

roundtool.com

# High-Performance Solid Carbide Round Tools

for Die & Mold, Medical, Consumer Electronic,  
Aerospace, Composite & Micro Machining



2015 Catalog



Made in the USA



**“Not just where machining is, but where machining will be.”**

RoundTool Laboratories was created to combine American manufacturing efficiency and product creativity with the high quality standards of Japanese and Western European carbide round tool manufacturing. We use only the best technology available from throughout the world, combined into a product line that offers the ultimate in milling, drilling and routing application productivity yet is affordable and made in the USA.

We guarantee your satisfaction. This Company was created with a total “white-paper” approach; there are no compromises regarding performance. Either we’ll meet or beat your current machining value on approved test, or we’ll credit your tools.

At RoundTool Labs 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 Povich  
President



## Tool Series Nomenclature

**In Order: Series • Flute Count • End Condition • Coating Type • Size**

Examples:

**GR4SD1 1/2**

GR Series, 4 flute, Square end, D1 coated, 1/2" diameter

**MP2BAT 0.1**

MP Series, 2 flute, Ball end, AT coated, 0.1 mm diameter

**LR8X3BUC .031**

LR8X Series, 3 flute, Ball end, UnCoated, .031 diameter

**GRERN4BD2 .030**

GR Extended Reach w/Neck Series, 4 flute, Ball end, D2 coated, .030 diameter

**SS5SA1 .062**

SS Series, 5 flute, Square end, A1 coated, .062 diameter

**HT6RAT 6.0**

HT Series, 6 flute, Radius end, AT coated, 6.0mm diameter

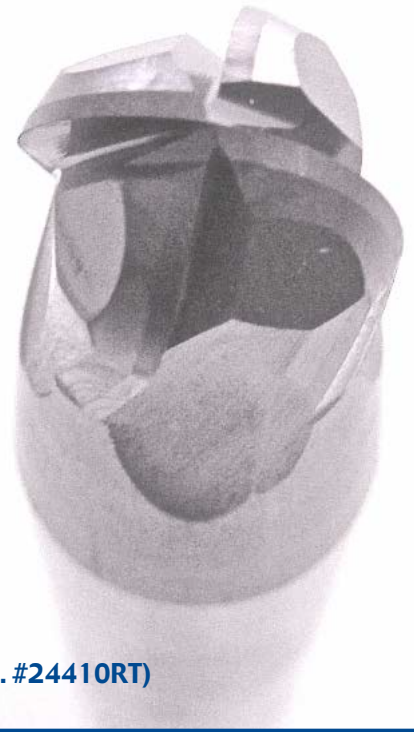
**DM4BAT 1/4L**

DM Series, 4 flute, Ball end, AT coated, 1/4" diameter Long selection

**MD2PUC 0.75**

MD Series, 2 flute, Pointed end, UnCoated, 0.75mm diameter

Please use listed EDP #'s followed by the “RT” suffix for inquiries and ordering (i.e. #24410RT)



Manufactured in the USA  
toolalliance.com



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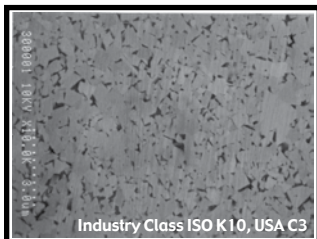


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eMail: sales@roundtool.com Domains: roundtool.com & toolalliance.com  
Special note: All RoundTool Laboratories EDP #'s will carry an "RT" suffix within the Tool Alliance database.  
Uniform Code Council (UCC) #713646

## 1 ULTRA-Grain®

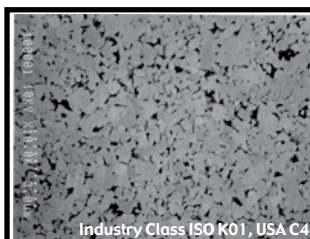
# Components of Guaranteed Quality

**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® 2 respectively demonstrate the complexity of the compound we commonly refer to as Cemented Carbide. Taken at magnification of 10,000 X 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 (K1c): 6.6  
TRS (GPa): 3.8  
Density (gm/cc): 14.90

ULTRA-Carb®

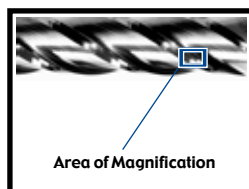


**Ultra-Grain® 2**  
Cobalt Percentage: 8%  
Grain Size (µm): ≤ 0.6  
Hardness: 93.8 HRA  
Fracture Toughness (K1c): 5.8  
TRS (GPa): 4.0  
Density (gm/cc): 14.6

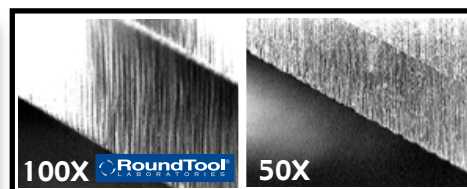
ULTRA-Grain®

## 2 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 improved lubricity are just some of the benefits brought to you by the latest solid carbide rotary tooling advances from Tool Alliance. The following photographs display a RoundTool end mill primary relief featuring SmoothGrind (left) versus a major competitor's product (right). To fully demonstrate the difference, the RoundTool 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.



Area of Magnification



### SmoothGrind® Competitor's

## 3 SmoothContricity®



**COMPONENT #3: The Tooling Process** All the best physical ingredients are wasted unless they are 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 are obtained using qualitative features; minimal 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.

35% tighter shank tolerance than h6!



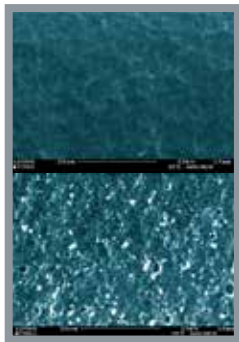
Shrink Fit Ready

## 4 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 process ranges from SmoothEdge 1, a micro-blasting treatment using extremely fine aluminum oxide powder (this procedure is standard with any non-micro coated product) to SmoothEdge 5, which adds a double cycle of honing & lubricity treatments. All five will 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 at [toolalliance.com](http://toolalliance.com).



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

## SmoothCoat® 5

**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.

**RoundTool Lab's Standard Coating Availability** Coating selection usually included within the EDP but for indicated Series it is added as a suffix to the EDP#.

Other Tool Alliance coatings:



Uncoated



AlTiN HSN<sup>2</sup>



TiB<sub>2</sub>



TiCN

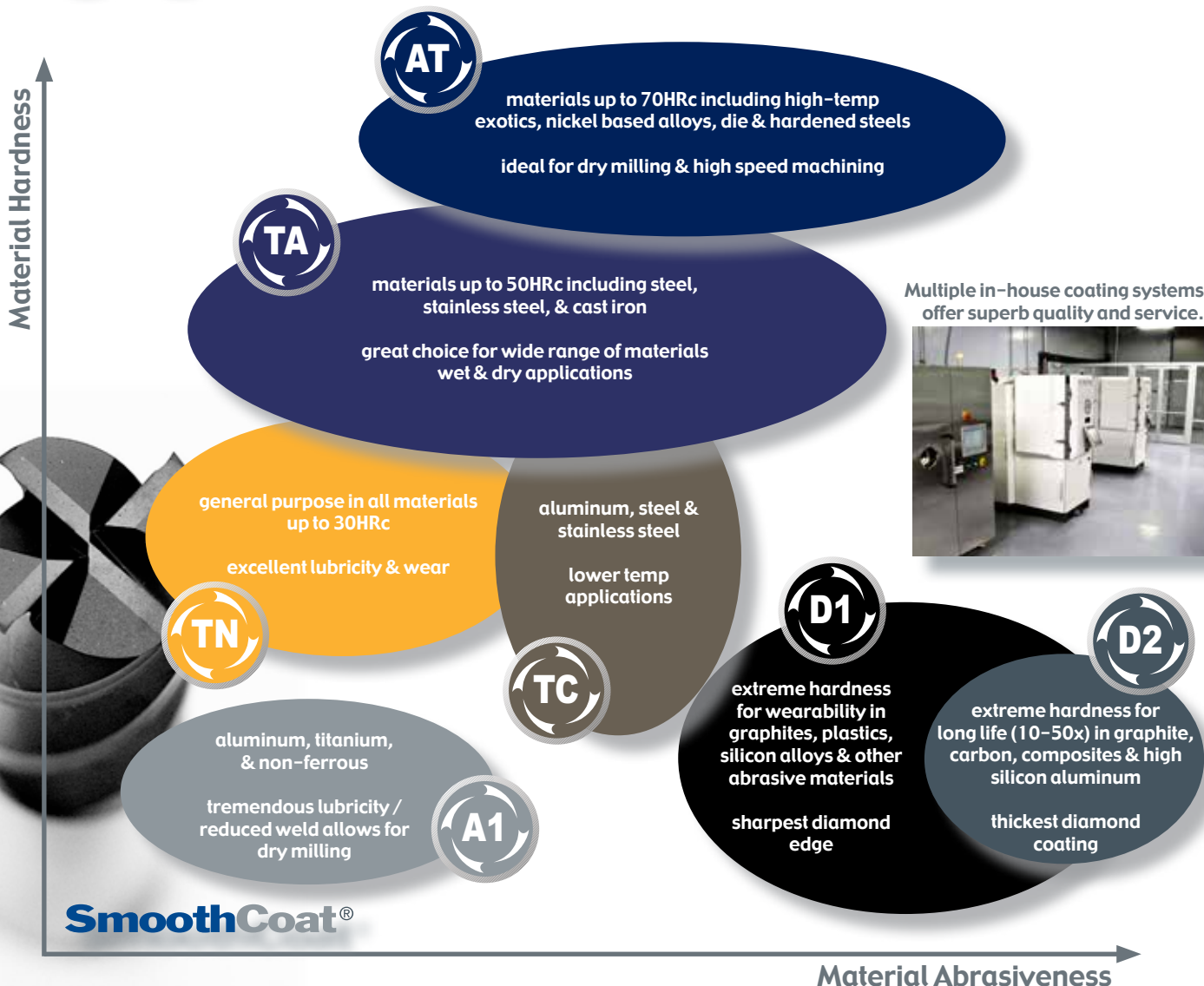


PVD Diamond



CVD Diamond

Standard Coatings available at respective "Coated" List Price



**new! MP & MPL Series: Multi-Purpose decimal micro end mills**



**Specs (micro end mills  
cutting diameter < 1/8"):**  
Cutting Diam  $+0.0003 / -0.0003$   
Shank Diam  $+0.0000 / -0.0002$   
Radius  $\pm .00015$   
**SFR = Shrink Fit Ready**

1/8" shank



**Premium carbide substrate with advanced geometry featuring two different LOC to Diameter ratios and AT or D1 coating.**

- Designed for diverse application range
- Match rigidity to app via a choice of 1.5X (MP) or 3.0X (MPL) LOC to Diameter ratios
- Available UnCoated, AT coated, or D1 coated
- Use AT in cobalt chrome, steels, stainless, high-temp alloys, and more
- Use D1 PVD Diamond in graphites, aluminum-silicon alloys, carbon fiber composites, reinforced plastics, & more
- One price for all square & ball end, two & four flute configurations (within same coating category)
- For the MP & MPL Series only, add the UC, AT, or D1 suffix to the EDP # when ordering (#43254D1).
- 1/2" OAL
- 1/8" shank
- Tight diameter tolerance of  $\pm .0003$



|                                                                                   |       |        |       |        |         |         |         |  |  |                                                                                     |        |       |        |         |         |         |  |  |  |
|-----------------------------------------------------------------------------------|-------|--------|-------|--------|---------|---------|---------|--|--|-------------------------------------------------------------------------------------|--------|-------|--------|---------|---------|---------|--|--|--|
| 1.5X                                                                              |       |        |       |        |         |         |         |  |  | 3.0X                                                                                |        |       |        |         |         |         |  |  |  |
| MP2S / MP2B 2-flute, LOC = 1.5X<br>MP4S / MP4B 4-flute, LOC = 1.5X                |       |        |       |        |         |         |         |  |  | MPL2S / MPL2B 2-flute, LOC = 3.0X<br>MPL4S / MPL4B 4-flute, LOC = 3.0X              |        |       |        |         |         |         |  |  |  |
|  |       |        |       |        |         |         |         |  |  |  |        |       |        |         |         |         |  |  |  |
|  |       |        |       |        |         |         |         |  |  |   |        |       |        |         |         |         |  |  |  |
| Diam                                                                              | 2 Sq  | 2 Ball | 4 Sq  | 4 Ball | UnCoat  | ATcoat  | D1coat  |  |  | 2 Sq                                                                                | 2 Ball | 4 Sq  | 4 Ball | UnCoat  | ATcoat  | D1coat  |  |  |  |
| .003                                                                              | 40578 | 40678  |       |        | \$22.00 | \$26.00 | \$30.00 |  |  | 40634                                                                               | 40734  |       |        | \$27.00 | \$31.00 | \$34.00 |  |  |  |
| .004                                                                              | 40579 | 40679  |       |        | \$22.00 | \$26.00 | \$30.00 |  |  | 40635                                                                               | 40735  |       |        | \$27.00 | \$31.00 | \$34.00 |  |  |  |
| .005                                                                              | 40799 | 40899  |       |        | \$15.00 | \$17.00 | \$20.00 |  |  | 40636                                                                               | 40736  |       |        | \$18.00 | \$20.00 | \$23.00 |  |  |  |
| .006                                                                              | 40800 | 40900  |       |        | \$15.00 | \$17.00 | \$20.00 |  |  | 40637                                                                               | 40737  |       |        | \$18.00 | \$20.00 | \$23.00 |  |  |  |
| .007                                                                              | 40002 | 40102  |       |        | \$15.00 | \$17.00 | \$20.00 |  |  | 40638                                                                               | 40738  |       |        | \$18.00 | \$20.00 | \$23.00 |  |  |  |
| .008                                                                              | 40003 | 40103  |       |        | \$15.00 | \$17.00 | \$20.00 |  |  | 40639                                                                               | 40739  |       |        | \$18.00 | \$20.00 | \$23.00 |  |  |  |
| .009                                                                              | 40004 | 40104  |       |        | \$15.00 | \$17.00 | \$20.00 |  |  | 40640                                                                               | 40740  |       |        | \$18.00 | \$20.00 | \$23.00 |  |  |  |
| .010                                                                              | 43244 | 43344  | 40599 | 40699  | \$13.00 | \$15.00 | \$18.00 |  |  | 40009                                                                               | 40048  | 40660 | 40760  | \$16.00 | \$18.00 | \$21.00 |  |  |  |
| .011                                                                              | 43245 | 43345  | 40600 | 40700  | \$13.00 | \$15.00 | \$18.00 |  |  | 40010                                                                               | 40049  | 40661 | 40761  | \$16.00 | \$18.00 | \$21.00 |  |  |  |
| .012                                                                              | 43246 | 43346  | 40601 | 40701  | \$13.00 | \$15.00 | \$18.00 |  |  | 40011                                                                               | 40050  | 40662 | 40762  | \$16.00 | \$18.00 | \$21.00 |  |  |  |
| .013                                                                              | 43247 | 43347  | 40602 | 40702  | \$13.00 | \$15.00 | \$18.00 |  |  | 40012                                                                               | 40051  | 40663 | 40763  | \$16.00 | \$18.00 | \$21.00 |  |  |  |
| .014                                                                              | 43298 | 43398  | 40603 | 40703  | \$13.00 | \$15.00 | \$18.00 |  |  | 40013                                                                               | 40052  | 40664 | 40764  | \$16.00 | \$18.00 | \$21.00 |  |  |  |
| .015                                                                              | 43249 | 43349  | 40604 | 40704  | \$13.00 | \$15.00 | \$18.00 |  |  | 40014                                                                               | 40053  | 40665 | 40765  | \$16.00 | \$18.00 | \$21.00 |  |  |  |
| .016                                                                              | 43250 | 43350  | 40605 | 40705  | \$13.00 | \$15.00 | \$18.00 |  |  | 40015                                                                               | 40054  | 40666 | 40766  | \$16.00 | \$18.00 | \$21.00 |  |  |  |
| .017                                                                              | 43251 | 43351  | 40606 | 40706  | \$13.00 | \$15.00 | \$18.00 |  |  | 40016                                                                               | 40055  | 40667 | 40767  | \$16.00 | \$18.00 | \$21.00 |  |  |  |
| .018                                                                              | 43252 | 43352  | 40607 | 40707  | \$13.00 | \$15.00 | \$18.00 |  |  | 40017                                                                               | 40056  | 40668 | 40768  | \$16.00 | \$18.00 | \$21.00 |  |  |  |
| .019                                                                              | 43253 | 43353  | 40608 | 40708  | \$13.00 | \$15.00 | \$18.00 |  |  | 40018                                                                               | 40057  | 40669 | 40769  | \$16.00 | \$18.00 | \$21.00 |  |  |  |
| .020                                                                              | 43254 | 43354  | 40609 | 40709  | \$13.00 | \$15.00 | \$18.00 |  |  | 40019                                                                               | 40040  | 40670 | 40770  | \$16.00 | \$18.00 | \$21.00 |  |  |  |
| .021                                                                              | 43255 | 43355  | 40610 | 40710  | \$12.50 | \$14.50 | \$18.00 |  |  | 40020                                                                               | 40058  | 40671 | 40771  | \$15.50 | \$18.00 | \$21.00 |  |  |  |
| .022                                                                              | 43256 | 43356  | 40611 | 40711  | \$12.50 | \$14.50 | \$17.50 |  |  | 40021                                                                               | 40059  | 40777 | 40877  | \$15.50 | \$17.50 | \$20.50 |  |  |  |
| .023                                                                              | 43257 | 43357  | 40612 | 40712  | \$12.50 | \$14.50 | \$17.50 |  |  | 40022                                                                               | 40060  | 40778 | 40878  | \$15.50 | \$17.50 | \$20.50 |  |  |  |
| .024                                                                              | 43258 | 43358  | 40613 | 40713  | \$12.50 | \$14.50 | \$17.50 |  |  | 40023                                                                               | 40061  | 40779 | 40879  | \$15.50 | \$17.50 | \$20.50 |  |  |  |
| .025                                                                              | 43259 | 43359  | 42259 | 42359  | \$12.50 | \$14.50 | \$17.50 |  |  | 40024                                                                               | 40041  | 40073 | 40090  | \$15.50 | \$17.50 | \$20.50 |  |  |  |
| .026                                                                              | 43260 | 43360  | 42260 | 42360  | \$12.50 | \$14.50 | \$17.50 |  |  | 40025                                                                               | 40062  | 40074 | 40091  | \$15.50 | \$17.50 | \$20.50 |  |  |  |
| .027                                                                              | 43261 | 43361  | 42261 | 42361  | \$12.50 | \$14.50 | \$17.50 |  |  | 40026                                                                               | 40063  | 40075 | 40092  | \$15.50 | \$17.50 | \$20.50 |  |  |  |
| .028                                                                              | 43262 | 43362  | 42262 | 42362  | \$12.50 | \$14.50 | \$17.50 |  |  | 40027                                                                               | 40064  | 40076 | 40093  | \$15.50 | \$17.50 | \$20.50 |  |  |  |
| .029                                                                              | 43263 | 43363  | 42263 | 42363  | \$12.50 | \$14.50 | \$17.50 |  |  | 40028                                                                               | 40065  | 40077 | 40094  | \$15.50 | \$17.50 | \$20.50 |  |  |  |
| .030                                                                              | 43264 | 43364  | 42264 | 42364  | \$12.00 | \$14.00 | \$17.00 |  |  | 40029                                                                               | 40042  | 40078 | 40095  | \$15.00 | \$17.00 | \$20.00 |  |  |  |
| .031                                                                              | 43265 | 43365  | 42265 | 42365  | \$12.00 | \$14.00 | \$17.00 |  |  | 40030                                                                               | 40043  | 40079 | 40096  | \$15.00 | \$17.00 | \$20.00 |  |  |  |
| .032                                                                              | 40005 | 40574  | 40470 | 40570  | \$12.00 | \$14.00 | \$17.00 |  |  | 40031                                                                               | 40066  | 40080 | 40097  | \$15.00 | \$17.00 | \$20.00 |  |  |  |
| .033                                                                              | 40580 | 40680  | 40614 | 40714  | \$12.00 | \$14.00 | \$17.00 |  |  | 40641                                                                               | 40741  | 40780 | 40880  | \$15.00 | \$17.00 | \$20.00 |  |  |  |
| .034                                                                              | 40581 | 40681  | 40615 | 40715  | \$12.00 | \$14.00 | \$17.00 |  |  | 40642                                                                               | 40742  | 40781 | 40881  | \$15.00 | \$17.00 | \$20.00 |  |  |  |
| .035                                                                              | 43266 | 43366  | 42266 | 42366  | \$12.00 | \$14.00 | \$17.00 |  |  | 40047                                                                               | 40067  | 40081 | 40098  | \$15.00 | \$17.00 | \$20.00 |  |  |  |
| .036                                                                              | 40582 | 40682  | 40616 | 40716  | \$12.00 | \$14.00 | \$17.00 |  |  | 40643                                                                               | 40743  | 40782 | 40882  | \$15.00 | \$17.00 | \$20.00 |  |  |  |
| .037                                                                              | 40006 | 40575  | 40471 | 40571  | \$12.00 | \$14.00 | \$17.00 |  |  | 40032                                                                               | 40068  | 40082 | 40099  | \$15.00 | \$17.00 | \$20.00 |  |  |  |
| .038                                                                              | 40583 | 40683  | 40617 | 40717  | \$12.00 | \$14.00 | \$17.00 |  |  | 40644                                                                               | 40744  | 40783 | 40883  | \$15.00 | \$17.00 | \$20.00 |  |  |  |
| .039                                                                              | 40584 | 40684  | 40618 | 40718  | \$12.00 | \$14.00 | \$17.00 |  |  | 40645                                                                               | 40745  | 40784 | 40884  | \$15.00 | \$17.00 | \$20.00 |  |  |  |
| .040                                                                              | 43267 | 43367  | 42267 | 42367  | \$12.00 | \$14.00 | \$17.00 |  |  | 40033                                                                               | 40044  | 40083 | 40100  | \$15.00 | \$17.00 | \$20.00 |  |  |  |
| .041                                                                              | 40585 | 40685  | 40619 | 40719  | \$12.00 | \$14.00 | \$17.00 |  |  | 40646                                                                               | 40746  | 40785 | 40885  | \$15.00 | \$17.00 | \$20.00 |  |  |  |
| .042                                                                              | 40586 | 40686  | 40620 | 40720  | \$12.00 | \$14.00 | \$17.00 |  |  | 40647                                                                               | 40747  | 40786 | 40886  | \$15.00 | \$17.00 | \$20.00 |  |  |  |
| .043                                                                              | 40587 | 40687  | 40621 | 40721  | \$12.00 | \$14.00 | \$17.00 |  |  | 40648                                                                               | 40748  | 40787 | 40887  | \$15.00 | \$17.00 | \$20.00 |  |  |  |
| .044                                                                              | 40588 | 40688  | 40623 | 40723  | \$12.00 | \$14.00 | \$17.00 |  |  | 40649                                                                               | 40749  | 40788 | 40888  | \$15.00 | \$17.00 | \$20.00 |  |  |  |
| .045                                                                              | 40589 | 40689  | 40624 | 40724  | \$12.00 | \$14.00 | \$17.00 |  |  | 40650                                                                               | 40750  | 40789 | 40889  | \$15.00 | \$17.00 | \$20.00 |  |  |  |
| .046                                                                              | 40007 | 40576  | 40472 | 40572  | \$12.00 | \$14.00 | \$17.00 |  |  | 40034                                                                               | 40069  | 40084 | 40101  | \$15.00 | \$17.00 | \$20.00 |  |  |  |
| .047                                                                              | 43268 | 43368  | 42268 | 42368  | \$12.00 | \$14.00 | \$17.00 |  |  | 40035                                                                               | 40045  | 40085 | 40108  | \$15.00 | \$17.00 | \$20.00 |  |  |  |
| .048                                                                              | 40590 | 40690  | 40625 | 40725  | \$12.00 | \$14.00 | \$17.00 |  |  | 40651                                                                               | 40751  | 40790 | 40890  | \$15.00 | \$17.00 | \$20.00 |  |  |  |
| .049                                                                              | 40591 | 40691  | 40626 | 40726  | \$12.00 | \$14.00 | \$17.00 |  |  | 40652                                                                               | 40752  | 40791 | 40891  | \$15.00 | \$17.00 | \$20.00 |  |  |  |
| .050                                                                              | 43269 | 43369  | 42269 | 42369  | \$11.00 | \$13.00 | \$16.00 |  |  | 40036                                                                               | 40070  | 40086 | 40109  | \$14.00 | \$16.00 | \$19.00 |  |  |  |
| .051                                                                              | 40592 | 40692  | 40627 | 40727  | \$11.00 | \$13.00 | \$16.00 |  |  | 40653                                                                               | 40753  | 40792 | 40892  | \$14.00 | \$16.00 | \$19.00 |  |  |  |
| .052                                                                              | 40593 | 40693  | 40628 | 40728  | \$11.00 | \$13.00 | \$16.00 |  |  | 40654                                                                               | 40754  | 40793 | 40893  | \$14.00 | \$16.00 | \$19.00 |  |  |  |
| .053                                                                              | 40594 | 40694  | 40629 | 40729  | \$11.00 | \$13.00 | \$16.00 |  |  | 40655                                                                               | 40755  | 40794 | 40894  | \$14.00 | \$16.00 | \$19.00 |  |  |  |
| .054                                                                              | 40595 | 40695  | 40630 | 40730  | \$11.00 | \$13.00 | \$16.00 |  |  | 40656                                                                               | 40756  | 40795 | 40895  | \$14.00 | \$16.00 | \$19.00 |  |  |  |
| .055                                                                              | 43270 | 43370  | 42270 | 42370  | \$11.00 | \$13.00 | \$16.00 |  |  | 40037                                                                               | 40046  | 40087 | 40110  | \$14.00 | \$16.00 | \$19.00 |  |  |  |
| .056                                                                              | 40596 | 40696  | 40631 | 40731  | \$11.00 | \$13.00 | \$16.00 |  |  | 40657                                                                               | 40757  | 40796 | 40896  | \$14.00 | \$16.00 | \$19.00 |  |  |  |
| .057                                                                              | 40008 | 40577  | 40473 | 40573  | \$11.00 | \$13.00 | \$16.00 |  |  | 40038                                                                               | 40071  | 40088 | 40111  | \$14.00 | \$16.00 | \$19.00 |  |  |  |
| .058                                                                              | 40597 | 40697  | 40632 | 40732  | \$11.00 | \$13.00 | \$16.00 |  |  | 40658                                                                               | 40758  | 40797 | 40897  | \$14.00 | \$16.00 | \$19.00 |  |  |  |
| .059                                                                              | 40598 | 40698  | 40633 | 40733  | \$11.00 | \$13.00 | \$16.00 |  |  | 40659                                                                               | 40759  | 40798 | 40898  | \$14.00 | \$16.00 | \$19.00 |  |  |  |
| .060                                                                              | 43271 | 43371  | 42271 | 42371  | \$11.00 | \$13.00 | \$16.00 |  |  | 40039                                                                               | 40072  | 40089 | 40112  | \$14.00 | \$16.00 | \$19.00 |  |  |  |
| .062                                                                              | 44000 | 44100  | 45000 | 45100  | \$11.00 | \$13.00 | \$16.00 |  |  | 44016                                                                               | 44116  | 45016 | 45116  | \$14.00 | \$16.00 | \$19.00 |  |  |  |
| .065                                                                              | 44001 | 44101  | 45001 | 45101  | \$11.00 | \$13.00 | \$16.00 |  |  | 44017                                                                               | 44117  | 45017 | 45117  | \$14.00 | \$16.00 | \$19.00 |  |  |  |



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



Diam

1.5X

MP2S / MP2B  
MP4S / MP4B

2-flute, LOC = 1.5X  
4-flute, LOC = 1.5X



2 Sq

2 Ball

4 Sq

4 Ball

UnCoat

ATcoat

D1coat

.070

44002

44102

45002

45102

\$11.00

\$13.00

\$16.00

.075

44003

44103

45003

45103

\$11.00

\$13.00

\$16.00

.078

44004

44104

45004

45104

\$11.00

\$13.00

\$16.00

.080

44005

44105

45005

45105

\$11.00

\$13.00

\$16.00

.085

44006

44106

45006

45106

\$11.00

\$13.00

\$16.00

.090

44007

44107

45007

45107

\$11.00

\$13.00

\$16.00

.093

44008

44108

45008

45108

\$11.00

\$13.00

\$16.00

.095

44009

44109

45009

45109

\$11.00

\$13.00

\$16.00

.100

44010

44110

45010

45110

\$11.00

\$13.00

\$16.00

.105

44011

44111

45011

45111

\$11.00

\$13.00

\$16.00

.110

44012

44112

45012

45112

\$11.00

\$13.00

\$16.00

.115

44013

44113

45013

45113

\$11.00

\$13.00

\$16.00

.118

44014

44114

45014

45114

\$11.00

\$13.00

\$16.00

.120

44015

44115

45015

45115

\$11.00

\$13.00

\$16.00

1/8" shank

## new! MP & MPL Series: Multi-Purpose metric micro end mills

Premium carbide substrate with advanced geometry featuring  
two different LOC to Diameter ratios and AT or D1 coating.

- Designed for diverse application range • 38 mm OAL • 3.0 mm shank
- Tight diameter tolerance of ± 0.008 mm
- Available UnCoated, AT (AlTiN) coated, or D1 PVD Diamond coated
- Match rigidity to application via choice of 1.5X (MP) or 3.0X (MPL) LOC to Diameter ratios
- Use AT in cobalt chrome, steels, stainless, high-temp alloys, and more
- Use D1 in graphites, aluminum-silicon alloys, carbon fiber composites, reinforced plastics, and more
- One price for all square & ball end, two & four flute configurations (within respective coating category)

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



Specs (MM micro end mills  
cutting diameter < 3.0mm):  
Cutting Diam +0.008 / -0.008mm  
Shank Diam +0.000 / -0.005mm  
Radius ± 0.004mm  
SFR = Shrink Fit Ready



3.0mm shank

Diam

1.5X

MP2S / MP2B  
MP4S / MP4B

2-flute, LOC = 1.5X  
4-flute, LOC = 1.5X



2 Sq

2 Ball

4 Sq

4 Ball

UnCoat

ATcoat

D1coat

0.10mm

40801

40901

\$21.00

\$23.00

\$26.00

0.15

40802

40902

\$15.00

\$17.00

\$20.00

0.20

40803

40903

\$15.00

\$17.00

\$20.00

0.25

43272

43372

40804

40904

\$13.00

\$15.00

\$18.00

0.30

43273

43373

40805

40905

\$13.00

\$15.00

\$18.00

0.35

43274

43374

40806

40906

\$13.00

\$15.00

\$18.00

0.40

43275

43375

40807

40907

\$13.00

\$15.00

\$18.00

0.45

43276

43376

40808

40908

\$13.00

\$15.00

\$18.00

0.50

43277

43377

40809

40909

\$13.00

\$15.00

\$18.00

0.55

43278

43378

40810

40910

\$12.50

\$14.50

\$17.50

0.60

43279

43379

40811

40911

\$12.50

\$14.50

\$17.50

0.65

43280

43380

40812

40912

\$12.50

\$14.50

\$17.50

0.70

43281

43381

42281

42381

\$12.50

\$14.50

\$17.50

0.75

43282

43382

42282

42382

\$12.50

\$14.50

\$17.50

0.80

43283

43383

42283

42383

\$12.00



# GR Series: UnCoated decimal micro end mills

High strength and hardness solid carbide end mills  
with reduced rake & increased helix. Featuring LOC = 5X diameter.



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



- Designed for milling of hardened steels, non-metals & non-ferrous alloys
- Proprietary cemented carbide grade offers extremely high hardness and density
- Features heavy core construction for maximum rigidity • Tight tolerance ± .0003

1/8" shank



| Diam | LOC  | OAL   | Shank | 2 flute Square UnCoated EDP# | 2 flute Ball UnCoated EDP# | 4 flute Square UnCoated EDP# | 4 flute Ball UnCoated EDP# | Price   |
|------|------|-------|-------|------------------------------|----------------------------|------------------------------|----------------------------|---------|
| .005 | .025 | 1-1/2 | 1/8   | 11270                        | 11275                      |                              |                            | \$21.00 |
| .006 | .030 | 1-1/2 | 1/8   | 11271                        | 11276                      |                              |                            | \$21.00 |
| .007 | .035 | 1-1/2 | 1/8   | 11272                        | 11277                      |                              |                            | \$21.00 |
| .008 | .040 | 1-1/2 | 1/8   | 11273                        | 11278                      |                              |                            | \$21.00 |
| .009 | .045 | 1-1/2 | 1/8   | 11274                        | 11279                      |                              |                            | \$21.00 |
| .010 | .050 | 1-1/2 | 1/8   | 10001                        | 10065                      | 11242                        | 11256                      | \$19.00 |
| .011 | .055 | 1-1/2 | 1/8   | 10002                        | 10066                      | 11243                        | 11257                      | \$19.00 |
| .012 | .060 | 1-1/2 | 1/8   | 10003                        | 10067                      | 11244                        | 11258                      | \$19.00 |
| .013 | .065 | 1-1/2 | 1/8   | 10004                        | 10068                      | 11245                        | 11259                      | \$19.00 |
| .014 | .070 | 1-1/2 | 1/8   | 10005                        | 10069                      | 11246                        | 11260                      | \$19.00 |
| .015 | .075 | 1-1/2 | 1/8   | 10006                        | 10070                      | 11247                        | 11261                      | \$19.00 |
| .016 | .080 | 1-1/2 | 1/8   | 10007                        | 10071                      | 11248                        | 11262                      | \$19.00 |
| .017 | .085 | 1-1/2 | 1/8   | 10008                        | 10072                      | 11249                        | 11263                      | \$19.00 |
| .018 | .090 | 1-1/2 | 1/8   | 10009                        | 10073                      | 11250                        | 11264                      | \$19.00 |
| .019 | .095 | 1-1/2 | 1/8   | 10010                        | 10074                      | 11251                        | 11265                      | \$19.00 |
| .020 | .100 | 1-1/2 | 1/8   | 10011                        | 10075                      | 12232                        | 12234                      | \$18.50 |
| .021 | .105 | 1-1/2 | 1/8   | 10012                        | 10076                      | 11252                        | 11266                      | \$18.50 |
| .022 | .110 | 1-1/2 | 1/8   | 10013                        | 10077                      | 11253                        | 11267                      | \$18.50 |
| .023 | .115 | 1-1/2 | 1/8   | 10014                        | 10078                      | 11254                        | 11268                      | \$18.50 |
| .024 | .120 | 1-1/2 | 1/8   | 10015                        | 10079                      | 11255                        | 11269                      | \$18.50 |
| .025 | .125 | 1-1/2 | 1/8   | 10016                        | 10080                      | 10129                        | 10178                      | \$18.50 |
| .026 | .130 | 1-1/2 | 1/8   | 10017                        | 10081                      | 10130                        | 10179                      | \$18.50 |
| .027 | .135 | 1-1/2 | 1/8   | 10018                        | 10082                      | 10131                        | 10180                      | \$18.50 |
| .028 | .140 | 1-1/2 | 1/8   | 10019                        | 10083                      | 10132                        | 10181                      | \$18.50 |
| .029 | .145 | 1-1/2 | 1/8   | 10020                        | 10084                      | 10133                        | 10182                      | \$18.50 |
| .030 | .150 | 1-1/2 | 1/8   | 10021                        | 10085                      | 10134                        | 10183                      | \$18.00 |
| .031 | .155 | 1-1/2 | 1/8   | 10022                        | 10086                      | 10135                        | 10184                      | \$18.00 |
| .032 | .160 | 1-1/2 | 1/8   | 10023                        | 10087                      | 10136                        | 10185                      | \$18.00 |
| .033 | .165 | 1-1/2 | 1/8   | 10024                        | 10088                      | 10137                        | 10186                      | \$18.00 |
| .034 | .170 | 1-1/2 | 1/8   | 10025                        | 10089                      | 10138                        | 10187                      | \$18.00 |
| .035 | .175 | 1-1/2 | 1/8   | 10026                        | 10090                      | 10139                        | 10188                      | \$18.00 |
| .036 | .180 | 1-1/2 | 1/8   | 10027                        | 10091                      | 10140                        | 10189                      | \$18.00 |
| .037 | .185 | 1-1/2 | 1/8   | 10028                        | 10092                      | 10141                        | 10190                      | \$18.00 |
| .038 | .190 | 1-1/2 | 1/8   | 10029                        | 10093                      | 10142                        | 10191                      | \$18.00 |
| .039 | .195 | 1-1/2 | 1/8   | 10030                        | 10094                      | 10143                        | 10192                      | \$18.00 |
| .040 | .200 | 1-1/2 | 1/8   | 10031                        | 10095                      | 10144                        | 10193                      | \$18.00 |
| .041 | .205 | 1-1/2 | 1/8   | 10032                        | 10096                      | 10145                        | 10194                      | \$18.00 |
| .042 | .210 | 1-1/2 | 1/8   | 10033                        | 10097                      | 10146                        | 10195                      | \$18.00 |
| .043 | .215 | 1-1/2 | 1/8   | 10034                        | 10098                      | 10147                        | 10196                      | \$18.00 |
| .044 | .220 | 1-1/2 | 1/8   | 10035                        | 10099                      | 10148                        | 10197                      | \$18.00 |
| .045 | .225 | 1-1/2 | 1/8   | 10036                        | 10100                      | 10149                        | 10198                      | \$18.00 |
| .046 | .230 | 1-1/2 | 1/8   | 10037                        | 10101                      | 10150                        | 10199                      | \$18.00 |
| .047 | .235 | 1-1/2 | 1/8   | 10038                        | 10102                      | 10151                        | 10200                      | \$18.00 |
| .048 | .240 | 1-1/2 | 1/8   | 10039                        | 10103                      | 10152                        | 10201                      | \$18.00 |
| .049 | .245 | 1-1/2 | 1/8   | 10040                        | 10104                      | 10153                        | 10202                      | \$18.00 |
| .050 | .250 | 1-1/2 | 1/8   | 10041                        | 10105                      | 10154                        | 10203                      | \$17.00 |
| .051 | .255 | 1-1/2 | 1/8   | 10042                        | 10106                      | 10155                        | 10204                      | \$17.00 |
| .052 | .260 | 1-1/2 | 1/8   | 10043                        | 10107                      | 10156                        | 10205                      | \$17.00 |
| .053 | .265 | 1-1/2 | 1/8   | 10044                        | 10108                      | 10157                        | 10206                      | \$17.00 |
| .054 | .270 | 1-1/2 | 1/8   | 10045                        | 10109                      | 10158                        | 10207                      | \$17.00 |
| .055 | .275 | 1-1/2 | 1/8   | 10046                        | 10110                      | 10159                        | 10208                      | \$17.00 |
| .056 | .280 | 1-1/2 | 1/8   | 10047                        | 10111                      | 10160                        | 10209                      | \$17.00 |
| .057 | .285 | 1-1/2 | 1/8   | 10048                        | 10112                      | 10161                        | 10210                      | \$17.00 |
| .058 | .290 | 1-1/2 | 1/8   | 10049                        | 10113                      | 10162                        | 10211                      | \$17.00 |
| .059 | .295 | 1-1/2 | 1/8   | 10050                        | 10114                      | 10163                        | 10212                      | \$17.00 |
| .060 | .300 | 1-1/2 | 1/8   | 10051                        | 10115                      | 10164                        | 10213                      | \$17.00 |
| .061 | .305 | 1-1/2 | 1/8   | 10052                        | 10116                      | 10165                        | 10214                      | \$17.00 |
| .062 | .310 | 1-1/2 | 1/8   | 10053                        | 10117                      | 10166                        | 10215                      | \$17.00 |



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

new!

# GR Series: AT coated decimal micro end mills

Thick core, high strength solid carbide end mills for die steels & hardened materials featuring proprietary AlTiN coating & LOC = 5X diameter.

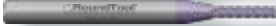
GR2SAT



GR2BAT



GR4SAT



GR4BAT



- Designed for milling of hard metals • Tight tolerance  $\pm .0003$
- Proprietary cemented carbide grade and AlTiN coating
- Features extended lengths of cut with heavy core for strength

1/8" shank



| Diam | LOC  | OAL   | Shank | 2 flute Square AT Coated EDP# | 2 flute Ball AT Coated EDP# | 4 flute Square AT Coated EDP# | 4 flute Ball AT Coated EDP# | Price   |
|------|------|-------|-------|-------------------------------|-----------------------------|-------------------------------|-----------------------------|---------|
| .005 | .025 | 1-1/2 | 1/8   | 00634                         | 00639                       |                               |                             | \$23.00 |
| .006 | .030 | 1-1/2 | 1/8   | 00635                         | 00640                       |                               |                             | \$23.00 |
| .007 | .035 | 1-1/2 | 1/8   | 00636                         | 00641                       |                               |                             | \$23.00 |
| .008 | .040 | 1-1/2 | 1/8   | 00637                         | 00642                       |                               |                             | \$23.00 |
| .009 | .045 | 1-1/2 | 1/8   | 00638                         | 00643                       |                               |                             | \$23.00 |
| .010 | .050 | 1-1/2 | 1/8   | 00230                         | 00293                       | 00644                         | 00658                       | \$21.00 |
| .011 | .055 | 1-1/2 | 1/8   | 00231                         | 00294                       | 00645                         | 00659                       | \$21.00 |
| .012 | .060 | 1-1/2 | 1/8   | 00232                         | 00295                       | 00646                         | 00660                       | \$21.00 |
| .013 | .065 | 1-1/2 | 1/8   | 00233                         | 00296                       | 00647                         | 00661                       | \$21.00 |
| .014 | .070 | 1-1/2 | 1/8   | 00234                         | 00297                       | 00648                         | 00662                       | \$21.00 |
| .015 | .075 | 1-1/2 | 1/8   | 00235                         | 00298                       | 00649                         | 00663                       | \$21.00 |
| .016 | .080 | 1-1/2 | 1/8   | 00236                         | 00299                       | 00650                         | 00664                       | \$21.00 |
| .017 | .085 | 1-1/2 | 1/8   | 00237                         | 00300                       | 00651                         | 00665                       | \$21.00 |
| .018 | .090 | 1-1/2 | 1/8   | 00238                         | 00301                       | 00652                         | 00666                       | \$21.00 |
| .019 | .095 | 1-1/2 | 1/8   | 00239                         | 00302                       | 00653                         | 00667                       | \$21.00 |
| .020 | .100 | 1-1/2 | 1/8   | 00240                         | 00303                       | 00346                         | 00395                       | \$20.50 |
| .021 | .105 | 1-1/2 | 1/8   | 00241                         | 00304                       | 00654                         | 00668                       | \$20.50 |
| .022 | .110 | 1-1/2 | 1/8   | 00242                         | 00305                       | 00655                         | 00669                       | \$20.50 |
| .023 | .115 | 1-1/2 | 1/8   | 00243                         | 00306                       | 00656                         | 00670                       | \$20.50 |
| .024 | .120 | 1-1/2 | 1/8   | 00244                         | 00307                       | 00657                         | 00671                       | \$20.50 |
| .025 | .125 | 1-1/2 | 1/8   | 00245                         | 00308                       | 00347                         | 00396                       | \$20.50 |
| .026 | .130 | 1-1/2 | 1/8   | 00246                         | 00309                       | 00348                         | 00397                       | \$20.50 |
| .027 | .135 | 1-1/2 | 1/8   | 00247                         | 00310                       | 00349                         | 00398                       | \$20.50 |
| .028 | .140 | 1-1/2 | 1/8   | 00248                         | 00311                       | 00350                         | 00399                       | \$20.50 |
| .029 | .145 | 1-1/2 | 1/8   | 00249                         | 00312                       | 00351                         | 00400                       | \$20.50 |
| .030 | .150 | 1-1/2 | 1/8   | 00250                         | 00313                       | 00352                         | 00401                       | \$20.00 |
| .031 | .155 | 1-1/2 | 1/8   | 00251                         | 00314                       | 00353                         | 00402                       | \$20.00 |
| .032 | .160 | 1-1/2 | 1/8   | 00252                         | 00315                       | 00354                         | 00403                       | \$20.00 |
| .033 | .165 | 1-1/2 | 1/8   | 00253                         | 00316                       | 00355                         | 00404                       | \$20.00 |
| .034 | .170 | 1-1/2 | 1/8   | 00254                         | 00317                       | 00366                         | 00405                       | \$20.00 |
| .035 | .175 | 1-1/2 | 1/8   | 00255                         | 00318                       | 00367                         | 00406                       | \$20.00 |
| .036 | .180 | 1-1/2 | 1/8   | 00266                         | 00319                       | 00368                         | 00407                       | \$20.00 |
| .037 | .185 | 1-1/2 | 1/8   | 00267                         | 00320                       | 00369                         | 00408                       | \$20.00 |
| .038 | .190 | 1-1/2 | 1/8   | 00268                         | 00321                       | 00370                         | 00409                       | \$20.00 |
| .039 | .195 | 1-1/2 | 1/8   | 00269                         | 00322                       | 00371                         | 00410                       | \$20.00 |
| .040 | .200 | 1-1/2 | 1/8   | 00270                         | 00323                       | 00372                         | 00411                       | \$20.00 |
| .041 | .205 | 1-1/2 | 1/8   | 00271                         | 00324                       | 00373                         | 00412                       | \$20.00 |
| .042 | .210 | 1-1/2 | 1/8   | 00272                         | 00325                       | 00374                         | 00413                       | \$20.00 |
| .043 | .215 | 1-1/2 | 1/8   | 00273                         | 00326                       | 00375                         | 00414                       | \$20.00 |
| .044 | .220 | 1-1/2 | 1/8   | 00274                         | 00327                       | 00376                         | 00415                       | \$20.00 |
| .045 | .225 | 1-1/2 | 1/8   | 00275                         | 00328                       | 00377                         | 00416                       | \$20.00 |
| .046 | .230 | 1-1/2 | 1/8   | 00276                         | 00329                       | 00378                         | 00417                       | \$20.00 |
| .047 | .235 | 1-1/2 | 1/8   | 00277                         | 00330                       | 00379                         | 00418                       | \$20.00 |
| .048 | .240 | 1-1/2 | 1/8   | 00278                         | 00331                       | 00380                         | 00419                       | \$20.00 |
| .049 | .245 | 1-1/2 | 1/8   | 00279                         | 00332                       | 00381                         | 00420                       | \$20.00 |
| .050 | .250 | 1-1/2 | 1/8   | 00280                         | 00333                       | 00382                         | 00421                       | \$19.00 |
| .051 | .255 | 1-1/2 | 1/8   | 00281                         | 00334                       | 00383                         | 00422                       | \$19.00 |
| .052 | .260 | 1-1/2 | 1/8   | 00282                         | 00335                       | 00384                         | 00423                       | \$19.00 |
| .053 | .265 | 1-1/2 | 1/8   | 00283                         | 00336                       | 00385                         | 00424                       | \$19.00 |
| .054 | .270 | 1-1/2 | 1/8   | 00284                         | 00337                       | 00386                         | 00425                       | \$19.00 |
| .055 | .275 | 1-1/2 | 1/8   | 00285                         | 00338                       | 00387                         | 00426                       | \$19.00 |
| .056 | .280 | 1-1/2 | 1/8   | 00286                         | 00339                       | 00388                         | 00427                       | \$19.00 |
| .057 | .285 | 1-1/2 | 1/8   | 00287                         | 00340                       | 00389                         | 00428                       | \$19.00 |
| .058 | .290 | 1-1/2 | 1/8   | 00288                         | 00341                       | 00390                         | 00429                       | \$19.00 |
| .059 | .295 | 1-1/2 | 1/8   | 00289                         | 00342                       | 00391                         | 00430                       | \$19.00 |
| .060 | .300 | 1-1/2 | 1/8   | 00290                         | 00343                       | 00392                         | 00431                       | \$19.00 |
| .061 | .305 | 1-1/2 | 1/8   | 00291                         | 00344                       | 00393                         | 00432                       | \$19.00 |
| .062 | .310 | 1-1/2 | 1/8   | 00292                         | 00345                       | 00394                         | 00433                       | \$19.00 |





# GR Series: D1 PVD Diamond coated decimal micro end mills

High strength, high hardness solid carbide end mills for graphite & abrasive materials  
 featuring LOC = 5X diameter and proprietary coating for medium to long-run setups.



- Designed for graphite and abrasive non-metals • Tight diameter tolerance  $\pm .0003$
- Proprietary cemented carbide grade and D1 PVD diamond coating
- Superior abrasion resistance for superb price / performance valuation

1/8" shank



| Diam | LOC  | OAL   | Shank | 2 flute Square<br>D1 Coated<br>EDP# | 2 flute Ball<br>D1 Coated<br>EDP# | 4 flute Square<br>D1 Coated<br>EDP# | 4 flute Ball<br>D1 Coated<br>EDP# | Price   |
|------|------|-------|-------|-------------------------------------|-----------------------------------|-------------------------------------|-----------------------------------|---------|
| .005 | .025 | 1-1/2 | 1/8   | 11204                               | 11209                             |                                     |                                   | \$26.00 |
| .006 | .030 | 1-1/2 | 1/8   | 11205                               | 11210                             |                                     |                                   | \$26.00 |
| .007 | .035 | 1-1/2 | 1/8   | 11206                               | 11211                             |                                     |                                   | \$26.00 |
| .008 | .040 | 1-1/2 | 1/8   | 11207                               | 11212                             |                                     |                                   | \$26.00 |
| .009 | .045 | 1-1/2 | 1/8   | 11208                               | 11213                             |                                     |                                   | \$26.00 |
| .010 | .050 | 1-1/2 | 1/8   | 10227                               | 10291                             | 11214                               | 11228                             | \$24.00 |
| .011 | .055 | 1-1/2 | 1/8   | 10228                               | 10292                             | 11215                               | 11229                             | \$24.00 |
| .012 | .060 | 1-1/2 | 1/8   | 10229                               | 10293                             | 11216                               | 11230                             | \$24.00 |
| .013 | .065 | 1-1/2 | 1/8   | 10230                               | 10294                             | 11217                               | 11231                             | \$24.00 |
| .014 | .070 | 1-1/2 | 1/8   | 10231                               | 10295                             | 11218                               | 11232                             | \$24.00 |
| .015 | .075 | 1-1/2 | 1/8   | 10232                               | 10296                             | 11219                               | 11233                             | \$24.00 |
| .016 | .080 | 1-1/2 | 1/8   | 10233                               | 10297                             | 11220                               | 11234                             | \$24.00 |
| .017 | .085 | 1-1/2 | 1/8   | 10234                               | 10298                             | 11221                               | 11235                             | \$24.00 |
| .018 | .090 | 1-1/2 | 1/8   | 10235                               | 10299                             | 11222                               | 11236                             | \$24.00 |
| .019 | .095 | 1-1/2 | 1/8   | 10236                               | 10300                             | 11223                               | 11237                             | \$24.00 |
| .020 | .100 | 1-1/2 | 1/8   | 10237                               | 10301                             | 12236                               | 12238                             | \$23.50 |
| .021 | .105 | 1-1/2 | 1/8   | 10238                               | 10302                             | 11224                               | 11238                             | \$23.50 |
| .022 | .110 | 1-1/2 | 1/8   | 10239                               | 10303                             | 11225                               | 11239                             | \$23.50 |
| .023 | .115 | 1-1/2 | 1/8   | 10240                               | 10304                             | 11226                               | 11240                             | \$23.50 |
| .024 | .120 | 1-1/2 | 1/8   | 10241                               | 10305                             | 11227                               | 11241                             | \$23.50 |
| .025 | .125 | 1-1/2 | 1/8   | 10242                               | 10306                             | 10355                               | 10404                             | \$23.50 |
| .026 | .130 | 1-1/2 | 1/8   | 10243                               | 10307                             | 10356                               | 10405                             | \$23.50 |
| .027 | .135 | 1-1/2 | 1/8   | 10244                               | 10308                             | 10357                               | 10406                             | \$23.50 |
| .028 | .140 | 1-1/2 | 1/8   | 10245                               | 10309                             | 10358                               | 10407                             | \$23.50 |
| .029 | .145 | 1-1/2 | 1/8   | 10246                               | 10310                             | 10359                               | 10408                             | \$23.50 |
| .030 | .150 | 1-1/2 | 1/8   | 10247                               | 10311                             | 10360                               | 10409                             | \$23.00 |
| .031 | .155 | 1-1/2 | 1/8   | 10248                               | 10312                             | 10361                               | 10410                             | \$23.00 |
| .032 | .160 | 1-1/2 | 1/8   | 10249                               | 10313                             | 10362                               | 10411                             | \$23.00 |
| .033 | .165 | 1-1/2 | 1/8   | 10250                               | 10314                             | 10363                               | 10412                             | \$23.00 |
| .034 | .170 | 1-1/2 | 1/8   | 10251                               | 10315                             | 10364                               | 10413                             | \$23.00 |
| .035 | .175 | 1-1/2 | 1/8   | 10252                               | 10316                             | 10365                               | 10414                             | \$23.00 |
| .036 | .180 | 1-1/2 | 1/8   | 10253                               | 10317                             | 10366                               | 10415                             | \$23.00 |
| .037 | .185 | 1-1/2 | 1/8   | 10254                               | 10318                             | 10367                               | 10416                             | \$23.00 |
| .038 | .190 | 1-1/2 | 1/8   | 10255                               | 10319                             | 10368                               | 10417                             | \$23.00 |
| .039 | .195 | 1-1/2 | 1/8   | 10256                               | 10320                             | 10369                               | 10418                             | \$23.00 |
| .040 | .200 | 1-1/2 | 1/8   | 10257                               | 10321                             | 10370                               | 10419                             | \$23.00 |
| .041 | .205 | 1-1/2 | 1/8   | 10258                               | 10322                             | 10371                               | 10420                             | \$23.00 |
| .042 | .210 | 1-1/2 | 1/8   | 10259                               | 10323                             | 10372                               | 10421                             | \$23.00 |
| .043 | .215 | 1-1/2 | 1/8   | 10260                               | 10324                             | 10373                               | 10422                             | \$23.00 |
| .044 | .220 | 1-1/2 | 1/8   | 10261                               | 10325                             | 10374                               | 10423                             | \$23.00 |
| .045 | .225 | 1-1/2 | 1/8   | 10262                               | 10326                             | 10375                               | 10424                             | \$23.00 |
| .046 | .230 | 1-1/2 | 1/8   | 10263                               | 10327                             | 10376                               | 10425                             | \$23.00 |
| .047 | .235 | 1-1/2 | 1/8   | 10264                               | 10328                             | 10377                               | 10426                             | \$23.00 |
| .048 | .240 | 1-1/2 | 1/8   | 10265                               | 10329                             | 10378                               | 10427                             | \$23.00 |
| .049 | .245 | 1-1/2 | 1/8   | 10266                               | 10330                             | 10379                               | 10428                             | \$23.00 |
| .050 | .250 | 1-1/2 | 1/8   | 10267                               | 10331                             | 10380                               | 10429                             | \$22.00 |
| .051 | .255 | 1-1/2 | 1/8   | 10268                               | 10332                             | 10381                               | 10430                             | \$22.00 |
| .052 | .260 | 1-1/2 | 1/8   | 10269                               | 10333                             | 10382                               | 10431                             | \$22.00 |
| .053 | .265 | 1-1/2 | 1/8   | 10270                               | 10334                             | 10383                               | 10432                             | \$22.00 |
| .054 | .270 | 1-1/2 | 1/8   | 10271                               | 10335                             | 10384                               | 10433                             | \$22.00 |
| .055 | .275 | 1-1/2 | 1/8   | 10272                               | 10336                             | 10385                               | 10434                             | \$22.00 |
| .056 | .280 | 1-1/2 | 1/8   | 10273                               | 10337                             | 10386                               | 10435                             | \$22.00 |
| .057 | .285 | 1-1/2 | 1/8   | 10274                               | 10338                             | 10387                               | 10436                             | \$22.00 |
| .058 | .290 | 1-1/2 | 1/8   | 10275                               | 10339                             | 10388                               | 10437                             | \$22.00 |
| .059 | .295 | 1-1/2 | 1/8   | 10276                               | 10340                             | 10389                               | 10438                             | \$22.00 |
| .060 | .300 | 1-1/2 | 1/8   | 10277                               | 10341                             | 10390                               | 10439                             | \$22.00 |
| .061 | .305 | 1-1/2 | 1/8   | 10278                               | 10342                             | 10391                               | 10440                             | \$22.00 |
| .062 | .310 | 1-1/2 | 1/8   | 10279                               | 10343                             | 10392                               | 10441                             | \$22.00 |

**new! GRER & GRERN Series: Extended Reach 4 flute micro end mills****High strength and hardness, 3" extra-long solid carbide end mills  
featuring LOC = 5X diameter & available standard neck clearance (GRERN).****1/8" shank**

GRER4S



GRER4B



GRERN4S



GRERN4B



- Designed for machining electrodes & other reach applications • 3" OAL
- Proprietary cemented carbide grade & available AT, D1 or D2 coating
- Use D1 (PVD) or D2 (CVD) Diamond coating for graphite & abrasive non-metals
- Use AT coating for die steels and other hard metals
- Tight diameter tolerance of  $\pm .0003$  (except for D2 coated  $+.0005/- .001$ )
- "N" designates inclusion of extended clearance neck (GRERN)

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

| Diam   | LOC  | LBS   | OAL | Shank | GRER4UC<br>4 flute UnCoated |           |         | GRER4AT<br>4 flute AT Coated |           |         | GRER4D1<br>4 flute D1 Coated |           |         | GRER4D2<br>4 flute D2 Coated |           |         |
|--------|------|-------|-----|-------|-----------------------------|-----------|---------|------------------------------|-----------|---------|------------------------------|-----------|---------|------------------------------|-----------|---------|
|        |      |       |     |       | Square EDP#                 | Ball EDP# | Price   | Square EDP#                  | Ball EDP# | Price   | Square EDP#                  | Ball EDP# | Price   | Square EDP#                  | Ball EDP# | Price   |
| .015   | .075 |       | 3"  | 1/8   | 00127                       | 00716     | \$24.00 | 00672                        | 00779     | \$27.00 | 00015                        | 00049     | \$31.00 | 00813                        | 00825     | \$60.00 |
| .015N  | .075 | .150  | 3"  | 1/8   | 00128                       | 00717     | \$30.00 | 00673                        | 00780     | \$33.00 | 00016                        | 00050     | \$37.00 | 00814                        | 00826     | \$66.00 |
| .020   | .100 |       | 3"  | 1/8   | 00129                       | 00718     | \$24.00 | 00674                        | 00781     | \$27.00 | 00017                        | 00051     | \$31.00 | 00815                        | 00827     | \$60.00 |
| .020N  | .100 | .200  | 3"  | 1/8   | 00746                       | 00719     | \$30.00 | 00675                        | 00782     | \$33.00 | 00018                        | 00052     | \$37.00 | 00816                        | 00828     | \$66.00 |
| .025   | .125 |       | 3"  | 1/8   | 00747                       | 00720     | \$24.00 | 00676                        | 00783     | \$27.00 | 00019                        | 00053     | \$31.00 | 00817                        | 00829     | \$60.00 |
| .025N  | .125 | .250  | 3"  | 1/8   | 00748                       | 00721     | \$30.00 | 00678                        | 00784     | \$33.00 | 00020                        | 00054     | \$37.00 | 00818                        | 00830     | \$66.00 |
| .030   | .150 |       | 3"  | 1/8   | 00749                       | 00722     | \$24.00 | 00679                        | 00785     | \$27.00 | 00021                        | 00055     | \$31.00 | 00819                        | 00831     | \$60.00 |
| .030N  | .150 | .300  | 3"  | 1/8   | 00750                       | 00723     | \$30.00 | 00680                        | 00786     | \$33.00 | 00022                        | 00056     | \$37.00 | 00820                        | 00832     | \$66.00 |
| .031   | .155 |       | 3"  | 1/8   | 00751                       | 00724     | \$24.00 | 00681                        | 00787     | \$27.00 | 00023                        | 00057     | \$31.00 | 00821                        | 00833     | \$60.00 |
| .031N  | .155 | .310  | 3"  | 1/8   | 00752                       | 00725     | \$30.00 | 00682                        | 00788     | \$33.00 | 00024                        | 00058     | \$37.00 | 00822                        | 00834     | \$66.00 |
| .035   | .175 |       | 3"  | 1/8   | 00753                       | 00726     | \$24.00 | 00683                        | 00789     | \$27.00 | 00025                        | 00059     | \$31.00 | 00823                        | 00835     | \$60.00 |
| .035N  | .175 | .350  | 3"  | 1/8   | 00754                       | 00727     | \$30.00 | 00684                        | 00790     | \$33.00 | 00026                        | 00060     | \$37.00 | 00824                        | 00836     | \$66.00 |
| .040   | .200 |       | 3"  | 1/8   | 00755                       | 00728     | \$24.00 | 00685                        | 00791     | \$27.00 | 00027                        | 00061     | \$31.00 | 00083                        | 00105     | \$60.00 |
| .040N  | .200 | .400  | 3"  | 1/8   | 00756                       | 00729     | \$30.00 | 00686                        | 00792     | \$33.00 | 00028                        | 00062     | \$37.00 | 00084                        | 00106     | \$66.00 |
| .045   | .225 |       | 3"  | 1/8   | 00757                       | 00730     | \$24.00 | 00687                        | 00793     | \$27.00 | 00029                        | 00063     | \$31.00 | 00085                        | 00107     | \$60.00 |
| .045N  | .225 | .450  | 3"  | 1/8   | 00758                       | 00731     | \$30.00 | 00688                        | 00794     | \$33.00 | 00030                        | 00064     | \$37.00 | 00086                        | 00108     | \$66.00 |
| .047   | .235 |       | 3"  | 1/8   | 00759                       | 00732     | \$24.00 | 00689                        | 00795     | \$27.00 | 00031                        | 00065     | \$31.00 | 00087                        | 00109     | \$60.00 |
| .047N  | .235 | .500  | 3"  | 1/8   | 00760                       | 00733     | \$30.00 | 00690                        | 00796     | \$33.00 | 00032                        | 00066     | \$37.00 | 00088                        | 00110     | \$66.00 |
| .050   | .250 |       | 3"  | 1/8   | 00761                       | 00734     | \$24.00 | 00691                        | 00797     | \$27.00 | 00033                        | 00067     | \$31.00 | 00089                        | 00111     | \$60.00 |
| .050N  | .250 | .500  | 3"  | 1/8   | 00762                       | 00735     | \$30.00 | 00692                        | 00798     | \$33.00 | 00034                        | 00068     | \$37.00 | 00090                        | 00112     | \$66.00 |
| .060   | .300 |       | 3"  | 1/8   | 00763                       | 00736     | \$24.00 | 00693                        | 00799     | \$27.00 | 00035                        | 00069     | \$31.00 | 00091                        | 00113     | \$60.00 |
| .060N  | .300 | 1.0"  | 3"  | 1/8   | 00764                       | 00737     | \$30.00 | 00694                        | 00800     | \$33.00 | 00036                        | 00070     | \$37.00 | 00092                        | 00114     | \$66.00 |
| .062   | .310 |       | 3"  | 1/8   | 00765                       | 00738     | \$24.00 | 00695                        | 00801     | \$27.00 | 00037                        | 00071     | \$31.00 | 00093                        | 00115     | \$60.00 |
| .062N  | .310 | 1.0"  | 3"  | 1/8   | 00766                       | 00739     | \$30.00 | 00696                        | 00802     | \$33.00 | 00038                        | 00072     | \$37.00 | 00094                        | 00116     | \$66.00 |
| .075   | .375 |       | 3"  | 1/8   | 00767                       | 00740     | \$24.00 | 00697                        | 00803     | \$27.00 | 00039                        | 00073     | \$31.00 | 00095                        | 00117     | \$60.00 |
| .075N  | .375 | 1.0"  | 3"  | 1/8   | 00768                       | 00741     | \$30.00 | 00698                        | 00804     | \$33.00 | 00040                        | 00074     | \$37.00 | 00096                        | 00118     | \$66.00 |
| .078   | .390 |       | 3"  | 1/8   | 00769                       | 00742     | \$24.00 | 00699                        | 00805     | \$27.00 | 00041                        | 00075     | \$31.00 | 00097                        | 00119     | \$60.00 |
| .078N  | .390 | 1.0"  | 3"  | 1/8   | 00770                       | 00743     | \$30.00 | 00700                        | 00806     | \$33.00 | 00042                        | 00076     | \$37.00 | 00098                        | 00120     | \$66.00 |
| .090   | .450 |       | 3"  | 1/8   | 00771                       | 00744     | \$24.00 | 00701                        | 00807     | \$27.00 | 00043                        | 00077     | \$31.00 | 00099                        | 00121     | \$60.00 |
| .090N  | .450 | 1.0"  | 3"  | 1/8   | 00226                       | 00745     | \$30.00 | 00702                        | 00808     | \$33.00 | 00044                        | 00078     | \$37.00 | 00100                        | 00122     | \$66.00 |
| .093   | .465 |       | 3"  | 1/8   | 00227                       | 00746     | \$24.00 | 00703                        | 00809     | \$27.00 | 00045                        | 00079     | \$31.00 | 00101                        | 00123     | \$60.00 |
| .093N  | .465 | 1.25" | 3"  | 1/8   | 00228                       | 00747     | \$30.00 | 00704                        | 00810     | \$33.00 | 00046                        | 00080     | \$37.00 | 00102                        | 00124     | \$66.00 |
| .1245  | .625 |       | 3"  | 1/8   | 00229                       | 00748     | \$24.00 | 00705                        | 00811     | \$27.00 | 00047                        | 00081     | \$31.00 | 00103                        | 00125     | \$60.00 |
| .1245N | .625 | 1.5"  | 3"  | 1/8   | 00715                       | 00749     | \$30.00 | 00706                        | 00812     | \$33.00 | 00048                        | 00082     | \$37.00 | 00104                        | 00126     | \$66.00 |

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

**HSM's New Best Friend****SmoothContricity®**

Maximized Tool Concentricity Exclusively by Tool Alliance®



## GR Series: UnCoated fractional end mills

Thick core, high strength, high hardness solid carbide end mills with increased helix and extended cutting lengths.

GR2SUC



GR2BUC



GR4SUC



GR4BUC



- Designed for milling of hardened steels, non-metals & non-ferrous alloys
- Proprietary cemented carbide grade offers extremely high hardness and density
- Features heavy core construction for maximum rigidity
- Tight tolerance with SmoothGrind polish-ground surfaces
- Regular, Long (L), and Extra-Long (XL) lengths



| Diam   | LOC   | OAL   | Shank | 2 flute Square UnCoated |          | 2 flute Ball UnCoated |          | 4 flute Square UnCoated |          | 4 flute Ball UnCoated |          |
|--------|-------|-------|-------|-------------------------|----------|-----------------------|----------|-------------------------|----------|-----------------------|----------|
|        |       |       |       | EDP#                    | Price    | EDP#                  | Price    | EDP#                    | Price    | EDP#                  | Price    |
| 1/64   | 5/64  | 1-1/2 | 1/8   | 00837                   | \$19.00  | 00854                 | \$21.00  | 00871                   | \$19.00  | 00888                 | \$21.00  |
| 1/32   | 5/32  | 1-1/2 | 1/8   | 00838                   | \$18.00  | 00855                 | \$20.00  | 00872                   | \$18.00  | 00889                 | \$20.00  |
| 1/32L  | 1/16  | 2"    | 1/8   | 00839                   | \$21.00  | 00708                 | \$23.00  | 11156                   | \$21.00  | 11175                 | \$23.00  |
| 1/32XL | 1/4   | 2"    | 1/8   | 00840                   | \$25.00  | 00007                 | \$27.00  | 11157                   | \$25.00  | 11176                 | \$27.00  |
| 3/64   | 15/64 | 1-1/2 | 1/8   | 23106                   | \$17.00  | 23108                 | \$19.00  | 23100                   | \$17.00  | 23103                 | \$19.00  |
| 1/16   | 5/16  | 1-1/2 | 1/8   | 10054                   | \$17.00  | 10118                 | \$19.00  | 10167                   | \$17.00  | 10216                 | \$19.00  |
| 1/16L  | 1/4   | 2"    | 1/8   | 11099                   | \$20.00  | 11169                 | \$22.00  | 11158                   | \$20.00  | 11177                 | \$22.00  |
| 1/16XL | 1/2   | 2"    | 1/8   | 11020                   | \$25.00  | 11032                 | \$27.00  | 11026                   | \$25.00  | 11038                 | \$27.00  |
| 5/64   | 25/64 | 1-1/2 | 1/8   | 10055                   | \$16.00  | 10119                 | \$18.00  | 10168                   | \$16.00  | 10217                 | \$18.00  |
| 3/32   | 15/32 | 1-1/2 | 1/8   | 10056                   | \$16.00  | 10120                 | \$18.00  | 10169                   | \$16.00  | 10218                 | \$18.00  |
| 7/64   | 35/64 | 1-1/2 | 1/8   | 10057                   | \$16.00  | 10121                 | \$18.00  | 10170                   | \$16.00  | 10219                 | \$18.00  |
| 1/8    | 5/8   | 1-1/2 | 1/8   | 10058                   | \$15.00  | 10122                 | \$17.00  | 10171                   | \$15.00  | 10220                 | \$17.00  |
| 1/8L   | 1/2   | 3"    | 1/8   | 11100                   | \$21.00  | 11170                 | \$23.00  | 11159                   | \$21.00  | 11178                 | \$23.00  |
| 1/8XL  | 1"    | 4"    | 1/8   | 11021                   | \$30.00  | 11033                 | \$32.00  | 11027                   | \$30.00  | 11039                 | \$32.00  |
| 9/64   | 45/64 | 2"    | 3/16  | 10059                   | \$21.00  | 10123                 | \$23.00  | 10172                   | \$21.00  | 10221                 | \$23.00  |
| 5/32   | 3/4   | 2"    | 3/16  | 10060                   | \$21.00  | 10124                 | \$23.00  | 10173                   | \$21.00  | 10222                 | \$23.00  |
| 11/64  | 3/4   | 2"    | 3/16  | 10061                   | \$21.00  | 10125                 | \$23.00  | 10174                   | \$21.00  | 10223                 | \$23.00  |
| 3/16   | 3/4   | 2"    | 3/16  | 10062                   | \$21.00  | 10126                 | \$23.00  | 10175                   | \$21.00  | 10224                 | \$23.00  |
| 3/16L  | 3/4   | 3"    | 3/16  | 11101                   | \$27.00  | 11171                 | \$29.00  | 11160                   | \$27.00  | 11179                 | \$29.00  |
| 3/16XL | 1-3/8 | 4"    | 3/16  | 11022                   | \$38.00  | 11034                 | \$40.00  | 11028                   | \$38.00  | 11040                 | \$40.00  |
| 7/32   | 1"    | 2-1/2 | 1/4   | 10063                   | \$26.00  | 10127                 | \$29.00  | 10176                   | \$26.00  | 10225                 | \$29.00  |
| 1/4    | 1"    | 2-1/2 | 1/4   | 10064                   | \$26.00  | 10128                 | \$29.00  | 10177                   | \$26.00  | 10226                 | \$29.00  |
| 1/4L   | 1"    | 4"    | 1/4   | 11023                   | \$35.00  | 11035                 | \$38.00  | 11029                   | \$35.00  | 11041                 | \$38.00  |
| 1/4XL  | 1-1/2 | 6"    | 1/4   | 11102                   | \$52.00  | 11172                 | \$55.00  | 11161                   | \$52.00  | 11180                 | \$55.00  |
| 5/16   | 1"    | 2-1/2 | 5/16  | 10713                   | \$32.00  | 10716                 | \$36.00  | 10719                   | \$32.00  | 10722                 | \$36.00  |
| 3/8    | 1"    | 2-1/2 | 3/8   | 10714                   | \$40.00  | 10717                 | \$45.00  | 10720                   | \$40.00  | 10723                 | \$45.00  |
| 3/8L   | 1-3/8 | 4"    | 3/8   | 11024                   | \$58.00  | 11036                 | \$63.00  | 11030                   | \$58.00  | 11042                 | \$63.00  |
| 3/8XL  | 2"    | 6"    | 3/8   | 11103                   | \$82.00  | 11173                 | \$87.00  | 11167                   | \$82.00  | 11181                 | \$87.00  |
| 7/16   | 1"    | 3"    | 7/16  | 10997                   | \$60.00  | 10998                 | \$68.00  | 11001                   | \$60.00  | 11002                 | \$68.00  |
| 1/2    | 1-1/4 | 3"    | 1/2   | 10715                   | \$62.00  | 10718                 | \$70.00  | 10721                   | \$62.00  | 10724                 | \$70.00  |
| 1/2L   | 1-3/8 | 4"    | 1/2   | 11155                   | \$76.00  | 11174                 | \$84.00  | 11168                   | \$76.00  | 11182                 | \$84.00  |
| 1/2XL  | 2"    | 6"    | 1/2   | 11025                   | \$100.00 | 11037                 | \$108.00 | 11031                   | \$100.00 | 11043                 | \$108.00 |
| 5/8    | 1-3/8 | 3-1/2 | 5/8   | 00851                   | \$110.00 | 00861                 | \$120.00 | 00868                   | \$110.00 | 00874                 | \$120.00 |
| 3/4    | 1-3/8 | 4"    | 3/4   | 00852                   | \$140.00 | 00863                 | \$152.00 | 00869                   | \$140.00 | 00876                 | \$152.00 |
| 1"     | 1-3/8 | 4"    | 1"    | 00859                   | \$230.00 | 00866                 | \$245.00 | 00873                   | \$230.00 | 00878                 | \$245.00 |



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



Specs (fractional end mills  
cut diameter ≥ 1/8"):  
Cutting Diam +.0000 / -.0015  
Shank Diam +.0000 / -.00025  
Radius ± .00075  
SFR = Shrink Fit Ready



# GR Series: D1 PVD Diamond coated fractional end mills

High strength, high hardness solid carbide end mills for graphite & abrasive materials featuring extended LOC's and proprietary coating for medium to long-run setups.

GR2SD1



GR2BD1



GR4SD1



GR4BD1



- Designed for graphite and abrasive non-metals
- Proprietary cemented carbide grade and D1 PVD diamond coating
- Hard, thin and smooth D1 for extremely sharp cutting edge
- Superior abrasion resistance for superb price / performance valuation
- Extremely close diameter tolerances
- Regular, Long (L), and Extra-Long (XL) lengths



| Diam   | LOC   | OAL   | Shank | 2 flute Square<br>D1 Coated |          | 2 flute Ball<br>D1 Coated |          | 4 flute Square<br>D1 Coated |          | 4 flute Ball<br>D1 Coated |          |
|--------|-------|-------|-------|-----------------------------|----------|---------------------------|----------|-----------------------------|----------|---------------------------|----------|
|        |       |       |       | EDP#                        | Price    | EDP#                      | Price    | EDP#                        | Price    | EDP#                      | Price    |
| 1/64   | 5/64  | 1-1/2 | 1/8   | 12378                       | \$24.00  | 12379                     | \$26.00  | 12380                       | \$24.00  | 12381                     | \$26.00  |
| 1/32   | 5/32  | 1-1/2 | 1/8   | 12382                       | \$23.00  | 12383                     | \$25.00  | 12384                       | \$23.00  | 12385                     | \$25.00  |
| 1/32L  | 1/16  | 2"    | 1/8   | 00700                       | \$26.00  | 00702                     | \$28.00  | 11189                       | \$26.00  | 11690                     | \$28.00  |
| 1/32XL | 1/4   | 2"    | 1/8   | 00701                       | \$30.00  | 00703                     | \$32.00  | 11190                       | \$30.00  | 11691                     | \$32.00  |
| 3/64   | 15/64 | 1-1/2 | 1/8   | 12386                       | \$22.00  | 12387                     | \$24.00  | 12388                       | \$22.00  | 12389                     | \$24.00  |
| 1/16   | 5/16  | 1-1/2 | 1/8   | 10280                       | \$22.00  | 10344                     | \$24.00  | 10393                       | \$22.00  | 10442                     | \$24.00  |
| 1/16L  | 1/4   | 2"    | 1/8   | 11183                       | \$25.00  | 11197                     | \$27.00  | 11191                       | \$25.00  | 11692                     | \$27.00  |
| 1/16XL | 1/2   | 2"    | 1/8   | 11044                       | \$30.00  | 11056                     | \$32.00  | 11050                       | \$30.00  | 11162                     | \$32.00  |
| 5/64   | 25/64 | 1-1/2 | 1/8   | 10281                       | \$21.00  | 10345                     | \$23.00  | 10394                       | \$21.00  | 10443                     | \$23.00  |
| 3/32   | 15/32 | 1-1/2 | 1/8   | 10282                       | \$21.00  | 10346                     | \$23.00  | 10395                       | \$21.00  | 10444                     | \$23.00  |
| 7/64   | 35/64 | 1-1/2 | 1/8   | 10283                       | \$21.00  | 10347                     | \$23.00  | 10396                       | \$21.00  | 10445                     | \$23.00  |
| 1/8    | 5/8   | 1-1/2 | 1/8   | 10284                       | \$20.00  | 10348                     | \$22.00  | 10397                       | \$20.00  | 10446                     | \$22.00  |
| 1/8L   | 1/2   | 3"    | 1/8   | 11184                       | \$28.00  | 11198                     | \$30.00  | 11192                       | \$28.00  | 11693                     | \$30.00  |
| 1/8XL  | 1"    | 4"    | 1/8   | 11045                       | \$38.00  | 11057                     | \$40.00  | 11051                       | \$38.00  | 11063                     | \$40.00  |
| 9/64   | 45/64 | 2"    | 3/16  | 10285                       | \$27.00  | 10349                     | \$29.00  | 10398                       | \$27.00  | 10447                     | \$29.00  |
| 5/32   | 3/4   | 2"    | 3/16  | 10286                       | \$27.00  | 10350                     | \$29.00  | 10399                       | \$27.00  | 10448                     | \$29.00  |
| 11/64  | 3/4   | 2"    | 3/16  | 10287                       | \$27.00  | 10351                     | \$29.00  | 10400                       | \$27.00  | 10449                     | \$29.00  |
| 3/16   | 3/4   | 2"    | 3/16  | 10288                       | \$27.00  | 10352                     | \$29.00  | 10401                       | \$27.00  | 10450                     | \$29.00  |
| 3/16L  | 3/4   | 3"    | 3/16  | 11185                       | \$35.50  | 11199                     | \$37.50  | 11193                       | \$35.50  | 11694                     | \$37.50  |
| 3/16XL | 1-3/8 | 4"    | 3/16  | 11046                       | \$48.50  | 11058                     | \$50.50  | 11052                       | \$48.50  | 11064                     | \$50.50  |
| 7/32   | 1"    | 2-1/2 | 1/4   | 10289                       | \$35.00  | 10353                     | \$38.00  | 10402                       | \$35.00  | 10451                     | \$38.00  |
| 1/4    | 1"    | 2-1/2 | 1/4   | 10290                       | \$35.00  | 10354                     | \$38.00  | 10403                       | \$35.00  | 10452                     | \$38.00  |
| 1/4L   | 1"    | 4"    | 1/4   | 11047                       | \$47.50  | 11059                     | \$50.50  | 11053                       | \$47.50  | 11065                     | \$50.50  |
| 1/4XL  | 1-1/2 | 6"    | 1/4   | 11186                       | \$68.00  | 11200                     | \$71.00  | 11194                       | \$68.00  | 11695                     | \$71.00  |
| 5/16   | 1"    | 2-1/2 | 5/16  | 10725                       | \$42.00  | 10728                     | \$46.00  | 10731                       | \$42.00  | 10734                     | \$46.00  |
| 3/8    | 1"    | 2-1/2 | 3/8   | 10726                       | \$51.00  | 10729                     | \$56.00  | 10732                       | \$51.00  | 10735                     | \$56.00  |
| 3/8L   | 1-3/8 | 4"    | 3/8   | 11048                       | \$72.00  | 11060                     | \$77.00  | 11054                       | \$72.00  | 11166                     | \$77.00  |
| 3/8XL  | 2"    | 6"    | 3/8   | 11187                       | \$103.00 | 11202                     | \$108.00 | 11195                       | \$103.00 | 11696                     | \$108.00 |
| 7/16   | 1"    | 3"    | 7/16  | 10999                       | \$74.00  | 11000                     | \$82.00  | 11003                       | \$74.00  | 11004                     | \$82.00  |
| 1/2    | 1-1/4 | 3"    | 1/2   | 10727                       | \$77.00  | 10730                     | \$85.00  | 10733                       | \$77.00  | 10736                     | \$85.00  |
| 1/2L   | 1-3/8 | 4"    | 1/2   | 11735                       | \$96.00  | 11736                     | \$104.00 | 11737                       | \$96.00  | 11738                     | \$104.00 |
| 1/2XL  | 2"    | 6"    | 1/2   | 11049                       | \$128.00 | 11061                     | \$136.00 | 11055                       | \$128.00 | 11062                     | \$136.00 |
| 5/8    | 1-3/8 | 3-1/2 | 5/8   | 12352                       | \$132.00 | 12355                     | \$142.00 | 12358                       | \$132.00 | 12361                     | \$142.00 |
| 3/4    | 1-3/8 | 4"    | 3/4   | 12353                       | \$166.00 | 12356                     | \$178.00 | 12359                       | \$166.00 | 12362                     | \$178.00 |
| 1"     | 1-3/8 | 4"    | 1"    | 12354                       | \$267.00 | 12357                     | \$282.00 | 12360                       | \$267.00 | 12363                     | \$282.00 |

## Prep Yourself



### SmoothEdge®

Surface & Edge Preparations Exclusively by Tool Alliance®



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



Specs (fractional end mills  
cut diameter ≥ 1/8"):  
Cutting Diam +.0000 / -.0015  
Shank Diam +.0000 / -.00025  
Radius ± .00075  
SFR = Shrink Fit Ready



## GR Series: D2 CVD Diamond coated fractional end mills

High strength, high hardness solid carbide end mills for graphite & abrasive materials featuring extended LOC's and proprietary CVD diamond coating for long-run setups.

GR2SD2



GR2BD2



GR4SD2



GR4BD2



- Designed for graphite and abrasive non-metals
- Proprietary cemented carbide grade and D2 CVD diamond coating
- Our hardest, thickest, longest lasting diamond coating
- Maximum tool life and wear resistance for long production runs
- Tight diameter tolerances for CVD diamond
- Regular, Long (L), and Extra-Long (XL) lengths



| Diam   | LOC   | OAL   | Shank | 2 flute Square D2 Coated |          | 2 flute Ball D2 Coated |          | 4 flute Square D2 Coated |          | 4 flute Ball D2 Coated |          |
|--------|-------|-------|-------|--------------------------|----------|------------------------|----------|--------------------------|----------|------------------------|----------|
|        |       |       |       | EDP#                     | Price    | EDP#                   | Price    | EDP#                     | Price    | EDP#                   | Price    |
| .015   | .075  | 1-1/2 | 1/8   | 10770                    | \$58.00  | 10782                  | \$60.00  | 12376                    | \$58.00  | 12377                  | \$60.00  |
| .020   | .100  | 1-1/2 | 1/8   | 10771                    | \$58.00  | 10783                  | \$60.00  | 12240                    | \$58.00  | 12242                  | \$60.00  |
| .031   | .155  | 1-1/2 | 1/8   | 10772                    | \$49.00  | 10784                  | \$51.00  | 10796                    | \$49.00  | 10808                  | \$51.00  |
| 1/32L  | 1/16  | 2"    | 1/8   | 00704                    | \$49.00  | 00706                  | \$51.00  | 12061                    | \$49.00  | 12089                  | \$51.00  |
| 1/32XL | 1/4   | 2"    | 1/8   | 00705                    | \$53.00  | 00707                  | \$55.00  | 12063                    | \$53.00  | 12091                  | \$55.00  |
| 3/64   | 15/64 | 1-1/2 | 1/8   | 10773                    | \$45.00  | 10785                  | \$47.00  | 10797                    | \$45.00  | 10809                  | \$47.00  |
| 1/16   | 5/16  | 1-1/2 | 1/8   | 10774                    | \$45.00  | 10786                  | \$47.00  | 10798                    | \$45.00  | 10810                  | \$47.00  |
| 1/16L  | 1/4   | 2"    | 1/8   | 12062                    | \$48.00  | 12086                  | \$50.00  | 12065                    | \$48.00  | 12093                  | \$50.00  |
| 1/16XL | 1/2   | 2"    | 1/8   | 12064                    | \$53.00  | 12088                  | \$55.00  | 12067                    | \$53.00  | 12095                  | \$55.00  |
| 5/64   | 25/64 | 1-1/2 | 1/8   | 12203                    | \$44.00  | 12217                  | \$46.00  | 12210                    | \$44.00  | 12225                  | \$46.00  |
| 3/32   | 15/32 | 1-1/2 | 1/8   | 10775                    | \$44.00  | 10787                  | \$46.00  | 10799                    | \$44.00  | 10811                  | \$46.00  |
| 7/64   | 35/64 | 1-1/2 | 1/8   | 12204                    | \$44.00  | 12218                  | \$46.00  | 12211                    | \$44.00  | 12226                  | \$46.00  |
| 1/8    | 5/8   | 1-1/2 | 1/8   | 10776                    | \$43.00  | 10788                  | \$45.00  | 10800                    | \$43.00  | 10812                  | \$45.00  |
| 1/8L   | 1/2   | 3"    | 1/8   | 12066                    | \$49.00  | 12090                  | \$51.00  | 12069                    | \$49.00  | 12097                  | \$51.00  |
| 1/8XL  | 1"    | 4"    | 1/8   | 12068                    | \$58.00  | 12092                  | \$60.00  | 12071                    | \$58.00  | 12099                  | \$60.00  |
| 9/64   | 45/64 | 2"    | 3/16  | 12205                    | \$66.50  | 12219                  | \$68.50  | 12212                    | \$66.50  | 12227                  | \$68.50  |
| 5/32   | 3/4   | 2"    | 3/16  | 12206                    | \$66.50  | 12220                  | \$68.50  | 12213                    | \$66.50  | 12228                  | \$68.50  |
| 11/64  | 3/4   | 2"    | 3/16  | 12207                    | \$66.50  | 12221                  | \$68.50  | 12214                    | \$66.50  | 12229                  | \$68.50  |
| 3/16   | 3/4   | 2"    | 3/16  | 10777                    | \$66.50  | 10789                  | \$68.50  | 10801                    | \$66.50  | 10813                  | \$68.50  |
| 3/16L  | 3/4   | 3"    | 3/16  | 12070                    | \$72.50  | 12094                  | \$74.50  | 12073                    | \$72.50  | 12101                  | \$74.50  |
| 3/16XL | 1-3/8 | 4"    | 3/16  | 12072                    | \$83.50  | 12096                  | \$85.50  | 12075                    | \$83.50  | 12103                  | \$85.50  |
| 7/32   | 1"    | 2-1/2 | 1/4   | 12208                    | \$88.50  | 12223                  | \$91.50  | 12215                    | \$88.50  | 12230                  | \$91.50  |
| 1/4    | 1"    | 2-1/2 | 1/4   | 10778                    | \$88.50  | 10790                  | \$91.50  | 10802                    | \$88.50  | 10814                  | \$91.50  |
| 1/4L   | 1"    | 4"    | 1/4   | 12074                    | \$97.50  | 12098                  | \$100.50 | 12077                    | \$97.50  | 12105                  | \$100.50 |
| 1/4XL  | 1-1/2 | 6"    | 1/4   | 12076                    | \$148.50 | 12100                  | \$151.50 | 12079                    | \$148.50 | 12107                  | \$151.50 |
| 5/16   | 1"    | 2-1/2 | 5/16  | 10779                    | \$115.00 | 10791                  | \$119.00 | 10803                    | \$115.00 | 10815                  | \$119.00 |
| 3/8    | 1"    | 2-1/2 | 3/8   | 10780                    | \$146.50 | 10792                  | \$151.50 | 10804                    | \$146.50 | 10816                  | \$151.50 |
| 3/8L   | 1-3/8 | 4"    | 3/8   | 12078                    | \$164.50 | 12102                  | \$169.50 | 12081                    | \$164.50 | 12109                  | \$169.50 |
| 3/8XL  | 2"    | 6"    | 3/8   | 12080                    | \$247.00 | 12104                  | \$252.00 | 12083                    | \$247.00 | 12111                  | \$252.00 |
| 7/16   | 1"    | 3"    | 7/16  | 12209                    | \$178.50 | 12224                  | \$186.50 | 12216                    | \$178.50 | 12231                  | \$186.50 |
| 1/2    | 1-1/4 | 3"    | 1/2   | 10781                    | \$196.00 | 10793                  | \$204.00 | 10805                    | \$196.00 | 10817                  | \$204.00 |
| 1/2L   | 1-3/8 | 4"    | 1/2   | 11745                    | \$208.00 | 11746                  | \$216.00 | 11747                    | \$208.00 | 11748                  | \$216.00 |
| 1/2XL  | 2"    | 6"    | 1/2   | 12084                    | \$305.00 | 12108                  | \$313.00 | 12087                    | \$305.00 | 12115                  | \$313.00 |
| 5/8    | 1-3/8 | 3-1/2 | 5/8   | 12364                    | \$272.00 | 12367                  | \$282.00 | 12370                    | \$272.00 | 12373                  | \$282.00 |
| 3/4    | 1-3/8 | 4"    | 3/4   | 12365                    | \$358.00 | 12368                  | \$370.00 | 12371                    | \$358.00 | 12374                  | \$370.00 |
| 1"     | 1-3/8 | 4"    | 1"    | 12366                    | \$730.00 | 12369                  | \$745.00 | 12372                    | \$730.00 | 12375                  | \$745.00 |

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



**Specs (micro end mills cut diameter < 1/8" w/ D2 coat):**  
Cutting Diam +.0005 / -.001  
Shank Diam +.0000 / -.0002  
Radius ± .00075  
SFR = Shrink Fit Ready



**Specs (fractional end mills cut diameter ≥ 1/8" w/ D2 coat):**  
Cutting Diam +.0000 / -.0020  
Shank Diam +.0000 / -.00025  
Radius ± .0010  
SFR = Shrink Fit Ready



## GR Series: UnCoated fractional w/Radius

Thick core, high strength, high hardness solid carbide end mills with increased helix and featuring extended cutting lengths.

- Designed for milling of hardened steels, non-metals & non-ferrous alloys • Tight diameter tolerance
- Proprietary cemented carbide grade offers extremely high hardness and density
- Features heavy core construction for maximum rigidity • Regular, Long (L), and Extra-Long (XL) lengths



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



Specs (fractional end mills cut diameter ≥ 1/8"):  
Cutting Diam +.0000 / -.0015  
Shank Diam +.0000 / -.00025  
Radius ± .00075  
SFR = Shrink Fit Ready

GR2RUC



GR4RUC



| Diam   | LOC   | OAL   | Shank | .015 Rad              |                       | .031 Rad              |                       | .062 Rad              |                       | Corner Rad UnCoated Price |
|--------|-------|-------|-------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|---------------------------|
|        |       |       |       | UnCoated 2 flute EDP# | UnCoated 4 flute EDP# | UnCoated 2 flute EDP# | UnCoated 4 flute EDP# | UnCoated 2 flute EDP# | UnCoated 4 flute EDP# |                           |
| 1/16L  | 1/4   | 2"    | 1/8   | 12245                 | 12262                 |                       |                       |                       |                       | \$25.00                   |
| 1/16XL | 1/2   | 2"    | 1/8   | 12246                 | 12263                 |                       |                       |                       |                       | \$30.00                   |
| 1/8    | 5/8   | 1-1/2 | 1/8   | 12247                 | 12264                 | 12279                 | 12294                 |                       |                       | \$20.00                   |
| 1/8L   | 1/2   | 3"    | 1/8   | 12248                 | 12265                 | 12280                 | 12295                 |                       |                       | \$26.00                   |
| 1/8XL  | 1"    | 4"    | 1/8   | 12249                 | 12266                 | 12281                 | 12296                 |                       |                       | \$35.00                   |
| 3/16   | 3/4   | 2"    | 3/16  | 12250                 | 12267                 | 12282                 | 12297                 |                       |                       | \$27.00                   |
| 3/16L  | 3/4   | 3"    | 3/16  | 12251                 | 12268                 | 12283                 | 12298                 |                       |                       | \$33.00                   |
| 3/16XL | 1-3/8 | 4"    | 3/16  | 12252                 | 12269                 | 12284                 | 12299                 | 12310                 | 12321                 | \$44.00                   |
| 1/4    | 1"    | 2-1/2 | 1/4   | 12253                 | 12270                 | 12285                 | 12300                 | 12311                 | 12322                 | \$33.00                   |
| 1/4L   | 1"    | 4"    | 1/4   | 12254                 | 12271                 | 12286                 | 12301                 | 12312                 | 12323                 | \$42.00                   |
| 1/4XL  | 1-1/2 | 6"    | 1/4   | 12255                 | 12272                 | 12287                 | 12302                 | 12313                 | 12324                 | \$59.00                   |
| 3/8    | 1"    | 2-1/2 | 3/8   | 12256                 | 12273                 | 12288                 | 12303                 | 12314                 | 12325                 | \$50.00                   |
| 3/8L   | 1-3/8 | 4"    | 3/8   | 12257                 | 12274                 | 12289                 | 12304                 | 12315                 | 12326                 | \$68.00                   |
| 3/8XL  | 2"    | 6"    | 3/8   | 12258                 | 12275                 | 12290                 | 12305                 | 12316                 | 12327                 | \$92.00                   |
| 1/2    | 1-1/4 | 3"    | 1/2   | 12259                 | 12276                 | 12291                 | 12306                 | 12317                 | 12328                 | \$76.00                   |
| 1/2L   | 1-3/8 | 4"    | 1/2   | 12260                 | 12277                 | 12292                 | 12307                 | 12318                 | 12329                 | \$90.00                   |
| 1/2XL  | 2"    | 6"    | 1/2   | 12261                 | 12278                 | 12293                 | 12308                 | 12319                 | 12330                 | \$114.00                  |

## GR Series: AT coated fractional w/Radius & Edge Prep

Thick core, high strength, high hardness solid carbide end mills with increased helix, featuring extended cutting lengths & SmoothEdge 4.

- Designed for milling of die & hardened steels and other hard metals • Tight diameter tolerance
- Proprietary cemented carbide grade offers extremely high hardness and density • SE1 for diameters < 1/8"
- Features heavy core construction for maximum rigidity • Regular, Long (L), and Extra-Long (XL) lengths



GR2RAT



GR4RAT



| Diam   | LOC   | OAL   | Shank | .015 Rad               |                        | .031 Rad               |                        | .062 Rad               |                        | Corner Rad+AT Price |
|--------|-------|-------|-------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|---------------------|
|        |       |       |       | AT Coated 2 flute EDP# | AT Coated 4 flute EDP# | AT Coated 2 flute EDP# | AT Coated 4 flute EDP# | AT Coated 2 flute EDP# | AT Coated 4 flute EDP# |                     |
| 1/16L  | 1/4   | 2"    | 1/8   | 00963                  | 00980                  |                        |                        |                        |                        | \$27.00             |
| 1/16XL | 1/2   | 2"    | 1/8   | 00964                  | 00981                  |                        |                        |                        |                        | \$32.00             |
| 1/8    | 5/8   | 1-1/2 | 1/8   | 00965                  | 00982                  | 00997                  | 01012                  |                        |                        | \$22.00             |
| 1/8L   | 1/2   | 3"    | 1/8   | 00966                  | 00983                  | 00998                  | 01013                  |                        |                        | \$29.00             |
| 1/8XL  | 1"    | 4"    | 1/8   | 00967                  | 00984                  | 00999                  | 01014                  |                        |                        | \$39.00             |
| 3/16   | 3/4   | 2"    | 3/16  | 00968                  | 00985                  | 01000                  | 01015                  |                        |                        | \$31.00             |
| 3/16L  | 3/4   | 3"    | 3/16  | 00969                  | 00986                  | 01001                  | 01016                  |                        |                        | \$38.00             |
| 3/16XL | 1-3/8 | 4"    | 3/16  | 00970                  | 00987                  | 01002                  | 01017                  | 01028                  | 01039                  | \$50.00             |
| 1/4    | 1"    | 2-1/2 | 1/4   | 00971                  | 00988                  | 01003                  | 01018                  | 01029                  | 01040                  | \$38.00             |
| 1/4L   | 1"    | 4"    | 1/4   | 00972                  | 00989                  | 01004                  | 01019                  | 01030                  | 01041                  | \$49.00             |
| 1/4XL  | 1-1/2 | 6"    | 1/4   | 00973                  | 00990                  | 01005                  | 01020                  | 01031                  | 01042                  | \$67.00             |
| 3/8    | 1"    | 2-1/2 | 3/8   | 00974                  | 00991                  | 01006                  | 01021                  | 01032                  | 01043                  | \$58.00             |
| 3/8L   | 1-3/8 | 4"    | 3/8   | 00975                  | 00992                  | 01007                  | 01022                  | 01033                  | 01044                  | \$77.00             |
| 3/8XL  | 2"    | 6"    | 3/8   | 00976                  | 00993                  | 01008                  | 01023                  | 01034                  | 01045                  | \$105.00            |
| 1/2    | 1-1/4 | 3"    | 1/2   | 00977                  | 00994                  | 01009                  | 01024                  | 01035                  | 01046                  | \$86.00             |
| 1/2L   | 1-3/8 | 4"    | 1/2   | 00978                  | 00995                  | 01010                  | 01025                  | 01036                  | 01047                  | \$102.00            |
| 1/2XL  | 2"    | 6"    | 1/2   | 00979                  | 00996                  | 01011                  | 01026                  | 01037                  | 01048                  | \$130.00            |



## GR Series: D1 PVD Diamond coated w/Radius

High hardness & strength solid carbide end mills for graphite & abrasive materials featuring extended LOC's and proprietary coating for medium to long-run setups.

- Designed for graphite and abrasive non-metals • Extremely close diameter tolerances & sharpness for diamond
- Proprietary cemented carbide grade, application-specific geometry, and thin & smooth D1 PVD diamond coating
- Superior abrasion resistance for superb price / performance valuation • Regular, Long (L), and Extra-Long (XL) lengths

GR2RD1



GR4RD1



| Diam   | LOC   | OAL   | Shank | .015 Rad                     |                              | .031 Rad                     |                              | .062 Rad                     |                              | Corner Rad+D1<br>Price |
|--------|-------|-------|-------|------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|------------------------|
|        |       |       |       | D1 Coated<br>2 flute<br>EDP# | D1 Coated<br>4 flute<br>EDP# | D1 Coated<br>2 flute<br>EDP# | D1 Coated<br>4 flute<br>EDP# | D1 Coated<br>2 flute<br>EDP# | D1 Coated<br>4 flute<br>EDP# |                        |
| 1/16L  | 1/4   | 2"    | 1/8   | 11698                        | 11704                        |                              |                              |                              |                              | \$30.00                |
| 1/16XL | 1/2   | 2"    | 1/8   | 11163                        | 11164                        |                              |                              |                              |                              | \$35.00                |
| 1/8    | 5/8   | 1-1/2 | 1/8   | 10705                        | 10706                        | 10763                        | 10764                        |                              |                              | \$25.00                |
| 1/8L   | 1/2   | 3"    | 1/8   | 11699                        | 11705                        | 11727                        | 11714                        |                              |                              | \$33.00                |
| 1/8XL  | 1"    | 4"    | 1/8   | 11165                        | 11066                        | 11077                        | 11078                        |                              |                              | \$43.00                |
| 3/16   | 3/4   | 2"    | 3/16  | 10707                        | 10708                        | 10765                        | 10766                        |                              |                              | \$33.00                |
| 3/16L  | 3/4   | 3"    | 3/16  | 11700                        | 11706                        | 11710                        | 11715                        |                              |                              | \$41.50                |
| 3/16XL | 1-3/8 | 4"    | 3/16  | 11067                        | 11068                        | 11079                        | 11080                        | 11091                        | 11092                        | \$54.50                |
| 1/4    | 1"    | 2-1/2 | 1/4   | 10709                        | 10710                        | 10767                        | 10768                        | 10807                        | 10842                        | \$42.00                |
| 1/4L   | 1"    | 4"    | 1/4   | 11069                        | 11070                        | 11081                        | 11082                        | 11093                        | 11094                        | \$54.50                |
| 1/4XL  | 1-1/2 | 6"    | 1/4   | 11701                        | 11707                        | 11711                        | 11716                        | 11720                        | 11724                        | \$75.00                |
| 3/8    | 1"    | 2-1/2 | 3/8   | 10711                        | 10712                        | 10769                        | 10794                        | 10843                        | 10854                        | \$61.00                |
| 3/8L   | 1-3/8 | 4"    | 3/8   | 11071                        | 11072                        | 11083                        | 11084                        | 11095                        | 11096                        | \$82.00                |
| 3/8XL  | 2"    | 6"    | 3/8   | 11702                        | 11708                        | 11712                        | 11717                        | 11721                        | 11725                        | \$113.00               |
| 1/2    | 1-1/4 | 3"    | 1/2   | 10761                        | 10762                        | 10795                        | 10806                        | 10855                        | 10970                        | \$91.00                |
| 1/2L   | 1-3/8 | 4"    | 1/2   | 11739                        | 11742                        | 11740                        | 11743                        | 11741                        | 11744                        | \$110.00               |
| 1/2XL  | 2"    | 6"    | 1/2   | 11703                        | 11074                        | 11085                        | 11086                        | 11097                        | 11098                        | \$142.00               |

## GR Series: D2 CVD Diamond coated w/Radius

High hardness & strength solid carbide end mills for graphite & abrasive materials featuring extended LOC's and proprietary CVD diamond coating for long-run setups.

- Designed for graphite and abrasive non-metals • Tight diameter tolerances for CVD diamond
- Proprietary cemented carbide grade, application-specific geometry, and thick & hard D2 CVD diamond coating
- Maximum tool life & wear resistance for long production runs • Regular, Long (L), and Extra-Long (XL) lengths

GR2RD2



GR4RD2



| Diam   | LOC   | OAL   | Shank | .015 Rad                     |                              | .031 Rad                     |                              | .062 Rad                     |                              | Corner Rad+D2<br>Price |
|--------|-------|-------|-------|------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|------------------------|
|        |       |       |       | D2 Coated<br>2 flute<br>EDP# | D2 Coated<br>4 flute<br>EDP# | D2 Coated<br>2 flute<br>EDP# | D2 Coated<br>4 flute<br>EDP# | D2 Coated<br>2 flute<br>EDP# | D2 Coated<br>4 flute<br>EDP# |                        |
| 1/16L  | 1/4   | 2"    | 1/8   | 12110                        | 12117                        |                              |                              |                              |                              | \$53.00                |
| 1/16XL | 1/2   | 2"    | 1/8   | 12112                        | 12119                        |                              |                              |                              |                              | \$58.00                |
| 1/8    | 5/8   | 1-1/2 | 1/8   | 12177                        | 12178                        | 12187                        | 12188                        |                              |                              | \$48.00                |
| 1/8L   | 1/2   | 3"    | 1/8   | 12114                        | 12121                        | 12134                        | 12141                        |                              |                              | \$54.00                |
| 1/8XL  | 1"    | 4"    | 1/8   | 12116                        | 12123                        | 12136                        | 12143                        |                              |                              | \$63.00                |
| 3/16   | 3/4   | 2"    | 3/16  | 12179                        | 12180                        | 12189                        | 12190                        |                              |                              | \$72.50                |
| 3/16L  | 3/4   | 3"    | 3/16  | 12118                        | 12125                        | 12138                        | 12145                        |                              |                              | \$78.50                |
| 3/16XL | 1-3/8 | 4"    | 3/16  | 12120                        | 12127                        | 12140                        | 12147                        | 12156                        | 12163                        | \$89.50                |
| 1/4    | 1"    | 2-1/2 | 1/4   | 12181                        | 12182                        | 12191                        | 12192                        | 12197                        | 12198                        | \$95.50                |
| 1/4L   | 1"    | 4"    | 1/4   | 12122                        | 12129                        | 12142                        | 12149                        | 12158                        | 12165                        | \$104.50               |
| 1/4XL  | 1-1/2 | 6"    | 1/4   | 12124                        | 12131                        | 12144                        | 12151                        | 12160                        | 12167                        | \$155.50               |
| 3/8    | 1"    | 2-1/2 | 3/8   | 12183                        | 12184                        | 12193                        | 12194                        | 12199                        | 12200                        | \$156.50               |
| 3/8L   | 1-3/8 | 4"    | 3/8   | 12126                        | 12133                        | 12146                        | 12153                        | 12162                        | 12169                        | \$174.50               |
| 3/8XL  | 2"    | 6"    | 3/8   | 12128                        | 12135                        | 12148                        | 12155                        | 12164                        | 12171                        | \$257.00               |
| 1/2    | 1-1/4 | 3"    | 1/2   | 12185                        | 12186                        | 12195                        | 12196                        | 12201                        | 12202                        | \$208.00               |
| 1/2L   | 1-3/8 | 4"    | 1/2   | 11749                        | 11752                        | 11750                        | 11753                        | 11751                        | 11754                        | \$222.00               |
| 1/2XL  | 2"    | 6"    | 1/2   | 12132                        | 12139                        | 12152                        | 12159                        | 12168                        | 12175                        | \$319.00               |

Specs (micro end mills cut diameter < 1/8" w/ D2 coat):  
Cutting Diam +.0005 / -.001  
Shank Diam +.0000 / -.0002  
Radius ± .00075  
SFR = Shrink Fit Ready

Specs (fractional end mills cut diameter ≥ 1/8" w/ D2 coat):  
Cutting Diam +.0000 / -.0020  
Shank Diam +.0000 / -.00025  
Radius ± .0010  
SFR = Shrink Fit Ready



## GR Series: UnCoated metric end mills

High strength, high hardness solid carbide end mills  
for wide application range featuring extended cutting lengths.



- Designed for milling of hardened steels, non-metals & non-ferrous alloys
- Proprietary cemented carbide grade offers extremely high hardness and density
- Features heavy core construction for maximum rigidity • Tight tolerance
- Sharp, polished SmoothGrind cutting edges and surfaces



| Diam   | LOC  | OAL | Shank |
|--------|------|-----|-------|
| 0.25mm | 1.2  | 38  | 3.0   |
| 0.3    | 1.5  | 38  | 3.0   |
| 0.4    | 2.0  | 38  | 3.0   |
| 0.5    | 2.5  | 38  | 3.0   |
| 0.6    | 3.0  | 38  | 3.0   |
| 0.7    | 3.5  | 38  | 3.0   |
| 0.8    | 4.0  | 38  | 3.0   |
| 0.9    | 4.5  | 38  | 3.0   |
| 1.0    | 5.0  | 38  | 3.0   |
| 1.1    | 5.5  | 38  | 3.0   |
| 1.2    | 6.0  | 38  | 3.0   |
| 1.3    | 6.5  | 38  | 3.0   |
| 1.4    | 7.0  | 38  | 3.0   |
| 1.5    | 7.5  | 38  | 3.0   |
| 1.6    | 8.0  | 38  | 3.0   |
| 1.7    | 8.5  | 38  | 3.0   |
| 1.8    | 9.0  | 38  | 3.0   |
| 1.9    | 9.5  | 38  | 3.0   |
| 2.0    | 10.0 | 38  | 3.0   |
| 2.1    | 10.5 | 38  | 3.0   |
| 2.2    | 11.0 | 38  | 3.0   |
| 2.3    | 11.5 | 38  | 3.0   |
| 2.4    | 12.0 | 38  | 3.0   |
| 2.5    | 12.5 | 38  | 3.0   |
| 2.6    | 13.0 | 38  | 3.0   |
| 2.7    | 13.5 | 38  | 3.0   |
| 2.8    | 14.0 | 38  | 3.0   |
| 2.9    | 14.5 | 38  | 3.0   |
| 3.0    | 15   | 38  | 3.0   |
| 3.5    | 16   | 50  | 4.0   |
| 4.0    | 20   | 50  | 4.0   |
| 4.5    | 20   | 50  | 5.0   |
| 5.0    | 20   | 50  | 5.0   |
| 6.0    | 25   | 63  | 6.0   |
| 8.0    | 28   | 63  | 8.0   |
| 10.0   | 30   | 70  | 10.0  |
| 12.0   | 32   | 74  | 12.0  |



2 flute Square  
UnCoated



2 flute Ball  
UnCoated



4 flute Square  
UnCoated



4 flute Ball  
UnCoated



UC

| EDP#  | EDP#  | EDP#  | EDP#  | Price   |
|-------|-------|-------|-------|---------|
| 10453 | 10487 |       |       | \$19.00 |
| 10454 | 10488 |       |       | \$19.00 |
| 10455 | 10489 |       |       | \$19.00 |
| 10456 | 10490 | 12233 | 12235 | \$19.00 |
| 10457 | 10491 |       |       | \$19.00 |
| 10458 | 10492 | 10521 | 10550 | \$18.00 |
| 10459 | 10493 | 10522 | 10551 | \$18.00 |
| 10460 | 10494 | 10523 | 10552 | \$18.00 |
| 10461 | 10495 | 10524 | 10553 | \$18.00 |
| 10462 | 10496 | 10525 | 10554 | \$18.00 |
| 10463 | 10497 | 10526 | 10555 | \$18.00 |
| 10464 | 10498 | 10527 | 10556 | \$18.00 |
| 10465 | 10499 | 10528 | 10557 | \$18.00 |
| 10466 | 10500 | 10529 | 10558 | \$17.00 |
| 10467 | 10501 | 10530 | 10559 | \$17.00 |
| 10468 | 10502 | 10531 | 10560 | \$17.00 |
| 10469 | 10503 | 10532 | 10561 | \$17.00 |
| 10470 | 10504 | 10533 | 10562 | \$17.00 |
| 10471 | 10505 | 10534 | 10563 | \$17.00 |
| 10472 | 10506 | 10535 | 10564 | \$17.00 |
| 10473 | 10507 | 10536 | 10565 | \$17.00 |
| 10474 | 10508 | 10537 | 10566 | \$17.00 |
| 10475 | 10509 | 10538 | 10567 | \$17.00 |
| 10476 | 10510 | 10539 | 10568 | \$17.00 |
| 10477 | 10511 | 10540 | 10569 | \$17.00 |
| 10478 | 10512 | 10541 | 10570 | \$17.00 |
| 10479 | 10513 | 10542 | 10571 | \$17.00 |
| 10480 | 10514 | 10543 | 10572 | \$17.00 |
| 10481 | 10515 | 10544 | 10573 | \$16.00 |
| 10482 | 10516 | 10545 | 10574 | \$22.00 |
| 10483 | 10517 | 10546 | 10575 | \$22.00 |
| 10484 | 10518 | 10547 | 10576 | \$23.50 |
| 10485 | 10519 | 10548 | 10577 | \$23.50 |
| 10486 | 10520 | 10549 | 10578 | \$27.00 |
| 10737 | 10740 | 10743 | 10746 | \$35.00 |
| 10738 | 10741 | 10744 | 10747 | \$58.00 |
| 10739 | 10742 | 10745 | 10748 | \$68.00 |

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



Specs (MM micro end mills  
cutting diameter < 3.0mm):  
Cutting Diam +0.008 / -0.008mm  
Shank Diam +0.000 / -0.005mm  
Radius ± 0.004mm  
SFR = Shrink Fit Ready

Specs (MM end mills  
cutting diameter ≥ 3.0mm):  
Cutting Diam +0.000 / -0.038mm  
Shank Diam +0.000 / -0.0064mm  
Radius ± 0.019mm  
SFR = Shrink Fit Ready

## GR metric with Radius:

GR4RUC

new!



## 4 flute UnCoated metric rads



| Diam  | LOC | OAL | Shank | Rad<br>0.2mm<br>EDP# | Rad<br>0.3mm<br>EDP# | Rad<br>0.5mm<br>EDP# | Rad<br>1.0mm<br>EDP# | Rad<br>1.5mm<br>EDP# | Rad<br>2.0mm<br>EDP# | Rad<br>2.5mm<br>EDP# | Rad<br>3.0mm<br>EDP# | Corner Rad<br>UnCoated<br>Price |
|-------|-----|-----|-------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|---------------------------------|
| 3.0mm | 15  | 38  | 3.0   | 44035                | 44036                | 44037                | 44038                |                      |                      |                      |                      | \$20.00                         |
| 4.0   | 20  | 50  | 4.0   | 44039                | 44040                | 44041                | 44042                |                      |                      |                      |                      | \$26.00                         |
| 5.0   | 20  | 50  | 5.0   | 44044                | 44045                | 44046                | 44047                | 44048                |                      |                      |                      | \$27.50                         |
| 6.0   | 25  | 63  | 6.0   | 44050                | 44051                | 44052                | 44053                | 44054                | 44055                |                      |                      | \$33.00                         |
| 8.0   | 28  | 63  | 8.0   | 44057                | 44058                | 44059                | 44060                | 44061                | 44062                | 44063                |                      | \$42.50                         |
| 10.0  | 30  | 70  | 10.0  | 44065                | 44066                | 44067                | 44068                | 44069                | 44070                | 44071                | 44072                | \$66.00                         |
| 12.0  | 32  | 74  | 12.0  | 44073                | 44074                | 44075                | 44076                | 44077                | 44078                | 44079                | 44080                | \$76.00                         |



# GR Series: D1 PVD Diamond coated metric end mills

High strength, high hardness solid carbide end mills for graphite & abrasive materials featuring extended LOC's and proprietary coating for medium to long-run setups.



- Designed for graphite and abrasive non-metals
- Proprietary cemented carbide grade and D1 PVD diamond coating
- Superior abrasion resistance for superb price / performance valuation
- Extremely close diameter tolerances with our thinnest & smoothest diamond
- Features SmoothGrind sharp & polished cutting edges



| Diam   | LOC  | OAL | Shank | 2 flute Square D1 Coated EDP# | 2 flute Ball D1 Coated EDP# | 4 flute Square D1 Coated EDP# | 4 flute Ball D1 Coated EDP# | Price   |
|--------|------|-----|-------|-------------------------------|-----------------------------|-------------------------------|-----------------------------|---------|
| 0.25mm | 1.2  | 38  | 3.0   | 10579                         | 10613                       |                               |                             | \$24.00 |
| 0.3    | 1.5  | 38  | 3.0   | 10580                         | 10614                       |                               |                             | \$24.00 |
| 0.4    | 2.0  | 38  | 3.0   | 10581                         | 10615                       |                               |                             | \$24.00 |
| 0.5    | 2.5  | 38  | 3.0   | 10582                         | 10616                       | 12237                         | 12239                       | \$24.00 |
| 0.6    | 3.0  | 38  | 3.0   | 10583                         | 10617                       |                               |                             | \$24.00 |
| 0.7    | 3.5  | 38  | 3.0   | 10584                         | 10618                       | 10647                         | 10676                       | \$23.00 |
| 0.8    | 4.0  | 38  | 3.0   | 10585                         | 10619                       | 10648                         | 10677                       | \$23.00 |
| 0.9    | 4.5  | 38  | 3.0   | 10586                         | 10620                       | 10649                         | 10678                       | \$23.00 |
| 1.0    | 5.0  | 38  | 3.0   | 10587                         | 10621                       | 10650                         | 10679                       | \$23.00 |
| 1.1    | 5.5  | 38  | 3.0   | 10588                         | 10622                       | 10651                         | 10680                       | \$23.00 |
| 1.2    | 6.0  | 38  | 3.0   | 10589                         | 10623                       | 10652                         | 10681                       | \$23.00 |
| 1.3    | 6.5  | 38  | 3.0   | 10590                         | 10624                       | 10653                         | 10682                       | \$23.00 |
| 1.4    | 7.0  | 38  | 3.0   | 10591                         | 10625                       | 10654                         | 10683                       | \$23.00 |
| 1.5    | 7.5  | 38  | 3.0   | 10592                         | 10626                       | 10655                         | 10684                       | \$22.00 |
| 1.6    | 8.0  | 38  | 3.0   | 10593                         | 10627                       | 10656                         | 10685                       | \$22.00 |
| 1.7    | 8.5  | 38  | 3.0   | 10594                         | 10628                       | 10657                         | 10686                       | \$22.00 |
| 1.8    | 9.0  | 38  | 3.0   | 10595                         | 10629                       | 10658                         | 10687                       | \$22.00 |
| 1.9    | 9.5  | 38  | 3.0   | 10596                         | 10630                       | 10659                         | 10688                       | \$22.00 |
| 2.0    | 10.0 | 38  | 3.0   | 10597                         | 10631                       | 10660                         | 10689                       | \$22.00 |
| 2.1    | 10.5 | 38  | 3.0   | 10598                         | 10632                       | 10661                         | 10690                       | \$22.00 |
| 2.2    | 11.0 | 38  | 3.0   | 10599                         | 10633                       | 10662                         | 10691                       | \$22.00 |
| 2.3    | 11.5 | 38  | 3.0   | 10600                         | 10634                       | 10663                         | 10692                       | \$22.00 |
| 2.4    | 12.0 | 38  | 3.0   | 10601                         | 10635                       | 10664                         | 10693                       | \$22.00 |
| 2.5    | 12.5 | 38  | 3.0   | 10602                         | 10636                       | 10665                         | 10694                       | \$22.00 |
| 2.6    | 13.0 | 38  | 3.0   | 10603                         | 10637                       | 10666                         | 10695                       | \$22.00 |
| 2.7    | 13.5 | 38  | 3.0   | 10604                         | 10638                       | 10667                         | 10696                       | \$22.00 |
| 2.8    | 14.0 | 38  | 3.0   | 10605                         | 10639                       | 10668                         | 10697                       | \$22.00 |
| 2.9    | 14.5 | 38  | 3.0   | 10606                         | 10640                       | 10669                         | 10698                       | \$22.00 |
| 3.0    | 15   | 38  | 3.0   | 10607                         | 10641                       | 10670                         | 10699                       | \$21.00 |
| 3.5    | 16   | 50  | 4.0   | 10608                         | 10642                       | 10671                         | 10700                       | \$28.00 |
| 4.0    | 20   | 50  | 4.0   | 10609                         | 10643                       | 10672                         | 10701                       | \$28.00 |
| 4.5    | 20   | 50  | 5.0   | 10610                         | 10644                       | 10673                         | 10702                       | \$31.00 |
| 5.0    | 20   | 50  | 5.0   | 10611                         | 10645                       | 10674                         | 10703                       | \$31.00 |
| 6.0    | 25   | 63  | 6.0   | 10612                         | 10646                       | 10675                         | 10704                       | \$36.00 |
| 8.0    | 28   | 63  | 8.0   | 10749                         | 10752                       | 10755                         | 10758                       | \$45.00 |
| 10.0   | 30   | 70  | 10.0  | 10750                         | 10753                       | 10756                         | 10759                       | \$72.00 |
| 12.0   | 32   | 74  | 12.0  | 10751                         | 10754                       | 10757                         | 10760                       | \$83.00 |

## GR metric w/ Rad + D1:

GR4RD1

new!



| Diam  | LOC | OAL | Shank | Rad 0.2mm EDP# | Rad 0.3mm EDP# | Rad 0.5mm EDP# | Rad 1.0mm EDP# | Rad 1.5mm EDP# | Rad 2.0mm EDP# | Rad 2.5mm EDP# | Rad 3.0mm EDP# | Corner Rad +D1 Price |
|-------|-----|-----|-------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------------|
| 3.0mm | 15  | 38  | 3.0   | 00130          | 00131          | 00132          | 00133          |                |                |                |                | \$25.00              |
| 4.0   | 20  | 50  | 4.0   | 00134          | 00135          | 00136          | 00137          |                |                |                |                | \$32.00              |
| 5.0   | 20  | 50  | 5.0   | 00139          | 00140          | 00141          | 00142          | 00143          |                |                |                | \$35.00              |
| 6.0   | 25  | 63  | 6.0   | 00145          | 00146          | 00147          | 00148          | 00149          | 00150          |                |                | \$42.00              |
| 8.0   | 28  | 63  | 8.0   | 00152          | 00153          | 00154          | 00155          | 00156          | 00157          | 00158          |                | \$52.50              |
| 10.0  | 30  | 70  | 10.0  | 00160          | 00161          | 00162          | 00163          | 00164          | 00165          | 00166          | 00167          | \$80.00              |
| 12.0  | 32  | 74  | 12.0  | 00168          | 00169          | 00170          | 00171          | 00172          | 00173          | 00174          | 00175          | \$91.00              |



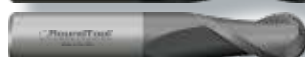
## GR Series: D2 CVD Diamond coated metric end mills

High strength, high hardness solid carbide end mills for graphite & abrasive materials featuring extended LOC's and proprietary CVD diamond coating for long-run setups.

GR2SD2



GR2BD2



GR4SD2



GR4BD2



- Designed for graphite and abrasive non-metals
- Proprietary cemented carbide grade and D2 CVD diamond coating
- Our thickest, hardest, longest lasting diamond coating
- Maximum tool life and wear resistance for long production runs
- Tight diameter tolerances for CVD diamond



| Diam  | LOC | OAL | Shank |
|-------|-----|-----|-------|
| 0.5mm | 2.5 | 38  | 3.0   |
| 1.0   | 5.0 | 38  | 3.0   |
| 1.5   | 7.5 | 38  | 3.0   |
| 2.0   | 10  | 38  | 3.0   |
| 3.0   | 15  | 38  | 3.0   |
| 4.0   | 20  | 50  | 4.0   |
| 5.0   | 20  | 50  | 5.0   |
| 6.0   | 25  | 63  | 6.0   |
| 8.0   | 28  | 63  | 8.0   |
| 10.0  | 30  | 70  | 10.0  |
| 12.0  | 32  | 74  | 12.0  |



2 flute Square  
D2 Coated



2 flute Ball  
D2 Coated



4 flute Square  
D2 Coated



4 flute Ball  
D2 Coated

| EDP#  | Price    | EDP#  | Price    | EDP#  | Price    | EDP#  | Price    |
|-------|----------|-------|----------|-------|----------|-------|----------|
| 00710 | \$58.00  | 00711 | \$60.00  | 00712 | \$58.00  | 12243 | \$60.00  |
| 10890 | \$49.00  | 10900 | \$51.00  | 10910 | \$49.00  | 10920 | \$51.00  |
| 10891 | \$45.00  | 10901 | \$47.00  | 10911 | \$45.00  | 10921 | \$47.00  |
| 10892 | \$44.00  | 10902 | \$46.00  | 10912 | \$44.00  | 10922 | \$46.00  |
| 10893 | \$43.00  | 10903 | \$45.00  | 10913 | \$43.00  | 10923 | \$45.00  |
| 10894 | \$66.50  | 10904 | \$68.50  | 10914 | \$66.50  | 10924 | \$68.50  |
| 10895 | \$86.00  | 10905 | \$88.00  | 10915 | \$86.00  | 10925 | \$88.00  |
| 10896 | \$88.50  | 10906 | \$91.50  | 10916 | \$88.50  | 10926 | \$91.50  |
| 10897 | \$115.00 | 10907 | \$119.00 | 10917 | \$115.00 | 10927 | \$119.00 |
| 10898 | \$176.50 | 10908 | \$181.50 | 10918 | \$176.50 | 10928 | \$181.50 |
| 10899 | \$196.00 | 10909 | \$204.00 | 10919 | \$196.00 | 10929 | \$204.00 |

## GR metric w/ Rad + D2:

GR4RD2

new!



| Diam  | LOC | OAL | Shank |
|-------|-----|-----|-------|
| 3.0mm | 15  | 38  | 3.0   |
| 4.0   | 20  | 50  | 4.0   |
| 5.0   | 20  | 50  | 5.0   |
| 6.0   | 25  | 63  | 6.0   |
| 8.0   | 28  | 63  | 8.0   |
| 10.0  | 30  | 70  | 10.0  |
| 12.0  | 32  | 74  | 12.0  |



## 4 flute D2 coated metric rads



| Rad<br>0.2mm<br>EDP# | Rad<br>0.3mm<br>EDP# | Rad<br>0.5mm<br>EDP# | Rad<br>1.0mm<br>EDP# | Rad<br>1.5mm<br>EDP# | Rad<br>2.0mm<br>EDP# | Rad<br>2.5mm<br>EDP# | Rad<br>3.0mm<br>EDP# | Corner Rad<br>+D2<br>Price |
|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------------|
| 00180                | 00181                | 00182                | 00183                |                      |                      |                      |                      | \$48.00                    |
| 00184                | 00185                | 00186                | 00187                |                      |                      |                      |                      | \$71.50                    |
| 00189                | 00190                | 00191                | 00192                | 00193                |                      |                      |                      | \$90.00                    |
| 00195                | 00196                | 00197                | 00198                | 00199                | 00200                |                      |                      | \$95.50                    |
| 00202                | 00203                | 00204                | 00205                | 00206                | 00207                | 00208                |                      | \$125.50                   |
| 00210                | 00211                | 00212                | 00213                | 00214                | 00215                | 00216                | 00217                | \$184.50                   |
| 00218                | 00219                | 00220                | 00221                | 00222                | 00223                | 00224                | 00225                | \$208.00                   |



Specs (MM micro end mills cut  
diameter < 3.0mm w/ D2 coat):  
Cutting Diam +0.013 / -0.025mm  
Shank Diam +0.000 / -0.005mm  
Radius ± 0.019mm  
SFR = Shrink Fit Ready



Specs (MM end mills cutting  
diameter ≥ 3.0mm w/ D2 coat):  
Cutting Diam +0.000 / -0.050mm  
Shank Diam +0.000 / -0.0064mm  
Radius ± 0.025mm  
SFR = Shrink Fit Ready



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





## HT Series: AT coated 6 or 8 flute Square & Radius

High strength, heavy core solid carbide end mills for high-speed machining of heat-treated & hardened materials up to 70HRC.

- Designed for peripheral milling or toroidal slotting • Proprietary cemented carbide grade and SmoothCoat AlTiN
- Includes SmoothEdge 1 edge prep • Maximum tool life and performance in HSM applications



### HT6SAT

| Diam | LOC   | OAL   | Shank | Flutes |
|------|-------|-------|-------|--------|
| 1/8  | 1/2   | 1-1/2 | 1/8   | 6      |
| 3/16 | 5/8   | 2"    | 3/16  | 6      |
| 1/4  | 3/4   | 2-1/2 | 1/4   | 6      |
| 5/16 | 13/16 | 2-1/2 | 5/16  | 6      |
| 3/8  | 1"    | 2-1/2 | 3/8   | 6      |
| 1/2  | 1"    | 3"    | 1/2   | 6      |
| 5/8  | 1-1/4 | 3-1/2 | 5/8   | 8      |
| 3/4  | 1-1/2 | 4"    | 3/4   | 8      |
| 1"   | 1-1/2 | 4"    | 1"    | 8      |



### Square w/AT HT6 or HT8SAT

| EDP#  | Price    |
|-------|----------|
| 23900 | \$21.50  |
| 23902 | \$25.00  |
| 23904 | \$31.00  |
| 23906 | \$38.00  |
| 23908 | \$49.00  |
| 23910 | \$75.00  |
| 23912 | \$136.00 |
| 23914 | \$180.00 |
| 23916 | \$280.00 |

### Radius

| Radius |
|--------|
| .010   |
| .010   |
| .010   |
| .010   |
| .030   |
| .030   |
| .030   |
| .030   |
| .030   |



### Radius w/AT HT6 or HT8SAT

| EDP#  | Price    |
|-------|----------|
| 23918 | \$23.00  |
| 23920 | \$27.00  |
| 23922 | \$34.00  |
| 23924 | \$42.00  |
| 23926 | \$54.00  |
| 23928 | \$82.00  |
| 23930 | \$144.00 |
| 23932 | \$190.00 |
| 23934 | \$290.00 |



### Metric Square HT6 or HT8SAT

| Diam  | LOC | OAL | Shank | Flutes |
|-------|-----|-----|-------|--------|
| 3.0mm | 12  | 38  | 3.0   | 6      |
| 4.0   | 14  | 50  | 4.0   | 6      |
| 5.0   | 16  | 50  | 5.0   | 6      |
| 6.0   | 19  | 63  | 6.0   | 6      |
| 8.0   | 20  | 63  | 8.0   | 6      |
| 10.0  | 25  | 70  | 10.0  | 6      |
| 12.0  | 30  | 74  | 12.0  | 6      |
| 16.0  | 32  | 89  | 16.0  | 8      |
| 20.0  | 38  | 100 | 20.0  | 8      |

| EDP#  | Price    |
|-------|----------|
| 23960 | \$21.50  |
| 23962 | \$24.00  |
| 23964 | \$25.00  |
| 23966 | \$31.00  |
| 23968 | \$38.00  |
| 23970 | \$62.00  |
| 23972 | \$75.00  |
| 23974 | \$136.00 |
| 23976 | \$200.00 |

### Radius

| Radius |
|--------|
| 0.3    |
| 0.3    |
| 0.3    |
| 0.3    |
| 0.3    |
| 0.3    |
| 0.3    |
| 0.3    |
| 0.3    |



### Metric Radius HT6 or HT8SAT

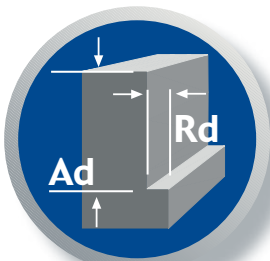
| EDP#  | Price    |
|-------|----------|
| 23978 | \$23.00  |
| 23980 | \$26.00  |
| 23982 | \$27.00  |
| 23984 | \$34.00  |
| 23986 | \$42.00  |
| 23988 | \$67.00  |
| 23990 | \$82.00  |
| 23992 | \$144.00 |
| 23994 | \$210.00 |

Specs (fractional end mills  
cutting diameter  $\geq 1/8$ ):  
Cutting Diam  $+0.000 / -0.015$   
Shank Diam  $+0.000 / -0.0025$   
Radius  $\pm .00075$   
SFR = Shrink Fit Ready

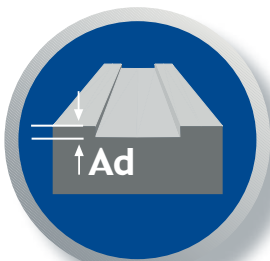
Specs (MM end mills  
cutting diameter  $\geq 3.0$ mm):  
Cutting Diam  $+0.000 / -0.038$ mm  
Shank Diam  $+0.000 / -0.0064$ mm  
Radius  $\pm 0.019$ mm  
SFR = Shrink Fit Ready

• Axial depth (Ad) and Radial depth (Rd) are expressed in % of cutter diameter.

• If recommended speed is higher than machine tool's capacity, run at maximum RPM and reduce feed appropriately.



Peripheral milling



Slot milling

| Material Hardness        | 35 - 45 HRC          |        | 45 - 55 HRC           |        | 55 - 65 HRC           |        | 65 - 70 HRC           |        |
|--------------------------|----------------------|--------|-----------------------|--------|-----------------------|--------|-----------------------|--------|
| Depth of cut Peripheral: | Ad = 1.5xD Rd = .1xD |        | Ad = 1.0xD Rd = .05xD |        | Ad = 1.0xD Rd = .03xD |        | Ad = 1.0xD Rd = .02xD |        |
| Depth of cut Slotting:   | Ad = .1xD            |        | Ad = .1xD             |        | Ad = .05xD            |        | Ad = .02xD            |        |
|                          | Speed                | Feed   | Speed                 | Feed   | Speed                 | Feed   | Speed                 | Feed   |
| Fractional Mill Diameter | RPM                  | in/min | RPM                   | in/min | RPM                   | in/min | RPM                   | in/min |
| 1/8"                     | 18,000               | 85     | 13,500                | 48     | 11,000                | 33     | 7,600                 | 21     |
| 3/16"                    | 12,000               | 86     | 9,000                 | 54     | 7,500                 | 36     | 5,000                 | 21     |
| 1/4"                     | 9,200                | 100    | 7,500                 | 72     | 5,600                 | 40     | 3,800                 | 20     |
| 5/16"                    | 7,000                | 05     | 5,600                 | 74     | 4,200                 | 50     | 3,000                 | 27     |
| 3/8"                     | 5,600                | 105    | 4,300                 | 76     | 3,500                 | 50     | 2,500                 | 27     |
| 1/2"                     | 3,800                | 90     | 3,000                 | 55     | 2,500                 | 30     | 1,500                 | 15     |

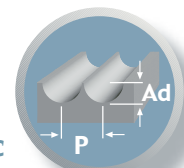
| Material Hardness        | 35 - 45 HRC          |        | 45 - 55 HRC           |        | 55 - 65 HRC           |        | 65 - 70 HRC           |        |
|--------------------------|----------------------|--------|-----------------------|--------|-----------------------|--------|-----------------------|--------|
| Depth of cut Peripheral: | Ad = 1.5xD Rd = .1xD |        | Ad = 1.0xD Rd = .05xD |        | Ad = 1.0xD Rd = .03xD |        | Ad = 1.0xD Rd = .02xD |        |
| Depth of cut Slotting:   | Ad = .1xD            |        | Ad = .1xD             |        | Ad = .05xD            |        | Ad = .02xD            |        |
|                          | Speed                | Feed   | Speed                 | Feed   | Speed                 | Feed   | Speed                 | Feed   |
| Metric Mill Diameter     | RPM                  | mm/min | RPM                   | mm/min | RPM                   | mm/min | RPM                   | mm/min |
| 3.0 mm                   | 19,500               | 2,300  | 14,000                | 1,280  | 11,900                | 900    | 8,050                 | 600    |
| 4.0                      | 14,000               | 2,600  | 11,000                | 1,670  | 9,000                 | 1,050  | 6,000                 | 600    |
| 5.0                      | 10,750               | 2,600  | 7,300                 | 1,550  | 5,550                 | 1,100  | 4,400                 | 510    |
| 6.0                      | 9,700                | 2,500  | 7,600                 | 1,850  | 6,000                 | 1,280  | 3,700                 | 510    |
| 8.0                      | 7,000                | 2,700  | 5,600                 | 1,900  | 4,200                 | 1,280  | 2,800                 | 640    |
| 10.0                     | 5,600                | 2,765  | 4,400                 | 2,000  | 3,600                 | 1,450  | 2,250                 | 685    |
| 12.0                     | 4,650                | 2,750  | 3,700                 | 1,790  | 3,000                 | 1,150  | 1,900                 | 500    |

**new! CBN Series: Cubic Boron Nitride 2 flute micro ball end mills****High speed and high precision milling of hardened steels up to 70HRc.**

CBN2BUC

Specs (CBN micro end mills):  
Cutting Diam  $\pm .0004$  /  $-.0004$   
Shank Diam  $\pm .0000$  /  $-.0003$   
Radius  $\pm .0002$   
SFR = Shrink Fit Ready

- Solid CBN head yields extremely hard & durable cutting surface
- Mills a superb polished surface finish on work piece material
- Extremely long life and high chipping resistance
- Precision ball accuracy tolerance of  $\pm .0002$
- Oversized 1/4" carbide shank for strength w/ 2" OAL
- Clearance neck followed by 15° TPS for reach
- Up to 20X life of solid carbide end mill
- UnCoated

Ad = Axial DOC  
P = Radial step over

| Diam | Radius | LOC  | LBS  | Neck $\varnothing$ | OAL | Shank | CBN2BUC<br>2 flute Ball |          | Recommendations<br>(for 62-70 HRc) |      |       |       |
|------|--------|------|------|--------------------|-----|-------|-------------------------|----------|------------------------------------|------|-------|-------|
|      |        |      |      |                    |     |       | EDP#                    | Price    | Speed                              | Feed | Ad    | P     |
| .010 | .0050  | .009 | .035 | .009               | 2"  | 1/4   | 51000                   | \$340.00 | 50,000                             | 40   | .0003 | .0006 |
| .015 | .0075  | .012 | .047 | .014               | 2"  | 1/4   | 51001                   | \$340.00 | 50,000                             | 50   | .0004 | .0008 |
| .020 | .0100  | .016 | .051 | .019               | 2"  | 1/4   | 51002                   | \$340.00 | 50,000                             | 50   | .0004 | .0008 |
| .025 | .0125  | .016 | .063 | .024               | 2"  | 1/4   | 51003                   | \$340.00 | 50,000                             | 60   | .0004 | .0010 |
| 1/32 | .0156  | .020 | .079 | .030               | 2"  | 1/4   | 51004                   | \$340.00 | 50,000                             | 80   | .0006 | .0012 |
| 1/16 | .0312  | .040 | .169 | .061               | 2"  | 1/4   | 51005                   | \$340.00 | 50,000                             | 120  | .0009 | .0020 |

**new! NF Series: Non-Ferrous 2 flute micro end mills****High helix, square end design for improved milling of aluminum, copper, brass, bronze & related alloys featuring proprietary SmoothCoat micro coatings.**

NF2SUC

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

- Designed for milling of non-ferrous materials • Tight tolerance  $\pm .0003$
- Proprietary cemented carbide grade with 3 different SmoothCoat micro coatings
- Features 45° helix for improved finish & increased chip removal
- LOC equals 3X cutting diameter • Necks & modifications available
- Use UnCoated for general purpose needs, corner rad alterations, etc.
- Use TC (TiCN) coated for abrasive alloys
- Use A1 (TiB2) coated for non-abrasive aluminum & magnesium alloys
- Use D1 PVD diamond coated for extremely abrasive non-ferrous alloys

| Diam  | LOC  | OAL   | Shank | UnCoated<br>NF2SUC |         | TC Coated<br>NF2STC |         | A1 Coated<br>NF2SA1 |         | D1 Coated<br>NF2SD1 |         |
|-------|------|-------|-------|--------------------|---------|---------------------|---------|---------------------|---------|---------------------|---------|
|       |      |       |       | EDP#               | Price   | EDP#                | Price   | EDP#                | Price   | EDP#                | Price   |
| .031  | .093 | 1-1/2 | 1/8   | 50800              | \$15.00 | 50801               | \$17.00 | 50802               | \$18.00 | 50803               | \$20.00 |
| .035  | .105 | 1-1/2 | 1/8   | 50804              | \$15.00 | 50805               | \$17.00 | 50806               | \$18.00 | 50807               | \$20.00 |
| .039  | .117 | 1-1/2 | 1/8   | 50808              | \$15.00 | 50809               | \$17.00 | 50810               | \$18.00 | 50811               | \$20.00 |
| .040  | .120 | 1-1/2 | 1/8   | 50812              | \$15.00 | 50813               | \$17.00 | 50814               | \$18.00 | 50815               | \$20.00 |
| .045  | .135 | 1-1/2 | 1/8   | 50816              | \$15.00 | 50817               | \$17.00 | 50818               | \$18.00 | 50819               | \$20.00 |
| .047  | .141 | 1-1/2 | 1/8   | 50820              | \$15.00 | 50821               | \$17.00 | 50822               | \$18.00 | 50823               | \$20.00 |
| .050  | .150 | 1-1/2 | 1/8   | 50824              | \$14.00 | 50825               | \$16.00 | 50826               | \$17.00 | 50827               | \$19.00 |
| .055  | .165 | 1-1/2 | 1/8   | 50828              | \$14.00 | 50829               | \$16.00 | 50830               | \$17.00 | 50831               | \$19.00 |
| .060  | .180 | 1-1/2 | 1/8   | 50832              | \$14.00 | 50833               | \$16.00 | 50834               | \$17.00 | 50835               | \$19.00 |
| .062  | .186 | 1-1/2 | 1/8   | 50836              | \$14.00 | 50837               | \$16.00 | 50838               | \$17.00 | 50839               | \$19.00 |
| .065  | .195 | 1-1/2 | 1/8   | 50840              | \$14.00 | 50841               | \$16.00 | 50842               | \$17.00 | 50843               | \$19.00 |
| .070  | .210 | 1-1/2 | 1/8   | 50844              | \$14.00 | 50845               | \$16.00 | 50846               | \$17.00 | 50847               | \$19.00 |
| .075  | .225 | 1-1/2 | 1/8   | 50848              | \$14.00 | 50849               | \$16.00 | 50850               | \$17.00 | 50851               | \$19.00 |
| .078  | .234 | 1-1/2 | 1/8   | 50852              | \$14.00 | 50853               | \$16.00 | 50854               | \$17.00 | 50855               | \$19.00 |
| .080  | .240 | 1-1/2 | 1/8   | 50856              | \$14.00 | 50857               | \$16.00 | 50858               | \$17.00 | 50859               | \$19.00 |
| .085  | .255 | 1-1/2 | 1/8   | 50860              | \$14.00 | 50861               | \$16.00 | 50862               | \$17.00 | 50863               | \$19.00 |
| .090  | .270 | 1-1/2 | 1/8   | 50864              | \$14.00 | 50865               | \$16.00 | 50866               | \$17.00 | 50867               | \$19.00 |
| .093  | .279 | 1-1/2 | 1/8   | 50868              | \$14.00 | 50869               | \$16.00 | 50870               | \$17.00 | 50871               | \$19.00 |
| .095  | .285 | 1-1/2 | 1/8   | 50872              | \$14.00 | 50873               | \$16.00 | 50874               | \$17.00 | 50875               | \$19.00 |
| .100  | .300 | 1-1/2 | 1/8   | 50876              | \$14.00 | 50877               | \$16.00 | 50878               | \$17.00 | 50879               | \$19.00 |
| .118  | .354 | 1-1/2 | 1/8   | 50880              | \$14.00 | 50881               | \$16.00 | 50882               | \$17.00 | 50883               | \$19.00 |
| .1245 | .375 | 1-1/2 | 1/8   | 50884              | \$14.00 | 50885               | \$16.00 | 50886               | \$17.00 | 50887               | \$19.00 |



## new! SS Series: 5 flute micro end mills for finishing

High helix, square end design for finishing operations in stainless, steels, titanium, high-temp alloys & more featuring proprietary SmoothCoat micro coatings.



SS5SUC

1/8" shank



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



| Diam  | LOC  | OAL   | Shank |
|-------|------|-------|-------|
| .031  | .093 | 1-1/2 | 1/8   |
| .040  | .120 | 1-1/2 | 1/8   |
| .047  | .141 | 1-1/2 | 1/8   |
| .050  | .150 | 1-1/2 | 1/8   |
| .060  | .180 | 1-1/2 | 1/8   |
| .062  | .186 | 1-1/2 | 1/8   |
| .070  | .210 | 1-1/2 | 1/8   |
| .078  | .234 | 1-1/2 | 1/8   |
| .080  | .240 | 1-1/2 | 1/8   |
| .090  | .270 | 1-1/2 | 1/8   |
| .093  | .279 | 1-1/2 | 1/8   |
| .100  | .300 | 1-1/2 | 1/8   |
| .1245 | .375 | 1-1/2 | 1/8   |

- Designed for finishing of tough ferrous materials • Tight tolerance ± .0003
- Proprietary cemented carbide grade with 3 different SmoothCoat micro coatings
- Features 45° helix with heavy core for strength
- LOC equals 3X cutting diameter • Necks & modifications available
- Use UnCoated for general purpose needs, corner rad alterations, etc.
- Use AT (AlTiN) coated for stainless, carbon, & tool steels, and high temp alloys
- Use A1 (TiB2) coated for titanium
- Use D1 PVD diamond coated for CFC's, graphite, plastics, and aluminum-silicon alloys

| 5 flute UnCoated<br>SS5SUC |         | 5 flute AT Coated<br>SS5SAT |         | 5 flute A1 Coated<br>SS5SA1 |         | 5 flute D1 Coated<br>SS5SD1 |         |
|----------------------------|---------|-----------------------------|---------|-----------------------------|---------|-----------------------------|---------|
| Square EDP#                | Price   | Square EDP#                 | Price   | Square EDP#                 | Price   | Square EDP#                 | Price   |
| 50900                      | \$17.00 | 50901                       | \$19.00 | 50902                       | \$20.00 | 50903                       | \$22.00 |
| 50904                      | \$17.00 | 50905                       | \$19.00 | 50906                       | \$20.00 | 50907                       | \$22.00 |
| 50908                      | \$17.00 | 50909                       | \$19.00 | 50910                       | \$20.00 | 50911                       | \$22.00 |
| 50912                      | \$16.00 | 50913                       | \$18.00 | 50914                       | \$19.00 | 50915                       | \$21.00 |
| 50916                      | \$16.00 | 50917                       | \$18.00 | 50918                       | \$19.00 | 50919                       | \$21.00 |
| 50920                      | \$16.00 | 50921                       | \$18.00 | 50922                       | \$19.00 | 50923                       | \$21.00 |
| 50924                      | \$16.00 | 50925                       | \$18.00 | 50926                       | \$19.00 | 50927                       | \$21.00 |
| 50928                      | \$16.00 | 50929                       | \$18.00 | 50930                       | \$19.00 | 50931                       | \$21.00 |
| 50932                      | \$16.00 | 50933                       | \$18.00 | 50934                       | \$19.00 | 50935                       | \$21.00 |
| 50936                      | \$16.00 | 50937                       | \$18.00 | 50938                       | \$19.00 | 50939                       | \$21.00 |
| 50940                      | \$16.00 | 50941                       | \$18.00 | 50942                       | \$19.00 | 50943                       | \$21.00 |
| 50944                      | \$16.00 | 50945                       | \$18.00 | 50946                       | \$19.00 | 50947                       | \$21.00 |
| 50948                      | \$16.00 | 50949                       | \$18.00 | 50950                       | \$19.00 | 50951                       | \$21.00 |

## new! SSL Series: Long 5 flute micro end mills for finishing

High helix, square end design for finishing operations in stainless, steels, titanium, high-temp alloys & more featuring proprietary SmoothCoat and 2.5" OAL.



SSL5SUC

1/8" shank



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



| Diam  | LOC  | OAL   | Shank |
|-------|------|-------|-------|
| .031  | .155 | 2-1/2 | 1/8   |
| .040  | .200 | 2-1/2 | 1/8   |
| .047  | .235 | 2-1/2 | 1/8   |
| .050  | .250 | 2-1/2 | 1/8   |
| .060  | .300 | 2-1/2 | 1/8   |
| .062  | .310 | 2-1/2 | 1/8   |
| .070  | .350 | 2-1/2 | 1/8   |
| .078  | .390 | 2-1/2 | 1/8   |
| .080  | .400 | 2-1/2 | 1/8   |
| .090  | .450 | 2-1/2 | 1/8   |
| .093  | .465 | 2-1/2 | 1/8   |
| .100  | .500 | 2-1/2 | 1/8   |
| .1245 | .625 | 2-1/2 | 1/8   |

- Designed for finishing of tough ferrous materials • Tight tolerance ± .0003
- Proprietary cemented carbide grade with 3 different SmoothCoat micro coatings
- Features 45° helix with heavy core for strength with OAL = 2.5"
- LOC equals 5X cutting diameter • Necks & modifications available
- Use UnCoated for general purpose needs, corner rad alterations, etc.
- Use AT (AlTiN) coated for stainless, carbon, & tool steels, and high temp alloys
- Use A1 (TiB2) coated for titanium
- Use D1 diamond coated for CFC's, graphite, and aluminum-silicon alloys

| 5 flute UnCoated<br>SSL5SUC |         | 5 flute AT Coated<br>SSL5SAT |         | 5 flute A1 Coated<br>SSL5SA1 |         | 5 flute D1 Coated<br>SSL5SD1 |         |
|-----------------------------|---------|------------------------------|---------|------------------------------|---------|------------------------------|---------|
| Square EDP#                 | Price   | Square EDP#                  | Price   | Square EDP#                  | Price   | Square EDP#                  | Price   |
| 50952                       | \$26.00 | 50953                        | \$29.00 | 50954                        | \$31.00 | 50955                        | \$33.00 |
| 50956                       | \$26.00 | 50957                        | \$29.00 | 50958                        | \$31.00 | 50959                        | \$33.00 |
| 50960                       | \$26.00 | 50961                        | \$29.00 | 50962                        | \$31.00 | 50963                        | \$33.00 |
| 50964                       | \$26.00 | 50965                        | \$29.00 | 50966                        | \$31.00 | 50967                        | \$33.00 |
| 50968                       | \$26.00 | 50969                        | \$29.00 | 50970                        | \$31.00 | 50971                        | \$33.00 |
| 50972                       | \$26.00 | 50973                        | \$29.00 | 50974                        | \$31.00 | 50975                        | \$33.00 |
| 50976                       | \$26.00 | 50977                        | \$29.00 | 50978                        | \$31.00 | 50979                        | \$33.00 |
| 50980                       | \$26.00 | 50981                        | \$29.00 | 50982                        | \$31.00 | 50983                        | \$33.00 |
| 50984                       | \$26.00 | 50985                        | \$29.00 | 50986                        | \$31.00 | 50987                        | \$33.00 |
| 50988                       | \$26.00 | 50989                        | \$29.00 | 50990                        | \$31.00 | 50991                        | \$33.00 |
| 50992                       | \$26.00 | 50993                        | \$29.00 | 50994                        | \$31.00 | 50995                        | \$33.00 |
| 50996                       | \$26.00 | 50997                        | \$29.00 | 50998                        | \$31.00 | 50999                        | \$33.00 |
| 51100                       | \$26.00 | 51101                        | \$29.00 | 51102                        | \$31.00 | 51103                        | \$33.00 |



## new! LR5X Series: Long Reach 3 flute micro end mills

Short flute length for rigidity in deep cavity milling with 5X diameter reach  
featuring proprietary SmoothCoat micro coating and 2.5" OAL.



LR5X3RUC (pictured)

Also available as LR5X3SUC and LR5X3BUC  
plus 3 coating options.

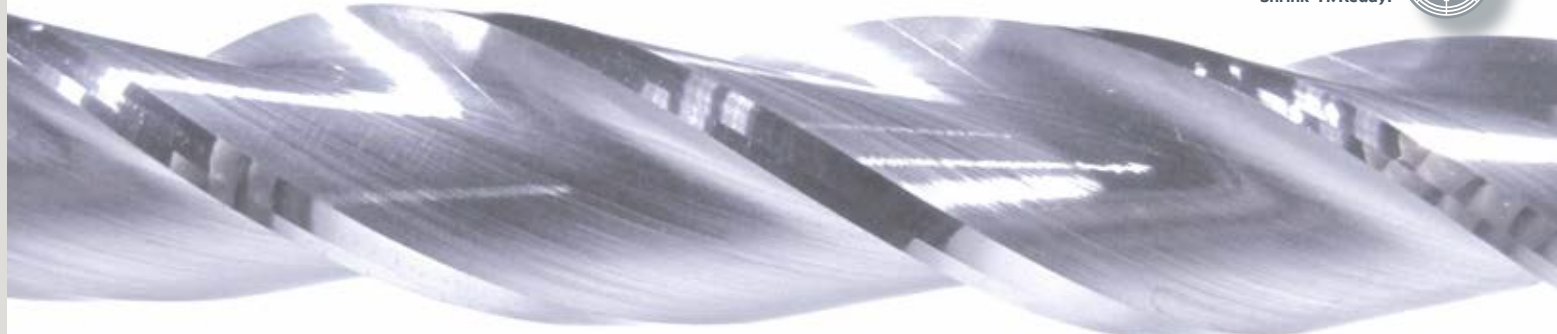
- Designed for cavity milling of a wide range of materials • Tight tolerance  $\pm .0003$
- Proprietary cemented carbide grade with 3 different SmoothCoat micro coatings
- Features three flutes @ 30° helix & reduced neck for clearance
- LOC = 1.5X cutting diameter • Total length below shank (LBS) = 5X.
- Use UnCoated for general purpose needs
- Use AT (AlTiN) coated for high-temp exotics & alloys, die & hardened steels, stainless
- Use A1 (TiB2) coated for titanium, aluminum & other non-ferrous materials
- Use D1 diamond coated for graphites & other extremely abrasive non-ferrous alloys



Specs (micro end mills  
cutting diameter  $< 1/8$ ):  
Cutting Diam  $+0.0003 / -0.0003$   
Shank Diam  $+0.0000 / -0.0002$   
Radius  $\pm .00015$   
SFR = Shrink Fit Ready

| Diam  | End      | LOC  | LBS  | OAL   | Shank | 3 flute UnCoated<br>LR5X3UC |         | 3 flute AT Coated<br>LR5X3AT |         | 3 flute A1 Coated<br>LR5X3A1 |         | 3 flute D1 Coated<br>LR5X3D1 |         |
|-------|----------|------|------|-------|-------|-----------------------------|---------|------------------------------|---------|------------------------------|---------|------------------------------|---------|
|       |          |      |      |       |       | EDP#                        | Price   | EDP#                         | Price   | EDP#                         | Price   | EDP#                         | Price   |
| .031  | Square   | .046 | .156 | 2-1/2 | 1/8   | 50640                       | \$26.00 | 50641                        | \$29.00 | 50642                        | \$31.00 | 50643                        | \$33.00 |
| .031  | .005 Rad | .046 | .156 | 2-1/2 | 1/8   | 50644                       | \$26.00 | 50645                        | \$29.00 | 50646                        | \$31.00 | 50647                        | \$33.00 |
| .031  | .010 Rad | .046 | .156 | 2-1/2 | 1/8   | 50648                       | \$26.00 | 50649                        | \$29.00 | 50650                        | \$31.00 | 50651                        | \$33.00 |
| .031  | Ball     | .046 | .156 | 2-1/2 | 1/8   | 50652                       | \$26.00 | 50653                        | \$29.00 | 50654                        | \$31.00 | 50655                        | \$33.00 |
| .047  | Square   | .070 | .250 | 2-1/2 | 1/8   | 50656                       | \$26.00 | 50657                        | \$29.00 | 50658                        | \$31.00 | 50659                        | \$33.00 |
| .047  | .005 Rad | .070 | .250 | 2-1/2 | 1/8   | 50660                       | \$26.00 | 50661                        | \$29.00 | 50662                        | \$31.00 | 50663                        | \$33.00 |
| .047  | .010 Rad | .070 | .250 | 2-1/2 | 1/8   | 50664                       | \$26.00 | 50665                        | \$29.00 | 50666                        | \$31.00 | 50667                        | \$33.00 |
| .047  | Ball     | .070 | .250 | 2-1/2 | 1/8   | 50668                       | \$26.00 | 50669                        | \$29.00 | 50670                        | \$31.00 | 50671                        | \$33.00 |
| .062  | Square   | .093 | .312 | 2-1/2 | 1/8   | 50672                       | \$26.00 | 50673                        | \$29.00 | 50674                        | \$31.00 | 50675                        | \$33.00 |
| .062  | .005 Rad | .093 | .312 | 2-1/2 | 1/8   | 50676                       | \$26.00 | 50677                        | \$29.00 | 50678                        | \$31.00 | 50679                        | \$33.00 |
| .062  | .010 Rad | .093 | .312 | 2-1/2 | 1/8   | 50680                       | \$26.00 | 50681                        | \$29.00 | 50682                        | \$31.00 | 50683                        | \$33.00 |
| .062  | .015 Rad | .093 | .312 | 2-1/2 | 1/8   | 50684                       | \$26.00 | 50685                        | \$29.00 | 50686                        | \$31.00 | 50687                        | \$33.00 |
| .062  | Ball     | .093 | .312 | 2-1/2 | 1/8   | 50688                       | \$26.00 | 50689                        | \$29.00 | 50690                        | \$31.00 | 50691                        | \$33.00 |
| .078  | Square   | .117 | .406 | 2-1/2 | 1/8   | 50692                       | \$26.00 | 50693                        | \$29.00 | 50694                        | \$31.00 | 50695                        | \$33.00 |
| .078  | .005 Rad | .117 | .406 | 2-1/2 | 1/8   | 50696                       | \$26.00 | 50697                        | \$29.00 | 50698                        | \$31.00 | 50699                        | \$33.00 |
| .078  | .010 Rad | .117 | .406 | 2-1/2 | 1/8   | 50700                       | \$26.00 | 50701                        | \$29.00 | 50702                        | \$31.00 | 50703                        | \$33.00 |
| .078  | .015 Rad | .117 | .406 | 2-1/2 | 1/8   | 50704                       | \$26.00 | 50705                        | \$29.00 | 50706                        | \$31.00 | 50707                        | \$33.00 |
| .078  | Ball     | .117 | .406 | 2-1/2 | 1/8   | 50708                       | \$26.00 | 50709                        | \$29.00 | 50710                        | \$31.00 | 50711                        | \$33.00 |
| .093  | Square   | .139 | .500 | 2-1/2 | 1/8   | 50712                       | \$26.00 | 50713                        | \$29.00 | 50714                        | \$31.00 | 50715                        | \$33.00 |
| .093  | .005 Rad | .139 | .500 | 2-1/2 | 1/8   | 50716                       | \$26.00 | 50717                        | \$29.00 | 50718                        | \$31.00 | 50719                        | \$33.00 |
| .093  | .010 Rad | .139 | .500 | 2-1/2 | 1/8   | 50720                       | \$26.00 | 50721                        | \$29.00 | 50722                        | \$31.00 | 50723                        | \$33.00 |
| .093  | .015 Rad | .139 | .500 | 2-1/2 | 1/8   | 50724                       | \$26.00 | 50725                        | \$29.00 | 50726                        | \$31.00 | 50727                        | \$33.00 |
| .093  | Ball     | .139 | .500 | 2-1/2 | 1/8   | 50728                       | \$26.00 | 50729                        | \$29.00 | 50730                        | \$31.00 | 50731                        | \$33.00 |
| .1245 | Square   | .187 | .625 | 2-1/2 | 1/8   | 50732                       | \$26.00 | 50733                        | \$29.00 | 50734                        | \$31.00 | 50735                        | \$33.00 |
| .1245 | .005 Rad | .187 | .625 | 2-1/2 | 1/8   | 50736                       | \$26.00 | 50737                        | \$29.00 | 50738                        | \$31.00 | 50739                        | \$33.00 |
| .1245 | .010 Rad | .187 | .625 | 2-1/2 | 1/8   | 50740                       | \$26.00 | 50741                        | \$29.00 | 50742                        | \$31.00 | 50743                        | \$33.00 |
| .1245 | .015 Rad | .187 | .625 | 2-1/2 | 1/8   | 50744                       | \$26.00 | 50745                        | \$29.00 | 50746                        | \$31.00 | 50747                        | \$33.00 |
| .1245 | Ball     | .187 | .625 | 2-1/2 | 1/8   | 50748                       | \$26.00 | 50749                        | \$29.00 | 50750                        | \$31.00 | 50751                        | \$33.00 |

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



## new! LR8X Series: Long Reach 3 flute micro end mills

Short flute length for rigidity in deep cavity milling with 8X diameter reach

featuring proprietary SmoothCoat micro coatings and 2.5" OAL.



LR8X3RUC (pictured)

Also available as LR8X3SUC and LR8X3BUC  
plus 3 coating options.

- Designed for cavity milling of a wide range of materials • Tight tolerance  $\pm .0003$
- Proprietary cemented carbide grade with 3 different SmoothCoat micro coatings
- Features three flutes @ 30° helix & reduced neck for clearance
- LOC = 1.5X cutting diameter • Total length below shank (LBS) = 8X.
- Use UnCoated for general purpose needs
- Use AT (AlTiN) coated for high-temp exotics & alloys, die & hardened steels, stainless
- Use A1 (TiB2) coated for titanium, aluminum & other non-ferrous materials
- Use D1 PVD diamond coated for graphites & other extremely abrasive non-ferrous alloys

1/8" shank



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



| Diam  | End      | LOC  | LBS  | OAL   | Shank | 3 flute UnCoated LR8X3UC |         | 3 flute AT Coated LR8X3AT |         | 3 flute A1 Coated LR8X3A1 |         | 3 flute D1 Coated LR8X3D1 |         |
|-------|----------|------|------|-------|-------|--------------------------|---------|---------------------------|---------|---------------------------|---------|---------------------------|---------|
|       |          |      |      |       |       | EDP#                     | Price   | EDP#                      | Price   | EDP#                      | Price   | EDP#                      | Price   |
| .031  | Square   | .046 | .250 | 2-1/2 | 1/8   | 51640                    | \$27.00 | 51641                     | \$30.00 | 51642                     | \$32.00 | 51643                     | \$34.00 |
| .031  | .005 Rad | .046 | .250 | 2-1/2 | 1/8   | 51644                    | \$27.00 | 51645                     | \$30.00 | 51646                     | \$32.00 | 51647                     | \$34.00 |
| .031  | .010 Rad | .046 | .250 | 2-1/2 | 1/8   | 51648                    | \$27.00 | 51649                     | \$30.00 | 51650                     | \$32.00 | 51651                     | \$34.00 |
| .031  | Ball     | .046 | .250 | 2-1/2 | 1/8   | 51652                    | \$27.00 | 51653                     | \$30.00 | 51654                     | \$32.00 | 51655                     | \$34.00 |
| .047  | Square   | .070 | .375 | 2-1/2 | 1/8   | 51656                    | \$27.00 | 51657                     | \$30.00 | 51658                     | \$32.00 | 51659                     | \$34.00 |
| .047  | .005 Rad | .070 | .375 | 2-1/2 | 1/8   | 51660                    | \$27.00 | 51661                     | \$30.00 | 51662                     | \$32.00 | 51663                     | \$34.00 |
| .047  | .010 Rad | .070 | .375 | 2-1/2 | 1/8   | 51664                    | \$27.00 | 51665                     | \$30.00 | 51666                     | \$32.00 | 51667                     | \$34.00 |
| .047  | Ball     | .070 | .375 | 2-1/2 | 1/8   | 51668                    | \$27.00 | 51669                     | \$30.00 | 51670                     | \$32.00 | 51671                     | \$34.00 |
| .062  | Square   | .093 | .500 | 2-1/2 | 1/8   | 51672                    | \$27.00 | 51673                     | \$30.00 | 51674                     | \$32.00 | 51675                     | \$34.00 |
| .062  | .005 Rad | .093 | .500 | 2-1/2 | 1/8   | 51676                    | \$27.00 | 51677                     | \$30.00 | 51678                     | \$32.00 | 51679                     | \$34.00 |
| .062  | .010 Rad | .093 | .500 | 2-1/2 | 1/8   | 51680                    | \$27.00 | 51681                     | \$30.00 | 51682                     | \$32.00 | 51683                     | \$34.00 |
| .062  | .015 Rad | .093 | .500 | 2-1/2 | 1/8   | 51684                    | \$27.00 | 51685                     | \$30.00 | 51686                     | \$32.00 | 51687                     | \$34.00 |
| .062  | Ball     | .093 | .500 | 2-1/2 | 1/8   | 51688                    | \$27.00 | 51689                     | \$30.00 | 51690                     | \$32.00 | 51691                     | \$34.00 |
| .078  | Square   | .117 | .625 | 2-1/2 | 1/8   | 51692                    | \$27.00 | 51693                     | \$30.00 | 51694                     | \$32.00 | 51695                     | \$34.00 |
| .078  | .005 Rad | .117 | .625 | 2-1/2 | 1/8   | 51696                    | \$27.00 | 51697                     | \$30.00 | 51698                     | \$32.00 | 51699                     | \$34.00 |
| .078  | .010 Rad | .117 | .625 | 2-1/2 | 1/8   | 51700                    | \$27.00 | 51701                     | \$30.00 | 51702                     | \$32.00 | 51703                     | \$34.00 |
| .078  | .015 Rad | .117 | .625 | 2-1/2 | 1/8   | 51704                    | \$27.00 | 51705                     | \$30.00 | 51706                     | \$32.00 | 51707                     | \$34.00 |
| .078  | Ball     | .117 | .625 | 2-1/2 | 1/8   | 51708                    | \$27.00 | 51709                     | \$30.00 | 51710                     | \$32.00 | 51711                     | \$34.00 |
| .093  | Square   | .139 | .750 | 2-1/2 | 1/8   | 51712                    | \$27.00 | 51713                     | \$30.00 | 51714                     | \$32.00 | 51715                     | \$34.00 |
| .093  | .005 Rad | .139 | .750 | 2-1/2 | 1/8   | 51716                    | \$27.00 | 51717                     | \$30.00 | 51718                     | \$32.00 | 51719                     | \$34.00 |
| .093  | .010 Rad | .139 | .750 | 2-1/2 | 1/8   | 51720                    | \$27.00 | 51721                     | \$30.00 | 51722                     | \$32.00 | 51723                     | \$34.00 |
| .093  | .015 Rad | .139 | .750 | 2-1/2 | 1/8   | 51724                    | \$27.00 | 51725                     | \$30.00 | 51726                     | \$32.00 | 51727                     | \$34.00 |
| .093  | Ball     | .139 | .750 | 2-1/2 | 1/8   | 51728                    | \$27.00 | 51729                     | \$30.00 | 51730                     | \$32.00 | 51731                     | \$34.00 |
| .1245 | Square   | .187 | .950 | 2-1/2 | 1/8   | 51732                    | \$27.00 | 51733                     | \$30.00 | 51734                     | \$32.00 | 51735                     | \$34.00 |
| .1245 | .005 Rad | .187 | .950 | 2-1/2 | 1/8   | 51736                    | \$27.00 | 51737                     | \$30.00 | 51738                     | \$32.00 | 51739                     | \$34.00 |
| .1245 | .010 Rad | .187 | .950 | 2-1/2 | 1/8   | 51740                    | \$27.00 | 51741                     | \$30.00 | 51742                     | \$32.00 | 51743                     | \$34.00 |
| .1245 | .015 Rad | .187 | .950 | 2-1/2 | 1/8   | 51744                    | \$27.00 | 51745                     | \$30.00 | 51746                     | \$32.00 | 51747                     | \$34.00 |
| .1245 | Ball     | .187 | .950 | 2-1/2 | 1/8   | 51748                    | \$27.00 | 51749                     | \$30.00 | 51750                     | \$32.00 | 51751                     | \$34.00 |

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



### Material Warning



SmoothCoat®

Superlattice PVD Hard Coatings Exclusively by Tool Alliance®



## new! LR12X Series: Long Reach 3 flute micro end mills

Short flute length for rigidity in deep cavity milling with 12X diameter reach  
featuring proprietary SmoothCoat micro coatings and 2.5" OAL.



LR12X3RUC (pictured)

Also available as LR12X3SUC and LR12X3BUC  
plus 3 coating options.

- Designed for cavity milling of a wide range of materials • Tight tolerance  $\pm .0003$
- Proprietary cemented carbide grade with 3 different SmoothCoat micro coatings
- Features three flutes @ 30° helix & reduced neck for clearance
- LOC = 1.5X cutting diameter • Total length below shank (LBS) = 12X.
- Use UnCoated for general purpose needs
- Use AT (AlTiN) coated for high-temp exotics & alloys, die & hardened steels, stainless
- Use A1 (TiB2) coated for titanium, aluminum & other non-ferrous materials
- Use D1 diamond coated for graphites & other extremely abrasive non-ferrous alloys



| Diam  | End      | LOC  | LBS   | OAL   | Shank | 3 flute UnCoated LR12X3UC |         | 3 flute AT Coated LR12X3AT |         | 3 flute A1 Coated LR12X3A1 |         | 3 flute D1 Coated LR12X3D1 |         |
|-------|----------|------|-------|-------|-------|---------------------------|---------|----------------------------|---------|----------------------------|---------|----------------------------|---------|
|       |          |      |       |       |       | EDP#                      | Price   | EDP#                       | Price   | EDP#                       | Price   | EDP#                       | Price   |
| .031  | Square   | .046 | .375  | 2-1/2 | 1/8   | 52640                     | \$28.00 | 52641                      | \$31.00 | 52642                      | \$33.00 | 52643                      | \$35.00 |
| .031  | .005 Rad | .046 | .375  | 2-1/2 | 1/8   | 52644                     | \$28.00 | 52645                      | \$31.00 | 52646                      | \$33.00 | 52647                      | \$35.00 |
| .031  | .010 Rad | .046 | .375  | 2-1/2 | 1/8   | 52648                     | \$28.00 | 52649                      | \$31.00 | 52650                      | \$33.00 | 52651                      | \$35.00 |
| .031  | Ball     | .046 | .375  | 2-1/2 | 1/8   | 52652                     | \$28.00 | 52653                      | \$31.00 | 52654                      | \$33.00 | 52655                      | \$35.00 |
| .047  | Square   | .070 | .570  | 2-1/2 | 1/8   | 52656                     | \$28.00 | 52657                      | \$31.00 | 52658                      | \$33.00 | 52659                      | \$35.00 |
| .047  | .005 Rad | .070 | .570  | 2-1/2 | 1/8   | 52660                     | \$28.00 | 52661                      | \$31.00 | 52662                      | \$33.00 | 52663                      | \$35.00 |
| .047  | .010 Rad | .070 | .570  | 2-1/2 | 1/8   | 52664                     | \$28.00 | 52665                      | \$31.00 | 52666                      | \$33.00 | 52667                      | \$35.00 |
| .047  | Ball     | .070 | .570  | 2-1/2 | 1/8   | 52668                     | \$28.00 | 52669                      | \$31.00 | 52670                      | \$33.00 | 52671                      | \$35.00 |
| .062  | Square   | .093 | .750  | 2-1/2 | 1/8   | 52672                     | \$28.00 | 52673                      | \$31.00 | 52674                      | \$33.00 | 52675                      | \$35.00 |
| .062  | .005 Rad | .093 | .750  | 2-1/2 | 1/8   | 52676                     | \$28.00 | 52677                      | \$31.00 | 52678                      | \$33.00 | 52679                      | \$35.00 |
| .062  | .010 Rad | .093 | .750  | 2-1/2 | 1/8   | 52680                     | \$28.00 | 52681                      | \$31.00 | 52682                      | \$33.00 | 52683                      | \$35.00 |
| .062  | .015 Rad | .093 | .750  | 2-1/2 | 1/8   | 52684                     | \$28.00 | 52685                      | \$31.00 | 52686                      | \$33.00 | 52687                      | \$35.00 |
| .062  | Ball     | .093 | .750  | 2-1/2 | 1/8   | 52688                     | \$28.00 | 52689                      | \$31.00 | 52690                      | \$33.00 | 52691                      | \$35.00 |
| .078  | Square   | .117 | .940  | 2-1/2 | 1/8   | 52692                     | \$28.00 | 52693                      | \$31.00 | 52694                      | \$33.00 | 52695                      | \$35.00 |
| .078  | .005 Rad | .117 | .940  | 2-1/2 | 1/8   | 52696                     | \$28.00 | 52697                      | \$31.00 | 52698                      | \$33.00 | 52699                      | \$35.00 |
| .078  | .010 Rad | .117 | .940  | 2-1/2 | 1/8   | 52700                     | \$28.00 | 52701                      | \$31.00 | 52702                      | \$33.00 | 52703                      | \$35.00 |
| .078  | .015 Rad | .117 | .940  | 2-1/2 | 1/8   | 52704                     | \$28.00 | 52705                      | \$31.00 | 52706                      | \$33.00 | 52707                      | \$35.00 |
| .078  | Ball     | .117 | .940  | 2-1/2 | 1/8   | 52708                     | \$28.00 | 52709                      | \$31.00 | 52710                      | \$33.00 | 52711                      | \$35.00 |
| .093  | Square   | .139 | 1.125 | 2-1/2 | 1/8   | 52712                     | \$28.00 | 52713                      | \$31.00 | 52714                      | \$33.00 | 52715                      | \$35.00 |
| .093  | .005 Rad | .139 | 1.125 | 2-1/2 | 1/8   | 52716                     | \$28.00 | 52717                      | \$31.00 | 52718                      | \$33.00 | 52719                      | \$35.00 |
| .093  | .010 Rad | .139 | 1.125 | 2-1/2 | 1/8   | 52720                     | \$28.00 | 52721                      | \$31.00 | 52722                      | \$33.00 | 52723                      | \$35.00 |
| .093  | .015 Rad | .139 | 1.125 | 2-1/2 | 1/8   | 52724                     | \$28.00 | 52725                      | \$31.00 | 52726                      | \$33.00 | 52727                      | \$35.00 |
| .093  | Ball     | .139 | 1.125 | 2-1/2 | 1/8   | 52728                     | \$28.00 | 52729                      | \$31.00 | 52730                      | \$33.00 | 52731                      | \$35.00 |
| .1245 | Square   | .187 | 1.500 | 2-1/2 | 1/8   | 52732                     | \$28.00 | 52733                      | \$31.00 | 52734                      | \$33.00 | 52735                      | \$35.00 |
| .1245 | .005 Rad | .187 | 1.500 | 2-1/2 | 1/8   | 52736                     | \$28.00 | 52737                      | \$31.00 | 52738                      | \$33.00 | 52739                      | \$35.00 |
| .1245 | .010 Rad | .187 | 1.500 | 2-1/2 | 1/8   | 52740                     | \$28.00 | 52741                      | \$31.00 | 52742                      | \$33.00 | 52743                      | \$35.00 |
| .1245 | .015 Rad | .187 | 1.500 | 2-1/2 | 1/8   | 52744                     | \$28.00 | 52745                      | \$31.00 | 52746                      | \$33.00 | 52747                      | \$35.00 |
| .1245 | Ball     | .187 | 1.500 | 2-1/2 | 1/8   | 52748                     | \$28.00 | 52749                      | \$31.00 | 52750                      | \$33.00 | 52751                      | \$35.00 |

## About the technology partners of RoundTool Laboratories®

Our technology partners are second to none. We find premiere 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 factories promise long-term stability & consistency in delivering Performance & Solutions to carbide rotary tooling consumers everywhere.



Coating systems



5-axis VMC control



Robotics



Substrate, abrasive, coolants &amp; workholding



Grinding centers



CNC grinder controls &amp; software



## DM Series: AT coated heavy core Ball Nose

High strength, high hardness solid carbide ball end mills for  
HSM roughing & finishing of hardened alloys up to 65HRc.



- Designed for milling complex contours and shapes in hard metals
- Proprietary cemented carbide grade, AlTiN coating & edge prep
- Maximum tool life and performance in HSM applications
- Extremely close diameter & radius tolerances
- Order by EDP# or "DM2BAT 1/4L"

DM2BAT



DM4BAT



2 flute Ball AT  
DM2BAT

4 flute Ball AT  
DM4BAT

|  | SE | Diam | LOC  | LBS | Taper | OAL | Shank | EDP#  | Price    | EDP#  | Price    |
|--|----|------|------|-----|-------|-----|-------|-------|----------|-------|----------|
|  |    | .032 | .032 |     | 5°    | 3"  | 1/4   | 24085 | \$33.00  | 24485 | \$33.00  |
|  |    | .040 | .040 |     | 5°    | 3"  | 1/4   | 24086 | \$33.00  | 24486 | \$33.00  |
|  |    | 1/16 | 1/16 |     | 5°    | 3"  | 1/4   | 24088 | \$33.00  | 24488 | \$33.00  |
|  |    | .080 | .080 |     | 5°    | 3"  | 1/4   | 24090 | \$33.00  | 24490 | \$33.00  |
|  |    | 3/32 | 3/32 |     | 5°    | 3"  | 1/4   | 24092 | \$33.00  | 24492 | \$33.00  |
|  |    | 1/8  | 1/8  |     | 5°    | 3"  | 1/4   | 24094 | \$33.00  | 24494 | \$33.00  |
|  |    | 3/16 | 3/16 |     | 5°    | 3"  | 1/4   | 24097 | \$33.00  | 24497 | \$33.00  |
|  |    | 1/4  | 1/4  | 1/2 |       | 3"  | 1/4   | 24100 | \$33.00  | 24400 | \$33.00  |
|  |    | 1/4L | 1/4  |     | 5°    | 4"  | 3/8   | 24101 | \$68.00  | 24401 | \$68.00  |
|  |    | 5/16 | 5/16 |     | 5°    | 4"  | 3/8   | 24103 | \$68.00  | 24403 | \$68.00  |
|  |    | 3/8  | 3/8  | 3/4 |       | 4"  | 3/8   | 24104 | \$68.00  | 24404 | \$68.00  |
|  |    | 3/8L | 3/8  |     | 5°    | 5"  | 1/2   | 24109 | \$118.00 | 24409 | \$118.00 |
|  |    | 1/2  | 1/2  | 1"  |       | 4"  | 1/2   | 24107 | \$100.00 | 24407 | \$100.00 |
|  |    | 1/2L | 1/2  |     | 5°    | 5"  | 5/8   | 24110 | \$150.00 | 24410 | \$150.00 |



Specs (DM Series  
fractional end mills):  
Cutting Diam  $+0.0000 / -0.0008$   
Shank Diam  $+0.0000 / -0.0025$   
Radius  $\pm .0004$   
SFR = Shrink Fit Ready

### Metric sizes

DM2BAT



DM4BAT



2 flute Ball AT  
DM2BAT

4 flute Ball AT  
DM4BAT

|  | SE | Diam  | LOC | LBS | Taper | OAL | Shank | EDP#  | Price    | EDP#  | Price    |
|--|----|-------|-----|-----|-------|-----|-------|-------|----------|-------|----------|
|  |    | 0.5mm | 0.5 |     | 5°    | 75  | 6.0   | 24115 | \$33.00  | 24415 | \$33.00  |
|  |    | 1.0   | 1   |     | 5°    | 75  | 6.0   | 24116 | \$33.00  | 24416 | \$33.00  |
|  |    | 1.5   | 1.5 |     | 5°    | 75  | 6.0   | 24118 | \$33.00  | 24418 | \$33.00  |
|  |    | 2.0   | 2   |     | 5°    | 75  | 6.0   | 24120 | \$33.00  | 24420 | \$33.00  |
|  |    | 3.0   | 3   |     | 5°    | 75  | 6.0   | 24122 | \$33.00  | 24422 | \$33.00  |
|  |    | 4.0   | 4   |     | 5°    | 75  | 6.0   | 24124 | \$33.00  | 24424 | \$33.00  |
|  |    | 5.0   | 5   |     | 5°    | 75  | 6.0   | 24126 | \$33.00  | 24426 | \$33.00  |
|  |    | 6.0   | 6   | 12  |       | 75  | 6.0   | 24136 | \$33.00  | 24436 | \$33.00  |
|  |    | 6.0   | 6   |     | 5°    | 100 | 8.0   | 24128 | \$58.00  | 24428 | \$58.00  |
|  |    | 8.0   | 8   |     | 5°    | 100 | 10.0  | 24130 | \$76.00  | 24430 | \$76.00  |
|  |    | 10.0  | 10  | 20  |       | 100 | 10.0  | 24132 | \$76.00  | 24432 | \$76.00  |
|  |    | 12.0  | 12  | 24  |       | 100 | 12.0  | 24134 | \$100.00 | 24434 | \$100.00 |



Specs (DM Series Metric  
size end mills):  
Cutting Diam  $+0.000 / -0.021\text{mm}$   
Shank Diam  $+0.000 / -0.0064\text{mm}$   
Radius  $\pm 0.010\text{mm}$   
SFR = Shrink Fit Ready



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



## DM Series: AT coated heavy core w/ Radius

High strength, high hardness solid carbide radius end mills for  
HSM roughing & finishing of hardened alloys up to 65HRc.



- Designed for milling complex contours and shapes in hard metals
- Proprietary cemented carbide grade, AlTiN coating & edge prep
- Maximum tool life and performance in HSM applications
- Extremely close diameter & radius tolerances
- Order by EDP# or "DM4RAT 1/4L .031"

DM2RAT



DM4RAT



| ⌀ | Diam | LOC  | LBS | Taper | OAL | Shank |
|---|------|------|-----|-------|-----|-------|
|   | 1/8  | 1/8  |     | 5°    | 3"  | 1/4   |
|   | 3/16 | 3/16 |     | 5°    | 3"  | 1/4   |
|   | 1/4  | 1/4  | 1/2 |       | 3"  | 1/4   |
|   | 1/4L | 1/4  |     | 5°    | 4"  | 3/8   |
|   | 3/8  | 3/8  | 3/4 |       | 4"  | 3/8   |
|   | 3/8L | 3/8  |     | 5°    | 5"  | 1/2   |
|   | 1/2  | 1/2  | 1"  |       | 4"  | 1/2   |
|   | 1/2L | 1/2  |     | 5°    | 5"  | 5/8   |



Specs (DM Series  
fractional end mills):  
Cutting Diam  $\pm .0000$  /  $-.0008$   
Shank Diam  $\pm .0000$  /  $-.00025$   
Radius  $\pm .0004$   
SFR = Shrink Fit Ready

| Radius<br>Size<br>Rad | 2 flute<br>DM2RAT<br>EDP# | 4 flute<br>DM4RAT<br>EDP# | Radius<br>Size<br>Rad | 2 flute<br>DM2RAT<br>EDP# | 4 flute<br>DM4RAT<br>EDP# | Radius<br>AT Coated<br>Price |
|-----------------------|---------------------------|---------------------------|-----------------------|---------------------------|---------------------------|------------------------------|
| .015                  | 24500                     | 24502                     | .020                  | 24501                     | 24503                     | \$33.00                      |
| .015                  | 24504                     | 24506                     | .020                  | 24505                     | 24507                     | \$33.00                      |
| .020                  | 24508                     | 24510                     | .031                  | 24509                     | 24511                     | \$33.00                      |
| .020                  | 24512                     | 24514                     | .031                  | 24513                     | 24515                     | \$68.00                      |
| .031                  | 24516                     | 24518                     | .062                  | 24517                     | 24519                     | \$68.00                      |
| .031                  | 24520                     | 24522                     | .062                  | 24521                     | 24523                     | \$118.00                     |
| .031                  | 24524                     | 24526                     | .062                  | 24525                     | 24527                     | \$100.00                     |
| .031                  | 24528                     | 24530                     | .062                  | 24529                     | 24531                     | \$150.00                     |

### Metric sizes

DM2RAT



DM4RAT



| ⌀ | Diam  | LOC | LBS | Taper | OAL | Shank |
|---|-------|-----|-----|-------|-----|-------|
|   | 3.0mm | 3   |     | 5°    | 75  | 6.0   |
|   | 4.0   | 4   |     | 5°    | 75  | 6.0   |
|   | 5.0   | 5   |     | 5°    | 75  | 6.0   |
|   | 6.0   | 6   | 12  |       | 75  | 6.0   |
|   | 6.0   | 6   |     | 5°    | 100 | 8.0   |
|   | 8.0   | 8   |     | 5°    | 100 | 10.0  |
|   | 10.0  | 10  | 20  |       | 100 | 10.0  |
|   | 12.0  | 12  | 24  |       | 100 | 12.0  |



Specs (DM Series Metric  
size end mills):  
Cutting Diam  $\pm 0.000$  /  $-0.021$ mm  
Shank Diam  $\pm 0.000$  /  $-0.0064$ mm  
Radius  $\pm 0.010$ mm  
SFR = Shrink Fit Ready

| Radius<br>Size<br>Rad | 2 flute<br>DM2RAT<br>EDP# | 4 flute<br>DM4RAT<br>EDP# | Radius<br>Size<br>Rad | 2 flute<br>DM2RAT<br>EDP# | 4 flute<br>DM4RAT<br>EDP# | Radius<br>AT Coated<br>Price |
|-----------------------|---------------------------|---------------------------|-----------------------|---------------------------|---------------------------|------------------------------|
| 0.3                   | 24532                     | 24534                     | 0.5                   | 24533                     | 24535                     | \$33.00                      |
| 0.3                   | 24536                     | 24538                     | 0.5                   | 24537                     | 24539                     | \$33.00                      |
| 0.3                   | 24540                     | 24542                     | 0.5                   | 24541                     | 24543                     | \$33.00                      |
| 0.5                   | 24544                     | 24546                     | 0.8                   | 24545                     | 24547                     | \$33.00                      |
| 0.5                   | 24548                     | 24550                     | 0.8                   | 24549                     | 24551                     | \$58.00                      |
| 0.5                   | 24552                     | 24554                     | 0.8                   | 24553                     | 24555                     | \$76.00                      |
| 1.0                   | 24556                     | 24558                     | 1.5                   | 24557                     | 24559                     | \$76.00                      |
| 1.0                   | 24560                     | 24562                     | 1.5                   | 24561                     | 24563                     | \$100.00                     |

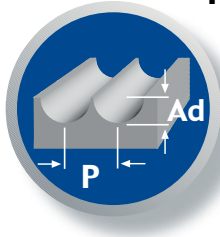
35% tighter shank  
tolerance than h6!  
Shrink-Fit Ready!



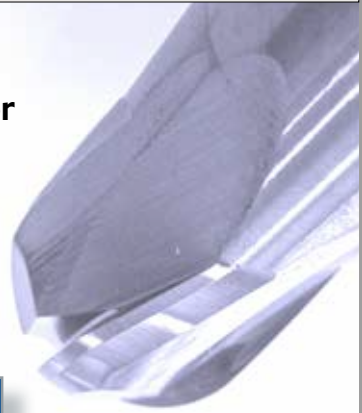


## DM Series: Technical Data

High strength, high hardness solid carbide ball end mills for high-speed machining of hardened alloys up to 65HRc.



- Designed for milling complex contours and shapes
- Proprietary cemented carbide grade and coating
- Maximum tool life and performance in HSM applications
- Pitch (P) and Axial depth (Ad) are expressed in % of cutter diameter
- If recommended speed is higher than machine tool's capacity, run at maximum RPM and reduce feed appropriately



| Material Hardness   | 30 - 40 HRc |          | 40 - 45 HRc |          | 45 - 55 HRc |          | 55 - 60 HRc |          | 60 - 65 HRc |          |
|---------------------|-------------|----------|-------------|----------|-------------|----------|-------------|----------|-------------|----------|
| Depth of Cut        | Ad = .1xD   | P = .2xD | Ad = .05xD  | P = .2xD | Ad = .03xD  | P = .1xD | Ad = .02xD  | P = .1xD | Ad = .01xD  | P = .1xD |
|                     | Speed       | Feed     | Speed       | Feed     | Speed       | Feed     | Speed       | Feed     | Speed       | Feed     |
| Fractional Diameter | RPM         | in/min   | RPM         | in/min   | RPM         | in/min   | RPM         | in/min   | RPM         | in/min   |
| .032                | 38,800      | 39       | 38,800      | 39       | 38,800      | 39       | 38,800      | 34       | 37,600      | 21       |
| .040                | 31,040      | 59       | 31,040      | 59       | 31,040      | 59       | 28,000      | 55       | 15,550      | 21       |
| 1/16"               | 31,040      | 74       | 31,040      | 74       | 31,040      | 74       | 28,000      | 70       | 15,550      | 23       |
| .080                | 31,040      | 74       | 31,040      | 74       | 31,040      | 74       | 28,000      | 70       | 15,550      | 23       |
| 3/32"               | 31,040      | 74       | 31,040      | 74       | 31,040      | 74       | 28,000      | 70       | 15,550      | 23       |
| 1/8"                | 23,925      | 86       | 23,925      | 80       | 20,925      | 80       | 18,925      | 70       | 10,425      | 23       |
| 3/16"               | 14,550      | 97       | 14,550      | 91       | 12,550      | 83       | 11,050      | 75       | 6,400       | 23       |
| 1/4"                | 12,025      | 97       | 12,025      | 85       | 10,625      | 83       | 9,625       | 75       | 8,425       | 25       |
| 5/16"               | 9,300       | 72       | 9,300       | 72       | 8,100       | 62       | 7,300       | 56       | 4,100       | 19       |
| 3/8"                | 7,285       | 54       | 7,285       | 54       | 6,300       | 46       | 5,650       | 40       | 3,400       | 15       |
| 7/16"               | 6,425       | 49       | 6,425       | 49       | 5,600       | 43       | 5,100       | 39       | 3,000       | 14       |
| 1/2"                | 6,125       | 48       | 6,125       | 48       | 5,325       | 42       | 4,775       | 38       | 2,675       | 13       |

Specs (DM Series fractional end mills):  
 Cutting Diam +0.000 / -.0008  
 Shank Diam +0.000 / -.00025  
 Radius ± .0004  
 SFR = Shrink Fit Ready

| Material Hardness    | 30 - 40 HRc |          | 40 - 45 HRc |          | 45 - 55 HRc |          | 55 - 60 HRc |          | 60 - 65 HRc |          |
|----------------------|-------------|----------|-------------|----------|-------------|----------|-------------|----------|-------------|----------|
| Depth of Cut         | Ad = .1xD   | P = .2xD | Ad = .05xD  | P = .2xD | Ad = .03xD  | P = .1xD | Ad = .02xD  | P = .1xD | Ad = .01xD  | P = .1xD |
|                      | Speed       | Feed     | Speed       | Feed     | Speed       | Feed     | Speed       | Feed     | Speed       | Feed     |
| Metric Mill Diameter | RPM         | mm/min   | RPM         | mm/min   | RPM         | mm/min   | RPM         | mm/min   | RPM         | mm/min   |
| 0.50 mm              | 38,800      | 991      | 38,800      | 991      | 38,800      | 991      | 38,800      | 864      | 37,600      | 533      |
| 1.0 mm               | 31,040      | 1,499    | 31,040      | 1,499    | 31,040      | 1,499    | 28,000      | 1,397    | 15,550      | 533      |
| 1.5 mm               | 31,040      | 1,880    | 31,040      | 1,880    | 31,040      | 1,880    | 28,000      | 1,778    | 15,550      | 584      |
| 2.0 mm               | 31,040      | 1,880    | 31,040      | 1,880    | 31,040      | 1,880    | 28,000      | 1,778    | 15,550      | 584      |
| 3.0 mm               | 31,040      | 1,880    | 31,040      | 1,880    | 31,040      | 1,880    | 28,000      | 1,778    | 15,550      | 584      |
| 4.0 mm               | 23,925      | 2,184    | 23,925      | 2,032    | 20,925      | 2,032    | 18,925      | 1,778    | 10,425      | 584      |
| 5.0 mm               | 14,550      | 2,464    | 14,550      | 2,311    | 12,550      | 2,108    | 11,050      | 1,905    | 6,400       | 584      |
| 6.0 mm               | 12,025      | 2,464    | 12,025      | 2,159    | 10,625      | 2,108    | 9,625       | 1,905    | 8,425       | 635      |
| 8.0 mm               | 9,300       | 1,829    | 9,300       | 1,829    | 8,100       | 1,575    | 7,300       | 1,422    | 4,100       | 483      |
| 10.0 mm              | 7,285       | 1,372    | 7,285       | 1,372    | 6,300       | 1,168    | 5,650       | 1,016    | 3,400       | 381      |
| 12.0 mm              | 6,425       | 1,245    | 6,425       | 1,245    | 5,600       | 1,092    | 5,100       | 991      | 3,000       | 356      |

Specs (DM Series Metric size end mills):  
 Cutting Diam +0.000 / -.0021mm  
 Shank Diam +0.000 / -.0064mm  
 Radius ± 0.010mm  
 SFR = Shrink Fit Ready

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



**new! GRD Series: Downshear 4 flute fractional end mills**

High strength, high hardness solid carbide square end mills featuring left-hand helix / right-hand cut "downshear" cutting geometry.



GRD4SUC

**35% tighter shank tolerance than h6!**

Shrink-Fit Ready!

Specs (fractional end mills cut diameter  $\geq 1/8$ ):  
Cutting Diam  $+0.0000 / -0.0015$   
Shank Diam  $+0.0000 / -0.0025$   
Radius  $\pm .00075$



- Designed for "push down" work-piece applications (LHS/RHC)
- Proprietary cemented carbide grade, SmoothEdge & SmoothCoat where applicable
- Use UnCoated for general purpose needs, corner rad alterations, etc.
- Use AT coated for stainless, carbon, & tool steels, and high temp alloys (includes SE4)
- Use D1 diamond coated for CFC's, graphite, plastics, and aluminum-silicon alloys
- Use D2 diamond coated for long-run jobs in CFC's, graphite, & aluminum-silicon alloys

| Diam | LOC   | OAL   | Shank | UnCoated GRD4SUC    |          | AT Coated w/ SE4 GRD4SAT |          | D1 Coated GRD4SD1   |          | D2 Coated GRD4SD2   |          |
|------|-------|-------|-------|---------------------|----------|--------------------------|----------|---------------------|----------|---------------------|----------|
|      |       |       |       | 4 flute Square EDP# | Price    | 4 flute Square EDP#      | Price    | 4 flute Square EDP# | Price    | 4 flute Square EDP# | Price    |
| 1/16 | 5/16  | 1-1/2 | 1/8   | 24600               | \$19.00  | 24601                    | \$21.00  | 24602               | \$24.00  | 24603               | \$47.00  |
| 1/8  | 5/8   | 1-1/2 | 1/8   | 24604               | \$17.00  | 24605                    | \$19.00  | 24606               | \$22.00  | 24607               | \$45.00  |
| 3/16 | 3/4   | 2"    | 3/16  | 24608               | \$24.00  | 24609                    | \$27.00  | 24610               | \$30.00  | 24611               | \$69.50  |
| 1/4  | 1"    | 2-1/2 | 1/4   | 24612               | \$29.00  | 24613                    | \$34.00  | 24614               | \$38.00  | 24615               | \$91.50  |
| 5/16 | 1"    | 2-1/2 | 5/16  | 24616               | \$36.00  | 24617                    | \$43.00  | 24618               | \$46.00  | 24619               | \$119.00 |
| 3/8  | 1"    | 2-1/2 | 3/8   | 24620               | \$46.00  | 24621                    | \$54.00  | 24622               | \$57.00  | 24623               | \$152.50 |
| 7/16 | 1"    | 3"    | 7/16  | 24624               | \$66.00  | 24625                    | \$76.00  | 24626               | \$80.00  | 24627               | \$184.50 |
| 1/2  | 1-1/4 | 3"    | 1/2   | 24628               | \$70.00  | 24629                    | \$80.00  | 24630               | \$85.00  | 24631               | \$202.00 |
| 5/8  | 1-3/8 | 3-1/2 | 5/8   | 24632               | \$120.00 | 24633                    | \$135.00 | 24634               | \$142.00 | 24635               | \$281.50 |
| 3/4  | 1-3/8 | 4"    | 3/4   | 24636               | \$152.00 | 24637                    | \$170.00 | 24638               | \$178.00 | 24639               | \$370.00 |
| 1"   | 1-3/8 | 4"    | 1"    | 24640               | \$250.00 | 24641                    | \$275.00 | 24642               | \$287.50 | 24643               | \$750.00 |

**new! SU & SD Series: Slow Helix 4 flute fractional end mills**

For materials that easily tear or shred during routing / milling featuring both UpCut (upshear) and DownCut (downshear) geometry.

SU4SUC



SD4SUC



- SD4S has slower helix and sharper edge than the GRD4S Series
- Use Base EDP and add UC, AT, D1 or D2 suffix for coating selection

| Diam | LOC   | OAL   | Shank | UpCut |       | UnCoated Price | AT Price | D1 Price | D2 Price |
|------|-------|-------|-------|-------|-------|----------------|----------|----------|----------|
|      |       |       |       | EDP#  | EDP#  |                |          |          |          |
| 1/16 | 5/16  | 1-1/2 | 1/8   | 24645 | 24665 | \$15.00        | \$16.50  | \$19.50  | \$44.00  |
| 1/8  | 5/8   | 1-1/2 | 1/8   | 24646 | 24666 | \$14.00        | \$15.50  | \$18.50  | \$42.00  |
| 3/16 | 3/4   | 2"    | 3/16  | 24647 | 24667 | \$21.00        | \$23.00  | \$26.00  | \$66.50  |
| 1/4  | 1"    | 2-1/2 | 1/4   | 24648 | 24668 | \$25.00        | \$28.00  | \$32.00  | \$87.50  |
| 5/16 | 1"    | 2-1/2 | 5/16  | 24649 | 24669 | \$32.00        | \$36.00  | \$40.00  | \$115.00 |
| 3/8  | 1"    | 2-1/2 | 3/8   | 24650 | 24670 | \$41.00        | \$45.00  | \$50.00  | \$147.50 |
| 7/16 | 1"    | 3"    | 7/16  | 24651 | 24671 | \$60.00        | \$66.00  | \$72.00  | \$178.50 |
| 1/2  | 1-1/4 | 3"    | 1/2   | 24652 | 24672 | \$65.00        | \$71.00  | \$77.00  | \$197.00 |
| 5/8  | 1-3/8 | 3-1/2 | 5/8   | 24653 | 24673 | \$108.00       | \$120.00 | \$130.00 | \$269.50 |
| 3/4  | 1-3/8 | 4"    | 3/4   | 24654 | 24674 | \$137.00       | \$150.00 | \$162.00 | \$355.00 |
| 1"   | 1-3/8 | 4"    | 1"    | 24655 | 24675 | \$210.00       | \$230.00 | \$244.00 | \$710.00 |

**new! OU & OD Series: Single flute helical routers**

High polish & sharp edge for plastics and related materials in both UpCut and DownCut.

- RHS/RHC high-shear UpCut
- OU1SUC or OU1SD1



| Diam | LOC   | OAL   | Shank | Square EDP# | UnCoated Price |         | D1 Price |
|------|-------|-------|-------|-------------|----------------|---------|----------|
|      |       |       |       |             | Price          | Price   |          |
| 1/8  | 5/8   | 2"    | 1/8   | 24685       | \$16.40        | \$20.70 |          |
| 3/16 | 3/4   | 2"    | 3/16  | 24686       | \$17.70        | \$22.70 |          |
| 1/4  | 3/4   | 2-1/2 | 1/4   | 24687       | \$19.60        | \$26.00 |          |
| 1/4L | 1-1/4 | 3"    | 1/4   | 24688       | \$25.20        | \$31.90 |          |
| 3/8  | 1-1/8 | 3"    | 3/8   | 24689       | \$38.70        | \$48.00 |          |
| 1/2  | 1-1/2 | 4"    | 1/2   | 24690       | \$67.50        | \$82.20 |          |

- LHS/RHC high-shear DownCut
- OD1SUC or OU1SD1



| Diam | LOC   | OAL   | Shank | Square EDP# | UnCoated Price |         | D1 Price |
|------|-------|-------|-------|-------------|----------------|---------|----------|
|      |       |       |       |             | Price          | Price   |          |
| 1/8  | 5/8   | 2"    | 1/8   | 24695       | \$16.40        | \$20.70 |          |
| 3/16 | 3/4   | 2"    | 3/16  | 24696       | \$17.70        | \$22.70 |          |
| 1/4  | 3/4   | 2-1/2 | 1/4   | 24697       | \$19.60        | \$26.00 |          |
| 1/4L | 1-1/4 | 3"    | 1/4   | 24698       | \$25.20        | \$31.90 |          |
| 3/8  | 1-1/8 | 3"    | 3/8   | 24699       | \$38.70        | \$48.00 |          |
| 1/2  | 1-1/2 | 4"    | 1/2   | 24700       | \$67.50        | \$82.20 |          |

**new! CUD Series: Compression Up/Down routers****Tight tolerance square end router for wide material range featuring 2+2 or 4+4 design.**

- Designed for compression routing of a wide range of materials
- Proprietary cemented carbide grade with sharp & polished SmoothGrind cutting edges plus available SmoothCoat
- Use UnCoated for general purpose routing needs • Use A1 (TiB2) coated for titanium, aluminum & other non-ferrous materials
- Use thin, smooth, & hard D1 PVD diamond coating for plastics, woods, composites, CFRP's, honeycombs & other abrasive materials
- Use hard & thick D2 CVD diamond coating for long-run jobs in composites, CFRP's, honeycombs & other abrasive materials

CUD2SUC



CUD4SUC



| Diam | Style | LOC   | Upshear | OAL   | Shank | CUD UnCoated |          | CUD A1 Coated |          | CUD D1 Coated |          | CUD D2 Coated |          |
|------|-------|-------|---------|-------|-------|--------------|----------|---------------|----------|---------------|----------|---------------|----------|
|      |       |       |         |       |       | Square EDP#  | Price    | Square EDP#   | Price    | Square EDP#   | Price    | Square EDP#   | Price    |
| 1/4  | 2+2   | 3/4   | .285    | 2-1/2 | 1/4   | 30416        | \$35.00  | 58281         | \$39.10  | 58365         | \$43.50  | 58366         | \$97.50  |
| 1/4  | 2+2   | 1"    | .285    | 2-1/2 | 1/4   | 58361        | \$38.00  | 58282         | \$42.10  | 58367         | \$46.50  | 58368         | \$100.50 |
| 1/4  | 4+4   | .905  | .250    | 2-1/2 | 1/4   | 40418        | \$39.00  | 58283         | \$43.10  | 58369         | \$47.50  | 58370         | \$101.50 |
| 1/4L | 4+4   | 1-1/4 | .250    | 2-1/2 | 1/4   | 40417        | \$42.00  | 58284         | \$46.10  | 58371         | \$50.50  | 58372         | \$104.50 |
| 3/8  | 2+2   | 1"    | .435    | 3"    | 3/8   | 58210        | \$52.00  | 58285         | \$58.00  | 58373         | \$61.50  | 58374         | \$157.50 |
| 3/8  | 2+2   | 1-1/8 | .435    | 3"    | 3/8   | 58362        | \$52.00  | 58286         | \$58.00  | 58375         | \$61.50  | 58376         | \$157.50 |
| 1/2  | 2+2   | 1"    | .435    | 3"    | 1/2   | 58363        | \$58.50  | 58287         | \$65.30  | 58377         | \$72.00  | 58378         | \$189.50 |
| 1/2  | 2+2   | 1-1/8 | .435    | 3"    | 1/2   | 58221        | \$59.50  | 58288         | \$66.30  | 58379         | \$73.00  | 58380         | \$190.50 |
| 1/2  | 2+2   | 1-1/8 | .435    | 4"    | 1/2   | 58220        | \$74.00  | 58289         | \$82.80  | 58381         | \$91.00  | 58382         | \$204.00 |
| 1/2  | 2+2   | 1-3/8 | .435    | 3"    | 1/2   | 58190        | \$61.50  | 58290         | \$68.30  | 58383         | \$75.00  | 58384         | \$192.50 |
| 1/2  | 2+2   | 1-3/8 | .435    | 4"    | 1/2   | 58230        | \$77.00  | 58291         | \$85.80  | 58385         | \$94.00  | 58386         | \$207.00 |
| 1/2  | 2+2   | 1-5/8 | .435    | 4"    | 1/2   | 58240        | \$79.00  | 58292         | \$87.80  | 58387         | \$96.00  | 58388         | \$283.00 |
| 5/8  | 2+2   | 1-5/8 | .735    | 4"    | 5/8   | 58250        | \$145.50 | 58293         | \$155.60 | 58389         | \$166.50 | 58390         | \$399.00 |
| 5/8  | 2+2   | 1-7/8 | .735    | 5"    | 5/8   | 58260        | \$162.00 | 58294         | \$177.90 | 58391         | \$194.50 | 58392         | \$415.00 |
| 5/8  | 2+2   | 2-1/4 | .735    | 5"    | 5/8   | 53864        | \$169.50 | 58295         | \$185.40 | 58393         | \$202.00 | 58394         | \$422.50 |
| 3/4  | 2+2   | 1-5/8 | .860    | 4"    | 3/4   | 58270        | \$165.00 | 58296         | \$177.00 | 58395         | \$189.00 | 58396         | \$513.00 |
| 3/4  | 2+2   | 2-1/2 | .985    | 5"    | 3/4   | 58280        | \$206.00 | 58297         | \$224.50 | 58397         | \$244.50 | 58398         | \$554.00 |

**FR Series: Fiberglass Routers****Large routers with various end styles for a wide material range.**

- Designed for routing of a wide range of materials
- Plain, Burr, End Mill, Drill point, and Fish Tail end features
- Proprietary cemented carbide grade with 3 different SmoothCoat coatings
- Use UnCoated for general purpose routing needs
- Use A1 (TiB2) coated for titanium, aluminum & other non-ferrous materials
- Use D1 PVD diamond coated for composites, CFRP's, honeycombs, plastics, woods & other abrasive materials • Use hard & thick D2 CVD diamond coating for long-run jobs in composites, CFRP's, honeycombs & other abrasive materials

D1 PVD Diamond coating is the perfect compliment for routing abrasive materials with our FR 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 (or A1/D2) as a suffix to the EDP #.



FRNOUC

No End Cut



FRNO

Burr Style End



FRBS

End Mill Style



FREM

135° Drill Point



FRDP

Fish Tail Cut



FRFT

**new!**

| Diam                    | LOC | OAL   | Shank | FRNO EDP# | UC  A1  D1  D2 |         |         |          | FRBS EDP# | FREM EDP# | FRDP EDP# | FRFT EDP# | UC  A1  D1  D2 |         |         |          |
|-------------------------|-----|-------|-------|-----------|----------------|---------|---------|----------|-----------|-----------|-----------|-----------|----------------|---------|---------|----------|
|                         |     |       |       |           | Price          | Price   | Price   | Price    |           |           |           |           | Price          | Price   | Price   | Price    |
| 1/8                     | 1/2 | 1-1/2 | 1/8   | 32001     | \$7.00         | \$8.90  | \$11.90 | \$34.90  | 32101     | 32201     | 32301     | 32401     | \$8.20         | \$10.50 | \$13.10 | \$36.10  |
| 3/16                    | 5/8 | 2"    | 3/16  | 32002     | \$10.30        | \$12.90 | \$15.90 | \$55.40  | 32102     | 32202     | 32302     | 32402     | \$12.90        | \$15.90 | \$18.50 | \$58.00  |
| 1/4                     | 3/4 | 2-1/2 | 1/4   | 32003     | \$11.70        | \$15.80 | \$18.80 | \$72.80  | 32103     | 32203     | 32303     | 32403     | \$14.50        | \$19.10 | \$21.60 | \$75.60  |
| 1/4L                    | 1"  | 3"    | 1/4   | 32007     | \$14.70        | \$19.20 | \$22.20 | \$76.20  | 32107     | 32207     | 32307     | 32407     | \$17.80        | \$22.50 | \$25.30 | \$79.30  |
| 5/16                    | 1"  | 2-1/2 | 5/16  | 32004     | \$19.50        | \$24.00 | \$28.00 | \$101.00 | 32104     | 32204     | 32304     | 32404     | \$24.70        | \$29.70 | \$33.20 | \$106.20 |
| 3/8                     | 1"  | 2-1/2 | 3/8   | 32005     | \$22.80        | \$28.30 | \$32.30 | \$128.30 | 32105     | 32205     | 32305     | 32405     | \$28.00        | \$34.30 | \$37.50 | \$133.50 |
| 1/2                     | 1"  | 3"    | 1/2   | 32006     | \$37.70        | \$44.50 | \$49.50 | \$167.00 | 32106     | 32206     | 32306     | 32406     | \$44.20        | \$52.80 | \$56.00 | \$173.50 |
| <b>Metric Diameters</b> |     |       |       |           |                |         |         |          |           |           |           |           |                |         |         |          |
| 6.0mm                   | 19  | 63    | 6.0   | 32008     | \$11.70        | \$15.80 | \$18.80 | \$72.80  | 32108     | 32208     | 32308     | 32408     | \$14.50        | \$19.10 | \$21.60 | \$75.60  |
| 6.0                     | 25  | 76    | 6.0   | 32009     | \$14.70        | \$19.20 | \$22.20 | \$76.20  | 32109     | 32209     | 32309     | 32409     | \$17.80        | \$22.50 | \$25.30 | \$79.30  |
| 8.0                     | 25  | 63    | 8.0   | 32010     | \$19.50        | \$24.00 | \$28.00 | \$101.00 | 32110     | 32210     | 32310     | 32410     | \$24.70        | \$29.70 | \$33.20 | \$106.20 |
| 10.0                    | 25  | 70    | 10.0  | 32011     | \$28.00        | \$36.00 | \$40.40 | \$144.90 | 32111     | 32211     | 32311     | 32411     | \$35.90        | \$44.30 | \$48.30 | \$152.80 |
| 12.0                    | 25  | 75    | 12.0  | 32012     | \$37.70        | \$44.50 | \$49.50 | \$167.00 | 32112     | 32212     | 32312     | 32412     | \$44.20        | \$52.80 | \$56.00 | \$173.50 |

**new! UDR Series: UpDraft fractional Routers****Tight tolerance router for a wide material range.**

- Designed for UpDraft routing of a wide range of materials
- Tight tolerance +0 / - .0005 w/ either 130° drill Point or fish Tail end
- Proprietary cemented carbide grade with 2 different SmoothCoat micro coatings
- Use UnCoated for general purpose routing needs
- Use A1 (TiB2) coated for titanium, aluminum & other non-ferrous materials
- Use D1 PVD diamond coated for composites, CFRP's, honeycombs, plastics, woods & other abrasive materials

UDRPUC



Drill Point

UDRTUC



Fish Tail



| Diam | End         | LOC  | OAL   | Shank | UDR UnCoated |         | UDR A1 Coated |         | UDR D1 Coated |         |
|------|-------------|------|-------|-------|--------------|---------|---------------|---------|---------------|---------|
|      |             |      |       |       | EDP#         | Price   | EDP#          | Price   | EDP#          | Price   |
| 1/32 | Fish Tail   | .255 | 1-1/2 | 1/8   | 50530        | \$9.50  | 50531         | \$11.50 | 50532         | \$14.50 |
| 1/32 | Drill Point | .255 | 1-1/2 | 1/8   | 50533        | \$9.50  | 50534         | \$11.50 | 50535         | \$14.50 |
| 3/64 | Fish Tail   | .255 | 1-1/2 | 1/8   | 50536        | \$9.50  | 50537         | \$11.50 | 50538         | \$14.50 |
| 3/64 | Drill Point | .255 | 1-1/2 | 1/8   | 50539        | \$9.50  | 50540         | \$11.50 | 50541         | \$14.50 |
| 1/16 | Fish Tail   | .255 | 1-1/2 | 1/8   | 50542        | \$9.50  | 50543         | \$11.50 | 50544         | \$14.50 |
| 1/16 | Drill Point | .255 | 1-1/2 | 1/8   | 50545        | \$9.50  | 50546         | \$11.50 | 50547         | \$14.50 |
| 3/32 | Fish Tail   | .395 | 1-1/2 | 1/8   | 50548        | \$9.50  | 50549         | \$11.50 | 50550         | \$14.50 |
| 3/32 | Drill Point | .395 | 1-1/2 | 1/8   | 50551        | \$9.50  | 50552         | \$11.50 | 50553         | \$14.50 |
| 1/8  | Fish Tail   | .500 | 1-1/2 | 1/8   | 50554        | \$9.50  | 50555         | \$11.50 | 50556         | \$14.50 |
| 1/8  | Drill Point | .500 | 1-1/2 | 1/8   | 50557        | \$9.50  | 50558         | \$11.50 | 50559         | \$14.50 |
| 3/16 | Fish Tail   | .625 | 2"    | 3/16  | 50560        | \$14.50 | 50561         | \$17.00 | 50562         | \$20.00 |
| 3/16 | Drill Point | .625 | 2"    | 3/16  | 50563        | \$14.50 | 50564         | \$17.00 | 50565         | \$20.00 |
| 1/4  | Fish Tail   | .750 | 2"    | 1/4   | 50566        | \$17.00 | 50567         | \$20.00 | 50568         | \$23.00 |
| 1/4  | Drill Point | .750 | 2"    | 1/4   | 50569        | \$17.00 | 50570         | \$20.00 | 50571         | \$23.00 |
| 1/4  | Fish Tail   | .750 | 2-1/2 | 1/4   | 50572        | \$18.50 | 50573         | \$21.50 | 50574         | \$24.50 |
| 1/4  | Drill Point | .750 | 2-1/2 | 1/4   | 50575        | \$18.50 | 50576         | \$21.50 | 50577         | \$24.50 |
| 1/4  | Fish Tail   | 1"   | 3"    | 1/4   | 50578        | \$22.50 | 50579         | \$26.00 | 50580         | \$29.00 |
| 1/4  | Drill Point | 1"   | 3"    | 1/4   | 50581        | \$22.50 | 50582         | \$26.00 | 50583         | \$29.00 |

**new! DDR Series: DownDraft fractional Routers****Tight tolerance router for a wide material range.**

- Designed for DownDraft routing of a wide range of materials
- Tight tolerance +0 / - .0005 w/ either 130° drill Point or fish Tail end
- Proprietary cemented carbide grade with 2 different SmoothCoat micro coatings
- Use UnCoated for general purpose routing needs
- Use A1 (TiB2) coated for titanium, aluminum & other non-ferrous materials
- Use D1 PVD diamond coated for composites, CFRP's, honeycombs, plastics, woods & other abrasive materials

DDRPUC



Drill Point

DDRTUC



Fish Tail



| Diam | End         | LOC  | OAL   | Shank | DDR UnCoated |         | DDR A1 Coated |         | DDR D1 Coated |         |
|------|-------------|------|-------|-------|--------------|---------|---------------|---------|---------------|---------|
|      |             |      |       |       | EDP#         | Price   | EDP#          | Price   | EDP#          | Price   |
| 1/32 | Fish Tail   | .255 | 1-1/2 | 1/8   | 50584        | \$9.50  | 50585         | \$11.50 | 50586         | \$14.50 |
| 1/32 | Drill Point | .255 | 1-1/2 | 1/8   | 50587        | \$9.50  | 50588         | \$11.50 | 50589         | \$14.50 |
| 3/64 | Fish Tail   | .255 | 1-1/2 | 1/8   | 50590        | \$9.50  | 50591         | \$11.50 | 50592         | \$14.50 |
| 3/64 | Drill Point | .255 | 1-1/2 | 1/8   | 50593        | \$9.50  | 50594         | \$11.50 | 50595         | \$14.50 |
| 1/16 | Fish Tail   | .255 | 1-1/2 | 1/8   | 50596        | \$9.50  | 50597         | \$11.50 | 50598         | \$14.50 |
| 1/16 | Drill Point | .255 | 1-1/2 | 1/8   | 50599        | \$9.50  | 50600         | \$11.50 | 50601         | \$14.50 |
| 3/32 | Fish Tail   | .395 | 1-1/2 | 1/8   | 50602        | \$9.50  | 50603         | \$11.50 | 50604         | \$14.50 |
| 3/32 | Drill Point | .395 | 1-1/2 | 1/8   | 50605        | \$9.50  | 50606         | \$11.50 | 50607         | \$14.50 |
| 1/8  | Fish Tail   | .500 | 1-1/2 | 1/8   | 50608        | \$9.50  | 50609         | \$11.50 | 50610         | \$14.50 |
| 1/8  | Drill Point | .500 | 1-1/2 | 1/8   | 50611        | \$9.50  | 50612         | \$11.50 | 50613         | \$14.50 |
| 3/16 | Fish Tail   | .625 | 2"    | 3/16  | 50614        | \$14.50 | 50615         | \$17.00 | 50616         | \$20.00 |
| 3/16 | Drill Point | .625 | 2"    | 3/16  | 50617        | \$14.50 | 50618         | \$17.00 | 50619         | \$20.00 |
| 1/4  | Fish Tail   | .750 | 2"    | 1/4   | 50620        | \$17.00 | 50621         | \$20.00 | 50622         | \$23.00 |
| 1/4  | Drill Point | .750 | 2"    | 1/4   | 50623        | \$17.00 | 50624         | \$20.00 | 50625         | \$23.00 |
| 1/4  | Fish Tail   | .750 | 2-1/2 | 1/4   | 50626        | \$18.50 | 50627         | \$21.50 | 50628         | \$24.50 |
| 1/4  | Drill Point | .750 | 2-1/2 | 1/4   | 50629        | \$18.50 | 50630         | \$21.50 | 50631         | \$24.50 |
| 1/4  | Fish Tail   | 1"   | 3"    | 1/4   | 50632        | \$22.50 | 50633         | \$26.00 | 50634         | \$29.00 |
| 1/4  | Drill Point | 1"   | 3"    | 1/4   | 50635        | \$22.50 | 50636         | \$26.00 | 50637         | \$29.00 |

# new! MD Series: 2 flute precision Micro Drills

**Tight tolerance drills w/4-facet point featuring proprietary SmoothCoat for micro tools.**

• Designed for micro drilling of a wide range of materials • Tight tolerance  $+0/-0.0003$  • Proprietary cemented carbide grade & SmoothCoat • Use UnCoated for general purpose needs • Use AT coated for high-temp exotics & alloys, die & hardened steels, stainless • Use A1 coated for titanium, aluminum & other non-ferrous materials • Use D1 coated for graphites & other extremely abrasive non-ferrous alloys

1/8" shank



| MD2PUC |            |      |       |       |       | MD2PAT |         | MD2PA1 |         | MD2PD1 |         |
|--------|------------|------|-------|-------|-------|--------|---------|--------|---------|--------|---------|
|        |            |      |       |       |       | UC     |         | AT     |         | A1     |         |
| Diam   | Drill Size | LOC  | Point | OAL   | Shank | EDP#   | Price   | EDP#   | Price   | EDP#   | Price   |
| .0040  | 0.10mm     | .070 | 118°  | 1-1/2 | 1/8   | 50000  | \$30.00 | 50001  | \$32.00 | 50002  | \$33.00 |
| .0050  | 0.13mm     | .070 | 118°  | 1-1/2 | 1/8   | 50004  | \$30.00 | 50005  | \$32.00 | 50006  | \$33.00 |
| .0059  | #97        | .120 | 118°  | 1-1/2 | 1/8   | 50008  | \$30.00 | 50009  | \$32.00 | 50010  | \$33.00 |
| .0063  | #96        | .120 | 118°  | 1-1/2 | 1/8   | 50012  | \$30.00 | 50013  | \$32.00 | 50014  | \$33.00 |
| .0067  | #95        | .150 | 118°  | 1-1/2 | 1/8   | 50016  | \$30.00 | 50017  | \$32.00 | 50018  | \$33.00 |
| .0071  | #94        | .150 | 118°  | 1-1/2 | 1/8   | 50020  | \$28.00 | 50021  | \$30.00 | 50022  | \$31.00 |
| .0075  | #93        | .150 | 118°  | 1-1/2 | 1/8   | 50024  | \$28.00 | 50025  | \$30.00 | 50026  | \$31.00 |
| .0079  | #92        | .150 | 118°  | 1-1/2 | 1/8   | 50028  | \$25.00 | 50029  | \$27.00 | 50030  | \$28.00 |
| .0083  | #91        | .150 | 118°  | 1-1/2 | 1/8   | 50032  | \$25.00 | 50033  | \$27.00 | 50034  | \$28.00 |
| .0087  | #90        | .150 | 118°  | 1-1/2 | 1/8   | 50036  | \$25.00 | 50037  | \$27.00 | 50038  | \$28.00 |
| .0091  | #89        | .220 | 118°  | 1-1/2 | 1/8   | 50040  | \$25.00 | 50041  | \$27.00 | 50042  | \$28.00 |
| .0095  | #88        | .220 | 118°  | 1-1/2 | 1/8   | 50044  | \$25.00 | 50045  | \$27.00 | 50046  | \$28.00 |
| .0098  | 0.25mm     | .220 | 118°  | 1-1/2 | 1/8   | 50048  | \$21.00 | 50049  | \$23.00 | 50050  | \$24.00 |
| .0100  | #87        | .220 | 118°  | 1-1/2 | 1/8   | 50052  | \$21.00 | 50053  | \$23.00 | 50054  | \$24.00 |
| .0105  | #86        | .220 | 118°  | 1-1/2 | 1/8   | 50056  | \$14.00 | 50057  | \$16.00 | 50058  | \$17.00 |
| .0110  | #85        | .220 | 118°  | 1-1/2 | 1/8   | 50060  | \$14.00 | 50061  | \$16.00 | 50062  | \$17.00 |
| .0115  | #84        | .220 | 118°  | 1-1/2 | 1/8   | 50064  | \$11.00 | 50065  | \$12.00 | 50066  | \$13.00 |
| .0118  | 0.30mm     | .280 | 118°  | 1-1/2 | 1/8   | 50068  | \$11.00 | 50069  | \$12.00 | 50070  | \$13.00 |
| .0120  | #83        | .280 | 118°  | 1-1/2 | 1/8   | 50072  | \$11.00 | 50073  | \$12.00 | 50074  | \$13.00 |
| .0125  | #82        | .280 | 118°  | 1-1/2 | 1/8   | 50076  | \$10.00 | 50077  | \$11.00 | 50078  | \$12.00 |
| .0130  | #81        | .280 | 118°  | 1-1/2 | 1/8   | 50080  | \$10.00 | 50081  | \$11.00 | 50082  | \$12.00 |
| .0135  | #80        | .280 | 130°  | 1-1/2 | 1/8   | 50084  | \$7.00  | 50085  | \$8.00  | 50086  | \$9.00  |
| .0138  | 0.35mm     | .280 | 130°  | 1-1/2 | 1/8   | 50088  | \$7.00  | 50089  | \$8.00  | 50090  | \$9.00  |
| .0145  | #79        | .280 | 130°  | 1-1/2 | 1/8   | 50092  | \$7.00  | 50093  | \$8.00  | 50094  | \$9.00  |
| .0156  | 1/64"      | .295 | 130°  | 1-1/2 | 1/8   | 50096  | \$7.00  | 50097  | \$8.00  | 50098  | \$9.00  |
| .0157  | 0.40mm     | .295 | 130°  | 1-1/2 | 1/8   | 50100  | \$7.00  | 50101  | \$8.00  | 50102  | \$9.00  |
| .0160  | #78        | .295 | 130°  | 1-1/2 | 1/8   | 50104  | \$7.00  | 50105  | \$8.00  | 50106  | \$9.00  |
| .0177  | 0.45mm     | .295 | 130°  | 1-1/2 | 1/8   | 50108  | \$7.00  | 50109  | \$8.00  | 50110  | \$9.00  |
| .0180  | #77        | .295 | 130°  | 1-1/2 | 1/8   | 50112  | \$7.00  | 50113  | \$8.00  | 50114  | \$9.00  |
| .0197  | 0.50mm     | .310 | 130°  | 1-1/2 | 1/8   | 50116  | \$7.00  | 50117  | \$8.00  | 50118  | \$9.00  |
| .0200  | #76        | .310 | 130°  | 1-1/2 | 1/8   | 50120  | \$7.00  | 50121  | \$8.00  | 50122  | \$9.00  |
| .0210  | #75        | .310 | 130°  | 1-1/2 | 1/8   | 50124  | \$7.00  | 50125  | \$8.00  | 50126  | \$9.00  |
| .0217  | 0.55mm     | .340 | 130°  | 1-1/2 | 1/8   | 50128  | \$7.00  | 50129  | \$8.00  | 50130  | \$9.00  |
| .0225  | #74        | .340 | 130°  | 1-1/2 | 1/8   | 50132  | \$7.00  | 50133  | \$8.00  | 50134  | \$9.00  |
| .0236  | 0.60mm     | .340 | 130°  | 1-1/2 | 1/8   | 50136  | \$7.00  | 50137  | \$8.00  | 50138  | \$9.00  |
| .0240  | #73        | .340 | 130°  | 1-1/2 | 1/8   | 50140  | \$7.00  | 50141  | \$8.00  | 50142  | \$9.00  |
| .0250  | #72        | .340 | 130°  | 1-1/2 | 1/8   | 50144  | \$7.00  | 50145  | \$8.00  | 50146  | \$9.00  |
| .0256  | 0.65mm     | .340 | 130°  | 1-1/2 | 1/8   | 50148  | \$7.00  | 50149  | \$8.00  | 50150  | \$9.00  |
| .0260  | #71        | .340 | 130°  | 1-1/2 | 1/8   | 50152  | \$7.00  | 50153  | \$8.00  | 50154  | \$9.00  |
| .0276  | 0.70mm     | .400 | 130°  | 1-1/2 | 1/8   | 50156  | \$7.00  | 50157  | \$8.00  | 50158  | \$9.00  |
| .0280  | #70        | .400 | 130°  | 1-1/2 | 1/8   | 50160  | \$6.00  | 50161  | \$7.00  | 50162  | \$8.00  |
| .0292  | #69        | .400 | 130°  | 1-1/2 | 1/8   | 50164  | \$6.00  | 50165  | \$7.00  | 50166  | \$8.00  |
| .0295  | 0.75mm     | .400 | 130°  | 1-1/2 | 1/8   | 50168  | \$6.00  | 50169  | \$7.00  | 50170  | \$8.00  |
| .0310  | #68        | .400 | 130°  | 1-1/2 | 1/8   | 50172  | \$6.00  | 50173  | \$7.00  | 50174  | \$8.00  |
| .0312  | 1/32"      | .400 | 130°  | 1-1/2 | 1/8   | 50176  | \$6.00  | 50177  | \$7.00  | 50178  | \$8.00  |
| .0315  | 0.80mm     | .400 | 130°  | 1-1/2 | 1/8   | 50180  | \$6.00  | 50181  | \$7.00  | 50182  | \$8.00  |
| .0320  | #67        | .400 | 130°  | 1-1/2 | 1/8   | 50184  | \$6.00  | 50185  | \$7.00  | 50186  | \$8.00  |
| .0330  | #66        | .400 | 130°  | 1-1/2 | 1/8   | 50188  | \$6.00  | 50189  | \$7.00  | 50190  | \$8.00  |
| .0335  | 0.85mm     | .400 | 130°  | 1-1/2 | 1/8   | 50192  | \$6.00  | 50193  | \$7.00  | 50194  | \$8.00  |
| .0354  | 0.90mm     | .400 | 130°  | 1-1/2 | 1/8   | 50196  | \$6.00  | 50197  | \$7.00  | 50198  | \$8.00  |
| .0360  | #64        | .400 | 130°  | 1-1/2 | 1/8   | 50200  | \$6.00  | 50201  | \$7.00  | 50202  | \$8.00  |
| .0370  | #63        | .400 | 130°  | 1-1/2 | 1/8   | 50204  | \$6.00  | 50205  | \$7.00  | 50206  | \$8.00  |
| .0374  | 0.95mm     | .400 | 130°  | 1-1/2 | 1/8   | 50208  | \$6.00  | 50209  | \$7.00  | 50210  | \$8.00  |
| .0380  | #62        | .400 | 130°  | 1-1/2 | 1/8   | 50212  | \$6.00  | 50213  | \$7.00  | 50214  | \$8.00  |
| .0390  | #61        | .400 | 130°  | 1-1/2 | 1/8   | 50216  | \$6.00  | 50217  | \$7.00  | 50218  | \$8.00  |
| .0394  | 1.00mm     | .400 | 130°  | 1-1/2 | 1/8   | 50220  | \$6.00  | 50221  | \$7.00  | 50222  | \$8.00  |
| .0400  | #60        | .400 | 130°  | 1-1/2 | 1/8   | 50224  | \$6.00  | 50225  | \$7.00  | 50226  | \$8.00  |
| .0410  | #59        | .400 | 130°  | 1-1/2 | 1/8   | 50228  | \$6.00  | 50229  | \$7.00  | 50230  | \$8.00  |
| .0413  | 1.05mm     | .400 | 130°  | 1-1/2 | 1/8   | 50232  | \$6.00  | 50233  | \$7.00  | 50234  | \$8.00  |
| .0420  | #58        | .400 | 130°  | 1-1/2 | 1/8   | 50236  | \$6.00  | 50237  | \$7.00  | 50238  | \$8.00  |
| .0433  | 1.10mm     | .400 | 130°  | 1-1/2 | 1/8   | 50240  | \$6.00  | 50241  | \$7.00  | 50242  | \$8.00  |
| .0440  | 1.12mm     | .400 | 130°  | 1-1/2 | 1/8   | 50244  | \$6.00  | 50245  | \$7.00  | 50246  | \$8.00  |
| .0453  | 1.15mm     | .400 | 130°  | 1-1/2 | 1/8   | 50248  | \$6.00  | 50249  | \$7.00  | 50250  | \$8.00  |

## new! MD Series: 2 flute precision Micro Drills (continued)

1/8" shank

| Diam  | Drill Size | LOC  | Point | OAL   | Shank | MD UnCoated<br>EDP# Price | MD w/AT Coat<br>EDP# Price | MD w/A1 Coat<br>EDP# Price | MD w/D1 Coat<br>EDP# Price |
|-------|------------|------|-------|-------|-------|---------------------------|----------------------------|----------------------------|----------------------------|
| .0465 | #56        | .400 | 130°  | 1-1/2 | 1/8   | 50252 \$6.00              | 50253 \$7.00               | 50254 \$8.00               | 50255 \$11.00              |
| .0469 | 3/64"      | .400 | 130°  | 1-1/2 | 1/8   | 50256 \$6.00              | 50257 \$7.00               | 50258 \$8.00               | 50259 \$11.00              |
| .0472 | 1.20mm     | .400 | 130°  | 1-1/2 | 1/8   | 50260 \$6.00              | 50261 \$7.00               | 50262 \$8.00               | 50263 \$11.00              |
| .0492 | 1.25mm     | .400 | 130°  | 1-1/2 | 1/8   | 50264 \$6.00              | 50265 \$7.00               | 50266 \$8.00               | 50267 \$11.00              |
| .0512 | 1.30mm     | .400 | 130°  | 1-1/2 | 1/8   | 50268 \$6.00              | 50269 \$7.00               | 50270 \$8.00               | 50271 \$11.00              |
| .0520 | #55        | .400 | 130°  | 1-1/2 | 1/8   | 50272 \$6.00              | 50273 \$7.00               | 50274 \$8.00               | 50275 \$11.00              |
| .0531 | 1.35mm     | .400 | 130°  | 1-1/2 | 1/8   | 50276 \$6.00              | 50277 \$7.00               | 50278 \$8.00               | 50279 \$11.00              |
| .0550 | #54        | .400 | 130°  | 1-1/2 | 1/8   | 50280 \$6.00              | 50281 \$7.00               | 50282 \$8.00               | 50283 \$11.00              |
| .0551 | 1.40mm     | .400 | 130°  | 1-1/2 | 1/8   | 50284 \$6.00              | 50285 \$7.00               | 50286 \$8.00               | 50287 \$11.00              |
| .0571 | 1.45mm     | .400 | 130°  | 1-1/2 | 1/8   | 50288 \$6.00              | 50289 \$7.00               | 50290 \$8.00               | 50291 \$11.00              |
| .0591 | 1.50mm     | .400 | 130°  | 1-1/2 | 1/8   | 50292 \$6.00              | 50293 \$7.00               | 50294 \$8.00               | 50295 \$11.00              |
| .0595 | #53        | .400 | 130°  | 1-1/2 | 1/8   | 50296 \$6.00              | 50297 \$7.00               | 50298 \$8.00               | 50299 \$11.00              |
| .0610 | 1.55mm     | .400 | 130°  | 1-1/2 | 1/8   | 50300 \$6.00              | 50301 \$7.00               | 50302 \$8.00               | 50303 \$11.00              |
| .0625 | 1/16"      | .400 | 130°  | 1-1/2 | 1/8   | 50304 \$6.00              | 50305 \$7.00               | 50306 \$8.00               | 50307 \$11.00              |
| .0630 | 1.60mm     | .400 | 130°  | 1-1/2 | 1/8   | 50308 \$6.00              | 50309 \$7.00               | 50310 \$8.00               | 50311 \$11.00              |
| .0635 | #52        | .400 | 130°  | 1-1/2 | 1/8   | 50312 \$6.00              | 50313 \$7.00               | 50314 \$8.00               | 50315 \$11.00              |
| .0650 | 1.65mm     | .400 | 130°  | 1-1/2 | 1/8   | 50316 \$6.00              | 50317 \$7.00               | 50318 \$8.00               | 50319 \$11.00              |
| .0669 | 1.70mm     | .400 | 130°  | 1-1/2 | 1/8   | 50320 \$6.00              | 50321 \$7.00               | 50322 \$8.00               | 50323 \$11.00              |
| .0670 | #51        | .400 | 130°  | 1-1/2 | 1/8   | 50324 \$6.00              | 50325 \$7.00               | 50326 \$8.00               | 50327 \$11.00              |
| .0689 | 1.75mm     | .400 | 130°  | 1-1/2 | 1/8   | 50328 \$6.00              | 50329 \$7.00               | 50330 \$8.00               | 50331 \$11.00              |
| .0700 | #50        | .400 | 130°  | 1-1/2 | 1/8   | 50332 \$6.00              | 50333 \$7.00               | 50334 \$8.00               | 50335 \$11.00              |
| .0709 | 1.80mm     | .400 | 130°  | 1-1/2 | 1/8   | 50336 \$6.00              | 50337 \$7.00               | 50338 \$8.00               | 50339 \$11.00              |
| .0728 | 1.85mm     | .400 | 130°  | 1-1/2 | 1/8   | 50340 \$6.00              | 50341 \$7.00               | 50342 \$8.00               | 50343 \$11.00              |
| .0730 | #49        | .400 | 130°  | 1-1/2 | 1/8   | 50344 \$6.00              | 50345 \$7.00               | 50346 \$8.00               | 50347 \$11.00              |
| .0748 | 1.90mm     | .400 | 130°  | 1-1/2 | 1/8   | 50348 \$6.00              | 50349 \$7.00               | 50350 \$8.00               | 50351 \$11.00              |
| .0760 | #48        | .400 | 130°  | 1-1/2 | 1/8   | 50352 \$6.00              | 50353 \$7.00               | 50354 \$8.00               | 50355 \$11.00              |
| .0781 | 5/64"      | .400 | 130°  | 1-1/2 | 1/8   | 50356 \$6.00              | 50357 \$7.00               | 50358 \$8.00               | 50359 \$11.00              |
| .0785 | #47        | .400 | 130°  | 1-1/2 | 1/8   | 50360 \$6.00              | 50361 \$7.00               | 50362 \$8.00               | 50363 \$11.00              |
| .0787 | 2.00mm     | .400 | 130°  | 1-1/2 | 1/8   | 50364 \$6.00              | 50365 \$7.00               | 50366 \$8.00               | 50367 \$11.00              |
| .0807 | 2.05mm     | .400 | 130°  | 1-1/2 | 1/8   | 50368 \$6.00              | 50369 \$7.00               | 50370 \$8.00               | 50371 \$11.00              |
| .0810 | #46        | .400 | 130°  | 1-1/2 | 1/8   | 50372 \$6.00              | 50373 \$7.00               | 50374 \$8.00               | 50375 \$11.00              |
| .0820 | #45        | .400 | 130°  | 1-1/2 | 1/8   | 50376 \$6.00              | 50377 \$7.00               | 50378 \$8.00               | 50379 \$11.00              |
| .0827 | 2.10mm     | .400 | 130°  | 1-1/2 | 1/8   | 50380 \$6.00              | 50381 \$7.00               | 50382 \$8.00               | 50383 \$11.00              |
| .0846 | 2.15mm     | .400 | 130°  | 1-1/2 | 1/8   | 50384 \$6.00              | 50385 \$7.00               | 50386 \$8.00               | 50387 \$11.00              |
| .0860 | #44        | .400 | 130°  | 1-1/2 | 1/8   | 50388 \$6.00              | 50389 \$7.00               | 50390 \$8.00               | 50391 \$11.00              |
| .0866 | 2.20mm     | .400 | 130°  | 1-1/2 | 1/8   | 50392 \$6.00              | 50393 \$7.00               | 50394 \$8.00               | 50395 \$11.00              |
| .0886 | 2.25mm     | .400 | 130°  | 1-1/2 | 1/8   | 50396 \$6.00              | 50397 \$7.00               | 50398 \$8.00               | 50399 \$11.00              |
| .0890 | #43        | .400 | 130°  | 1-1/2 | 1/8   | 50400 \$6.00              | 50401 \$7.00               | 50402 \$8.00               | 50403 \$11.00              |
| .0906 | 2.30mm     | .400 | 130°  | 1-1/2 | 1/8   | 50404 \$6.00              | 50405 \$7.00               | 50406 \$8.00               | 50407 \$11.00              |
| .0925 | 2.35mm     | .400 | 130°  | 1-1/2 | 1/8   | 50408 \$6.00              | 50409 \$7.00               | 50410 \$8.00               | 50411 \$11.00              |
| .0935 | #42        | .400 | 130°  | 1-1/2 | 1/8   | 50412 \$6.00              | 50413 \$7.00               | 50414 \$8.00               | 50415 \$11.00              |
| .0938 | 3/32"      | .400 | 130°  | 1-1/2 | 1/8   | 50416 \$6.00              | 50417 \$7.00               | 50418 \$8.00               | 50419 \$11.00              |
| .0945 | 2.40mm     | .400 | 130°  | 1-1/2 | 1/8   | 50420 \$6.00              | 50421 \$7.00               | 50422 \$8.00               | 50423 \$11.00              |
| .0960 | #41        | .400 | 130°  | 1-1/2 | 1/8   | 50424 \$6.00              | 50425 \$7.00               | 50426 \$8.00               | 50427 \$11.00              |
| .0965 | 2.45mm     | .400 | 130°  | 1-1/2 | 1/8   | 50428 \$6.00              | 50429 \$7.00               | 50430 \$8.00               | 50431 \$11.00              |
| .0980 | #40        | .400 | 130°  | 1-1/2 | 1/8   | 50432 \$6.00              | 50433 \$7.00               | 50434 \$8.00               | 50435 \$11.00              |
| .0984 | 2.50mm     | .400 | 130°  | 1-1/2 | 1/8   | 50436 \$6.00              | 50437 \$7.00               | 50438 \$8.00               | 50439 \$11.00              |
| .0995 | #39        | .400 | 130°  | 1-1/2 | 1/8   | 50440 \$6.00              | 50441 \$7.00               | 50442 \$8.00               | 50443 \$11.00              |
| .1004 | 2.55mm     | .400 | 130°  | 1-1/2 | 1/8   | 50444 \$6.00              | 50445 \$7.00               | 50446 \$8.00               | 50447 \$11.00              |
| .1015 | #38        | .400 | 130°  | 1-1/2 | 1/8   | 50448 \$6.00              | 50449 \$7.00               | 50450 \$8.00               | 50451 \$11.00              |
| .1024 | 2.60mm     | .400 | 130°  | 1-1/2 | 1/8   | 50452 \$6.00              | 50453 \$7.00               | 50454 \$8.00               | 50455 \$11.00              |
| .1040 | #37        | .400 | 130°  | 1-1/2 | 1/8   | 50456 \$6.00              | 50457 \$7.00               | 50458 \$8.00               | 50459 \$11.00              |
| .1043 | 2.65mm     | .400 | 130°  | 1-1/2 | 1/8   | 50460 \$6.00              | 50461 \$7.00               | 50462 \$8.00               | 50463 \$11.00              |
| .1063 | 2.70mm     | .400 | 130°  | 1-1/2 | 1/8   | 50464 \$6.00              | 50465 \$7.00               | 50466 \$8.00               | 50467 \$11.00              |
| .1065 | #36        | .400 | 130°  | 1-1/2 | 1/8   | 50468 \$6.00              | 50469 \$7.00               | 50470 \$8.00               | 50471 \$11.00              |
| .1083 | 2.75mm     | .400 | 130°  | 1-1/2 | 1/8   | 50472 \$6.00              | 50473 \$7.00               | 50474 \$8.00               | 50475 \$11.00              |
| .1094 | 7/64"      | .400 | 130°  | 1-1/2 | 1/8   | 50476 \$6.00              | 50477 \$7.00               | 50478 \$8.00               | 50479 \$11.00              |
| .1100 | #35        | .400 | 130°  | 1-1/2 | 1/8   | 50480 \$6.00              | 50481 \$7.00               | 50482 \$8.00               | 50483 \$11.00              |
| .1110 | #34        | .400 | 130°  | 1-1/2 | 1/8   | 50484 \$6.00              | 50485 \$7.00               | 50486 \$8.00               | 50487 \$11.00              |
| .1122 | 2.85mm     | .400 | 130°  | 1-1/2 | 1/8   | 50488 \$6.00              | 50489 \$7.00               | 50490 \$8.00               | 50491 \$11.00              |
| .1130 | #33        | .400 | 130°  | 1-1/2 | 1/8   | 50492 \$6.00              | 50493 \$7.00               | 50494 \$8.00               | 50495 \$11.00              |
| .1142 | 2.90mm     | .400 | 130°  | 1-1/2 | 1/8   | 50496 \$6.00              | 50497 \$7.00               | 50498 \$8.00               | 50499 \$11.00              |
| .1160 | #32        | .400 | 130°  | 1-1/2 | 1/8   | 50500 \$6.00              | 50501 \$7.00               | 50502 \$8.00               | 50503 \$11.00              |
| .1161 | 2.95mm     | .400 | 130°  | 1-1/2 | 1/8   | 50504 \$6.00              | 50505 \$7.00               | 50506 \$8.00               | 50507 \$11.00              |
| .1181 | 3.00mm     | .400 | 130°  | 1-1/2 | 1/8   | 50508 \$6.00              | 50509 \$7.00               | 50510 \$8.00               | 50511 \$11.00              |
| .1200 | #31        | .400 | 130°  | 1-1/2 | 1/8   | 50512 \$6.00              | 50513 \$7.00               | 50514 \$8.00               | 50515 \$11.00              |
| .1201 | 3.05mm     | .400 | 130°  | 1-1/2 | 1/8   | 50516 \$6.00              | 50517 \$7.00               | 50518 \$8.00               | 50519 \$11.00              |
| .1220 | 3.10mm     | .400 | 130°  | 1-1/2 | 1/8   | 50520 \$6.00              | 50521 \$7.00               | 50522 \$8.00               | 50523 \$11.00              |
| .1240 | 3.15mm     | .400 | 130°  | 1-1/2 | 1/8   | 50524 \$6.00              | 50525 \$7.00               | 50526 \$8.00               | 50527 \$11.00              |
| .1250 | 1/8"       | .400 | 130°  | 1-1/2 | 1/8   | 50528 \$6.00              | 50529 \$7.00               | 50638 \$8.00               | 50639 \$11.00              |



## new! BP Series: 2 flute Brad Point drills

**Tight tolerance drills with brad (spur) point featuring D1 SmoothCoat or UnCoated.**

• Designed for drilling composites, plastics, wood, fiberglass, and more • Tight tolerance +0/-0.0003 • Proprietary cemented carbide grade plus available D1 SmoothCoat • Use UnCoated for general purpose needs • Use D1 coated for graphites & other extremely abrasive non-ferrous alloys • Fractional, Wire Gage, Letter, and Metric size ranges • Features 140° brad point



Drill Specifications:  
Cutting Diam +.0000/-0.0003  
Shank Diam +.0000/-0.0003  
SFR = Shrink Fit Ready

BP2UC



| Diam  | LOF   | OAL   | EDP#  | UC Price | D1 Coat  |
|-------|-------|-------|-------|----------|----------|
| 3/64  | 3/4   | 1-1/2 | 61203 | \$10.00  | \$14.40  |
| 1/16  | 3/4   | 1-1/2 | 61204 | \$10.00  | \$14.40  |
| 5/64  | 7/8   | 1-3/4 | 61205 | \$10.20  | \$14.70  |
| 3/32  | 1"    | 2"    | 61206 | \$10.60  | \$15.10  |
| 7/64  | 1-1/4 | 2-1/4 | 61207 | \$11.80  | \$17.10  |
| 1/8   | 1-1/4 | 2-1/4 | 61208 | \$12.20  | \$17.50  |
| 9/64  | 1-3/8 | 2-1/2 | 61209 | \$14.00  | \$19.90  |
| 5/32  | 1-3/8 | 2-1/2 | 61210 | \$16.20  | \$22.10  |
| 11/64 | 1-5/8 | 2-3/4 | 61211 | \$18.00  | \$23.90  |
| 3/16  | 1-5/8 | 2-3/4 | 61212 | \$18.20  | \$24.10  |
| 13/64 | 1-3/4 | 3"    | 61213 | \$21.70  | \$30.50  |
| 7/32  | 1-3/4 | 3"    | 61214 | \$24.10  | \$32.90  |
| 15/64 | 2"    | 3-1/4 | 61215 | \$26.00  | \$34.80  |
| 1/4   | 2"    | 3-1/4 | 61216 | \$27.70  | \$36.50  |
| 17/64 | 2-1/8 | 3-1/2 | 61217 | \$31.90  | \$42.20  |
| 9/32  | 2-1/8 | 3-1/2 | 61218 | \$35.00  | \$45.30  |
| 19/64 | 2-3/8 | 3-3/4 | 61219 | \$37.30  | \$48.20  |
| 5/16  | 2-3/8 | 3-3/4 | 61220 | \$40.20  | \$50.60  |
| 21/64 | 2-1/2 | 4"    | 61221 | \$43.30  | \$57.10  |
| 11/32 | 2-1/2 | 4"    | 61222 | \$47.90  | \$61.70  |
| 23/64 | 2-3/4 | 4-1/4 | 61223 | \$53.20  | \$67.00  |
| 3/8   | 2-3/4 | 4-1/4 | 61224 | \$52.50  | \$66.30  |
| 25/64 | 2-7/8 | 4-1/2 | 61225 | \$66.00  | \$83.20  |
| 13/32 | 2-7/8 | 4-1/2 | 61226 | \$71.00  | \$88.20  |
| 27/64 | 2-7/8 | 4-1/2 | 61227 | \$78.20  | \$95.40  |
| 7/16  | 2-7/8 | 4-1/2 | 61228 | \$83.50  | \$100.70 |
| 29/64 | 3"    | 4-3/4 | 61229 | \$91.70  | \$114.60 |
| 15/32 | 3"    | 4-3/4 | 61230 | \$97.00  | \$119.90 |
| 31/64 | 3"    | 4-3/4 | 61231 | \$101.40 | \$124.30 |
| 1/2   | 3"    | 4-3/4 | 61232 | \$98.70  | \$121.60 |
| 17/32 | 4"    | 6"    | 61233 | \$149.60 | \$181.10 |
| 9/16  | 4"    | 6"    | 61234 | \$160.50 | \$192.00 |
| 19/32 | 4"    | 6"    | 61235 | \$184.40 | \$215.90 |
| 5/8   | 4"    | 6"    | 61236 | \$186.50 | \$218.00 |
| 21/32 | 4"    | 6"    | 61237 | \$211.00 | \$251.00 |
| 11/16 | 4"    | 6"    | 61238 | \$214.60 | \$254.70 |
| 3/4   | 4"    | 6"    | 61239 | \$250.30 | \$290.40 |
| 13/16 | 4"    | 6"    | 61291 | \$342.00 | \$387.80 |
| 7/8   | 4"    | 6"    | 61292 | \$362.70 | \$408.50 |
| 15/16 | 4"    | 6"    | 61293 | \$366.80 | \$418.30 |
| 1"    | 4"    | 6"    | 61294 | \$362.80 | \$414.30 |

RTL'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 # for inclusion of coating for this Series.**



| Diam | LOF   | OAL   | EDP#  | UC Price | D1 Coat |
|------|-------|-------|-------|----------|---------|
| 1    | 1-3/4 | 3-1/4 | 61301 | \$26.30  | \$35.10 |
| 2    | 1-3/4 | 3"    | 61302 | \$25.00  | \$33.80 |
| 3    | 1-3/4 | 3"    | 61303 | \$23.50  | \$32.30 |
| 4    | 1-3/4 | 3"    | 61304 | \$22.90  | \$31.70 |
| 5    | 1-3/4 | 3"    | 61305 | \$22.30  | \$31.10 |
| 6    | 1-3/4 | 3"    | 61306 | \$22.10  | \$30.90 |
| 7    | 1-3/4 | 3"    | 61307 | \$21.10  | \$29.90 |
| 8    | 1-3/4 | 3"    | 61308 | \$20.80  | \$29.60 |
| 9    | 1-3/4 | 3"    | 61309 | \$20.20  | \$29.00 |
| 10   | 1-5/8 | 2-3/4 | 61310 | \$19.80  | \$28.60 |
| 11   | 1-5/8 | 2-3/4 | 61311 | \$19.70  | \$28.50 |
| 12   | 1-5/8 | 2-3/4 | 61312 | \$19.40  | \$28.20 |
| 13   | 1-5/8 | 2-3/4 | 61313 | \$18.90  | \$27.10 |
| 14   | 1-5/8 | 2-3/4 | 61314 | \$18.80  | \$27.00 |
| 15   | 1-5/8 | 2-3/4 | 61315 | \$18.60  | \$26.80 |
| 16   | 1-5/8 | 2-3/4 | 61316 | \$18.40  | \$26.60 |
| 17   | 1-5/8 | 2-3/4 | 61317 | \$18.20  | \$26.40 |
| 18   | 1-5/8 | 2-3/4 | 61318 | \$17.70  | \$25.90 |
| 19   | 1-5/8 | 2-3/4 | 61319 | \$17.60  | \$25.80 |
| 20   | 1-3/8 | 2-1/2 | 61320 | \$17.10  | \$25.30 |
| 21   | 1-3/8 | 2-1/2 | 61321 | \$16.80  | \$25.00 |
| 22   | 1-3/8 | 2-1/2 | 61322 | \$16.70  | \$24.90 |
| 23   | 1-3/8 | 2-1/2 | 61323 | \$16.00  | \$24.20 |
| 24   | 1-3/8 | 2-1/2 | 61324 | \$15.30  | \$23.50 |
| 25   | 1-3/8 | 2-1/2 | 61325 | \$14.90  | \$23.10 |
| 26   | 1-3/8 | 2-1/2 | 61326 | \$14.50  | \$22.70 |
| 27   | 1-3/8 | 2-1/2 | 61327 | \$14.50  | \$22.70 |
| 28   | 1-3/8 | 2-1/2 | 61328 | \$14.00  | \$22.20 |
| 29   | 1-3/8 | 2-1/2 | 61329 | \$13.80  | \$22.00 |
| 30   | 1-3/8 | 2-1/4 | 61330 | \$13.10  | \$21.30 |
| 31   | 1-1/4 | 2-1/4 | 61331 | \$12.90  | \$18.90 |
| 32   | 1-1/4 | 2-1/4 | 61332 | \$12.70  | \$18.60 |
| 33   | 1-1/4 | 2-1/4 | 61333 | \$12.30  | \$18.20 |
| 34   | 1-1/4 | 2-1/4 | 61334 | \$12.30  | \$18.20 |
| 35   | 1-1/4 | 2-1/4 | 61335 | \$12.00  | \$18.00 |
| 36   | 1-1/4 | 2-1/4 | 61336 | \$11.80  | \$17.70 |
| 37   | 1-1/4 | 2-1/4 | 61337 | \$11.80  | \$17.70 |
| 38   | 1-1/4 | 2-1/4 | 61338 | \$11.80  | \$17.70 |
| 39   | 1-1/4 | 2-1/4 | 61339 | \$11.80  | \$17.70 |
| 40   | 1"    | 2"    | 61340 | \$11.10  | \$15.60 |
| 41   | 1"    | 2"    | 61341 | \$10.60  | \$15.10 |
| 42   | 1"    | 2"    | 61342 | \$10.60  | \$15.10 |
| 43   | 1"    | 2"    | 61343 | \$10.20  | \$14.70 |
| 44   | 1"    | 2"    | 61344 | \$10.20  | \$14.70 |
| 45   | 7/8   | 1-3/4 | 61345 | \$10.20  | \$14.70 |
| 46   | 7/8   | 1-3/4 | 61346 | \$10.20  | \$14.70 |
| 47   | 7/8   | 1-3/4 | 61347 | \$10.20  | \$14.70 |
| 48   | 7/8   | 1-3/4 | 61348 | \$10.00  | \$14.40 |
| 49   | 7/8   | 1-3/4 | 61349 | \$10.00  | \$14.40 |
| 50   | 7/8   | 1-3/4 | 61350 | \$10.00  | \$14.40 |
| 51   | 3/4   | 1-1/2 | 61351 | \$10.00  | \$14.40 |
| 52   | 3/4   | 1-1/2 | 61352 | \$10.00  | \$14.40 |
| 53   | 3/4   | 1-1/2 | 61353 | \$10.00  | \$14.40 |
| 54   | 3/4   | 1-1/2 | 61354 | \$10.00  | \$14.40 |
| 55   | 3/4   | 1-1/2 | 61355 | \$10.00  | \$14.40 |
| 56   | 3/4   | 1-1/2 | 61356 | \$10.00  | \$14.40 |
| 57   | 3/4   | 1-1/2 | 61357 | \$10.00  | \$14.40 |
| 58   | 3/4   | 1-1/2 | 61358 | \$10.00  | \$14.40 |
| 59   | 3/4   | 1-1/2 | 61359 | \$10.00  | \$14.40 |
| 60   | 3/4   | 1-1/2 | 61360 | \$10.00  | \$14.40 |

| Diam | LOF   | OAL   | EDP#  | UC Price | D1 Coat |
|------|-------|-------|-------|----------|---------|
| A    | 2"    | 3-1/4 | 61241 | \$27.00  | \$35.80 |
| B    | 2"    | 3-1/4 | 61242 | \$27.40  | \$36.20 |
| C    | 2"    | 3-1/4 | 61243 | \$28.10  | \$36.90 |
| D    | 2"    | 3-1/4 | 61244 | \$28.70  | \$37.50 |
| E    | 2"    | 3-1/4 | 61245 | \$29.80  | \$38.60 |
| F    | 2"    | 3-1/2 | 61246 | \$31.90  | \$42.20 |
| G    | 2-1/8 | 3-1/2 | 61247 | \$31.90  | \$42.20 |
| H    | 2-1/8 | 3-1/2 | 61248 | \$33.10  | \$43.50 |
| I    | 2-1/8 | 3-1/2 | 61249 | \$33.80  | \$44.20 |
| J    | 2-1/8 | 3-1/2 | 61250 | \$34.80  | \$45.20 |
| K    | 2-1/8 | 3-1/2 | 61251 | \$35.00  | \$45.30 |
| L    | 2-1/8 | 3-1/2 | 61252 | \$36.20  | \$46.60 |
| M    | 2-3/8 | 3-3/4 | 61253 | \$37.30  | \$47.70 |
| N    | 2-3/8 | 3-3/4 | 61254 | \$40.20  | \$50.60 |
| O    | 2-3/8 | 3-3/4 | 61255 | \$42.60  | \$56.40 |
| P    | 2-3/8 | 4"    | 61256 | \$43.30  | \$57.10 |
| Q    | 2-1/2 | 4"    | 61285 | \$46.80  | \$60.60 |
| R    | 2-1/2 | 4"    | 61286 | \$47.90  | \$61.70 |
| S    | 2-1/2 | 4"    | 61287 | \$50.50  | \$64.30 |
| T    | 2-3/4 | 4-1/4 | 61288 | \$53.20  | \$67.00 |
| U    | 2-3/4 | 4-1/4 | 61289 | \$55.90  | \$69.70 |
| V    | 2-3/4 | 4-1/4 | 61290 | \$59.10  | \$76.30 |
| W    | 2-7/8 | 4-1/2 | 61257 | \$59.10  | \$76.30 |
| X    | 2-7/8 | 4-1/2 | 61258 | \$69.30  | \$86.50 |
| Y    | 2-7/8 | 4-1/2 | 61259 | \$69.30  | \$86.50 |
| Z    | 2-7/8 | 4-1/2 | 61260 | \$77.10  | \$94.40 |



| Diam  | LOF | OAL | EDP#  | UC Price | D1 Coat  |
|-------|-----|-----|-------|----------|----------|
| 1.0mm | 13  | 38  | 61261 | \$10.00  | \$14.40  |
| 1.5   | 19  | 38  | 61262 | \$10.00  | \$14.40  |
| 2.0   | 22  | 44  | 61263 | \$10.20  | \$14.70  |
| 2.5   | 25  | 50  | 61264 | \$11.10  | \$15.60  |
| 3.0   | 32  | 57  | 61265 | \$12.70  | \$18.00  |
| 3.5   | 35  | 63  | 61266 | \$14.00  | \$19.90  |
| 4.0   | 35  | 63  | 61267 | \$16.70  | \$24.90  |
| 4.5   | 41  | 70  | 61268 | \$18.40  | \$26.60  |
| 5.0   | 44  | 76  | 61269 | \$20.60  | \$29.40  |
| 5.5   | 44  | 76  | 61270 | \$23.50  | \$32.30  |
| 6.0   | 50  | 82  | 61271 | \$27.00  | \$35.80  |
| 6.5   | 50  | 82  | 61272 | \$31.80  | \$42.20  |
| 7.0   | 54  | 89  | 61273 | \$34.70  | \$45.10  |
| 7.5   | 60  | 95  | 61274 | \$37.30  | \$47.70  |
| 8.0   | 60  | 95  | 61275 | \$42.60  | \$56.40  |
| 8.5   | 63  | 101 | 61276 | \$46.80  | \$60.60  |
| 9.0   | 70  | 108 | 61277 | \$50.50  | \$64.30  |
| 9.5   | 70  | 108 | 61278 | \$55.90  | \$69.70  |
| 10.0  | 73  | 114 | 61279 | \$66.00  | \$83.20  |
| 10.5  | 73  | 114 | 61280 | \$77.10  | \$94.40  |
| 11.0  | 73  | 114 | 61281 | \$78.20  | \$95.40  |
| 11.5  | 76  | 120 | 61282 | \$91.70  | \$114.60 |
| 12.0  | 76  | 120 | 61283 | \$101.40 | \$124.30 |
| 12.5  | 76  | 120 | 61284 | \$103.30 | \$126.20 |



Drill Specifications (Metric):  
Cutting Diam +0.000/-0.008 mm  
Shank Diam +0.000/-0.008 mm  
SFR = Shrink Fit Ready

## Technical Data: GR Diamond Coated Series / D1 & D2

Speeds and Feeds for milling graphite and abrasive materials.

Use maximum spindle RPM to achieve up to 3000 SFPM.

- D1 & D2 coated GR Series will likely utilize your maximum possible spindle speed
- For reference, the chart below displays your achievable SFPM based upon your machining center
- Tool life should be 10–50 times that of uncoated carbide with improved accuracy and finish
- Long life allows unattended machining and part completion without tooling change
- Premium carbide substrate and special material preparation increases coating adhesion

| Diam | mm   | 100 SFPM | 250 SFPM | 500 SFPM  | 3000 SFPM | Roughing Feed<br>Rate CPT | Finishing Feed<br>Rate CPT | Roughing Feed<br>mm per tooth | Finishing Feed<br>mm per tooth |
|------|------|----------|----------|-----------|-----------|---------------------------|----------------------------|-------------------------------|--------------------------------|
|      |      | 30 M/min | 75 M/min | 150 M/min | 900 M/min |                           |                            |                               |                                |
| 1/64 | 0.4  | 24000    | 60000    | max rpm   | max rpm   | .0002 – .0005             | .0002 – .0003              | 0.005 – 0.013                 | 0.005 – 0.008                  |
| 1/32 | 0.8  | 12000    | 30000    | 60000     | max rpm   | .0005 – .001              | .0003 – .0006              | 0.013 – 0.025                 | 0.008 – 0.015                  |
| 1/16 | 1.5  | 6100     | 15300    | 30500     | max rpm   | .0008 – .002              | .0005 – .0013              | 0.203 – 0.051                 | 0.013 – 0.033                  |
| 3/32 | 2.5  | 4100     | 10200    | 20400     | max rpm   | .001 – .0022              | .0008 – .0015              | 0.025 – 0.056                 | 0.020 – 0.038                  |
| 1/8  | 3.0  | 3050     | 7640     | 15300     | max rpm   | .001 – .0025              | .001 – .002                | 0.025 – 0.064                 | 0.025 – 0.051                  |
| 3/16 | 4.5  | 2050     | 5100     | 10200     | 61000     | .002 – .0035              | .001 – .0025               | 0.051 – 0.090                 | 0.025 – 0.064                  |
| 1/4  | 6.0  | 1500     | 3820     | 7640      | 45800     | .0025 – .0045             | .001 – .0035               | 0.064 – 0.114                 | 0.025 – 0.090                  |
| 5/16 | 8.0  | 1220     | 3050     | 6120      | 36700     | .003 – .005               | .001 – .004                | 0.076 – 0.127                 | 0.025 – 0.102                  |
| 3/8  | 10.0 | 1020     | 2550     | 5100      | 30500     | .003 – .006               | .001 – .004                | 0.076 – 0.152                 | 0.025 – 0.102                  |
| 7/16 | 11.0 | 875      | 2200     | 4365      | 26200     | .004 – .008               | .001 – .005                | 0.102 – 0.203                 | 0.025 – 0.127                  |
| 1/2  | 12.0 | 765      | 1900     | 3820      | 23000     | .005 – .012               | .001 – .006                | 0.127 – 0.305                 | 0.025 – 0.152                  |

Metric dimensions and recommendations displayed in blue type. M/min = surface meters per minute. SFPM = surface feet per minute. Feed rates displayed in chip load per tooth.

### Typical Applications for D1 & D2 Diamond:

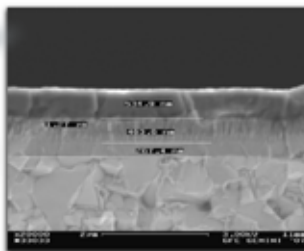
- Graphites • Aluminum-Silicon Alloys • Carbon Fiber Composites • Plastics • Green Ceramics
- Copper Alloys • Brass Magnesium • Hard Carbons • Fiberglass • High Silicon Aluminum
- Composite CFRP's • Metal Matrix Composites • Wood Composites
- Delrin • Kevlar • PEEK • Glass-Filled Composites



## About our D1 & D2 Diamond Coatings:

RoundTool Laboratories Diamond Coated End Mill Series are a perfect match on graphite molds for EDM. Our D1 and D2 coatings offer industry leading wear resistance when subjected to the abrasive properties of EDM graphite parts. RoundTool offers two versions of diamond; D1 is a PVD applied diamond while our D2 is a CVD application. Supporting both Series is a carbide end mill specially designed and manufactured with graphite milling in mind. While other companies simply coat standard off-the-shelf end mills, the GR-D1 and GR-D2 represent customized engineering featuring higher helix & heavier core, which in turn offer freer cutting and less deflection. These two series have also achieved great success in other applications featuring highly abrasive materials.

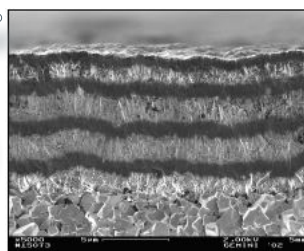
### SmoothCoat®



SmoothCoat® D1: RoundTool Lab's new generation of D1 raises the bar on PVD diamond coatings. D1 PVD Diamond is a smooth amorphous diamond coating that also maintains an extremely upsharp cutting edge. D1 offers the highest value proposition in a large majority of applications. Short, medium, and long running jobs all benefit from D1's unique attributes, and small diameter end mills particularly are complimented by the smooth & thin coating structure. These end mills will produce the finest finish and most accurate cut of our diamond selection. D1 end mills also have a quick turnaround time with our in-house coating facility.

Type: PVD Color: Shiny Black Thickness per side: 1.75 – 2.5 microns

### SmoothCoat®



SmoothCoat® D2: RoundTool Lab's new generation of D2 is a "grown on" CVD diamond coating that offers the highest wear resistance in machining graphite and abrasive non-metals. Tool life can be increased by up to 50x that of standard uncoated carbide end mills. With long tool life and minimal wear, D2 coated end mills improve part accuracy and workpiece tolerance levels. D2 end mills have a longer lead time due to the amount of time spent in the coating vessel physically growing the diamond crystalline structure.

Type: CVD Color: Flat Dark Grey Thickness per side: 4–6 microns

# new! Technical Data: MP, GR, GRD, SS, NF & LRX Series

Speeds and Feeds for a variety of materials.

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



Peripheral Milling: Full length of cut possible if radial depth  $\leq$  10% of tool diameter.



Slot Milling: Based on axial depth  $<$  20% of tool diameter.

- Data is for UnCoated (UC) condition of tool
- For coated tools, increase SFM by at least 25%
- For D1 and D2 coatings please refer to their separate Data sheet on page #37
- If recommended speed is higher than machine tool's capacity, run at maximum RPM and reduce feed rate accordingly

## Fractional Data

| Fractional Data       |  | Peripheral<br>Milling<br>SFPM |  | Slotting<br>SFPM | Feed Per Tooth based on End Mill Diameter |        |       |       |       |       |       |      |
|-----------------------|-----------------------------------------------------------------------------------|-------------------------------|-----------------------------------------------------------------------------------|------------------|-------------------------------------------|--------|-------|-------|-------|-------|-------|------|
|                       |                                                                                   |                               |                                                                                   |                  | < .010                                    | 1/64"  | 1/32" | 1/16" | 1/8"  | 3/16" | 1/4"  | 3/8" |
| Non-Ferrous           |                                                                                   |                               |                                                                                   |                  |                                           |        |       |       |       |       |       |      |
| 6061 T6 Aluminum      | up to 2000                                                                        | up to 1500                    | .0001                                                                             | .00015           | .0002                                     | .0004  | .0008 | .0012 | .0015 | .002  | .003  |      |
| Copper, Brass, Bronze | up to 1200                                                                        | up to 1000                    | .0001                                                                             | .00015           | .0002                                     | .0004  | .0008 | .0012 | .0015 | .002  | .003  |      |
| Plastics              | up to 2000                                                                        | up to 1500                    | .00015                                                                            | .0002            | .0003                                     | .0006  | .001  | .002  | .003  | .004  | .005  |      |
| Steels                |                                                                                   |                               |                                                                                   |                  |                                           |        |       |       |       |       |       |      |
| 1018, 1020            | 150 to 300                                                                        | 125 to 250                    | .0001                                                                             | .00015           | .0002                                     | .00025 | .0005 | .001  | .0015 | .002  | .0025 |      |
| 4140, 4340, P20       | 125 to 250                                                                        | 125 to 225                    | .00007                                                                            | .0001            | .00015                                    | .00025 | .0005 | .0007 | .001  | .0015 | .002  |      |
| A2, D2, H13 ≤ 32HRC   | 125 to 225                                                                        | 100 to 150                    | .00007                                                                            | .0001            | .00015                                    | .00025 | .0005 | .0007 | .001  | .0015 | .002  |      |
| A2, D2, H13 ≥ 32HRC   | 100 to 125                                                                        | 100 to 125                    | .0001                                                                             | .00015           | .0001                                     | .00015 | .0003 | .0005 | .0008 | .0010 | .0015 |      |
| Stainless Steels      |                                                                                   |                               |                                                                                   |                  |                                           |        |       |       |       |       |       |      |
| 15-5, 17-4 ≤ 32HRC    | 150 to 350                                                                        | 100 to 225                    | .00007                                                                            | .0001            | .00015                                    | .00025 | .0005 | .0007 | .001  | .0015 | .002  |      |
| 15-5, 17-4 ≥ 32HRC    | 100 to 125                                                                        | 100 to 150                    | .00005                                                                            | .00008           | .0001                                     | .00015 | .0003 | .0005 | .0008 | .0010 | .0015 |      |
| 303, 304, 316         | 150 to 300                                                                        | 125 to 225                    | .00007                                                                            | .0001            | .00015                                    | .00025 | .0005 | .0007 | .001  | .0012 | .0015 |      |
| 420, 440C             | 150 to 250                                                                        | 125 to 225                    | .00007                                                                            | .0001            | .00015                                    | .00025 | .0005 | .0007 | .001  | .0015 | .0015 |      |
| High Temp Alloys      |                                                                                   |                               |                                                                                   |                  |                                           |        |       |       |       |       |       |      |
| Inconel 625           | 75 to 150                                                                         | 75 to 125                     | .00005                                                                            | .00008           | .0001                                     | .00015 | .0005 | .0007 | .001  | .0015 | .002  |      |
| Inconel 718           | 50 to 120                                                                         | 50 to 110                     | .00005                                                                            | .00008           | .0001                                     | .00013 | .0003 | .0005 | .001  | .0015 | .0015 |      |
| 6Al-4V Titanium       | 100 to 150                                                                        | 75 to 125                     | .00005                                                                            | .00008           | .0001                                     | .00015 | .0005 | .0007 | .001  | .001  | .0015 |      |
| Cast Iron             |                                                                                   |                               |                                                                                   |                  |                                           |        |       |       |       |       |       |      |
| Gray Iron ≤ 32HRC     | 150 to 300                                                                        | 125 to 250                    | .0001                                                                             | .00015           | .0002                                     | .00025 | .0005 | .0007 | .001  | .0015 | .002  |      |
| Ductile Iron          | 150 to 250                                                                        | 125 to 250                    | .0001                                                                             | .00015           | .0002                                     | .00025 | .0005 | .0007 | .001  | .0015 | .002  |      |

## Metric Data

| Metric Data           |  Peripheral<br>Milling<br>M/Min |  Slotting<br>M/Min | Feed Per Tooth based on End Mill Diameter |        |        |        |        |        |        |       |       |
|-----------------------|--------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|-------------------------------------------|--------|--------|--------|--------|--------|--------|-------|-------|
|                       |                                                                                                                    |                                                                                                       | < 1.0mm                                   | 2.0 mm | 3.0 mm | 4.0 mm | 5.0 mm | 6.0 mm | 8.0 mm | 10 mm | 12 mm |
| Non-Ferrous           |                                                                                                                    |                                                                                                       |                                           |        |        |        |        |        |        |       |       |
| 6061 T6 Aluminum      | up to 600                                                                                                          | up to 450                                                                                             | 0.005                                     | 0.007  | 0.025  | 0.025  | 0.030  | 0.038  | 0.050  | 0.050 | 0.076 |
| Copper, Brass, Bronze | up to 365                                                                                                          | up to 300                                                                                             | 0.005                                     | 0.007  | 0.025  | 0.025  | 0.030  | 0.038  | 0.050  | 0.050 | 0.076 |
| Plastics              | up to 600                                                                                                          | up to 450                                                                                             | 0.0075                                    | 0.009  | 0.025  | 0.025  | 0.050  | 0.076  | 0.100  | 0.100 | 0.130 |
| Steels                |                                                                                                                    |                                                                                                       |                                           |        |        |        |        |        |        |       |       |
| 1018, 1020            | 45 to 90                                                                                                           | 38 to 76                                                                                              | 0.005                                     | 0.005  | 0.015  | 0.018  | 0.025  | 0.038  | 0.050  | 0.050 | 0.065 |
| 4140, 4340, P20       | 38 to 76                                                                                                           | 38 to 68                                                                                              | 0.004                                     | 0.005  | 0.012  | 0.014  | 0.018  | 0.025  | 0.038  | 0.038 | 0.050 |
| A2, D2, H13 ≤ 32HRC   | 38 to 68                                                                                                           | 30 to 45                                                                                              | 0.004                                     | 0.005  | 0.012  | 0.014  | 0.018  | 0.025  | 0.038  | 0.038 | 0.050 |
| A2, D2, H13 ≥ 32HRC   | 30 to 38                                                                                                           | 30 to 38                                                                                              | 0.005                                     | 0.005  | 0.010  | 0.010  | 0.012  | 0.020  | 0.025  | 0.025 | 0.038 |
| Stainless Steels      |                                                                                                                    |                                                                                                       |                                           |        |        |        |        |        |        |       |       |
| 15-5, 17-4 ≤ 32HRC    | 45 to 110                                                                                                          | 30 to 68                                                                                              | 0.004                                     | 0.005  | 0.012  | 0.014  | 0.018  | 0.025  | 0.038  | 0.038 | 0.050 |
| 15-5, 17-4 ≥ 32HRC    | 30 to 38                                                                                                           | 30 to 45                                                                                              | 0.0025                                    | 0.005  | 0.010  | 0.010  | 0.012  | 0.020  | 0.025  | 0.025 | 0.038 |
| 303, 304, 316         | 45 to 90                                                                                                           | 38 to 68                                                                                              | 0.004                                     | 0.005  | 0.012  | 0.014  | 0.018  | 0.025  | 0.030  | 0.030 | 0.038 |
| 420, 440C             | 45 to 76                                                                                                           | 38 to 68                                                                                              | 0.004                                     | 0.005  | 0.012  | 0.014  | 0.018  | 0.025  | 0.038  | 0.038 | 0.038 |
| High Temp Alloys      |                                                                                                                    |                                                                                                       |                                           |        |        |        |        |        |        |       |       |
| Inconel 625           | 22 to 45                                                                                                           | 22 to 38                                                                                              | 0.0025                                    | 0.005  | 0.012  | 0.012  | 0.018  | 0.025  | 0.038  | 0.038 | 0.050 |
| Inconel 718           | 15 to 36                                                                                                           | 15 to 34                                                                                              | 0.0025                                    | 0.005  | 0.010  | 0.010  | 0.012  | 0.025  | 0.038  | 0.038 | 0.038 |
| 6Al-4V Titanium       | 30 to 45                                                                                                           | 22 to 38                                                                                              | 0.0025                                    | 0.005  | 0.012  | 0.012  | 0.018  | 0.025  | 0.025  | 0.025 | 0.038 |
| Cast Iron             |                                                                                                                    |                                                                                                       |                                           |        |        |        |        |        |        |       |       |
| Gray Iron ≤ 32HRC     | 45 to 90                                                                                                           | 38 to 76                                                                                              | 0.005                                     | 0.007  | 0.012  | 0.014  | 0.018  | 0.025  | 0.038  | 0.038 | 0.050 |
| Ductile Iron          | 45 to 76                                                                                                           | 38 to 76                                                                                              | 0.005                                     | 0.007  | 0.012  | 0.014  | 0.018  | 0.025  | 0.038  | 0.038 | 0.050 |



## Terms & Conditions

**Our goal is to delight our customers.**

**Ordering Information:** All RoundTool® products have a Series-Size designator and EDP number. Both should be used when entering orders via e-mail, fax, phone, or postal mail communications. RoundTool EDP numbers bear an "RT" suffix to differentiate themselves from other Tool Alliance product lines. This suffix is not displayed in the catalog but will be printed on all official correspondence.

**Availability:** RoundTool® products are available mostly through select Industrial Distributors 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 November 3, 2014, 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 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 (U.S. Dollar).

**Returned Items:** Current catalog items are returnable subject to a 25% handling charge and approval by the RoundTool® 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 Return Authorization (RA) number must be obtained from the RoundTool® Sales Department prior to return. Returned product must be sent to the Factory for credit; consignment locations are not capable of issuing either RA's or credit memos. Special tools 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 effect pricing upon quotation. Special orders cannot be cancelled without prior approval and proper consideration.

**Product Warranty:** RoundTool® warrants that products sold by it shall be free from defects in materials and workmanship. RoundTool Labs 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:** RoundTool® 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.



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 Tool 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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Mil-Tec, Incorporated  
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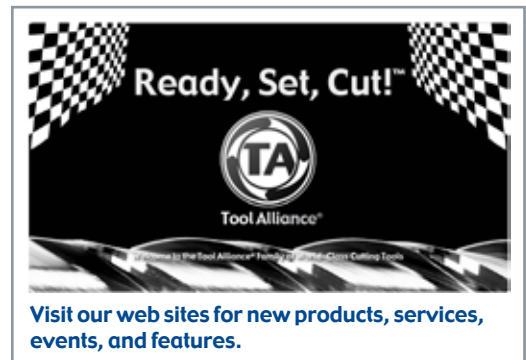
Tool Alliance / California  
Ultra-Tool Int'l Inc.  
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## RoundTool Laboratories® sales features:

- The Company has a well known brand, superb quality reputation, and a 45 year operating history.
- Tool Alliance 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 USA-based 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 RoundTool 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 PVD Diamond (D1), CVD Diamond (D2), TiB2 (A1) and HSN<sup>2</sup> (AT).
- 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.



## About the technology of RoundTool® and Tool Alliance®:

We obsess over details that create the finest cutting tools available. Our reward is customer satisfaction via increasing their 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.
- SmoothContricity® = Precision grinding, tool holding, and tolerances for minimized TIR.
- SmoothCoat® = Sputter-based SuperNitride PVD coating for superior surface hardness & uniformity.
- SmoothEdge® = Surface and edge preparations for lubricity and minimized break-in.



Sharpness & Lubricity.  
No wonder it works better.

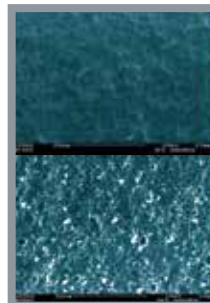
**SmoothGrind®**

Tight tolerances.  
Minimized run-out.



**SmoothContricity®**

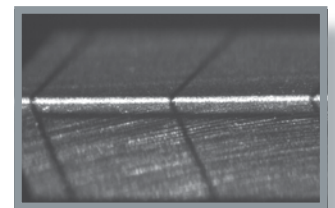
Our coating @ 2,000X (top).  
Everybody else's (bottom).



**SmoothCoat®**

Edge Integrity.  
Runs great on the first pass.

RoundTool end mill cutting edge  
magnified to display SE4 hone.



**SmoothEdge®**



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