 7/16" | 1/2" | 5/8" | 3/4" |
|-------------------------|-----------------|-------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Steel | UnCoated | SmoothCoat | | | | | | | | | | |
| 1018 / 1020 | 100 to 250 | 100 to 300 | .0010 | .0030 | .0050 | .0070 | .0090 | .0100 | .0110 | .0120 | .0140 | .0160 |
| 4140 / 4340 / P20 | 60 to 230 | 60 to 260 | .0010 | .0030 | .0050 | .0070 | .0090 | .0100 | .0110 | .0120 | .0140 | .0160 |
| Stainless Steel | | | | | | | | | | | | |
| 303 / 304 / 316 | 60 to 150 | 60 to 200 | .0010 | .0030 | .0050 | .0060 | .0070 | .0080 | .0090 | .0100 | .0120 | .0140 |
| 410 / 420 / 440C | 40 to 100 | 40 to 150 | .0010 | .0030 | .0050 | .0060 | .0070 | .0080 | .0090 | .0100 | .0120 | .0140 |
| 15-5/17-4 ≤ 32HRc | 75 to 175 | 75 to 200 | .0010 | .0015 | .0025 | .0040 | .0050 | .0060 | .0070 | .0080 | .0090 | .0100 |
| 15-5/17-4 ≥ 32HRc | 50 to 125 | 50 to 150 | .0005 | .0010 | .0015 | .0025 | .0030 | .0035 | .0038 | .0040 | .0050 | .0060 |
| 13-8 / 316L | 60 to 150 | 60 to 200 | .0010 | .0030 | .0050 | .0060 | .0070 | .0080 | .0090 | .0100 | .0120 | .0140 |
| Tool Steel | | | | | | | | | | | | |
| A2/D2/H13 ≤ 32HRc | 60 to 150 | 60 to 200 | .0010 | .0015 | .0025 | .0040 | .0050 | .0060 | .0070 | .0080 | .0090 | .0100 |
| A2/D2/H13 ≥ 32HRc | 40 to 100 | 40 to 150 | .0005 | .0010 | .0015 | .0025 | .0028 | .0030 | .0035 | .0040 | .0050 | .0060 |
| Titanium | | | | | | | | | | | | |
| 6Al-4V | 40 to 150 | 40 to 175 | .0005 | .0010 | .0020 | .0025 | .0028 | .0030 | .0035 | .0040 | .0050 | .0060 |
| High Temp Alloys | | | | | | | | | | | | |
| Inconel 625 | 30 to 70 | 30 to 80 | .0010 | .0015 | .0025 | .0040 | .0050 | .0060 | .0070 | .0080 | .0090 | .0100 |
| Inconel 718 | 30 to 45 | 30 to 50 | .0005 | .0010 | .0020 | .0025 | .0028 | .0030 | .0035 | .0040 | .0050 | .0060 |
| Cast Iron | | | | | | | | | | | | |
| Gray Iron ≤ 32HRc | 150 to 300 | 150 to 350 | .0010 | .0030 | .0050 | .0070 | .0085 | .0100 | .0110 | .0120 | .0140 | .0160 |
| Ductile Iron | 150 to 300 | 150 to 350 | .0010 | .0030 | .0050 | .0070 | .0085 | .0100 | .0110 | .0120 | .0140 | .0160 |
| Non-Ferrous | | | | | | | | | | | | |
| 6061 T6 Aluminum | 250 to 750 | 250 to 1000 | .0010 | .0030 | .0050 | .0070 | .0085 | .0100 | .0110 | .0120 | .0140 | .0160 |
| Copper, Brass, Bronze | 150 to 400 | 150 to 500 | .0010 | .0030 | .0050 | .0070 | .0085 | .0100 | .0110 | .0120 | .0140 | .0160 |
| Plastic | 250 to 1000 | 250 to 1000 | .0010 | .0030 | .0050 | .0070 | .0085 | .0100 | .0110 | .0120 | .0140 | .0160 |

Drill Specifications:

Diameter: +.0000 / -.0003

LOC: +.060 / -.090

OAL: +.060 / -.090

Point Angle: ±1°

Helix Angle: ±1°

Note: Series 560 Combined Drill/C'sink:

Body Diameter: +.0000 / -.0003

Drill Diameter: +.003 / -.000

Ultra-Tool® drills feature diameter tolerances 40% tighter than industry standards. Plus, all shanks are SFR (shrink-fit ready).

Try our drills with standard SmoothCoat for a superb leap in lubricity, productivity, and tool life.



Complete range of Brad Point drills with D1 coating!

Application Data for ULTRATOOL® Burrs

| Burr Diam | Diam Metric | # Flutes Std Cut | RPM* | Max. RPM |
|-----------|-------------|------------------|-----------------|----------|
| 1/16 | 1.6 mm | 6 | 60,000 - 90,000 | 100,000 |
| 1/8 | 3.2 mm | 12 | 40,000 - 70,000 | 80,000 |
| 3/16 | 4.8 mm | 15 | 35,000 - 60,000 | 70,000 |
| 1/4 | 6.3 mm | 16 | 30,000 - 50,000 | 60,000 |
| 5/16 | 8.0 mm | 18 | 20,000 - 40,000 | 52,000 |
| 3/8 | 9.5 mm | 20 | 20,000 - 40,000 | 52,000 |
| 7/16 | 11.0 mm | 22 | 15,000 - 40,000 | 50,000 |
| 1/2 | 12.7 mm | 24 | 15,000 - 40,000 | 45,000 |
| 5/8 | 16.0 mm | 28 | 12,000 - 25,000 | 30,000 |
| 3/4 | 19.0 mm | 30 | 10,000 - 20,000 | 24,000 |
| 1" | 25.4 mm | 36 | 7,500 - 20,000 | 22,000 |

*Speeds are for Standard Cut. Reduce by approximately 25% with addition of Dura-Cut. Fine Cut increases flute count approximately 50%. Decrease speed accordingly. Coarse Cut decreases flute count approximately 20%. Increase speed accordingly. Lower listed speeds when cutting harder ferrous materials.

Ultra-Tool® Burrs feature higher hardness and a greater flute count than most competing brands for increased tool life.

Burr heads and solid carbide burrs are manufactured from Ultra-Carb®. Shanks are high speed steel hardened to a rating of 45-48 Rockwell C.

**Burr Specifications:**

Standard cylindrical helix angle: 30° ± 2°

Cutting Diameter: ± .010

Flute Count: ± 1

Shank Diameter: +0 / -.0005, TIR max .002

Brazed Burr TIR: max .005

Taper Angles: ± 1°

DeBurring

#1 Standard, #2 Fine, #3 Coarse, #4 DuraCut, #5 CoarseDura
#6 FineDura, #7 Fast Mill, #8 Diamond. In the event of extended lead times the next closest cut style within the same pricing category may be substituted to enhance service levels.

ULTRATOOL® Terms & Conditions

Ordering Information: All Ultra-Tool® products have a Series-Size designator and EDP number. One or both may be used when entering orders via eMail, fax, phone, web, or postal mail communications. If the product is coated, be sure to include the coating suffix.

Availability: Ultra-Tool® products are available primarily through select Industrial Distributors and catalog houses worldwide. Locally, your Industrial Distributor can provide communication, technical assistance, and inventory support. Standard products are subject to prior sale.

Pricing: All prices shown are effective December 2, 2019, supersede and cancel all previous listed prices, and are subject to change without notice. The amount of any present or future sales tax, value-added tax, or similar tax applicable to the products listed herein shall be added to the purchase price and paid by the customer. All sales made at list price less standard applicable distributor discount. Contract pricing must be obtained in writing via current quotation, with stated pricing, effective date, and expiration date, to be valid.

Shipping: Preferred carriers are UPS ground services, Federal Express Express Saver (Guaranteed 3-Day), and Federal Express premium services. Prices quoted herein are F.O.B. our Factory in Huntington Beach, California, U.S.A.

Terms: Domestic and Export Net 30 Days.

Minimum Charge: \$50.00 Net.

Returned Items: Current catalog items are returnable subject to a 25% handling charge and approval by the Ultra-Tool® Inspection Department. Credit cannot be issued for any product that has in any way been modified, machined, altered, coated, marked, or displaying other characteristics that render it in a "used" condition. A Returned Goods Authorization (RGA) number must be obtained from the Ultra-Tool® Sales Department prior to return. Returned product must be sent to the Factory for credit; consignment locations are not capable of issuing either RGA's or credit memos. Special tools are not returnable. Due to technical advancements, products sold 3 years ago and prior are not returnable.

Specials Policy: We reserve the right to overship or undership and invoice special tools up to a 10% variance per item. Quantities under 10 are subject to a one piece variance. Any variations to this policy must be stated in advance as it will affect pricing upon quotation. Special orders cannot be cancelled without prior approval and proper consideration.

Product Warranty: Ultra-Tool® warrants that products sold by it shall be free from defects in materials and workmanship. Ultra-Tool will replace, repair, or grant credit for any product which does not comply with this warranty. This warranty does not apply to any products which have been in any way modified, machined, misused, subjected to accident, or used beyond normal life. Warranty claims should be made through the distributor from whom the product was purchased. There are no other warranties, expressed or implied, made by us except as expressed above, and we neither assume nor authorize any other firm or person to assume for it any other obligation or liability in connection with our products.

Cooperative Advertising: Ultra-Tool® does not participate in any cooperative advertising programs with either industrial distributors or manufacturer's representatives. This policy allows us to avoid any possible favoritism or conflicts of interest, and keeps costs and sales prices as low as possible.

ULTRATOOL® is friendly to the environment. All paper products are separated for reuse and shredded for packaging materials. Shipping boxes are reused when possible. Conservation programs are in place for reduced energy use (additionally, our coastal location eliminates the need for artificial heating or cooling on most days). All displaced materials during the manufacturing process are collected, separated, and returned to a materials recycler. Coolants are recycled when appropriate. Mop water is evaporated and resultant sediment is properly disposed. Skylights provide natural lighting and reduce electricity usage.

Visit our factories on your next trip to the greater Los Angeles / San Diego, CA area (solid carbide) or Fort Myers / Naples, FL (indexable). View our automated facilities, meet our Associates, and tell us how we can better grow our relationship together. Huntington Beach is officially "Surf City" with miles of open beach on the Pacific Ocean, and we're minutes away from attractions such as Disneyland, Knott's, Universal Studios, Reagan and Nixon Presidential Libraries, Getty Museum, Dodger Stadium, Staples Center, Angel Stadium, Honda Center, The Alliance Club, and the list goes on. The closest airport is Orange County (SNA), followed by Long Beach (LGB), Los Angeles (LAX), and then Ontario (ONT). Fort Myers (airport code RSW) is on the beautiful Gulf of Mexico coast, a recreational haven, home to Major League Baseball spring training, and within a 3-hour drive to Orlando, Tampa Bay, Sarasota, Miami, Fort Lauderdale, the Everglades, and more.



Fort Myers, Florida



Huntington Beach, California



Huntington Beach, California



Huntington Beach, California

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This catalog is dedicated to all the hard-working Associates of Tool Alliance in California and Florida.
Our people make our Company. Thank you for everything you do.

Best,
Dave

ULTRATOOL® Decimal Equivalent Chart

| | | | |
|-------------|-------------|--------------|-----------------|
| 80 .0135 | 1/8 .1250 | 19/64 .2969 | 47/64 .7344 |
| 79 .0145 | 30 .1285 | N .3020 | .7480 19.0mm |
| 1/64 .0156 | 29 .1360 | 5/16 .3125 | 3/4 .7500 |
| 78 .0160 | .1378 3.5mm | .3150 8.0mm | 49/64 .7656 |
| 77 .0180 | 28 .1405 | O .3160 | .7677 19.5mm |
| .0197 0.5mm | 9/64 .1406 | P .3230 | 25/32 .7812 |
| 76 .0200 | 27 .1440 | 21/64 .3281 | .7874 20.0mm |
| 75 .0210 | 26 .1470 | Q .3320 | 51/64 .7969 |
| 74 .0225 | 25 .1495 | .3346 8.5mm | .8071 20.5mm |
| 73 .0240 | 24 .1520 | R .3390 | 13/16 .8125 |
| 72 .0250 | 23 .1540 | 11/32 .3438 | .8268 21.0mm |
| 71 .0260 | 5/32 .1562 | S .3480 | 53/64 .8281 |
| 70 .0280 | 22 .1570 | .3543 9.0mm | 27/32 .8438 |
| 69 .0292 | .1575 4.0mm | T .3580 | .8465 21.5mm |
| 68 .0310 | 21 .1590 | 23/64 .3594 | 55/64 .8594 |
| 1/32 .0312 | 20 .1610 | U .3680 | .8661 22.0mm |
| 67 .0320 | 19 .1660 | .3740 9.5mm | 7/8 .8750 |
| 66 .0330 | 18 .1695 | 3/8 .3750 | .8858 22.5mm |
| 65 .0350 | 11/64 .1719 | V .3770 | 57/64 .8906 |
| 64 .0360 | 17 .1730 | W .3860 | .9055 23.0mm |
| 63 .0370 | 16 .1770 | 25/64 .3906 | 29/32 .9062 |
| 62 .0380 | .1772 4.5mm | .3937 10.0mm | 59/64 .9219 |
| 61 .0390 | 15 .1800 | X .3970 | .9252 23.5mm |
| .0394 1.0mm | 14 .1820 | Y .4040 | 15/16 .9375 |
| 60 .0400 | 13 .1850 | 13/32 .4062 | .9449 24.0mm |
| 59 .0410 | 3/16 .1875 | Z .4130 | 61/64 .9531 |
| 58 .0420 | 12 .1890 | .4134 10.5mm | .9646 24.5mm |
| 57 .0430 | 11 .1910 | 27/64 .4219 | 31/32 .9688 |
| 56 .0465 | 10 .1935 | .4331 11.0mm | .9843 25.0mm |
| 3/64 .0469 | 9 .1960 | 7/16 .4375 | 63/64 .9844 |
| 55 .0520 | .1969 5.0mm | .4528 11.5mm | 1" 1.000 25.4mm |
| 54 .0550 | 8 .1990 | 29/64 .4531 | |
| .0591 1.5mm | 7 .2010 | 15/32 .4688 | |
| 53 .0595 | 13/64 .2031 | .4724 12.0mm | |
| 1/16 .0625 | 6 .2040 | 31/64 .4844 | |
| 52 .0635 | 5 .2055 | .4921 12.5mm | |
| 51 .0670 | 4 .2090 | 1/2 .5000 | |
| 50 .0700 | 3 .2130 | .5118 13.0mm | |
| 49 .0730 | .2165 5.5mm | 33/64 .5156 | |
| 48 .0760 | 7/32 .2188 | 17/32 .5312 | |
| 5/64 .0781 | 2 .2210 | .5315 13.5mm | |
| 47 .0785 | 1 .2280 | 35/64 .5469 | |
| .0787 2.0mm | A .2340 | .5512 14.0mm | |
| 46 .0810 | 15/64 .2344 | 9/16 .5625 | |
| 45 .0820 | .2362 6.0mm | .5709 14.5mm | |
| 44 .0860 | B .2380 | 37/64 .5781 | |
| 43 .0890 | C .2420 | .5906 15.0mm | |
| 42 .0935 | D .2460 | 19/32 .5938 | |
| 3/32 .0938 | E .2500 | 39/64 .6094 | |
| 41 .0960 | 1/4 .2500 | .6102 15.5mm | |
| 40 .0980 | .2559 6.5mm | 5/8 .6250 | |
| .0984 2.5mm | F .2570 | .6299 16.0mm | |
| 39 .0995 | G .2610 | 41/64 .6406 | |
| 38 .1015 | 17/64 .2656 | .6496 16.5mm | |
| 37 .1040 | H .2660 | 21/32 .6562 | |
| 36 .1065 | I .2720 | .6693 17.0mm | |
| 7/64 .1094 | .2756 7.0mm | 43/64 .6719 | |
| 35 .1100 | J .2770 | 11/16 .6875 | |
| 34 .1110 | K .2810 | .6890 17.5mm | |
| 33 .1130 | 9/32 .2812 | 45/64 .7031 | |
| 32 .1160 | L .2900 | .7087 18.0mm | |
| .1181 3.0mm | M .2950 | 23/32 .7188 | |
| 31 .1200 | .2953 7.5mm | .7283 18.5mm | |

Conversion Formulas

inches to millimeters:
multiply by 25.4millimeters to inches:
multiply by .03937

toolalliance.com

Ultra-Tool® sales features:

- The Company has a well known brand, superb quality reputation, and a 45-year operating history.
- Ultra-Tool is dedicated solely to the solid carbide rotary tooling industry.
- We are privately held, operate with long-term focus and goals, and manufacture our products within our company-owned factories.
- Our substrate, geometry, and coating are specially selected for each application and Series.
- Our cutting tools have extremely accurate diameter, radius, and concentricity characteristics.
- All solid carbide Ultra-Tool products are "SFR" (Shrink-Fit Ready).
- Our grinding method and coating process yields an extremely sharp and long lasting cutting edge.
- We offer a full line of standard tools including "hard to find" items.
- We offer proprietary coatings such as TiB2 (A1) and HSN² (AT), all performed in-house for quick delivery.
- We can stock firm blanket orders.
- We offer quick turnaround on special blueprint items.
- We have a great mix of Automation and Craftsmanship.
- Both fractional and metric size ranges are offered.
- We have sales offices in both coastal time zones (Florida and California).
- We strongly support traditional Industrial Distribution.
- We have large standard inventories and excellent service levels.



Visit our web sites for new products, services, events, and features.

About the technology of Ultra-Tool® & Tool Alliance®:

We obsess over details that create the finest cutting tools available. Our reward is customer satisfaction via increased factory productivity. We cannot be the best without thinking differently, so over a 45 year operating history we've developed proprietary technologies that yield significant characteristics of cutting tools unlike any you'll find elsewhere:

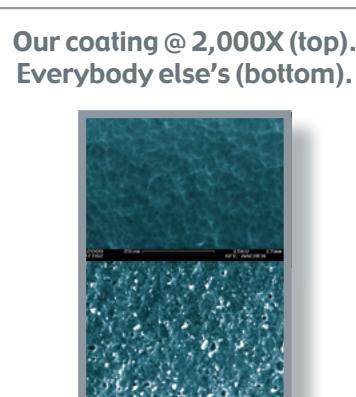
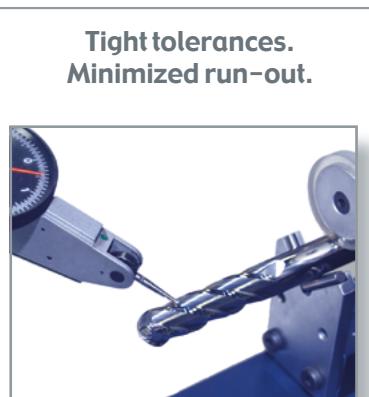
- SmoothGrind® = Polished cutting edges for extreme sharpness and lubricity.
- SmoothConicity® = Precision grinding, tool holding, and tolerances for minimized TIR.
- SmoothCoat® = Sputter-based SuperNitride PVD coating for superior surface hardness & uniformity.
- SmoothEdge® = Surface and edge preparation for lubricity and minimized break-in.

ULTRA TOOL®



Sharpness & Lubricity.
No wonder it works better.

SmoothGrind®



ULTRA TOOL®

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