



FEATURED SOLUTIONS

# Corner Conditioning



Photo courtesy of Mike S. Murray

**"I use your 3/32" corner rounding end mill, 5/32" drill/end mill and the 1/8" 90° engraver. They have machined tons of bottle openers and they show no sign of wear!"**

**– Mike S. Murray, UT**

# Corner Conditioning

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

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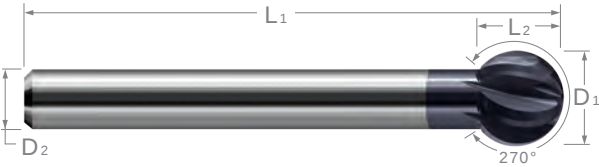
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UNDERCUTTING END MILLS

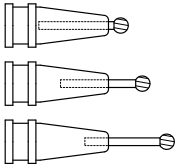
270° Reduced Shank

UNDERCUTTING END MILLS



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

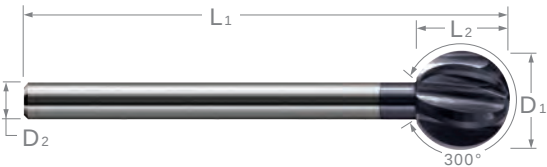
Chuck at  
Any Depth!



| CUTTER DIAMETER                                      | LENGTH OF CUT                                        | FLUTES | SHANK DIAMETER | OVERALL LENGTH | UNCOATED |        | AITIN COATED |        |
|------------------------------------------------------|------------------------------------------------------|--------|----------------|----------------|----------|--------|--------------|--------|
| D <sub>1</sub> <sup>+ .000"</sup> <sub>- .002"</sub> | L <sub>2</sub> <sup>+ .020"</sup> <sub>- .000"</sub> |        | D <sub>2</sub> | L <sub>1</sub> | 6 FL     | PRICE  | 6 FL         | PRICE  |
| 1/4                                                  | .217                                                 | 6      | 4 mm           | 3-1/2          | 956116   | 255.40 | 956116-C3    | 264.30 |
| 5/16                                                 | .273                                                 | 6      | 3/16           | 3-1/2          | 956120   | 260.40 | 956120-C3    | 269.30 |
| 3/8                                                  | .324                                                 | 6      | 6 mm           | 3-1/2          | 956124   | 263.00 | 956124-C3    | 273.10 |
| 1/2                                                  | .432                                                 | 6      | 5/16           | 4              | 956132   | 276.40 | 956132-C3    | 291.50 |
| 5/8                                                  | .546                                                 | 6      | 3/8            | 4              | 956140   | 316.90 | 956140-C3    | 333.20 |
| 3/4                                                  | .645                                                 | 6      | 1/2            | 5              | 956148   | 455.90 | 956148-C3    | 463.90 |
| 1                                                    | .873                                                 | 6      | 5/8            | 5              | 956164   | 645.10 | 956164-C3    | 672.40 |

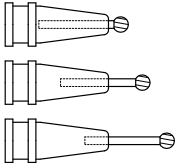
UNDERCUTTING END MILLS

300° Reduced Shank



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

Chuck at  
Any Depth!

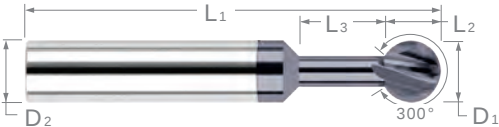


| CUTTER DIAMETER                                      | LENGTH OF CUT                                        | FLUTES | SHANK DIAMETER | OVERALL LENGTH | UNCOATED |        | AITIN COATED |        |
|------------------------------------------------------|------------------------------------------------------|--------|----------------|----------------|----------|--------|--------------|--------|
| D <sub>1</sub> <sup>+ .000"</sup> <sub>- .002"</sub> | L <sub>2</sub> <sup>+ .020"</sup> <sub>- .000"</sub> |        | D <sub>2</sub> | L <sub>1</sub> | 6 FL     | PRICE  | 6 FL         | PRICE  |
| 1/4                                                  | .232                                                 | 6      | 3 mm           | 3-1/2          | 947416   | 273.70 | 947416-C3    | 282.60 |
| 5/16                                                 | .293                                                 | 6      | 9/64           | 3-1/2          | 947420   | 277.00 | 947420-C3    | 285.90 |
| 3/8                                                  | .355                                                 | 6      | 4 mm           | 3-1/2          | 947424   | 280.30 | 947424-C3    | 290.40 |
| 1/2                                                  | .472                                                 | 6      | 3/16           | 4              | 947432   | 293.60 | 947432-C3    | 308.70 |
| 5/8                                                  | .589                                                 | 6      | 1/4            | 4              | 947440   | 334.00 | 947440-C3    | 350.30 |
| 3/4                                                  | .706                                                 | 6      | 5/16           | 5              | 947448   | 473.00 | 947448-C3    | 490.40 |
| 1                                                    | .939                                                 | 6      | 7/16           | 5              | 947464   | 661.30 | 947464-C3    | 688.60 |

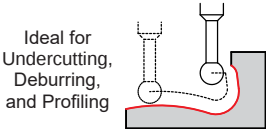
NEW

UNDERCUTTING END MILLS

300°



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



UNDERCUTTING END MILLS

| CUTTER<br>DIAMETER                                                      | LENGTH<br>OF CUT                                                        | NECK<br>DIA. | NECK<br>LENGTH                                                          | FLUTES | SHANK<br>DIAMETER | OVERALL<br>LENGTH | UNCOATED |       | AITIN COATED |       |
|-------------------------------------------------------------------------|-------------------------------------------------------------------------|--------------|-------------------------------------------------------------------------|--------|-------------------|-------------------|----------|-------|--------------|-------|
|                                                                         |                                                                         |              |                                                                         |        |                   |                   | TOOL #   | PRICE | TOOL #       | PRICE |
| D <sub>1</sub> $\begin{smallmatrix} +.000" \\ -.001" \end{smallmatrix}$ | L <sub>2</sub> $\begin{smallmatrix} +.010" \\ -.000" \end{smallmatrix}$ |              | L <sub>3</sub> $\begin{smallmatrix} +.020" \\ -.000" \end{smallmatrix}$ |        | D <sub>2</sub>    | L <sub>1</sub>    |          |       |              |       |
| 1/32                                                                    | .028                                                                    | .010         | .031                                                                    | 2      | 1/8               | 1-1/2             | 983931   | 72.60 | 983931-C3    | 77.80 |
| 1/32                                                                    | .028                                                                    | .010         | .062                                                                    | 2      | 1/8               | 1-1/2             | 979131   | 72.60 | 979131-C3    | 77.80 |
| .0394 (1 mm)                                                            | .036                                                                    | .014         | .047                                                                    | 2      | 1/8               | 1-1/2             | 98391M   | 72.60 | 98391M-C3    | 77.80 |
| .0394 (1 mm)                                                            | .036                                                                    | .014         | .078                                                                    | 2      | 1/8               | 1-1/2             | 97911M   | 72.60 | 97911M-C3    | 77.80 |
| 3/64                                                                    | .043                                                                    | .018         | .062                                                                    | 2      | 1/8               | 1-1/2             | 983947   | 72.60 | 983947-C3    | 77.80 |
| 3/64                                                                    | .043                                                                    | .018         | .093                                                                    | 2      | 1/8               | 1-1/2             | 979147   | 72.60 | 979147-C3    | 77.80 |
| 3/64                                                                    | .043                                                                    | .018         | .125                                                                    | 2      | 1/8               | 1-1/2             | 940047   | 72.60 | 940047-C3    | 77.80 |
| 1/16                                                                    | .057                                                                    | .024         | .031                                                                    | 2      | 1/8               | 1-1/2             | 989562   | 51.50 | 989562-C3    | 56.70 |
| 1/16                                                                    | .057                                                                    | .024         | .062                                                                    | 2      | 1/8               | 1-1/2             | 875762   | 51.50 | 875762-C3    | 56.70 |
| 1/16                                                                    | .057                                                                    | .024         | .078                                                                    | 2      | 1/8               | 1-1/2             | 983962   | 51.50 | 983962-C3    | 56.70 |
| 1/16                                                                    | .057                                                                    | .024         | .125                                                                    | 2      | 1/8               | 1-1/2             | 979162   | 51.50 | 979162-C3    | 56.70 |
| 1/16                                                                    | .057                                                                    | .024         | .187                                                                    | 2      | 1/8               | 1-1/2             | 940062   | 51.50 | 940062-C3    | 56.70 |
| 1/16                                                                    | .057                                                                    | .024         | .250                                                                    | 2      | 1/8               | 1-1/2             | 767862   | 51.50 | 767862-C3    | 56.70 |
| 5/64                                                                    | .072                                                                    | .031         | .047                                                                    | 2      | 1/8               | 1-1/2             | 989578   | 51.50 | 989578-C3    | 56.70 |
| 5/64                                                                    | .072                                                                    | .031         | .093                                                                    | 2      | 1/8               | 1-1/2             | 983978   | 51.50 | 983978-C3    | 56.70 |
| 5/64                                                                    | .072                                                                    | .031         | .156                                                                    | 2      | 1/8               | 1-1/2             | 979178   | 51.50 | 979178-C3    | 56.70 |
| 5/64                                                                    | .072                                                                    | .031         | .218                                                                    | 2      | 1/8               | 1-1/2             | 940078   | 51.50 | 940078-C3    | 56.70 |
| 3/32                                                                    | .086                                                                    | .038         | .062                                                                    | 2      | 1/8               | 1-1/2             | 989593   | 51.50 | 989593-C3    | 56.70 |
| 3/32                                                                    | .086                                                                    | .038         | .093                                                                    | 2      | 1/8               | 1-1/2             | 875793   | 51.50 | 875793-C3    | 56.70 |
| 3/32                                                                    | .086                                                                    | .038         | .125                                                                    | 2      | 1/8               | 1-1/2             | 983993   | 51.50 | 983993-C3    | 56.70 |
| 3/32                                                                    | .086                                                                    | .038         | .156                                                                    | 2      | 1/8               | 1-1/2             | 926893   | 51.50 | 926893-C3    | 56.70 |
| 3/32                                                                    | .086                                                                    | .038         | .218                                                                    | 2      | 1/8               | 1-1/2             | 979193   | 51.50 | 979193-C3    | 56.70 |
| 3/32                                                                    | .086                                                                    | .038         | .281                                                                    | 2      | 1/8               | 1-1/2             | 940093   | 51.50 | 940093-C3    | 56.70 |
| 3/32                                                                    | .086                                                                    | .038         | .375                                                                    | 2      | 1/8               | 1-1/2             | 766693   | 51.50 | 766693-C3    | 56.70 |
| 7/64                                                                    | .101                                                                    | .047         | .156                                                                    | 2      | 1/8               | 1-1/2             | 984007   | 52.10 | 984007-C3    | 57.30 |
| 7/64                                                                    | .101                                                                    | .047         | .250                                                                    | 2      | 1/8               | 1-1/2             | 979207   | 52.10 | 979207-C3    | 57.30 |
| .1181 (3 mm)                                                            | .110                                                                    | .051         | .078                                                                    | 2      | 1/8               | 1-1/2             | 98953M   | 51.50 | 98953M-C3    | 56.70 |
| .1181 (3 mm)                                                            | .110                                                                    | .051         | .156                                                                    | 2      | 1/8               | 1-1/2             | 98393M   | 51.50 | 98393M-C3    | 56.70 |
| .1181 (3 mm)                                                            | .110                                                                    | .051         | .218                                                                    | 2      | 1/8               | 1-1/2             | 92683M   | 51.50 | 92683M-C3    | 56.70 |

|                                                                         |                                                                         |      |                                                                         |   |                |                |        |       |           |       |
|-------------------------------------------------------------------------|-------------------------------------------------------------------------|------|-------------------------------------------------------------------------|---|----------------|----------------|--------|-------|-----------|-------|
| D <sub>1</sub> $\begin{smallmatrix} +.000" \\ -.002" \end{smallmatrix}$ | L <sub>2</sub> $\begin{smallmatrix} +.020" \\ -.000" \end{smallmatrix}$ |      | L <sub>3</sub> $\begin{smallmatrix} +.030" \\ -.000" \end{smallmatrix}$ |   | D <sub>2</sub> | L <sub>1</sub> | TOOL # | PRICE | TOOL #    | PRICE |
| 1/8                                                                     | .116                                                                    | .053 | .047                                                                    | 4 | 1/8            | 1-1/2          | 943608 | 38.20 | 943608-C3 | 43.40 |
| 1/8                                                                     | .116                                                                    | .053 | .093                                                                    | 4 | 1/8            | 1-1/2          | 990608 | 42.00 | 990608-C3 | 47.20 |
| 1/8                                                                     | .116                                                                    | .053 | .125                                                                    | 4 | 1/8            | 1-1/2          | 933008 | 45.20 | 933008-C3 | 50.40 |
| 1/8                                                                     | .116                                                                    | .053 | .156                                                                    | 4 | 1/8            | 1-1/2          | 875808 | 49.10 | 875808-C3 | 54.30 |
| 1/8                                                                     | .116                                                                    | .053 | .187                                                                    | 4 | 1/8            | 1-1/2          | 984008 | 49.10 | 984008-C3 | 54.30 |
| 1/8                                                                     | .116                                                                    | .053 | .250                                                                    | 4 | 1/8            | 1-1/2          | 843208 | 54.80 | 843208-C3 | 60.00 |
| 1/8                                                                     | .116                                                                    | .053 | .281                                                                    | 4 | 1/8            | 1-1/2          | 979208 | 54.80 | 979208-C3 | 60.00 |

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UNDERCUTTING END MILLS

300° (cont.)

continued from previous page

| CUTTER<br>DIAMETER                                  | LENGTH<br>OF CUT                                    | NECK<br>DIA. | NECK<br>LENGTH                                      | FLUTES | SHANK<br>DIAMETER | OVERALL<br>LENGTH | UNCOATED |        | AItIN COATED |        |
|-----------------------------------------------------|-----------------------------------------------------|--------------|-----------------------------------------------------|--------|-------------------|-------------------|----------|--------|--------------|--------|
|                                                     |                                                     |              |                                                     |        |                   |                   | TOOL #   | PRICE  | TOOL #       | PRICE  |
| D <sub>1</sub> <sup>+ .0007</sup> <sub>-.0027</sub> | L <sub>2</sub> <sup>+ .0207</sup> <sub>-.0007</sub> |              | L <sub>3</sub> <sup>+ .0307</sup> <sub>-.0007</sub> |        | D <sub>2</sub>    | L <sub>1</sub>    |          |        |              |        |
| 1/8                                                 | .116                                                | .053         | .312                                                | 4      | 1/8               | 1-1/2             | 794608   | 56.90  | 794608-C3    | 62.10  |
| 1/8                                                 | .116                                                | .053         | .375                                                | 4      | 1/8               | 1-1/2             | 940108   | 60.40  | 940108-C3    | 65.60  |
| 1/8                                                 | .116                                                | .053         | .437                                                | 4      | 1/8               | 1-1/2             | 739008   | 62.60  | 739008-C3    | 67.80  |
| 1/8                                                 | .116                                                | .053         | .500                                                | 4      | 1/8               | 1-1/2             | 952308   | 64.70  | 952308-C3    | 69.90  |
| 1/8                                                 | .116                                                | .053         | .625                                                | 4      | 1/8               | 2                 | 911908   | 87.20  | 911908-C3    | 92.40  |
| 1/8                                                 | .116                                                | .053         | .750                                                | 4      | 1/8               | 3                 | 877908   | 90.10  | 877908-C3    | 95.30  |
| 9/64                                                | .130                                                | .062         | .125                                                | 4      | 3/16              | 2                 | 933009   | 56.80  | 933009-C3    | 62.40  |
| 9/64                                                | .130                                                | .062         | .218                                                | 4      | 3/16              | 2                 | 984009   | 59.10  | 984009-C3    | 64.70  |
| 9/64                                                | .130                                                | .062         | .312                                                | 4      | 3/16              | 2                 | 979209   | 66.10  | 979209-C3    | 71.70  |
| 5/32                                                | .145                                                | .071         | .047                                                | 4      | 3/16              | 2                 | 943610   | 53.00  | 943610-C3    | 58.60  |
| 5/32                                                | .145                                                | .071         | .125                                                | 4      | 3/16              | 2                 | 990610   | 53.00  | 990610-C3    | 58.60  |
| 5/32                                                | .145                                                | .071         | .187                                                | 4      | 3/16              | 2                 | 738810   | 56.60  | 738810-C3    | 62.20  |
| 5/32                                                | .145                                                | .071         | .250                                                | 4      | 3/16              | 2                 | 984010   | 60.10  | 984010-C3    | 65.70  |
| 5/32                                                | .145                                                | .071         | .375                                                | 4      | 3/16              | 2                 | 979210   | 69.50  | 979210-C3    | 75.10  |
| 5/32                                                | .145                                                | .071         | .500                                                | 4      | 3/16              | 2                 | 940110   | 73.40  | 940110-C3    | 79.00  |
| 5/32                                                | .145                                                | .071         | .625                                                | 4      | 3/16              | 2                 | 952310   | 74.90  | 952310-C3    | 80.50  |
| 3/16                                                | .174                                                | .082         | .062                                                | 4      | 3/16              | 2                 | 943612   | 53.00  | 943612-C3    | 58.60  |
| 3/16                                                | .174                                                | .082         | .125                                                | 4      | 3/16              | 2                 | 990612   | 53.00  | 990612-C3    | 58.60  |
| 3/16                                                | .174                                                | .082         | .187                                                | 4      | 3/16              | 2                 | 933012   | 56.60  | 933012-C3    | 62.20  |
| 3/16                                                | .174                                                | .082         | .250                                                | 4      | 3/16              | 2                 | 984012   | 60.10  | 984012-C3    | 65.70  |
| 3/16                                                | .174                                                | .082         | .312                                                | 4      | 3/16              | 2                 | 926912   | 64.70  | 926912-C3    | 70.30  |
| 3/16                                                | .174                                                | .082         | .375                                                | 4      | 3/16              | 2                 | 843212   | 67.00  | 843212-C3    | 72.60  |
| 3/16                                                | .174                                                | .082         | .437                                                | 4      | 3/16              | 2                 | 979212   | 69.50  | 979212-C3    | 75.10  |
| 3/16                                                | .174                                                | .082         | .500                                                | 4      | 3/16              | 2                 | 794612   | 70.80  | 794612-C3    | 76.40  |
| 3/16                                                | .174                                                | .082         | .625                                                | 4      | 3/16              | 2                 | 940112   | 72.00  | 940112-C3    | 77.60  |
| 3/16                                                | .174                                                | .082         | .750                                                | 4      | 3/16              | 2                 | 952312   | 75.50  | 952312-C3    | 81.10  |
| 3/16                                                | .174                                                | .082         | .875                                                | 4      | 3/16              | 2-1/2             | 834612   | 78.70  | 834612-C3    | 84.30  |
| 3/16                                                | .174                                                | .082         | 1.000                                               | 4      | 3/16              | 2-1/2             | 911912   | 80.30  | 911912-C3    | 85.90  |
| 3/16                                                | .174                                                | .082         | 1.250                                               | 4      | 3/16              | 3                 | 877912   | 83.60  | 877912-C3    | 89.20  |
| .1969 (5 mm)                                        | .182                                                | .086         | .156                                                | 4      | 1/4               | 2-1/2             | 99065M   | 73.30  | 99065M-C3    | 80.90  |
| .1969 (5 mm)                                        | .182                                                | .086         | .250                                                | 4      | 1/4               | 2-1/2             | 98405M   | 76.80  | 98405M-C3    | 84.40  |
| 7/32                                                | .203                                                | .098         | .156                                                | 4      | 1/4               | 2-1/2             | 990614   | 73.30  | 990614-C3    | 80.90  |
| 7/32                                                | .203                                                | .098         | .312                                                | 4      | 1/4               | 2-1/2             | 984014   | 81.50  | 984014-C3    | 89.10  |
| .2362 (6 mm)                                        | .220                                                | .106         | .156                                                | 4      | 1/4               | 2-1/2             | 99066M   | 72.30  | 99066M-C3    | 79.90  |
| .2362 (6 mm)                                        | .220                                                | .106         | .312                                                | 4      | 1/4               | 2-1/2             | 98406M   | 81.50  | 98406M-C3    | 89.10  |
| .2362 (6 mm)                                        | .220                                                | .106         | .437                                                | 4      | 1/4               | 2-1/2             | 92696M   | 84.30  | 92696M-C3    | 91.90  |
| .2362 (6 mm)                                        | .220                                                | .106         | .562                                                | 4      | 1/4               | 2-1/2             | 97926M   | 88.80  | 97926M-C3    | 96.40  |
| 1/4                                                 | .233                                                | .112         | .093                                                | 4      | 1/4               | 2-1/2             | 943616   | 71.00  | 943616-C3    | 78.60  |
| 1/4                                                 | .233                                                | .112         | .187                                                | 4      | 1/4               | 2-1/2             | 990616   | 71.00  | 990616-C3    | 78.60  |
| 1/4                                                 | .233                                                | .112         | .250                                                | 4      | 1/4               | 2-1/2             | 933016   | 74.90  | 933016-C3    | 82.50  |
| 1/4                                                 | .233                                                | .112         | .375                                                | 4      | 1/4               | 2-1/2             | 984016   | 78.20  | 984016-C3    | 85.80  |
| 1/4                                                 | .233                                                | .112         | .437                                                | 4      | 1/4               | 2-1/2             | 738616   | 82.30  | 738616-C3    | 89.90  |
| 1/4                                                 | .233                                                | .112         | .500                                                | 4      | 1/4               | 2-1/2             | 926916   | 86.30  | 926916-C3    | 93.90  |
| 1/4                                                 | .233                                                | .112         | .625                                                | 4      | 1/4               | 2-1/2             | 979216   | 94.70  | 979216-C3    | 102.30 |
| 1/4                                                 | .233                                                | .112         | .750                                                | 4      | 1/4               | 2-1/2             | 940116   | 100.90 | 940116-C3    | 108.50 |
| 1/4                                                 | .233                                                | .112         | 1.000                                               | 4      | 1/4               | 2-1/2             | 952316   | 108.20 | 952316-C3    | 115.80 |
| 1/4                                                 | .233                                                | .112         | 1.250                                               | 4      | 1/4               | 3                 | 911916   | 116.90 | 911916-C3    | 124.50 |
| 1/4                                                 | .233                                                | .112         | 1.500                                               | 4      | 1/4               | 4                 | 877916   | 125.50 | 877916-C3    | 134.40 |

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UNDERCUTTING END MILLS

300° (cont.)

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| CUTTER DIAMETER                                      | LENGTH OF CUT                                        | NECK DIA. | NECK LENGTH                                          | FLUTES | SHANK DIAMETER | OVERALL LENGTH | UNCOATED |        | AISI COATED |        |
|------------------------------------------------------|------------------------------------------------------|-----------|------------------------------------------------------|--------|----------------|----------------|----------|--------|-------------|--------|
|                                                      |                                                      |           |                                                      |        |                |                | TOOL #   | PRICE  | TOOL #      | PRICE  |
| D <sub>1</sub> <sup>+ .000"</sup> <sub>- .002"</sub> | L <sub>2</sub> <sup>+ .020"</sup> <sub>- .000"</sub> |           | L <sub>3</sub> <sup>+ .030"</sup> <sub>- .000"</sub> |        | D <sub>2</sub> | L <sub>1</sub> |          |        |             |        |
| 9/32                                                 | .262                                                 | .127      | .187                                                 | 4      | 5/16           | 2-1/2          | 990618   | 100.20 | 990618-C3   | 109.10 |
| 9/32                                                 | .262                                                 | .127      | .375                                                 | 4      | 5/16           | 2-1/2          | 984018   | 117.60 | 984018-C3   | 126.50 |
| 5/16                                                 | .291                                                 | .143      | .250                                                 | 4      | 5/16           | 2-1/2          | 990620   | 96.90  | 990620-C3   | 105.80 |
| 5/16                                                 | .291                                                 | .143      | .437                                                 | 4      | 5/16           | 2-1/2          | 984020   | 115.20 | 984020-C3   | 124.10 |
| 5/16                                                 | .291                                                 | .143      | .750                                                 | 4      | 5/16           | 2-1/2          | 979220   | 129.50 | 979220-C3   | 138.40 |
| 5/16                                                 | .291                                                 | .143      | 1.000                                                | 4      | 5/16           | 2-1/2          | 940120   | 144.00 | 940120-C3   | 152.90 |
| 3/8                                                  | .349                                                 | .172      | .156                                                 | 4      | 3/8            | 2-1/2          | 943624   | 101.70 | 943624-C3   | 111.80 |
| 3/8                                                  | .349                                                 | .172      | .250                                                 | 4      | 3/8            | 2-1/2          | 990624   | 103.40 | 990624-C3   | 113.50 |
| 3/8                                                  | .349                                                 | .172      | .375                                                 | 4      | 3/8            | 2-1/2          | 933024   | 112.40 | 933024-C3   | 122.50 |
| 3/8                                                  | .349                                                 | .172      | .500                                                 | 4      | 3/8            | 2-1/2          | 984024   | 121.40 | 984024-C3   | 131.50 |
| 3/8                                                  | .349                                                 | .172      | .687                                                 | 4      | 3/8            | 2-1/2          | 926924   | 131.10 | 926924-C3   | 141.20 |
| 3/8                                                  | .349                                                 | .172      | .750                                                 | 4      | 3/8            | 2-1/2          | 843224   | 134.80 | 843224-C3   | 144.90 |
| 3/8                                                  | .349                                                 | .172      | 1.000                                                | 4      | 3/8            | 3              | 979224   | 141.00 | 979224-C3   | 151.10 |
| 3/8                                                  | .349                                                 | .172      | 1.250                                                | 4      | 3/8            | 3              | 940124   | 147.60 | 940124-C3   | 157.70 |
| 3/8                                                  | .349                                                 | .172      | 1.500                                                | 4      | 3/8            | 4              | 952324   | 171.40 | 952324-C3   | 185.20 |
| .3937 (10 mm)                                        | .366                                                 | .181      | .312                                                 | 4      | 7/16           | 2-3/4          | 990625   | 127.60 | 990625-C3   | 140.20 |
| .3937 (10 mm)                                        | .366                                                 | .181      | .562                                                 | 4      | 7/16           | 2-3/4          | 984025   | 151.80 | 984025-C3   | 164.40 |
| 1/2                                                  | .466                                                 | .230      | .187                                                 | 4      | 1/2            | 3              | 943632   | 156.60 | 943632-C3   | 171.70 |
| 1/2                                                  | .466                                                 | .230      | .312                                                 | 4      | 1/2            | 3              | 990632   | 157.80 | 990632-C3   | 172.90 |
| 1/2                                                  | .466                                                 | .230      | .750                                                 | 4      | 1/2            | 3              | 984032   | 179.20 | 984032-C3   | 194.30 |
| 1/2                                                  | .466                                                 | .230      | 1.000                                                | 4      | 1/2            | 3              | 926932   | 193.90 | 926932-C3   | 209.00 |
| 1/2                                                  | .466                                                 | .230      | 1.250                                                | 4      | 1/2            | 4              | 979232   | 217.70 | 979232-C3   | 232.80 |
| 1/2                                                  | .466                                                 | .230      | 1.625                                                | 4      | 1/2            | 4              | 940132   | 213.80 | 940132-C3   | 228.90 |
| 1/2                                                  | .466                                                 | .230      | 2.000                                                | 4      | 1/2            | 4              | 952332   | 239.00 | 952332-C3   | 254.10 |
| NEW 5/8                                              | .583                                                 | .292      | 1.000                                                | 4      | 5/8            | 3-1/2          | 984040   | 266.60 | 984040-C3   | 281.70 |
| 5/8                                                  | .583                                                 | .292      | 1.625                                                | 4      | 5/8            | 4              | 979240   | 272.50 | 979240-C3   | 288.80 |
| NEW 3/4                                              | .699                                                 | .355      | 1.500                                                | 4      | 3/4            | 4              | 926948   | 314.40 | 926948-C3   | 330.70 |
| 3/4                                                  | .699                                                 | .355      | 2.000                                                | 4      | 3/4            | 6              | 979248   | 343.80 | 979248-C3   | 367.40 |

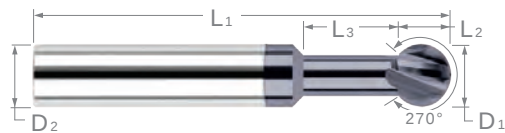


Check Out All of Our Undercutting Solutions!

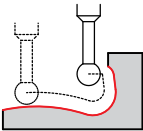
UNDERCUTTING END MILLS

270°

UNDERCUTTING END MILLS



Ideal for Undercutting, Deburring, and Profiling



- 270° spherical ball
- Designed for undercutting, deburring, and multi-axis machining
- Center cutting
- Choose from two types:
  - Type I: Straight neck
  - Type II: Tapered neck (1.5° per side)
- Solid carbide • CNC ground in the USA

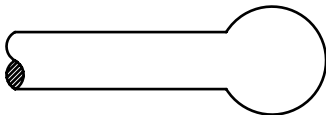
Stocked in Multiple Reach Lengths



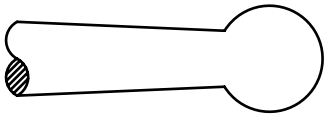
| CUTTER DIAMETER                         | LENGTH OF CUT                           | NECK DIAMETER | NECK LENGTH                             | TYPE | FLUTES | SHANK DIA. | OAL   | UNCOATED |       | AITIN COATED |       | AMORPHOUS DIAMOND |       |
|-----------------------------------------|-----------------------------------------|---------------|-----------------------------------------|------|--------|------------|-------|----------|-------|--------------|-------|-------------------|-------|
| D1 <sup>+ .000"</sup> <sub>-.001"</sub> | L2 <sup>+ .010"</sup> <sub>-.000"</sub> |               | L3 <sup>+ .020"</sup> <sub>-.000"</sub> |      |        | D2         | L1    | TOOL #   | PRICE | TOOL #       | PRICE | TOOL #            | PRICE |
| .0200                                   | .017                                    | .012          | .016                                    | I    | 2      | 1/8        | 1-1/2 | 974220   | 75.30 | 974220-C3    | 80.50 |                   |       |
| .0200                                   | .017                                    | .012          | .031                                    | I    | 2      | 1/8        | 1-1/2 | 52820    | 75.30 | 52820-C3     | 80.50 |                   |       |
| .0200                                   | .017                                    | .012          | .047                                    | I    | 2      | 1/8        | 1-1/2 | 23200    | 80.20 | 23200-C3     | 85.40 |                   |       |
| .0200                                   | .017                                    | .012          | .062                                    | I    | 2      | 1/8        | 1-1/2 | 54620    | 82.70 | 54620-C3     | 87.90 |                   |       |
| .0250                                   | .021                                    | .014          | .031                                    | I    | 2      | 1/8        | 1-1/2 | 974225   | 66.40 | 974225-C3    | 71.60 |                   |       |
| .0250                                   | .021                                    | .014          | .047                                    | I    | 2      | 1/8        | 1-1/2 | 52825    | 66.40 | 52825-C3     | 71.60 |                   |       |
| .0250                                   | .021                                    | .014          | .062                                    | I    | 2      | 1/8        | 1-1/2 | 23201    | 71.40 | 23201-C3     | 76.60 |                   |       |
| .0250                                   | .021                                    | .014          | .078                                    | I    | 2      | 1/8        | 1-1/2 | 54625    | 73.90 | 54625-C3     | 79.10 |                   |       |
| 1/32                                    | .027                                    | .016          | .015                                    | I    | 2      | 1/8        | 1-1/2 | 931502   | 60.90 | 931502-C3    | 66.10 |                   |       |
| 1/32                                    | .027                                    | .016          | .031                                    | I    | 2      | 1/8        | 1-1/2 | 23102    | 60.90 | 23102-C3     | 66.10 |                   |       |
| 1/32                                    | .027                                    | .016          | .047                                    | I    | 2      | 1/8        | 1-1/2 | 974231   | 60.90 | 974231-C3    | 66.10 |                   |       |
| 1/32                                    | .027                                    | .016          | .047                                    | II   | 2      | 1/8        | 1-1/2 | 758431   | 62.10 | 758431-C3    | 67.30 |                   |       |
| 1/32                                    | .027                                    | .016          | .062                                    | I    | 2      | 1/8        | 1-1/2 | 52831    | 60.90 | 52831-C3     | 66.10 |                   |       |
| 1/32                                    | .027                                    | .016          | .078                                    | I    | 2      | 1/8        | 1-1/2 | 39731    | 60.90 | 39731-C3     | 66.10 |                   |       |
| 1/32                                    | .027                                    | .016          | .093                                    | I    | 2      | 1/8        | 1-1/2 | 23202    | 62.50 | 23202-C3     | 67.70 |                   |       |
| 1/32                                    | .027                                    | .016          | .125                                    | I    | 2      | 1/8        | 1-1/2 | 54631    | 71.40 | 54631-C3     | 76.60 |                   |       |
| 1/32                                    | .027                                    | .016          | .187                                    | I    | 2      | 1/8        | 1-1/2 | 55202    | 71.40 | 55202-C3     | 76.60 |                   |       |
| 1/32                                    | .027                                    | .016          | .218                                    | I    | 2      | 1/8        | 1-1/2 | 867731   | 60.90 | 867731-C3    | 66.10 |                   |       |
| .0394 (1 mm)                            | .033                                    | .024          | .047                                    | I    | 2      | 1/8        | 1-1/2 | 2311M    | 60.90 | 2311M-C3     | 66.10 |                   |       |
| .0394 (1 mm)                            | .033                                    | .024          | .062                                    | I    | 2      | 1/8        | 1-1/2 | 97421M   | 60.90 | 97421M-C3    | 66.10 |                   |       |
| .0394 (1 mm)                            | .033                                    | .024          | .078                                    | I    | 2      | 1/8        | 1-1/2 | 5281M    | 61.40 | 5281M-C3     | 66.60 |                   |       |
| .0394 (1 mm)                            | .033                                    | .024          | .093                                    | I    | 2      | 1/8        | 1-1/2 | 3971M    | 60.90 | 3971M-C3     | 66.10 |                   |       |
| .0394 (1 mm)                            | .033                                    | .024          | .125                                    | I    | 2      | 1/8        | 1-1/2 | 2321M    | 69.60 | 2321M-C3     | 74.80 |                   |       |
| .0394 (1 mm)                            | .033                                    | .024          | .187                                    | I    | 2      | 1/8        | 1-1/2 | 54639    | 71.40 | 54639-C3     | 76.60 |                   |       |
| .0394 (1 mm)                            | .033                                    | .024          | .250                                    | I    | 2      | 1/8        | 1-1/2 | 5521M    | 78.90 | 5521M-C3     | 84.10 |                   |       |
| .0400                                   | .034                                    | .024          | .093                                    | I    | 2      | 1/8        | 1-1/2 | 39771    | 60.90 | 39771-C3     | 66.10 |                   |       |
| .0400                                   | .034                                    | .024          | .125                                    | I    | 2      | 1/8        | 1-1/2 | 23271    | 61.40 | 23271-C3     | 66.60 |                   |       |
| 3/64                                    | .040                                    | .029          | .047                                    | I    | 2      | 1/8        | 1-1/2 | 23103    | 60.90 | 23103-C3     | 66.10 |                   |       |
| 3/64                                    | .040                                    | .029          | .062                                    | I    | 2      | 1/8        | 1-1/2 | 974247   | 60.90 | 974247-C3    | 66.10 |                   |       |
| 3/64                                    | .040                                    | .029          | .062                                    | II   | 2      | 1/8        | 1-1/2 | 758447   | 62.10 | 758447-C3    | 67.30 |                   |       |
| 3/64                                    | .040                                    | .029          | .093                                    | I    | 2      | 1/8        | 1-1/2 | 52847    | 60.90 | 52847-C3     | 66.10 | 52847-C4          | 74.00 |

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Type I - Straight Neck



Type II - Tapered Neck



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| CUTTER<br>DIAMETER                                       | LENGTH<br>OF CUT                                         | NECK<br>DIAMETER | NECK<br>LENGTH                                           | TYPE | FLUTES | SHANK<br>DIA.  | OAL            | UNCOATED |       | AItIN COATED |       | AMORPHOUS<br>DIAMOND |       |
|----------------------------------------------------------|----------------------------------------------------------|------------------|----------------------------------------------------------|------|--------|----------------|----------------|----------|-------|--------------|-------|----------------------|-------|
| D <sub>1</sub><br>+ <sup>.000</sup> / <sub>-.001</sub> " | L <sub>2</sub><br>+ <sup>.010</sup> / <sub>-.000</sub> " |                  | L <sub>3</sub><br>+ <sup>.020</sup> / <sub>-.000</sub> " |      |        | D <sub>2</sub> | L <sub>1</sub> | TOOL #   | PRICE | TOOL #       | PRICE | TOOL #               | PRICE |
| 3/64                                                     | .040                                                     | .029             | .125                                                     | I    | 2      | 1/8            | 1-1/2          | 39703    | 60.90 | 39703-C3     | 66.10 |                      |       |
| 3/64                                                     | .040                                                     | .029             | .156                                                     | I    | 2      | 1/8            | 1-1/2          | 23203    | 71.40 | 23203-C3     | 76.60 | 23203-C4             | 84.50 |
| 3/64                                                     | .040                                                     | .029             | .187                                                     | I    | 2      | 1/8            | 1-1/2          | 41303    | 71.40 | 41303-C3     | 76.60 |                      |       |
| 3/64                                                     | .040                                                     | .029             | .250                                                     | I    | 2      | 1/8            | 1-1/2          | 54647    | 71.40 | 54647-C3     | 76.60 |                      |       |
| 3/64                                                     | .040                                                     | .029             | .312                                                     | I    | 2      | 1/8            | 1-1/2          | 909047   | 75.70 | 909047-C3    | 80.90 |                      |       |
| 3/64                                                     | .040                                                     | .029             | .375                                                     | I    | 2      | 1/8            | 1-1/2          | 55203    | 75.00 | 55203-C3     | 80.20 |                      |       |
| 3/64                                                     | .040                                                     | .029             | .437                                                     | I    | 2      | 1/8            | 2              | 867747   | 82.50 | 867747-C3    | 87.70 |                      |       |
| .0500                                                    | .042                                                     | .030             | .093                                                     | I    | 2      | 1/8            | 1-1/2          | 52850    | 50.70 | 52850-C3     | 55.90 |                      |       |
| .0500                                                    | .042                                                     | .030             | .125                                                     | I    | 2      | 1/8            | 1-1/2          | 39750    | 50.70 | 39750-C3     | 55.90 |                      |       |
| .0500                                                    | .042                                                     | .030             | .156                                                     | I    | 2      | 1/8            | 1-1/2          | 23250    | 61.20 | 23250-C3     | 66.40 |                      |       |
| 1/16                                                     | .053                                                     | .037             | .031                                                     | I    | 2      | 1/8            | 1-1/2          | 931504   | 40.50 | 931504-C3    | 45.70 |                      |       |
| 1/16                                                     | .053                                                     | .037             | .047                                                     | I    | 2      | 1/8            | 1-1/2          | 774262   | 40.90 | 774262-C3    | 46.10 |                      |       |
| 1/16                                                     | .053                                                     | .037             | .062                                                     | I    | 2      | 1/8            | 1-1/2          | 23104    | 40.50 | 23104-C3     | 45.70 |                      |       |
| 1/16                                                     | .053                                                     | .037             | .078                                                     | I    | 2      | 1/8            | 1-1/2          | 974262   | 40.90 | 974262-C3    | 46.10 |                      |       |
| 1/16                                                     | .053                                                     | .037             | .078                                                     | II   | 2      | 1/8            | 1-1/2          | 758462   | 41.30 | 758462-C3    | 46.50 |                      |       |
| 1/16                                                     | .053                                                     | .037             | .093                                                     | I    | 2      | 1/8            | 1-1/2          | 52862    | 40.50 | 52862-C3     | 45.70 | 52862-C4             | 53.60 |
| 1/16                                                     | .053                                                     | .037             | .125                                                     | I    | 2      | 1/8            | 1-1/2          | 39704    | 42.20 | 39704-C3     | 47.40 |                      |       |
| 1/16                                                     | .053                                                     | .037             | .156                                                     | I    | 2      | 1/8            | 1-1/2          | 794362   | 42.20 | 794362-C3    | 47.40 |                      |       |
| 1/16                                                     | .053                                                     | .037             | .187                                                     | I    | 2      | 1/8            | 1-1/2          | 23204    | 42.20 | 23204-C3     | 47.40 | 23204-C4             | 55.30 |
| 1/16                                                     | .053                                                     | .037             | .218                                                     | I    | 2      | 1/8            | 1-1/2          | 41304    | 48.00 | 41304-C3     | 53.20 |                      |       |
| 1/16                                                     | .053                                                     | .037             | .250                                                     | I    | 2      | 1/8            | 1-1/2          | 54662    | 52.10 | 54662-C3     | 57.30 |                      |       |
| 1/16                                                     | .053                                                     | .037             | .312                                                     | I    | 2      | 1/8            | 1-1/2          | 909062   | 52.10 | 909062-C3    | 57.30 |                      |       |
| 1/16                                                     | .053                                                     | .037             | .375                                                     | I    | 2      | 1/8            | 1-1/2          | 55204    | 52.10 | 55204-C3     | 57.30 |                      |       |
| 1/16                                                     | .053                                                     | .037             | .437                                                     | I    | 2      | 1/8            | 2              | 867762   | 59.70 | 867762-C3    | 64.90 |                      |       |
| 1/16                                                     | .053                                                     | .037             | .500                                                     | I    | 2      | 1/8            | 2              | 775462   | 59.70 | 775462-C3    | 64.90 |                      |       |
| 5/64                                                     | .067                                                     | .045             | .031                                                     | I    | 2      | 1/8            | 1-1/2          | 931505   | 41.60 | 931505-C3    | 46.80 |                      |       |
| 5/64                                                     | .067                                                     | .045             | .062                                                     | I    | 2      | 1/8            | 1-1/2          | 23105    | 41.20 | 23105-C3     | 46.40 |                      |       |
| 5/64                                                     | .067                                                     | .045             | .093                                                     | I    | 2      | 1/8            | 1-1/2          | 974278   | 41.60 | 974278-C3    | 46.80 |                      |       |
| 5/64                                                     | .067                                                     | .045             | .093                                                     | II   | 2      | 1/8            | 1-1/2          | 758478   | 42.10 | 758478-C3    | 47.30 |                      |       |
| 5/64                                                     | .067                                                     | .045             | .125                                                     | I    | 2      | 1/8            | 1-1/2          | 52878    | 41.20 | 52878-C3     | 46.40 | 52878-C4             | 54.30 |
| 5/64                                                     | .067                                                     | .045             | .187                                                     | I    | 2      | 1/8            | 1-1/2          | 39705    | 43.50 | 39705-C3     | 48.70 |                      |       |
| 5/64                                                     | .067                                                     | .045             | .250                                                     | I    | 2      | 1/8            | 1-1/2          | 23205    | 44.30 | 23205-C3     | 49.50 | 23205-C4             | 57.40 |
| 5/64                                                     | .067                                                     | .045             | .312                                                     | I    | 2      | 1/8            | 1-1/2          | 41305    | 44.30 | 41305-C3     | 49.50 |                      |       |
| 5/64                                                     | .067                                                     | .045             | .375                                                     | I    | 2      | 1/8            | 2              | 54678    | 53.00 | 54678-C3     | 58.20 |                      |       |
| 5/64                                                     | .067                                                     | .045             | .500                                                     | I    | 2      | 1/8            | 2              | 55205    | 53.00 | 55205-C3     | 58.20 |                      |       |
| 5/64                                                     | .067                                                     | .045             | .625                                                     | I    | 2      | 1/8            | 2              | 867778   | 53.00 | 867778-C3    | 58.20 |                      |       |
| 3/32                                                     | .079                                                     | .054             | .031                                                     | I    | 2      | 1/8            | 1-1/2          | 931506   | 41.20 | 931506-C3    | 46.40 |                      |       |
| 3/32                                                     | .079                                                     | .054             | .062                                                     | I    | 2      | 1/8            | 1-1/2          | 23106    | 41.20 | 23106-C3     | 46.40 |                      |       |
| 3/32                                                     | .079                                                     | .054             | .093                                                     | I    | 2      | 1/8            | 1-1/2          | 789893   | 41.60 | 789893-C3    | 46.80 |                      |       |
| 3/32                                                     | .079                                                     | .054             | .125                                                     | I    | 2      | 1/8            | 1-1/2          | 974293   | 41.20 | 974293-C3    | 46.40 |                      |       |
| 3/32                                                     | .079                                                     | .054             | .125                                                     | II   | 2      | 1/8            | 1-1/2          | 758493   | 42.10 | 758493-C3    | 47.30 |                      |       |
| 3/32                                                     | .079                                                     | .054             | .187                                                     | I    | 2      | 1/8            | 1-1/2          | 905106   | 41.20 | 905106-C3    | 46.40 |                      |       |
| 3/32                                                     | .079                                                     | .054             | .250                                                     | I    | 2      | 1/8            | 1-1/2          | 52893    | 41.20 | 52893-C3     | 46.40 | 52893-C4             | 54.30 |
| 3/32                                                     | .079                                                     | .054             | .312                                                     | I    | 2      | 1/8            | 1-1/2          | 39706    | 45.40 | 39706-C3     | 50.60 |                      |       |
| 3/32                                                     | .079                                                     | .054             | .375                                                     | I    | 2      | 1/8            | 1-1/2          | 23206    | 45.00 | 23206-C3     | 50.20 | 23206-C4             | 58.10 |
| 3/32                                                     | .079                                                     | .054             | .437                                                     | I    | 2      | 1/8            | 2              | 41306    | 53.00 | 41306-C3     | 58.20 |                      |       |
| 3/32                                                     | .079                                                     | .054             | .500                                                     | I    | 2      | 1/8            | 2              | 54693    | 53.00 | 54693-C3     | 58.20 |                      |       |
| 3/32                                                     | .079                                                     | .054             | .625                                                     | I    | 2      | 1/8            | 2              | 55206    | 60.90 | 55206-C3     | 66.10 |                      |       |
| 3/32                                                     | .079                                                     | .054             | .750                                                     | I    | 2      | 1/8            | 2              | 867793   | 61.40 | 867793-C3    | 66.60 |                      |       |

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UNDERCUTTING END MILLS

| CUTTER<br>DIAMETER                                | LENGTH<br>OF CUT                                  | NECK<br>DIAMETER | NECK<br>LENGTH                                    | TYPE | FLUTES | SHANK<br>DIA.  | OAL            | UNCOATED |       | AITIN COATED |       | AMORPHOUS<br>DIAMOND |       |
|---------------------------------------------------|---------------------------------------------------|------------------|---------------------------------------------------|------|--------|----------------|----------------|----------|-------|--------------|-------|----------------------|-------|
| D <sub>1</sub> <small>+ .000"<br/>- .002"</small> | L <sub>2</sub> <small>+ .020"<br/>- .000"</small> |                  | L <sub>3</sub> <small>+ .030"<br/>- .000"</small> |      |        | D <sub>2</sub> | L <sub>1</sub> | TOOL #   | PRICE | TOOL #       | PRICE | TOOL #               | PRICE |
| .1000                                             | .085                                              | .060             | .312                                              | I    | 2      | 1/8            | 1-1/2          | 39783    | 45.40 | 39783-C3     | 50.60 |                      |       |
| .1000                                             | .085                                              | .060             | .375                                              | I    | 2      | 1/8            | 1-1/2          | 23283    | 45.40 | 23283-C3     | 50.60 |                      |       |
| 7/64                                              | .093                                              | .064             | .187                                              | I    | 2      | 1/8            | 1-1/2          | 905107   | 40.90 | 905107-C3    | 46.10 |                      |       |
| 7/64                                              | .093                                              | .064             | .250                                              | I    | 2      | 1/8            | 1-1/2          | 52907    | 40.90 | 52907-C3     | 46.10 |                      |       |
| 7/64                                              | .093                                              | .064             | .375                                              | I    | 2      | 1/8            | 1-1/2          | 39707    | 44.70 | 39707-C3     | 49.90 |                      |       |
| 7/64                                              | .093                                              | .064             | .500                                              | I    | 2      | 1/8            | 2              | 23207    | 52.10 | 23207-C3     | 57.30 |                      |       |
| 7/64                                              | .093                                              | .064             | 1.000                                             | I    | 2      | 1/8            | 3              | 29507    | 59.70 | 29507-C3     | 64.90 |                      |       |
| .1181 (3 mm)                                      | .100                                              | .070             | .093                                              | I    | 2      | 1/8            | 1-1/2          | 2313M    | 40.90 | 2313M-C3     | 46.10 |                      |       |
| .1181 (3 mm)                                      | .100                                              | .070             | .156                                              | II   | 2      | 1/8            | 1-1/2          | 75843M   | 41.30 | 75843M-C3    | 46.50 |                      |       |
| .1181 (3 mm)                                      | .100                                              | .070             | .187                                              | I    | 2      | 1/8            | 1-1/2          | 90513M   | 40.90 | 90513M-C3    | 46.10 |                      |       |
| .1181 (3 mm)                                      | .100                                              | .070             | .250                                              | I    | 2      | 1/8            | 1-1/2          | 5283M    | 40.90 | 5283M-C3     | 46.10 |                      |       |
| .1181 (3 mm)                                      | .100                                              | .070             | .375                                              | I    | 2      | 1/8            | 1-1/2          | 3973M    | 44.70 | 3973M-C3     | 49.90 |                      |       |
| .1181 (3 mm)                                      | .100                                              | .070             | .500                                              | I    | 2      | 1/8            | 2              | 2323M    | 52.10 | 2323M-C3     | 57.30 |                      |       |
| 1/8                                               | .107                                              | .076             | .062                                              | I    | 4      | 1/8            | 1-1/2          | 931508   | 35.70 | 931508-C3    | 40.90 |                      |       |
| 1/8                                               | .107                                              | .076             | .093                                              | I    | 4      | 1/8            | 1-1/2          | 787908   | 36.00 | 787908-C3    | 41.20 |                      |       |
| 1/8                                               | .107                                              | .076             | .125                                              | I    | 4      | 1/8            | 1-1/2          | 23108    | 35.70 | 23108-C3     | 40.90 |                      |       |
| 1/8                                               | .107                                              | .076             | .187                                              | I    | 4      | 1/8            | 1-1/2          | 974308   | 36.60 | 974308-C3    | 41.80 |                      |       |
| 1/8                                               | .107                                              | .076             | .187                                              | II   | 4      | 1/8            | 1-1/2          | 758508   | 37.30 | 758508-C3    | 42.50 |                      |       |
| 1/8                                               | .107                                              | .076             | .250                                              | I    | 4      | 1/8            | 1-1/2          | 52908    | 37.80 | 52908-C3     | 43.00 | 52908-C4             | 50.90 |
| 1/8                                               | .107                                              | .076             | .312                                              | I    | 4      | 1/8            | 1-1/2          | 828408   | 38.20 | 828408-C3    | 43.40 |                      |       |
| 1/8                                               | .107                                              | .076             | .375                                              | I    | 4      | 1/8            | 1-1/2          | 39708    | 38.50 | 39708-C3     | 43.70 |                      |       |
| 1/8                                               | .107                                              | .076             | .437                                              | I    | 4      | 1/8            | 1-1/2          | 794408   | 41.60 | 794408-C3    | 46.80 |                      |       |
| 1/8                                               | .107                                              | .076             | .500                                              | I    | 4      | 1/8            | 1-1/2          | 23208    | 41.20 | 23208-C3     | 46.40 | 23208-C4             | 54.30 |
| 1/8                                               | .107                                              | .076             | .625                                              | I    | 4      | 1/8            | 2              | 922908   | 44.10 | 922908-C3    | 49.30 |                      |       |
| 1/8                                               | .107                                              | .076             | .750                                              | I    | 4      | 1/8            | 2              | 41308    | 44.10 | 41308-C3     | 49.30 |                      |       |
| 1/8                                               | .107                                              | .076             | .875                                              | I    | 4      | 1/8            | 3              | 846608   | 45.90 | 846608-C3    | 51.10 |                      |       |
| 1/8                                               | .107                                              | .076             | 1.000                                             | I    | 4      | 1/8            | 3              | 29508    | 47.80 | 29508-C3     | 53.00 |                      |       |
| 1/8                                               | .107                                              | .076             | 1.125                                             | I    | 4      | 1/8            | 3              | 769508   | 50.00 | 769508-C3    | 55.20 |                      |       |
| 1/8                                               | .107                                              | .076             | 1.250                                             | I    | 4      | 1/8            | 3              | 960608   | 51.20 | 960608-C3    | 56.40 |                      |       |
| 1/8                                               | .107                                              | .076             | 1.500                                             | I    | 4      | 1/8            | 3              | 55208    | 54.60 | 55208-C3     | 59.80 |                      |       |
| 1/8                                               | .107                                              | .076             | 1.750                                             | I    | 4      | 1/8            | 3              | 929608   | 57.40 | 929608-C3    | 62.60 |                      |       |
| 9/64                                              | .119                                              | .084             | .125                                              | I    | 4      | 3/16           | 2              | 23109    | 42.50 | 23109-C3     | 48.10 |                      |       |
| 9/64                                              | .119                                              | .084             | .250                                              | I    | 4      | 3/16           | 2              | 52909    | 46.00 | 52909-C3     | 51.60 |                      |       |
| 9/64                                              | .119                                              | .084             | .375                                              | I    | 4      | 3/16           | 2              | 39709    | 49.50 | 39709-C3     | 55.10 |                      |       |
| 9/64                                              | .119                                              | .084             | .500                                              | I    | 4      | 3/16           | 2              | 23209    | 51.90 | 23209-C3     | 57.50 |                      |       |
| 9/64                                              | .119                                              | .084             | .750                                              | I    | 4      | 3/16           | 2              | 41309    | 55.70 | 41309-C3     | 61.30 |                      |       |
| 5/32                                              | .133                                              | .098             | .078                                              | I    | 4      | 3/16           | 2              | 931510   | 42.50 | 931510-C3    | 48.10 |                      |       |
| 5/32                                              | .133                                              | .098             | .125                                              | I    | 4      | 3/16           | 2              | 23110    | 42.50 | 23110-C3     | 48.10 |                      |       |
| 5/32                                              | .133                                              | .098             | .187                                              | I    | 4      | 3/16           | 2              | 974310   | 43.30 | 974310-C3    | 48.90 |                      |       |
| 5/32                                              | .133                                              | .098             | .250                                              | I    | 4      | 3/16           | 2              | 52910    | 46.00 | 52910-C3     | 51.60 |                      |       |
| 5/32                                              | .133                                              | .098             | .375                                              | I    | 4      | 3/16           | 2              | 39710    | 48.50 | 39710-C3     | 54.10 |                      |       |
| 5/32                                              | .133                                              | .098             | .500                                              | I    | 4      | 3/16           | 2              | 23210    | 51.90 | 23210-C3     | 57.50 |                      |       |
| 5/32                                              | .133                                              | .098             | .750                                              | I    | 4      | 3/16           | 2              | 41310    | 55.70 | 41310-C3     | 61.30 |                      |       |
| 5/32                                              | .133                                              | .098             | 1.000                                             | I    | 4      | 3/16           | 3              | 29510    | 60.20 | 29510-C3     | 65.80 |                      |       |
| 5/32                                              | .133                                              | .098             | 1.500                                             | I    | 4      | 3/16           | 3              | 55210    | 63.30 | 55210-C3     | 68.90 |                      |       |

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| CUTTER<br>DIAMETER                                    | LENGTH<br>OF CUT                                      | NECK<br>DIAMETER | NECK<br>LENGTH                                        | TYPE | FLUTES | SHANK<br>DIA.  | OAL            | UNCOATED |        | TITIN COATED |        | AMORPHOUS<br>DIAMOND |       |
|-------------------------------------------------------|-------------------------------------------------------|------------------|-------------------------------------------------------|------|--------|----------------|----------------|----------|--------|--------------|--------|----------------------|-------|
| D <sub>1</sub> <sup>+.000"</sup><br><sub>-.002"</sub> | L <sub>2</sub> <sup>+.020"</sup><br><sub>-.000"</sub> |                  | L <sub>3</sub> <sup>+.030"</sup><br><sub>-.000"</sub> |      |        | D <sub>2</sub> | L <sub>1</sub> | TOOL #   | PRICE  | TOOL #       | PRICE  | TOOL #               | PRICE |
| 3/16                                                  | .160                                                  | .117             | .078                                                  | I    | 4      | 3/16           | 2              | 931512   | 42.50  | 931512-C3    | 48.10  |                      |       |
| 3/16                                                  | .160                                                  | .117             | .093                                                  | I    | 4      | 3/16           | 2              | 787912   | 42.90  | 787912-C3    | 48.50  |                      |       |
| 3/16                                                  | .160                                                  | .117             | .125                                                  | I    | 4      | 3/16           | 2              | 23112    | 42.50  | 23112-C3     | 48.10  |                      |       |
| 3/16                                                  | .160                                                  | .117             | .187                                                  | I    | 4      | 3/16           | 2              | 974312   | 46.00  | 974312-C3    | 51.60  |                      |       |
| 3/16                                                  | .160                                                  | .117             | .187                                                  | II   | 4      | 3/16           | 2              | 758512   | 47.00  | 758512-C3    | 52.60  |                      |       |
| 3/16                                                  | .160                                                  | .117             | .250                                                  | I    | 4      | 3/16           | 2              | 52912    | 46.00  | 52912-C3     | 51.60  | 52912-C4             | 64.10 |
| 3/16                                                  | .160                                                  | .117             | .375                                                  | I    | 4      | 3/16           | 2              | 39712    | 48.50  | 39712-C3     | 54.10  |                      |       |
| 3/16                                                  | .160                                                  | .117             | .437                                                  | I    | 4      | 3/16           | 2              | 794412   | 50.70  | 794412-C3    | 56.30  |                      |       |
| 3/16                                                  | .160                                                  | .117             | .500                                                  | I    | 4      | 3/16           | 2              | 23212    | 50.20  | 23212-C3     | 55.80  | 23212-C4             | 68.30 |
| 3/16                                                  | .160                                                  | .117             | .625                                                  | I    | 4      | 3/16           | 2              | 922912   | 53.10  | 922912-C3    | 58.70  |                      |       |
| 3/16                                                  | .160                                                  | .117             | .750                                                  | I    | 4      | 3/16           | 2              | 41312    | 55.70  | 41312-C3     | 61.30  |                      |       |
| 3/16                                                  | .160                                                  | .117             | .875                                                  | I    | 4      | 3/16           | 3              | 846612   | 58.00  | 846612-C3    | 63.60  |                      |       |
| 3/16                                                  | .160                                                  | .117             | 1.000                                                 | I    | 4      | 3/16           | 3              | 29512    | 60.20  | 29512-C3     | 65.80  |                      |       |
| 3/16                                                  | .160                                                  | .117             | 1.250                                                 | I    | 4      | 3/16           | 3              | 960612   | 62.60  | 960612-C3    | 68.20  |                      |       |
| 3/16                                                  | .160                                                  | .117             | 1.500                                                 | I    | 4      | 3/16           | 3              | 55212    | 64.90  | 55212-C3     | 70.50  |                      |       |
| 3/16                                                  | .160                                                  | .117             | 1.750                                                 | I    | 4      | 3/16           | 3              | 929612   | 76.70  | 929612-C3    | 82.30  |                      |       |
| .1969 (5 mm)                                          | .167                                                  | .119             | .250                                                  | I    | 4      | 1/4            | 2-1/2          | 5295M    | 59.50  | 5295M-C3     | 67.10  |                      |       |
| .1969 (5 mm)                                          | .167                                                  | .119             | .500                                                  | I    | 4      | 1/4            | 2-1/2          | 2325M    | 60.90  | 2325M-C3     | 68.50  |                      |       |
| .1969 (5 mm)                                          | .167                                                  | .119             | 1.000                                                 | I    | 4      | 1/4            | 4              | 2955M    | 69.80  | 2955M-C3     | 78.70  |                      |       |
| 7/32                                                  | .186                                                  | .138             | .250                                                  | I    | 4      | 1/4            | 2-1/2          | 52914    | 63.90  | 52914-C3     | 71.50  |                      |       |
| 7/32                                                  | .186                                                  | .138             | .500                                                  | I    | 4      | 1/4            | 2-1/2          | 23214    | 66.40  | 23214-C3     | 74.00  |                      |       |
| 7/32                                                  | .186                                                  | .138             | .750                                                  | I    | 4      | 1/4            | 2-1/2          | 41314    | 70.00  | 41314-C3     | 77.60  |                      |       |
| .2362 (6 mm)                                          | .201                                                  | .148             | .250                                                  | I    | 4      | 1/4            | 2-1/2          | 97436M   | 59.00  | 97436M-C3    | 66.60  |                      |       |
| .2362 (6 mm)                                          | .201                                                  | .148             | .375                                                  | I    | 4      | 1/4            | 2-1/2          | 5296M    | 59.00  | 5296M-C3     | 66.60  |                      |       |
| .2362 (6 mm)                                          | .201                                                  | .148             | .500                                                  | I    | 4      | 1/4            | 2-1/2          | 3976M    | 62.10  | 3976M-C3     | 69.70  |                      |       |
| .2362 (6 mm)                                          | .201                                                  | .148             | .750                                                  | I    | 4      | 1/4            | 2-1/2          | 2326M    | 65.90  | 2326M-C3     | 73.50  |                      |       |
| .2362 (6 mm)                                          | .201                                                  | .148             | 1.250                                                 | I    | 4      | 1/4            | 4              | 2956M    | 75.00  | 2956M-C3     | 83.90  |                      |       |
| .2362 (6 mm)                                          | .201                                                  | .148             | 2.000                                                 | I    | 4      | 1/4            | 4              | 96066M   | 87.50  | 96066M-C3    | 96.40  |                      |       |
| 1/4                                                   | .213                                                  | .158             | .078                                                  | I    | 4      | 1/4            | 2-1/2          | 931516   | 57.20  | 931516-C3    | 64.80  |                      |       |
| 1/4                                                   | .213                                                  | .158             | .125                                                  | I    | 4      | 1/4            | 2-1/2          | 23116    | 56.70  | 23116-C3     | 64.30  |                      |       |
| 1/4                                                   | .213                                                  | .158             | .187                                                  | I    | 4      | 1/4            | 2-1/2          | 789916   | 57.20  | 789916-C3    | 64.80  |                      |       |
| 1/4                                                   | .213                                                  | .158             | .250                                                  | I    | 4      | 1/4            | 2-1/2          | 974316   | 59.50  | 974316-C3    | 67.10  |                      |       |
| 1/4                                                   | .213                                                  | .158             | .250                                                  | II   | 4      | 1/4            | 2-1/2          | 758516   | 61.20  | 758516-C3    | 68.80  |                      |       |
| 1/4                                                   | .213                                                  | .158             | .312                                                  | I    | 4      | 1/4            | 2-1/2          | 905116   | 60.10  | 905116-C3    | 67.70  |                      |       |
| 1/4                                                   | .213                                                  | .158             | .375                                                  | I    | 4      | 1/4            | 2-1/2          | 52916    | 60.20  | 52916-C3     | 67.80  | 52916-C4             | 80.80 |
| 1/4                                                   | .213                                                  | .158             | .437                                                  | I    | 4      | 1/4            | 2-1/2          | 828416   | 61.40  | 828416-C3    | 69.00  |                      |       |
| 1/4                                                   | .213                                                  | .158             | .500                                                  | I    | 4      | 1/4            | 2-1/2          | 39716    | 62.10  | 39716-C3     | 69.70  |                      |       |
| 1/4                                                   | .213                                                  | .158             | .625                                                  | I    | 4      | 1/4            | 2-1/2          | 927616   | 62.60  | 927616-C3    | 70.20  |                      |       |
| 1/4                                                   | .213                                                  | .158             | .750                                                  | I    | 4      | 1/4            | 2-1/2          | 23216    | 65.90  | 23216-C3     | 73.50  | 23216-C4             | 86.50 |
| 1/4                                                   | .213                                                  | .158             | .875                                                  | I    | 4      | 1/4            | 2-1/2          | 786916   | 66.50  | 786916-C3    | 74.10  |                      |       |
| 1/4                                                   | .213                                                  | .158             | 1.000                                                 | I    | 4      | 1/4            | 2-1/2          | 922916   | 66.80  | 922916-C3    | 74.40  |                      |       |
| 1/4                                                   | .213                                                  | .158             | 1.125                                                 | I    | 4      | 1/4            | 2-1/2          | 41316    | 69.40  | 41316-C3     | 77.00  |                      |       |
| 1/4                                                   | .213                                                  | .158             | 1.250                                                 | I    | 4      | 1/4            | 4              | 846616   | 74.50  | 846616-C3    | 83.40  |                      |       |
| 1/4                                                   | .213                                                  | .158             | 1.500                                                 | I    | 4      | 1/4            | 4              | 29516    | 76.30  | 29516-C3     | 85.20  |                      |       |
| 1/4                                                   | .213                                                  | .158             | 2.000                                                 | I    | 4      | 1/4            | 4              | 960616   | 81.00  | 960616-C3    | 89.90  |                      |       |
| 1/4                                                   | .213                                                  | .158             | 2.250                                                 | I    | 4      | 1/4            | 4              | 55216    | 85.90  | 55216-C3     | 94.80  |                      |       |
| 1/4                                                   | .213                                                  | .158             | 2.500                                                 | I    | 4      | 1/4            | 4              | 929616   | 113.10 | 929616-C3    | 122.00 |                      |       |

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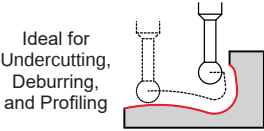
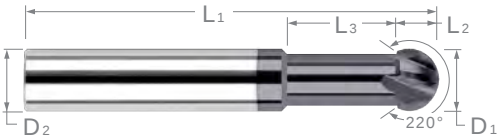
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UNDERCUTTING END MILLS

| CUTTER<br>DIAMETER                                     | LENGTH<br>OF CUT                                       | NECK<br>DIAMETER | NECK<br>LENGTH                                         | TYPE | FLUTES | SHANK<br>DIA.  | OAL            | UNCOATED |        | AITIN COATED |        | AMORPHOUS<br>DIAMOND |        |
|--------------------------------------------------------|--------------------------------------------------------|------------------|--------------------------------------------------------|------|--------|----------------|----------------|----------|--------|--------------|--------|----------------------|--------|
| D <sub>1</sub> <sup>+ .000"</sup><br><sub>-.002"</sub> | L <sub>2</sub> <sup>+ .020"</sup><br><sub>-.000"</sub> |                  | L <sub>3</sub> <sup>+ .030"</sup><br><sub>-.000"</sub> |      |        | D <sub>2</sub> | L <sub>1</sub> | TOOL #   | PRICE  | TOOL #       | PRICE  | TOOL #               | PRICE  |
| 9/32                                                   | .240                                                   | .180             | .375                                                   | I    | 4      | 5/16           | 2-1/2          | 52918    | 80.20  | 52918-C3     | 89.10  |                      |        |
| 9/32                                                   | .240                                                   | .180             | .750                                                   | I    | 4      | 5/16           | 2-1/2          | 23218    | 82.50  | 23218-C3     | 91.40  |                      |        |
| 5/16                                                   | .266                                                   | .201             | .187                                                   | I    | 4      | 5/16           | 2-1/2          | 23120    | 75.90  | 23120-C3     | 84.80  |                      |        |
| 5/16                                                   | .266                                                   | .201             | .375                                                   | I    | 4      | 5/16           | 2-1/2          | 52920    | 78.90  | 52920-C3     | 87.80  |                      |        |
| 5/16                                                   | .266                                                   | .201             | .500                                                   | I    | 4      | 5/16           | 2-1/2          | 39720    | 80.80  | 39720-C3     | 89.70  |                      |        |
| 5/16                                                   | .266                                                   | .201             | .750                                                   | I    | 4      | 5/16           | 2-1/2          | 23220    | 85.10  | 23220-C3     | 94.00  |                      |        |
| 5/16                                                   | .266                                                   | .201             | 1.125                                                  | I    | 4      | 5/16           | 4              | 41320    | 96.60  | 41320-C3     | 107.30 |                      |        |
| 5/16                                                   | .266                                                   | .201             | 1.500                                                  | I    | 4      | 5/16           | 4              | 29520    | 103.30 | 29520-C3     | 114.00 |                      |        |
| 5/16                                                   | .266                                                   | .201             | 2.000                                                  | I    | 4      | 5/16           | 4              | 960620   | 109.60 | 960620-C3    | 120.30 |                      |        |
| 5/16                                                   | .266                                                   | .201             | 2.250                                                  | I    | 4      | 5/16           | 4              | 55220    | 111.40 | 55220-C3     | 122.10 |                      |        |
| 5/16                                                   | .266                                                   | .201             | 2.500                                                  | I    | 4      | 5/16           | 4              | 929620   | 111.40 | 929620-C3    | 122.10 |                      |        |
| 3/8                                                    | .320                                                   | .241             | .093                                                   | I    | 4      | 3/8            | 2-1/2          | 931524   | 81.90  | 931524-C3    | 92.00  |                      |        |
| 3/8                                                    | .320                                                   | .241             | .187                                                   | I    | 4      | 3/8            | 2-1/2          | 23124    | 81.90  | 23124-C3     | 92.00  |                      |        |
| 3/8                                                    | .320                                                   | .241             | .250                                                   | II   | 4      | 3/8            | 2-1/2          | 758524   | 83.50  | 758524-C3    | 93.60  |                      |        |
| 3/8                                                    | .320                                                   | .241             | .375                                                   | I    | 4      | 3/8            | 2-1/2          | 52924    | 83.80  | 52924-C3     | 93.90  | 52924-C4             | 108.60 |
| 3/8                                                    | .320                                                   | .241             | .500                                                   | I    | 4      | 3/8            | 2-1/2          | 39724    | 83.80  | 39724-C3     | 93.90  |                      |        |
| 3/8                                                    | .320                                                   | .241             | .750                                                   | I    | 4      | 3/8            | 2-1/2          | 23224    | 85.10  | 23224-C3     | 95.20  | 23224-C4             | 109.90 |
| 3/8                                                    | .320                                                   | .241             | 1.000                                                  | I    | 4      | 3/8            | 2-1/2          | 922924   | 96.20  | 922924-C3    | 106.30 |                      |        |
| 3/8                                                    | .320                                                   | .241             | 1.125                                                  | I    | 4      | 3/8            | 4              | 41324    | 105.40 | 41324-C3     | 119.20 |                      |        |
| 3/8                                                    | .320                                                   | .241             | 1.500                                                  | I    | 4      | 3/8            | 4              | 29524    | 108.30 | 29524-C3     | 122.10 |                      |        |
| 3/8                                                    | .320                                                   | .241             | 2.000                                                  | I    | 4      | 3/8            | 4              | 960624   | 112.10 | 960624-C3    | 125.90 |                      |        |
| 3/8                                                    | .320                                                   | .241             | 2.250                                                  | I    | 4      | 3/8            | 4              | 55224    | 116.20 | 55224-C3     | 130.00 |                      |        |
| 3/8                                                    | .320                                                   | .241             | 2.500                                                  | I    | 4      | 3/8            | 4              | 929624   | 119.90 | 929624-C3    | 133.70 |                      |        |
| .3937 (10 mm)                                          | .335                                                   | .252             | .375                                                   | I    | 4      | 7/16           | 2-3/4          | 52925    | 118.40 | 52925-C3     | 131.00 |                      |        |
| .3937 (10 mm)                                          | .335                                                   | .252             | .750                                                   | I    | 4      | 7/16           | 2-3/4          | 23225    | 118.80 | 23225-C3     | 131.40 |                      |        |
| 7/16                                                   | .373                                                   | .285             | .500                                                   | I    | 4      | 7/16           | 2-3/4          | 52928    | 114.90 | 52928-C3     | 127.50 |                      |        |
| 7/16                                                   | .373                                                   | .285             | 1.000                                                  | I    | 4      | 7/16           | 2-3/4          | 23228    | 118.80 | 23228-C3     | 131.40 |                      |        |
| .4724 (12 mm)                                          | .403                                                   | .308             | .500                                                   | I    | 4      | 1/2            | 3              | 52931    | 149.60 | 52931-C3     | 164.70 |                      |        |
| .4724 (12 mm)                                          | .403                                                   | .308             | 1.000                                                  | I    | 4      | 1/2            | 3              | 23231    | 158.10 | 23231-C3     | 173.20 |                      |        |
| 1/2                                                    | .427                                                   | .323             | .187                                                   | I    | 4      | 1/2            | 3              | 23132    | 117.50 | 23132-C3     | 132.60 |                      |        |
| 1/2                                                    | .427                                                   | .323             | .312                                                   | II   | 4      | 1/2            | 3              | 758532   | 119.80 | 758532-C3    | 134.90 |                      |        |
| 1/2                                                    | .427                                                   | .323             | .500                                                   | I    | 4      | 1/2            | 3              | 52932    | 118.60 | 52932-C3     | 133.70 | 52932-C4             | 148.50 |
| 1/2                                                    | .427                                                   | .323             | .750                                                   | I    | 4      | 1/2            | 3              | 39732    | 121.70 | 39732-C3     | 136.80 |                      |        |
| 1/2                                                    | .427                                                   | .323             | 1.000                                                  | I    | 4      | 1/2            | 3              | 23232    | 122.50 | 23232-C3     | 137.60 | 23232-C4             | 152.40 |
| 1/2                                                    | .427                                                   | .323             | 1.250                                                  | I    | 4      | 1/2            | 3              | 922932   | 127.40 | 922932-C3    | 142.50 |                      |        |
| 1/2                                                    | .427                                                   | .323             | 1.500                                                  | I    | 4      | 1/2            | 6              | 41332    | 208.60 | 41332-C3     | 223.70 |                      |        |
| 1/2                                                    | .427                                                   | .323             | 2.000                                                  | I    | 4      | 1/2            | 6              | 29532    | 213.30 | 29532-C3     | 228.40 |                      |        |
| 1/2                                                    | .427                                                   | .323             | 2.500                                                  | I    | 4      | 1/2            | 6              | 960632   | 213.50 | 960632-C3    | 228.60 |                      |        |
| 1/2                                                    | .427                                                   | .323             | 3.000                                                  | I    | 4      | 1/2            | 6              | 55232    | 228.00 | 55232-C3     | 243.10 |                      |        |
| 1/2                                                    | .427                                                   | .323             | 3.500                                                  | I    | 4      | 1/2            | 6              | 929632   | 240.10 | 929632-C3    | 255.20 |                      |        |
| 5/8                                                    | .533                                                   | .412             | 1.000                                                  | I    | 4      | 5/8            | 3-1/2          | 39740    | 246.20 | 39740-C3     | 261.30 |                      |        |
| 5/8                                                    | .533                                                   | .412             | 1.500                                                  | I    | 4      | 5/8            | 3-1/2          | 23240    | 246.20 | 23240-C3     | 261.30 |                      |        |
| 3/4                                                    | .640                                                   | .500             | 1.000                                                  | I    | 4      | 3/4            | 4              | 39748    | 251.10 | 39748-C3     | 267.40 |                      |        |
| 3/4                                                    | .640                                                   | .500             | 1.500                                                  | I    | 4      | 3/4            | 4              | 23248    | 339.00 | 23248-C3     | 355.30 |                      |        |

UNDERCUTTING END MILLS

220°



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

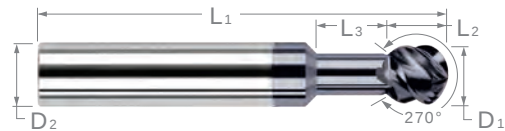
| CUTTER DIAMETER                                     | LENGTH OF CUT                                       | NECK DIAMETER | NECK LENGTH                                         | FLUTES | SHANK DIAMETER | OVERALL LENGTH | UNCOATED |       | AItIN COATED |       |
|-----------------------------------------------------|-----------------------------------------------------|---------------|-----------------------------------------------------|--------|----------------|----------------|----------|-------|--------------|-------|
| D <sub>1</sub> <sup>+0.000"</sup> <sub>-.001"</sub> | L <sub>2</sub> <sup>+0.010"</sup> <sub>-.000"</sub> |               | L <sub>3</sub> <sup>+0.020"</sup> <sub>-.000"</sub> |        | D <sub>2</sub> | L <sub>1</sub> | TOOL #   | PRICE | TOOL #       | PRICE |
| 1/32                                                | .021                                                | .023          | .093                                                | 2      | 1/8            | 1-1/2          | 22802    | 61.50 | 22802-C3     | 66.70 |
| .0394 (1 mm)                                        | .026                                                | .030          | .093                                                | 2      | 1/8            | 1-1/2          | 785839   | 62.10 | 785839-C3    | 67.30 |
| .0394 (1 mm)                                        | .026                                                | .030          | .125                                                | 2      | 1/8            | 1-1/2          | 2281M    | 68.70 | 2281M-C3     | 73.90 |
| 3/64                                                | .031                                                | .035          | .156                                                | 2      | 1/8            | 1-1/2          | 22803    | 61.50 | 22803-C3     | 66.70 |
| 1/16                                                | .042                                                | .047          | .062                                                | 2      | 1/8            | 1-1/2          | 22704    | 41.80 | 22704-C3     | 47.00 |
| 1/16                                                | .042                                                | .047          | .125                                                | 2      | 1/8            | 1-1/2          | 785862   | 43.60 | 785862-C3    | 48.80 |
| 1/16                                                | .042                                                | .047          | .187                                                | 2      | 1/8            | 1-1/2          | 22804    | 43.60 | 22804-C3     | 48.80 |
| 1/16                                                | .042                                                | .047          | .250                                                | 2      | 1/8            | 1-1/2          | 22904    | 43.60 | 22904-C3     | 48.80 |
| 5/64                                                | .052                                                | .059          | .062                                                | 2      | 1/8            | 1-1/2          | 22705    | 41.80 | 22705-C3     | 47.00 |
| 5/64                                                | .052                                                | .059          | .250                                                | 2      | 1/8            | 1-1/2          | 22805    | 43.60 | 22805-C3     | 48.80 |
| 3/32                                                | .063                                                | .070          | .062                                                | 2      | 1/8            | 1-1/2          | 22706    | 41.80 | 22706-C3     | 47.00 |
| 3/32                                                | .063                                                | .070          | .375                                                | 2      | 1/8            | 1-1/2          | 22806    | 44.30 | 22806-C3     | 49.50 |
| .1181 (3 mm)                                        | .079                                                | .090          | .500                                                | 2      | 1/8            | 2              | 2283M    | 45.40 | 2283M-C3     | 50.60 |

| D <sub>1</sub> <sup>+0.000"</sup> <sub>-.002"</sub> | L <sub>2</sub> <sup>+0.020"</sup> <sub>-.000"</sub> |      | L <sub>3</sub> <sup>+0.030"</sup> <sub>-.000"</sub> |   | D <sub>2</sub> | L <sub>1</sub> | TOOL # | PRICE  | TOOL #    | PRICE  |
|-----------------------------------------------------|-----------------------------------------------------|------|-----------------------------------------------------|---|----------------|----------------|--------|--------|-----------|--------|
| 1/8                                                 | .084                                                | .094 | .125                                                | 4 | 1/8            | 1-1/2          | 22708  | 36.10  | 22708-C3  | 41.30  |
| 1/8                                                 | .084                                                | .094 | .250                                                | 4 | 1/8            | 1-1/2          | 826708 | 37.80  | 826708-C3 | 43.00  |
| 1/8                                                 | .084                                                | .094 | .500                                                | 4 | 1/8            | 1-1/2          | 22808  | 40.70  | 22808-C3  | 45.90  |
| 1/8                                                 | .084                                                | .094 | .750                                                | 4 | 1/8            | 2              | 833808 | 43.80  | 833808-C3 | 49.00  |
| 1/8                                                 | .084                                                | .094 | 1.000                                               | 4 | 1/8            | 3              | 22908  | 47.00  | 22908-C3  | 52.20  |
| 1/8                                                 | .084                                                | .094 | 1.500                                               | 4 | 1/8            | 3              | 971608 | 57.90  | 971608-C3 | 63.10  |
| 5/32                                                | .105                                                | .125 | .500                                                | 4 | 3/16           | 2              | 22810  | 51.00  | 22810-C3  | 56.60  |
| 3/16                                                | .126                                                | .141 | .125                                                | 4 | 3/16           | 2              | 22712  | 42.90  | 22712-C3  | 48.50  |
| 3/16                                                | .126                                                | .141 | .250                                                | 4 | 3/16           | 2              | 826712 | 45.50  | 826712-C3 | 51.10  |
| 3/16                                                | .126                                                | .141 | .500                                                | 4 | 3/16           | 2              | 22812  | 51.00  | 22812-C3  | 56.60  |
| 3/16                                                | .126                                                | .141 | .750                                                | 4 | 3/16           | 2              | 833812 | 54.90  | 833812-C3 | 60.50  |
| 3/16                                                | .126                                                | .141 | 1.000                                               | 4 | 3/16           | 3              | 22912  | 59.00  | 22912-C3  | 64.60  |
| .2362 (6 mm)                                        | .158                                                | .172 | .750                                                | 4 | 1/4            | 2-1/2          | 2286M  | 64.50  | 2286M-C3  | 72.10  |
| 1/4                                                 | .168                                                | .188 | .125                                                | 4 | 1/4            | 2-1/2          | 22716  | 57.60  | 22716-C3  | 65.20  |
| 1/4                                                 | .168                                                | .188 | .375                                                | 4 | 1/4            | 2-1/2          | 826716 | 59.80  | 826716-C3 | 67.40  |
| 1/4                                                 | .168                                                | .188 | .750                                                | 4 | 1/4            | 2-1/2          | 22816  | 64.50  | 22816-C3  | 72.10  |
| 1/4                                                 | .168                                                | .188 | 1.000                                               | 4 | 1/4            | 2-1/2          | 833816 | 68.00  | 833816-C3 | 75.60  |
| 1/4                                                 | .168                                                | .188 | 1.500                                               | 4 | 1/4            | 4              | 22916  | 75.00  | 22916-C3  | 83.90  |
| 1/4                                                 | .168                                                | .188 | 2.250                                               | 4 | 1/4            | 4              | 971616 | 97.90  | 971616-C3 | 106.80 |
| 5/16                                                | .210                                                | .235 | .187                                                | 4 | 5/16           | 2-1/2          | 22720  | 76.70  | 22720-C3  | 85.60  |
| 5/16                                                | .210                                                | .235 | .750                                                | 4 | 5/16           | 2-1/2          | 22820  | 83.80  | 22820-C3  | 92.70  |
| 5/16                                                | .210                                                | .235 | 1.500                                               | 4 | 5/16           | 4              | 22920  | 101.20 | 22920-C3  | 111.90 |
| 3/8                                                 | .252                                                | .281 | .187                                                | 4 | 3/8            | 2-1/2          | 22724  | 82.50  | 22724-C3  | 92.60  |
| 3/8                                                 | .252                                                | .281 | .750                                                | 4 | 3/8            | 2-1/2          | 22824  | 87.80  | 22824-C3  | 97.90  |
| 3/8                                                 | .252                                                | .281 | 1.500                                               | 4 | 3/8            | 4              | 22924  | 106.30 | 22924-C3  | 120.10 |
| 3/8                                                 | .252                                                | .281 | 2.250                                               | 4 | 3/8            | 4              | 971624 | 147.50 | 971624-C3 | 161.30 |
| 1/2                                                 | .336                                                | .375 | .187                                                | 4 | 1/2            | 3              | 22732  | 119.10 | 22732-C3  | 134.20 |
| 1/2                                                 | .336                                                | .375 | 1.000                                               | 4 | 1/2            | 3              | 22832  | 126.60 | 22832-C3  | 141.70 |
| 1/2                                                 | .336                                                | .375 | 2.000                                               | 4 | 1/2            | 6              | 22932  | 209.70 | 22932-C3  | 224.80 |

UNDERCUTTING END MILLS

270° High Helix

UNDERCUTTING END MILLS



High Helix  
for Improved  
Performance!



270° Spherical Ball

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

| CUTTER DIA.    |                    | LENGTH OF CUT  |                    | NECK DIA. |  | NECK LENGTH    |                    | FLUTES |  | SHANK DIA.     |  | OAL            |  | UNCOATED |       | AlTiN COATED |       | TiB <sub>2</sub> COATED |       |
|----------------|--------------------|----------------|--------------------|-----------|--|----------------|--------------------|--------|--|----------------|--|----------------|--|----------|-------|--------------|-------|-------------------------|-------|
| D <sub>1</sub> | + .000"<br>- .001" | L <sub>2</sub> | + .010"<br>- .000" |           |  | L <sub>3</sub> | + .020"<br>- .000" |        |  | D <sub>2</sub> |  | L <sub>1</sub> |  | TOOL #   | PRICE | TOOL #       | PRICE | TOOL #                  | PRICE |
| 1/32           |                    | .027           |                    | .016      |  | .062           |                    | 2      |  | 1/8            |  | 1-1/2          |  | 951131   | 70.20 | 951131-C3    | 75.40 |                         |       |
| 1/32           |                    | .027           |                    | .016      |  | .093           |                    | 2      |  | 1/8            |  | 1-1/2          |  | 966531   | 70.20 | 966531-C3    | 75.40 |                         |       |
| .0394 (1 mm)   |                    | .033           |                    | .024      |  | .078           |                    | 2      |  | 1/8            |  | 1-1/2          |  | 95111M   | 70.20 | 95111M-C3    | 75.40 |                         |       |
| .0394 (1 mm)   |                    | .033           |                    | .024      |  | .125           |                    | 2      |  | 1/8            |  | 1-1/2          |  | 96651M   | 70.20 | 96651M-C3    | 75.40 |                         |       |
| 3/64           |                    | .040           |                    | .029      |  | .093           |                    | 2      |  | 1/8            |  | 1-1/2          |  | 951147   | 70.20 | 951147-C3    | 75.40 |                         |       |
| 3/64           |                    | .040           |                    | .029      |  | .156           |                    | 2      |  | 1/8            |  | 1-1/2          |  | 966547   | 70.20 | 966547-C3    | 75.40 |                         |       |
| 1/16           |                    | .053           |                    | .037      |  | .093           |                    | 2      |  | 1/8            |  | 1-1/2          |  | 951162   | 50.80 | 951162-C3    | 56.00 | 951162-C8               | 58.40 |
| 1/16           |                    | .053           |                    | .037      |  | .125           |                    | 2      |  | 1/8            |  | 1-1/2          |  | 773762   | 52.50 | 773762-C3    | 57.70 |                         |       |
| 1/16           |                    | .053           |                    | .037      |  | .187           |                    | 2      |  | 1/8            |  | 1-1/2          |  | 966562   | 52.50 | 966562-C3    | 57.70 | 966562-C8               | 60.10 |
| 1/16           |                    | .053           |                    | .037      |  | .250           |                    | 2      |  | 1/8            |  | 1-1/2          |  | 970462   | 64.20 | 970462-C3    | 69.40 | 970462-C8               | 71.80 |
| 5/64           |                    | .067           |                    | .045      |  | .125           |                    | 2      |  | 1/8            |  | 1-1/2          |  | 951178   | 50.80 | 951178-C3    | 56.00 | 951178-C8               | 58.40 |
| 5/64           |                    | .067           |                    | .045      |  | .250           |                    | 2      |  | 1/8            |  | 1-1/2          |  | 966578   | 52.50 | 966578-C3    | 57.70 | 966578-C8               | 60.10 |
| 5/64           |                    | .067           |                    | .045      |  | .375           |                    | 2      |  | 1/8            |  | 2              |  | 970478   | 64.20 | 970478-C3    | 69.40 | 970478-C8               | 71.80 |
| 3/32           |                    | .079           |                    | .054      |  | .062           |                    | 2      |  | 1/8            |  | 1-1/2          |  | 774493   | 48.50 | 774493-C3    | 53.70 |                         |       |
| 3/32           |                    | .079           |                    | .054      |  | .125           |                    | 2      |  | 1/8            |  | 1-1/2          |  | 837393   | 48.50 | 837393-C3    | 53.70 | 837393-C8               | 56.10 |
| 3/32           |                    | .079           |                    | .054      |  | .250           |                    | 2      |  | 1/8            |  | 1-1/2          |  | 951193   | 50.80 | 951193-C3    | 56.00 | 951193-C8               | 58.40 |
| 3/32           |                    | .079           |                    | .054      |  | .375           |                    | 2      |  | 1/8            |  | 1-1/2          |  | 966593   | 55.60 | 966593-C3    | 60.80 | 966593-C8               | 63.20 |
| 3/32           |                    | .079           |                    | .054      |  | .500           |                    | 2      |  | 1/8            |  | 2              |  | 970493   | 64.20 | 970493-C3    | 69.40 | 970493-C8               | 71.80 |

| D <sub>1</sub> | + .000"<br>- .002" | L <sub>2</sub> | + .020"<br>- .000" |      |  | L <sub>3</sub> | + .030"<br>- .000" |   |  | D <sub>2</sub> |  | L <sub>1</sub> |  | TOOL # | PRICE | TOOL #    | PRICE | TOOL #    | PRICE |
|----------------|--------------------|----------------|--------------------|------|--|----------------|--------------------|---|--|----------------|--|----------------|--|--------|-------|-----------|-------|-----------|-------|
| 1/8            |                    | .107           |                    | .076 |  | .125           |                    | 4 |  | 1/8            |  | 1-1/2          |  | 934108 | 44.50 | 934108-C3 | 49.70 | 934108-C8 | 52.10 |
| 1/8            |                    | .107           |                    | .076 |  | .187           |                    | 4 |  | 1/8            |  | 1-1/2          |  | 808608 | 45.40 | 808608-C3 | 50.60 | 808608-C8 | 53.00 |
| 1/8            |                    | .107           |                    | .076 |  | .250           |                    | 4 |  | 1/8            |  | 1-1/2          |  | 951208 | 46.40 | 951208-C3 | 51.60 | 951208-C8 | 54.00 |
| 1/8            |                    | .107           |                    | .076 |  | .375           |                    | 4 |  | 1/8            |  | 1-1/2          |  | 863708 | 48.70 | 863708-C3 | 53.90 | 863708-C8 | 56.30 |
| 1/8            |                    | .107           |                    | .076 |  | .500           |                    | 4 |  | 1/8            |  | 1-1/2          |  | 994708 | 50.80 | 994708-C3 | 56.00 | 994708-C8 | 58.40 |
| 1/8            |                    | .107           |                    | .076 |  | 1.000          |                    | 4 |  | 1/8            |  | 3              |  | 997108 | 57.50 | 997108-C3 | 62.70 | 997108-C8 | 65.10 |
| 1/8            |                    | .107           |                    | .076 |  | 1.500          |                    | 4 |  | 1/8            |  | 3              |  | 928808 | 61.30 | 928808-C3 | 66.50 | 928808-C8 | 68.90 |
| 5/32           |                    | .133           |                    | .098 |  | .250           |                    | 4 |  | 3/16           |  | 2              |  | 951210 | 60.20 | 951210-C3 | 65.80 | 951210-C8 | 67.80 |
| 5/32           |                    | .133           |                    | .098 |  | .500           |                    | 4 |  | 3/16           |  | 2              |  | 994710 | 64.70 | 994710-C3 | 70.30 | 994710-C8 | 72.30 |
| 5/32           |                    | .133           |                    | .098 |  | 1.000          |                    | 4 |  | 3/16           |  | 3              |  | 997110 | 73.90 | 997110-C3 | 79.50 | 997110-C8 | 81.50 |
| 3/16           |                    | .160           |                    | .117 |  | .125           |                    | 4 |  | 3/16           |  | 2              |  | 934112 | 55.60 | 934112-C3 | 61.20 | 934112-C8 | 63.20 |
| 3/16           |                    | .160           |                    | .117 |  | .250           |                    | 4 |  | 3/16           |  | 2              |  | 951212 | 57.20 | 951212-C3 | 62.80 | 951212-C8 | 64.80 |
| 3/16           |                    | .160           |                    | .117 |  | .500           |                    | 4 |  | 3/16           |  | 2              |  | 994712 | 61.90 | 994712-C3 | 67.50 | 994712-C8 | 69.50 |
| 3/16           |                    | .160           |                    | .117 |  | .750           |                    | 4 |  | 3/16           |  | 2              |  | 897712 | 64.70 | 897712-C3 | 70.30 | 897712-C8 | 72.30 |
| 3/16           |                    | .160           |                    | .117 |  | 1.000          |                    | 4 |  | 3/16           |  | 3              |  | 997112 | 73.90 | 997112-C3 | 79.50 | 997112-C8 | 81.50 |
| 3/16           |                    | .160           |                    | .117 |  | 1.250          |                    | 4 |  | 3/16           |  | 3              |  | 893512 | 77.80 | 893512-C3 | 83.40 | 893512-C8 | 85.40 |

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UNDERCUTTING END MILLS

270° High Helix (cont.)

continued from previous page

| CUTTER DIA.                                         | LENGTH OF CUT                                       | NECK DIA. | NECK LENGTH                                         | FLUTES | SHANK DIA.     | OAL            | UNCOATED |        | AlTiN COATED |        | TiB <sub>2</sub> COATED |        |
|-----------------------------------------------------|-----------------------------------------------------|-----------|-----------------------------------------------------|--------|----------------|----------------|----------|--------|--------------|--------|-------------------------|--------|
| D <sub>1</sub> <sup>+0.000"</sup> <sub>-.002"</sub> | L <sub>2</sub> <sup>+0.020"</sup> <sub>-.000"</sub> |           | L <sub>3</sub> <sup>+0.030"</sup> <sub>-.000"</sub> |        | D <sub>2</sub> | L <sub>1</sub> | TOOL #   | PRICE  | TOOL #       | PRICE  | TOOL #                  | PRICE  |
| 1/4                                                 | .213                                                | .158      | .125                                                | 4      | 1/4            | 2-1/2          | 934116   | 79.60  | 934116-C3    | 87.20  | 934116-C8               | 87.80  |
| 1/4                                                 | .213                                                | .158      | .250                                                | 4      | 1/4            | 2-1/2          | 808616   | 81.40  | 808616-C3    | 89.00  | 808616-C8               | 89.60  |
| 1/4                                                 | .213                                                | .158      | .375                                                | 4      | 1/4            | 2-1/2          | 951216   | 83.30  | 951216-C3    | 90.90  | 951216-C8               | 91.50  |
| 1/4                                                 | .213                                                | .158      | .500                                                | 4      | 1/4            | 2-1/2          | 863716   | 85.90  | 863716-C3    | 93.50  | 863716-C8               | 94.10  |
| 1/4                                                 | .213                                                | .158      | .750                                                | 4      | 1/4            | 2-1/2          | 994716   | 91.20  | 994716-C3    | 98.80  | 994716-C8               | 99.40  |
| 1/4                                                 | .213                                                | .158      | 1.000                                               | 4      | 1/4            | 2-1/2          | 808516   | 92.60  | 808516-C3    | 100.20 | 808516-C8               | 100.80 |
| 1/4                                                 | .213                                                | .158      | 1.125                                               | 4      | 1/4            | 2-1/2          | 897716   | 93.90  | 897716-C3    | 101.50 | 897716-C8               | 102.10 |
| 1/4                                                 | .213                                                | .158      | 1.500                                               | 4      | 1/4            | 4              | 997116   | 100.40 | 997116-C3    | 109.30 | 997116-C8               | 109.60 |
| 1/4                                                 | .213                                                | .158      | 2.250                                               | 4      | 1/4            | 4              | 928816   | 111.10 | 928816-C3    | 120.00 | 928816-C8               | 120.30 |
| 5/16                                                | .266                                                | .201      | .750                                                | 4      | 5/16           | 2-1/2          | 994720   | 106.10 | 994720-C3    | 115.00 | 994720-C8               | 123.50 |
| 5/16                                                | .266                                                | .201      | 1.500                                               | 4      | 5/16           | 4              | 997120   | 126.00 | 997120-C3    | 136.70 | 997120-C8               | 147.10 |
| 3/8                                                 | .320                                                | .241      | .375                                                | 4      | 3/8            | 2-1/2          | 951224   | 119.00 | 951224-C3    | 129.10 | 951224-C8               | 140.10 |
| 3/8                                                 | .320                                                | .241      | .750                                                | 4      | 3/8            | 2-1/2          | 994724   | 120.40 | 994724-C3    | 130.50 | 994724-C8               | 141.50 |
| 3/8                                                 | .320                                                | .241      | 1.125                                               | 4      | 3/8            | 4              | 897724   | 129.30 | 897724-C3    | 143.10 | 897724-C8               | 154.10 |
| 3/8                                                 | .320                                                | .241      | 1.500                                               | 4      | 3/8            | 4              | 997124   | 132.60 | 997124-C3    | 146.40 | 997124-C8               | 157.40 |
| 1/2                                                 | .427                                                | .323      | .500                                                | 4      | 1/2            | 3              | 951232   | 169.90 | 951232-C3    | 185.00 | 951232-C8               | 194.70 |
| 1/2                                                 | .427                                                | .323      | 1.000                                               | 4      | 1/2            | 3              | 994732   | 174.20 | 994732-C3    | 189.30 | 994732-C8               | 199.00 |
| 1/2                                                 | .427                                                | .323      | 1.500                                               | 4      | 1/2            | 6              | 897732   | 250.60 | 897732-C3    | 265.70 | 897732-C8               | 295.10 |
| 1/2                                                 | .427                                                | .323      | 2.000                                               | 4      | 1/2            | 6              | 997132   | 257.30 | 997132-C3    | 272.40 | 997132-C8               | 301.80 |
| 1/2                                                 | .427                                                | .323      | 3.000                                               | 4      | 1/2            | 6              | 928832   | 287.00 | 928832-C3    | 302.10 | 928832-C8               | 331.50 |

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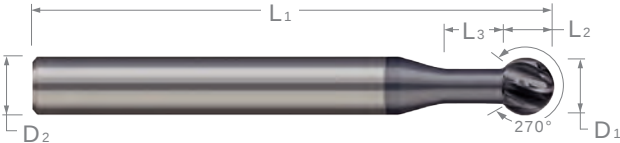
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15

UNDERCUTTING END MILLS

270° for Hardened Steels

UNDERCUTTING END MILLS



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

Stocked in  
Multiple Reach  
Lengths



| CUTTER DIAMETER                                     | LENGTH OF CUT                                       | NECK DIA. | NECK LENGTH                                         | FLUTES | SHANK DIAMETER | OVERALL LENGTH | AlTiN NANO COATED |       |
|-----------------------------------------------------|-----------------------------------------------------|-----------|-----------------------------------------------------|--------|----------------|----------------|-------------------|-------|
| D <sub>1</sub> <sup>+0.000"</sup> <sub>-.001"</sub> | L <sub>2</sub> <sup>+0.010"</sup> <sub>-.000"</sub> |           | L <sub>3</sub> <sup>+0.020"</sup> <sub>-.000"</sub> |        | D <sub>2</sub> | L <sub>1</sub> | TOOL #            | PRICE |
| 1/32                                                | .027                                                | .016      | .062                                                | 4      | 1/8            | 1-1/2          | 823231-C6         | 69.30 |
| 1/32                                                | .027                                                | .016      | .078                                                | 4      | 1/8            | 1-1/2          | 819831-C6         | 69.30 |
| 1/32                                                | .027                                                | .016      | .125                                                | 4      | 1/8            | 1-1/2          | 745431-C6         | 69.90 |
| 3/64                                                | .040                                                | .029      | .093                                                | 4      | 1/8            | 1-1/2          | 823247-C6         | 69.30 |
| 3/64                                                | .040                                                | .029      | .125                                                | 4      | 1/8            | 1-1/2          | 819847-C6         | 69.30 |
| 1/16                                                | .053                                                | .037      | .062                                                | 4      | 1/8            | 1-1/2          | 831562-C6         | 47.70 |
| 1/16                                                | .053                                                | .037      | .093                                                | 4      | 1/8            | 1-1/2          | 823262-C6         | 47.70 |
| 1/16                                                | .053                                                | .037      | .125                                                | 4      | 1/8            | 1-1/2          | 819862-C6         | 49.60 |
| 1/16                                                | .053                                                | .037      | .250                                                | 4      | 1/8            | 1-1/2          | 745462-C6         | 50.10 |
| 5/64                                                | .067                                                | .045      | .125                                                | 4      | 1/8            | 1-1/2          | 823278-C6         | 48.70 |
| 5/64                                                | .067                                                | .045      | .187                                                | 4      | 1/8            | 1-1/2          | 819878-C6         | 50.50 |
| 3/32                                                | .080                                                | .054      | .062                                                | 4      | 1/8            | 1-1/2          | 831593-C6         | 48.70 |
| 3/32                                                | .080                                                | .054      | .125                                                | 4      | 1/8            | 1-1/2          | 746493-C6         | 49.10 |
| 3/32                                                | .080                                                | .054      | .250                                                | 4      | 1/8            | 1-1/2          | 823293-C6         | 48.70 |
| 3/32                                                | .080                                                | .054      | .312                                                | 4      | 1/8            | 1-1/2          | 819893-C6         | 52.60 |
| 3/32                                                | .080                                                | .054      | .375                                                | 4      | 1/8            | 1-1/2          | 748893-C6         | 53.10 |

| D <sub>1</sub> <sup>+0.000"</sup> <sub>-.002"</sub> | L <sub>2</sub> <sup>+0.020"</sup> <sub>-.000"</sub> |      | L <sub>3</sub> <sup>+0.030"</sup> <sub>-.000"</sub> |   | D <sub>2</sub> | L <sub>1</sub> | TOOL #    | PRICE  |
|-----------------------------------------------------|-----------------------------------------------------|------|-----------------------------------------------------|---|----------------|----------------|-----------|--------|
| 1/8                                                 | .107                                                | .076 | .125                                                | 6 | 1/8            | 1-1/2          | 831608-C6 | 42.70  |
| 1/8                                                 | .107                                                | .076 | .250                                                | 6 | 1/8            | 1-1/2          | 823308-C6 | 44.90  |
| 1/8                                                 | .107                                                | .076 | .375                                                | 6 | 1/8            | 1-1/2          | 819908-C6 | 45.70  |
| 1/8                                                 | .107                                                | .076 | .500                                                | 6 | 1/8            | 2              | 748908-C6 | 48.00  |
| 1/8                                                 | .107                                                | .076 | .750                                                | 6 | 1/8            | 2              | 725708-C6 | 48.80  |
| 5/32                                                | .133                                                | .098 | .250                                                | 6 | 3/16           | 2              | 823310-C6 | 54.10  |
| 3/16                                                | .160                                                | .117 | .125                                                | 6 | 3/16           | 2              | 831612-C6 | 50.40  |
| 3/16                                                | .160                                                | .117 | .250                                                | 6 | 3/16           | 2              | 823312-C6 | 54.10  |
| 3/16                                                | .160                                                | .117 | .375                                                | 6 | 3/16           | 2              | 819912-C6 | 56.70  |
| 3/16                                                | .160                                                | .117 | .500                                                | 6 | 3/16           | 2              | 748912-C6 | 59.50  |
| 1/4                                                 | .213                                                | .158 | .125                                                | 8 | 1/4            | 2-1/2          | 831616-C6 | 67.50  |
| 1/4                                                 | .213                                                | .158 | .375                                                | 6 | 1/4            | 2-1/2          | 823316-C6 | 71.80  |
| 1/4                                                 | .213                                                | .158 | .500                                                | 6 | 1/4            | 2-1/2          | 819916-C6 | 73.10  |
| 1/4                                                 | .213                                                | .158 | .750                                                | 6 | 1/4            | 2-1/2          | 748916-C6 | 76.20  |
| 3/8                                                 | .320                                                | .241 | .375                                                | 8 | 3/8            | 2-1/2          | 823324-C6 | 98.40  |
| 3/8                                                 | .320                                                | .241 | .500                                                | 8 | 3/8            | 2-1/2          | 819924-C6 | 98.40  |
| 1/2                                                 | .427                                                | .323 | .500                                                | 8 | 1/2            | 3              | 823332-C6 | 140.00 |
| 1/2                                                 | .427                                                | .323 | .750                                                | 8 | 1/2            | 3              | 819932-C6 | 143.50 |

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270° Deburring Undercut



High Number of Flutes

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- Stop scrapping expensive parts due to handheld operator errors
- High flute count allows for increased feeds which reduces cycle times
- Achieve better finish than with milling-type cutters
- Double cut style flute pattern      • Center cutting
- Solid carbide      • CNC ground in the USA

| CUTTER DIA.    | LOC                                   | NECK DIA. | NECK LENGTH                           | RIGHT HAND TEETH | LEFT HAND TEETH | SHANK DIA.     | OAL            | UNCOATED |       | AITIN COATED |       |
|----------------|---------------------------------------|-----------|---------------------------------------|------------------|-----------------|----------------|----------------|----------|-------|--------------|-------|
|                |                                       |           |                                       |                  |                 |                |                | TOOL #   | PRICE | TOOL #       | PRICE |
| D <sub>1</sub> | L <sub>2</sub> $\pm .010"$<br>- .000" |           | L <sub>3</sub> $\pm .020"$<br>- .000" |                  |                 | D <sub>2</sub> | L <sub>1</sub> |          |       |              |       |
| .031 (1/32)    | .026                                  | .014      | .031                                  | 12               | 10              | 1/8            | 1-1/2          | 899631   | 72.00 | 899631-C3    | 77.20 |
| .031 (1/32)    | .026                                  | .014      | .062                                  | 12               | 10              | 1/8            | 1-1/2          | 980531   | 71.40 | 980531-C3    | 76.60 |
| .031 (1/32)    | .026                                  | .014      | .093                                  | 12               | 10              | 1/8            | 1-1/2          | 926431   | 73.60 | 926431-C3    | 78.80 |
| .031 (1/32)    | .026                                  | .014      | .125                                  | 12               | 10              | 1/8            | 1-1/2          | 883231   | 76.00 | 883231-C3    | 81.20 |
| .039 (1 mm)    | .033                                  | .019      | .047                                  | 12               | 10              | 1/8            | 1-1/2          | 89961M   | 71.40 | 89961M-C3    | 76.60 |
| .039 (1 mm)    | .033                                  | .019      | .125                                  | 12               | 10              | 1/8            | 1/1/2          | 92641M   | 76.00 | 92641M-C3    | 81.20 |
| .047 (3/64)    | .040                                  | .024      | .093                                  | 12               | 10              | 1/8            | 1-1/2          | 980547   | 71.40 | 980547-C3    | 76.60 |
| .047 (3/64)    | .040                                  | .024      | .125                                  | 12               | 10              | 1/8            | 1-1/2          | 890847   | 73.60 | 890847-C3    | 78.80 |
| .047 (3/64)    | .040                                  | .024      | .156                                  | 12               | 10              | 1/8            | 1-1/2          | 926447   | 73.60 | 926447-C3    | 78.80 |
| .047 (3/64)    | .040                                  | .024      | .250                                  | 12               | 10              | 1/8            | 1-1/2          | 883247   | 76.00 | 883247-C3    | 81.20 |
| .062 (1/16)    | .053                                  | .032      | .062                                  | 15               | 12              | 1/8            | 1-1/2          | 899662   | 53.60 | 899662-C3    | 58.80 |
| .062 (1/16)    | .053                                  | .032      | .093                                  | 15               | 12              | 1/8            | 1-1/2          | 980562   | 53.60 | 980562-C3    | 58.80 |
| .062 (1/16)    | .053                                  | .032      | .125                                  | 15               | 12              | 1/8            | 1-1/2          | 890862   | 55.40 | 890862-C3    | 60.60 |
| .062 (1/16)    | .053                                  | .032      | .187                                  | 15               | 12              | 1/8            | 1-1/2          | 926462   | 55.40 | 926462-C3    | 60.60 |
| .062 (1/16)    | .053                                  | .032      | .250                                  | 15               | 12              | 1/8            | 1-1/2          | 883262   | 57.40 | 883262-C3    | 62.60 |
| .062 (1/16)    | .053                                  | .032      | .312                                  | 15               | 12              | 1/8            | 1-1/2          | 808362   | 57.40 | 808362-C3    | 62.60 |
| .078 (5/64)    | .067                                  | .035      | .062                                  | 15               | 12              | 1/8            | 1-1/2          | 899678   | 53.60 | 899678-C3    | 58.80 |
| .078 (5/64)    | .067                                  | .035      | .125                                  | 15               | 12              | 1/8            | 1-1/2          | 980578   | 53.60 | 980578-C3    | 58.80 |
| .078 (5/64)    | .067                                  | .035      | .250                                  | 15               | 12              | 1/8            | 1-1/2          | 926478   | 55.40 | 926478-C3    | 60.60 |
| .078 (5/64)    | .067                                  | .035      | .375                                  | 15               | 12              | 1/8            | 2              | 883278   | 56.20 | 883278-C3    | 61.40 |
| .093 (3/32)    | .079                                  | .038      | .062                                  | 15               | 12              | 1/8            | 1-1/2          | 899693   | 56.90 | 899693-C3    | 62.10 |
| .093 (3/32)    | .079                                  | .038      | .125                                  | 15               | 12              | 1/8            | 1-1/2          | 895393   | 56.90 | 895393-C3    | 62.10 |
| .093 (3/32)    | .079                                  | .038      | .187                                  | 15               | 12              | 1/8            | 1-1/2          | 809693   | 56.90 | 809693-C3    | 62.10 |
| .093 (3/32)    | .079                                  | .038      | .250                                  | 15               | 12              | 1/8            | 1-1/2          | 980593   | 56.90 | 980593-C3    | 62.10 |
| .093 (3/32)    | .079                                  | .038      | .312                                  | 15               | 12              | 1/8            | 1-1/2          | 890893   | 59.00 | 890893-C3    | 64.20 |
| .093 (3/32)    | .079                                  | .038      | .375                                  | 15               | 12              | 1/8            | 1-1/2          | 926493   | 58.40 | 926493-C3    | 63.60 |
| .093 (3/32)    | .079                                  | .038      | .500                                  | 15               | 12              | 1/8            | 2              | 883293   | 64.70 | 883293-C3    | 69.90 |
| .118 (3 mm)    | .101                                  | .056      | .250                                  | 15               | 12              | 1/8            | 1-1/2          | 98053M   | 59.30 | 98053M-C3    | 64.50 |
| .118 (3 mm)    | .101                                  | .056      | .375                                  | 15               | 12              | 1/8            | 1-1/2          | 89083M   | 61.40 | 89083M-C3    | 66.60 |
| .118 (3 mm)    | .101                                  | .056      | .500                                  | 15               | 12              | 1/8            | 2              | 92643M   | 63.00 | 92643M-C3    | 68.20 |

continued on next page

UNDERCUTTING END MILLS

270° Deburring Undercut (cont.)

continued from previous page

| CUTTER<br>DIA. | LOC                                                | NECK<br>DIA. | NECK<br>LENGTH                                     | RIGHT HAND<br>TEETH | LEFT HAND<br>TEETH | SHANK<br>DIA.  | OAL            | UNCOATED |        | AITiN COATED |        |
|----------------|----------------------------------------------------|--------------|----------------------------------------------------|---------------------|--------------------|----------------|----------------|----------|--------|--------------|--------|
|                |                                                    |              |                                                    |                     |                    |                |                | TOOL #   | PRICE  | TOOL #       | PRICE  |
| D <sub>1</sub> | L <sub>2</sub> <sup>+.020"</sup> <sub>-.000"</sub> |              | L <sub>3</sub> <sup>+.030"</sup> <sub>-.000"</sub> |                     |                    | D <sub>2</sub> | L <sub>1</sub> |          |        |              |        |
| .125 (1/8)     | .107                                               | .059         | .125                                               | 16                  | 13                 | 1/8            | 1-1/2          | 899708   | 54.90  | 899708-C3    | 60.10  |
| .125 (1/8)     | .107                                               | .059         | .187                                               | 16                  | 13                 | 1/8            | 1-1/2          | 809908   | 55.10  | 809908-C3    | 60.30  |
| .125 (1/8)     | .107                                               | .059         | .250                                               | 16                  | 13                 | 1/8            | 1-1/2          | 980608   | 56.90  | 980608-C3    | 62.10  |
| .125 (1/8)     | .107                                               | .059         | .375                                               | 16                  | 13                 | 1/8            | 1-1/2          | 890908   | 57.80  | 890908-C3    | 63.00  |
| .125 (1/8)     | .107                                               | .059         | .500                                               | 16                  | 13                 | 1/8            | 2              | 926508   | 59.00  | 926508-C3    | 64.20  |
| .125 (1/8)     | .107                                               | .059         | .750                                               | 16                  | 13                 | 1/8            | 2              | 886108   | 61.80  | 886108-C3    | 67.00  |
| .125 (1/8)     | .107                                               | .059         | 1.000                                              | 16                  | 13                 | 1/8            | 3              | 883308   | 65.40  | 883308-C3    | 70.60  |
| .156 (5/32)    | .133                                               | .078         | .250                                               | 16                  | 13                 | 3/16           | 2              | 980610   | 62.40  | 980610-C3    | 68.00  |
| .156 (5/32)    | .133                                               | .078         | .500                                               | 16                  | 13                 | 3/16           | 2              | 926510   | 67.20  | 926510-C3    | 72.80  |
| .187 (3/16)    | .160                                               | .097         | .125                                               | 16                  | 13                 | 3/16           | 2              | 899712   | 58.40  | 899712-C3    | 64.00  |
| .187 (3/16)    | .160                                               | .097         | .250                                               | 16                  | 13                 | 3/16           | 2              | 980612   | 61.80  | 980612-C3    | 67.40  |
| .187 (3/16)    | .160                                               | .097         | .375                                               | 16                  | 13                 | 3/16           | 2              | 890912   | 63.90  | 890912-C3    | 69.50  |
| .187 (3/16)    | .160                                               | .097         | .500                                               | 16                  | 13                 | 3/16           | 2              | 926512   | 67.20  | 926512-C3    | 72.80  |
| .187 (3/16)    | .160                                               | .097         | .750                                               | 16                  | 13                 | 3/16           | 2              | 886112   | 72.50  | 886112-C3    | 78.10  |
| .187 (3/16)    | .160                                               | .097         | 1.000                                              | 16                  | 13                 | 3/16           | 3              | 883312   | 76.30  | 883312-C3    | 81.90  |
| .250 (1/4)     | .213                                               | .136         | .125                                               | 16                  | 13                 | 1/4            | 2-1/2          | 899716   | 73.10  | 899716-C3    | 80.70  |
| .250 (1/4)     | .213                                               | .136         | .375                                               | 16                  | 13                 | 1/4            | 2-1/2          | 980616   | 73.90  | 980616-C3    | 81.50  |
| .250 (1/4)     | .213                                               | .136         | .500                                               | 16                  | 13                 | 1/4            | 2-1/2          | 890916   | 75.90  | 890916-C3    | 83.50  |
| .250 (1/4)     | .213                                               | .136         | .750                                               | 16                  | 13                 | 1/4            | 2-1/2          | 926516   | 79.40  | 926516-C3    | 87.00  |
| .250 (1/4)     | .213                                               | .136         | 1.125                                              | 16                  | 13                 | 1/4            | 2-1/2          | 886116   | 82.00  | 886116-C3    | 89.60  |
| .375 (3/8)     | .320                                               | .200         | .375                                               | 16                  | 13                 | 3/8            | 2-1/2          | 980624   | 98.50  | 980624-C3    | 108.60 |
| .375 (3/8)     | .320                                               | .200         | .750                                               | 16                  | 13                 | 3/8            | 2-1/2          | 926524   | 104.30 | 926524-C3    | 114.40 |

UNDERCUTTING END MILLS

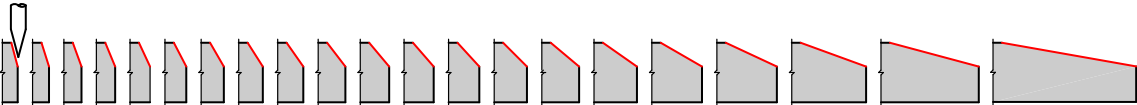
CHAMFER CUTTERS

Pointed & Flat End



Available in  
2, 3, 4 & 6 Flutes!

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



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

| ANGLE PER SIDE   | DIA. | FLUTES | TIP      | TYPE | LOC  |           | OAL   |       | UNCOATED |       | AITiN COATED |       | TiB2 COATED |       |
|------------------|------|--------|----------|------|------|-----------|-------|-------|----------|-------|--------------|-------|-------------|-------|
| A1 +0°30' -0°30' | D2   |        | T (MAX.) |      | L2   | L4 (MAX.) | L1    |       | TOOL #   | PRICE | TOOL #       | PRICE | TOOL #      | PRICE |
| 15°              | 1/8  | 2      | .010     | I    | .233 |           | 1-1/2 |       | 18715    | 19.20 | 18715-C3     | 24.40 | 18715-C8    | 26.80 |
|                  | 1/8  | 2      | .010     | I    | .233 |           | 3     | LONG! | 50615    | 25.00 | 50615-C3     | 30.20 |             |       |
|                  | 1/8  | 3      | .040     | II   | .159 | .075      | 1-1/2 |       | 968615   | 20.40 | 968615-C3    | 25.60 |             |       |
|                  | 1/8  | 4      | .040     | II   | .159 | .075      | 1-1/2 |       | 866115   | 21.50 | 866115-C3    | 26.70 |             |       |
|                  | 3/16 | 2      | .010     | I    | .350 |           | 2     |       | 72415    | 26.60 | 72415-C3     | 32.20 |             |       |
|                  | 3/16 | 2      | .010     | I    | .350 |           | 4     | LONG! | 986915   | 40.10 | 986915-C3    | 47.70 |             |       |
|                  | 3/16 | 3      | .040     | II   | .275 | .075      | 2     |       | 978115   | 30.30 | 978115-C3    | 35.90 |             |       |
|                  | 3/16 | 4      | .040     | II   | .275 | .075      | 2     |       | 848715   | 31.80 | 848715-C3    | 37.40 |             |       |
|                  | 1/4  | 2      | .010     | I    | .448 |           | 2-1/2 |       | 47615    | 38.10 | 47615-C3     | 45.70 | 47615-C8    | 46.30 |
|                  | 1/4  | 3      | .060     | II   | .355 | .112      | 2-1/2 |       | 18515    | 35.80 | 18515-C3     | 43.40 |             |       |
|                  | 1/4  | 3      | .060     | II   | .355 | .112      | 4     | LONG! | 48515    | 49.80 | 48515-C3     | 54.60 |             |       |
|                  | 1/4  | 4      | .060     | II   | .355 | .112      | 2-1/2 |       | 876415   | 40.00 | 876415-C3    | 47.60 |             |       |
|                  | 1/4  | 4      | .040     | III  | .391 | .075      | 2-1/2 |       | 833115   | 42.90 | 833115-C3    | 50.50 |             |       |
|                  | 5/16 | 3      | .060     | II   | .471 | .112      | 2-1/2 |       | 977015   | 44.90 | 977015-C3    | 53.80 |             |       |
|                  | 3/8  | 2      | .010     | I    | .700 |           | 2-1/2 |       | 72515    | 51.10 | 72515-C3     | 61.20 |             |       |
|                  | 3/8  | 3      | .060     | II   | .588 | .112      | 2-1/2 |       | 18415    | 48.10 | 18415-C3     | 58.20 | 18415-C8    | 69.20 |
|                  | 3/8  | 3      | .060     | II   | .588 | .112      | 4     | LONG! | 981215   | 75.20 | 981215-C3    | 89.00 |             |       |
|                  | 3/8  | 4      | .060     | II   | .588 | .112      | 2-1/2 |       | 895115   | 53.70 | 895115-C3    | 63.80 |             |       |

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**TYPE I - POINTED**

Flat relief ground to center, yielding a web thickness at tip (T)

2 FLUTES 4 FLUTES

**TYPE II - FLAT END**

Flat relief ground to a non-end cutting flat tip (T)

3 FLUTES 4 FLUTES 6 FLUTES

DISTANCE TO THEO. SHARP CORNER L4

**TYPE III - END CUTTING**

Flat relief ground to an end cutting tip diameter (T), two flutes to center

4 FLUTES

DISTANCE TO THEO. SHARP CORNER L4

CHAMFER CUTTERS

Pointed & Flat End (cont.)

continued from previous page

| ANGLE<br>PER SIDE                          | DIA.           | FLUTES | TIP      | TYPE | LOC            |                       | OAL            | UNCOATED |        | AITiN COATED |        | TiB <sub>2</sub> COATED |       |
|--------------------------------------------|----------------|--------|----------|------|----------------|-----------------------|----------------|----------|--------|--------------|--------|-------------------------|-------|
|                                            |                |        |          |      |                |                       |                | TOOL #   | PRICE  | TOOL #       | PRICE  | TOOL #                  | PRICE |
| A <sub>1</sub> <sup>+0°30'</sup><br>-0°30' | D <sub>2</sub> |        | T (MAX.) |      | L <sub>2</sub> | L <sub>4</sub> (MAX.) | L <sub>1</sub> |          |        |              |        |                         |       |
| 15°                                        | 1/2            | 2      | .010     | I    | .933           |                       | 3              | 960415   | 86.10  | 960415-C3    | 101.20 |                         |       |
|                                            | 1/2            | 4      | .080     | II   | .784           | .149                  | 3              | 18315    | 71.30  | 18315-C3     | 86.40  |                         |       |
|                                            | 1/2            | 6      | .080     | II   | .784           | .149                  | 3              | 839215   | 79.80  | 839215-C3    | 94.90  |                         |       |
|                                            | 5/8            | 6      | .080     | II   | 1.017          | .149                  | 3-1/2          | 952815   | 125.40 | 952815-C3    | 140.50 |                         |       |
|                                            | 3/4            | 6      | .100     | II   | 1.213          | .187                  | 4              | 949315   | 187.80 | 949315-C3    | 204.10 |                         |       |
| 17.5°                                      | 1/8            | 2      | .010     | I    | .198           |                       | 1-1/2          | 18718    | 22.80  | 18718-C3     | 28.00  |                         |       |
|                                            | 1/4            | 2      | .010     | I    | .396           |                       | 2-1/2          | 47618    | 41.60  | 47618-C3     | 49.20  |                         |       |
|                                            | 1/4            | 3      | .060     | II   | .301           | .095                  | 2-1/2          | 18518    | 41.60  | 18518-C3     | 49.20  |                         |       |
|                                            | 3/8            | 3      | .060     | II   | .500           | .107                  | 2-1/2          | 18418    | 54.20  | 18418-C3     | 64.30  |                         |       |
|                                            | 1/2            | 4      | .080     | II   | .666           | .127                  | 3              | 18318    | 83.10  | 18318-C3     | 98.20  |                         |       |
| 20°                                        | 1/8            | 2      | .010     | I    | .172           |                       | 1-1/2          | 18720    | 19.20  | 18720-C3     | 24.40  | 18720-C8                | 26.80 |
|                                            | 1/8            | 2      | .010     | I    | .172           |                       | 3 LONG!        | 50620    | 25.00  | 50620-C3     | 30.20  |                         |       |
|                                            | 1/8            | 3      | .040     | II   | .117           | .055                  | 1-1/2          | 968620   | 20.40  | 968620-C3    | 25.60  |                         |       |
|                                            | 1/8            | 4      | .040     | II   | .117           | .055                  | 1-1/2          | 866120   | 21.50  | 866120-C3    | 26.70  |                         |       |
|                                            | 3/16           | 2      | .010     | I    | .258           |                       | 2              | 72420    | 26.60  | 72420-C3     | 32.20  | 72420-C8                | 34.20 |
|                                            | 3/16           | 2      | .010     | I    | .258           |                       | 4 LONG!        | 986920   | 40.10  | 986920-C3    | 47.70  |                         |       |
|                                            | 3/16           | 3      | .040     | II   | .203           | .055                  | 2              | 978120   | 30.30  | 978120-C3    | 35.90  |                         |       |
|                                            | 3/16           | 4      | .040     | II   | .203           | .055                  | 2              | 848720   | 31.80  | 848720-C3    | 37.40  |                         |       |
|                                            | 1/4            | 2      | .010     | I    | .343           |                       | 2-1/2          | 47620    | 38.10  | 47620-C3     | 45.70  | 47620-C8                | 46.30 |
|                                            | 1/4            | 3      | .060     | II   | .261           | .082                  | 2-1/2          | 18520    | 35.80  | 18520-C3     | 43.40  | 18520-C8                | 44.00 |
|                                            | 1/4            | 3      | .060     | II   | .261           | .082                  | 4 LONG!        | 48520    | 49.80  | 48520-C3     | 58.70  |                         |       |
|                                            | 1/4            | 4      | .060     | II   | .261           | .082                  | 2-1/2          | 876420   | 43.40  | 876420-C3    | 51.00  |                         |       |
|                                            | 1/4            | 4      | .040     | III  | .288           | .055                  | 2-1/2          | 833120   | 45.10  | 833120-C3    | 52.70  |                         |       |
|                                            | 5/16           | 3      | .060     | II   | .347           | .082                  | 2-1/2          | 977020   | 51.10  | 977020-C3    | 60.00  |                         |       |
|                                            | 3/8            | 2      | .010     | I    | .515           |                       | 2-1/2          | 72520    | 51.10  | 72520-C3     | 61.20  |                         |       |
|                                            | 3/8            | 3      | .060     | II   | .433           | .082                  | 2-1/2          | 18420    | 48.10  | 18420-C3     | 58.20  |                         |       |
|                                            | 3/8            | 3      | .060     | II   | .433           | .082                  | 4 LONG!        | 981220   | 75.20  | 981220-C3    | 89.00  |                         |       |
|                                            | 3/8            | 4      | .060     | II   | .433           | .082                  | 2-1/2          | 895120   | 58.30  | 895120-C3    | 68.40  |                         |       |
|                                            | 1/2            | 2      | .010     | I    | .687           |                       | 3              | 960420   | 86.10  | 960420-C3    | 101.20 |                         |       |
|                                            | 1/2            | 4      | .080     | II   | .577           | .110                  | 3              | 18320    | 71.30  | 18320-C3     | 86.40  |                         |       |
|                                            | 1/2            | 6      | .080     | II   | .577           | .110                  | 3              | 839220   | 79.80  | 839220-C3    | 94.90  |                         |       |
| 22.5°                                      | 1/8            | 2      | .010     | I    | .151           |                       | 1-1/2          | 18723    | 22.10  | 18723-C3     | 27.30  | 18723-C8                | 29.70 |
|                                            | 1/8            | 3      | .040     | II   | .103           | .048                  | 1-1/2          | 968623   | 22.10  | 968623-C3    | 27.30  |                         |       |
|                                            | 3/16           | 2      | .010     | I    | .226           |                       | 2              | 72423    | 29.00  | 72423-C3     | 34.60  |                         |       |
|                                            | 3/16           | 3      | .040     | II   | .178           | .048                  | 2              | 978123   | 29.00  | 978123-C3    | 34.60  |                         |       |
|                                            | 1/4            | 2      | .010     | I    | .302           |                       | 2-1/2          | 47623    | 41.60  | 47623-C3     | 49.20  |                         |       |
|                                            | 1/4            | 3      | .060     | II   | .229           | .072                  | 2-1/2          | 18523    | 41.60  | 18523-C3     | 49.20  |                         |       |
|                                            | 3/8            | 2      | .010     | I    | .453           |                       | 2-1/2          | 72523    | 55.90  | 72523-C3     | 66.00  |                         |       |
|                                            | 3/8            | 3      | .060     | II   | .380           | .072                  | 2-1/2          | 18423    | 55.90  | 18423-C3     | 66.00  |                         |       |
|                                            | 1/2            | 2      | .010     | I    | .604           |                       | 3              | 960423   | 89.00  | 960423-C3    | 104.10 |                         |       |
|                                            | 1/2            | 4      | .080     | II   | .507           | .097                  | 3              | 18323    | 78.70  | 18323-C3     | 93.80  |                         |       |

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CHAMFER CUTTERS

CHAMFER CUTTERS  
Pointed & Flat End (cont.)

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| ANGLE<br>PER SIDE                             | DIA.           | FLUTES | TIP                 | TYPE | LOC            |                       | OAL            | UNCOATED |        | AITIN COATED |        | TiB <sub>2</sub> COATED |       |
|-----------------------------------------------|----------------|--------|---------------------|------|----------------|-----------------------|----------------|----------|--------|--------------|--------|-------------------------|-------|
|                                               |                |        |                     |      |                |                       |                | TOOL #   | PRICE  | TOOL #       | PRICE  | TOOL #                  | PRICE |
| A <sub>1</sub><br><sup>+0°30'</sup><br>-0°30' | D <sub>2</sub> |        | T <sub>(MAX.)</sub> |      | L <sub>2</sub> | L <sub>4</sub> (MAX.) | L <sub>1</sub> |          |        |              |        |                         |       |
| 25°                                           | 1/8            | 2      | .010                | I    | .134           |                       | 1-1/2          | 18725    | 22.10  | 18725-C3     | 27.30  | 18725-C8                | 29.70 |
|                                               | 1/8            | 3      | .040                | II   | .091           | .043                  | 1-1/2          | 968625   | 22.10  | 968625-C3    | 27.30  |                         |       |
|                                               | 3/16           | 2      | .010                | I    | .201           |                       | 2              | 72425    | 28.80  | 72425-C3     | 34.40  |                         |       |
|                                               | 3/16           | 3      | .040                | II   | .158           | .043                  | 2              | 978125   | 28.80  | 978125-C3    | 34.40  |                         |       |
|                                               | 1/4            | 2      | .010                | I    | .268           |                       | 2-1/2          | 47625    | 41.60  | 47625-C3     | 49.20  |                         |       |
|                                               | 1/4            | 3      | .060                | II   | .204           | .064                  | 2-1/2          | 18525    | 41.40  | 18525-C3     | 49.00  |                         |       |
|                                               | 1/4            | 4      | .060                | II   | .204           | .064                  | 2-1/2          | 876425   | 43.20  | 876425-C3    | 50.80  |                         |       |
|                                               | 3/8            | 2      | .010                | I    | .402           |                       | 2-1/2          | 72525    | 55.50  | 72525-C3     | 65.60  |                         |       |
|                                               | 3/8            | 3      | .060                | II   | .338           | .064                  | 2-1/2          | 18425    | 55.50  | 18425-C3     | 65.60  |                         |       |
|                                               | 1/2            | 2      | .010                | I    | .536           |                       | 3              | 960425   | 88.10  | 960425-C3    | 103.20 |                         |       |
|                                               | 1/2            | 4      | .080                | II   | .450           | .086                  | 3              | 18325    | 77.80  | 18325-C3     | 92.90  |                         |       |
| NEW<br>27.5°                                  | 1/8            | 2      | .010                | I    | .120           |                       | 1-1/2          | 18728    | 22.80  | 18728-C3     | 28.00  |                         |       |
|                                               | 3/16           | 2      | .010                | I    | .180           |                       | 2              | 72428    | 29.60  | 72428-C3     | 35.20  |                         |       |
|                                               | 1/4            | 2      | .010                | I    | .240           |                       | 2-1/2          | 47628    | 41.60  | 47628-C3     | 49.20  |                         |       |
|                                               | 1/4            | 3      | .060                | II   | .182           | .058                  | 2-1/2          | 18528    | 41.60  | 18528-C3     | 49.20  |                         |       |
|                                               | 1/2            | 4      | .080                | II   | .403           | .077                  | 3              | 18328    | 78.70  | 18328-C3     | 93.80  |                         |       |
| 30°                                           | 3 mm           | 2      | .120 mm             | I    | 2.60 mm        |                       | 38 mm          | 900230   | 21.50  | 900230-C3    | 26.70  |                         |       |
|                                               | 1/8            | 2      | .010                | I    | .108           |                       | 1-1/2          | 18730    | 19.20  | 18730-C3     | 24.40  | 18730-C8                | 26.80 |
|                                               | 1/8            | 2      | .010                | I    | .108           |                       | 3 LONG!        | 50630    | 25.00  | 50630-C3     | 30.20  |                         |       |
|                                               | 1/8            | 3      | .040                | II   | .074           | .035                  | 1-1/2          | 968630   | 20.40  | 968630-C3    | 25.60  |                         |       |
|                                               | 1/8            | 4      | .040                | II   | .074           | .035                  | 1-1/2          | 866130   | 21.50  | 866130-C3    | 26.70  |                         |       |
|                                               | 1/8            | 4      | .040                | III  | .074           | .035                  | 1-1/2          | 802830   | 24.00  | 802830-C3    | 29.20  |                         |       |
|                                               | 3/16           | 2      | .010                | I    | .162           |                       | 2              | 72430    | 26.60  | 72430-C3     | 32.20  | 72430-C8                | 34.20 |
|                                               | 3/16           | 2      | .010                | I    | .162           |                       | 4 LONG!        | 986930   | 40.10  | 986930-C3    | 47.70  |                         |       |
|                                               | 3/16           | 3      | .040                | II   | .128           | .035                  | 2              | 978130   | 33.00  | 978130-C3    | 38.60  |                         |       |
|                                               | 3/16           | 4      | .040                | II   | .128           | .035                  | 2              | 848730   | 34.50  | 848730-C3    | 40.10  |                         |       |
|                                               | 1/4            | 2      | .010                | I    | .217           |                       | 2-1/2          | 47630    | 38.10  | 47630-C3     | 45.70  | 47630-C8                | 46.30 |
|                                               | 1/4            | 3      | .060                | II   | .165           | .052                  | 2-1/2          | 18530    | 35.80  | 18530-C3     | 43.40  | 18530-C8                | 44.00 |
|                                               | 1/4            | 3      | .060                | II   | .165           | .052                  | 4 LONG!        | 48530    | 49.80  | 48530-C3     | 54.60  |                         |       |
|                                               | 1/4            | 4      | .060                | II   | .165           | .052                  | 2-1/2          | 876430   | 40.00  | 876430-C3    | 47.60  |                         |       |
|                                               | 1/4            | 4      | .040                | III  | .181           | .035                  | 2-1/2          | 833130   | 42.60  | 833130-C3    | 50.20  |                         |       |
|                                               | 5/16           | 2      | .010                | I    | .271           |                       | 2-1/2          | 880330   | 46.10  | 880330-C3    | 55.00  |                         |       |
|                                               | 5/16           | 3      | .060                | II   | .219           | .052                  | 2-1/2          | 977030   | 44.90  | 977030-C3    | 53.80  |                         |       |
|                                               | 5/16           | 4      | .060                | II   | .219           | .052                  | 2-1/2          | 873230   | 47.80  | 873230-C3    | 56.70  |                         |       |
|                                               | 3/8            | 2      | .010                | I    | .325           |                       | 2-1/2          | 72530    | 51.10  | 72530-C3     | 61.20  |                         |       |
|                                               | 3/8            | 3      | .060                | II   | .273           | .052                  | 2-1/2          | 18430    | 48.10  | 18430-C3     | 58.20  | 18430-C8                | 69.20 |
|                                               | 3/8            | 3      | .060                | II   | .273           | .052                  | 4 LONG!        | 981230   | 75.20  | 981230-C3    | 89.00  |                         |       |
|                                               | 3/8            | 4      | .060                | II   | .273           | .052                  | 2-1/2          | 895130   | 53.70  | 895130-C3    | 63.80  |                         |       |
|                                               | 3/8            | 4      | .060                | III  | .273           | .052                  | 2-1/2          | 827830   | 57.40  | 827830-C3    | 67.50  |                         |       |
|                                               | 1/2            | 2      | .010                | I    | .433           |                       | 3              | 960430   | 81.30  | 960430-C3    | 96.40  |                         |       |
|                                               | 1/2            | 3      | .080                | II   | .364           | .069                  | 3              | 871830   | 80.00  | 871830-C3    | 95.10  |                         |       |
|                                               | 1/2            | 4      | .080                | II   | .364           | .069                  | 3              | 18330    | 67.30  | 18330-C3     | 82.40  | 18330-C8                | 92.10 |
|                                               | 1/2            | 4      | .080                | III  | .364           | .069                  | 3              | 820230   | 74.80  | 820230-C3    | 89.90  |                         |       |
|                                               | 1/2            | 6      | .080                | II   | .364           | .069                  | 3              | 839230   | 75.20  | 839230-C3    | 90.30  |                         |       |
|                                               | 5/8            | 6      | .080                | II   | .472           | .069                  | 3-1/2          | 952830   | 125.40 | 952830-C3    | 140.50 |                         |       |
|                                               | 3/4            | 6      | .100                | II   | .563           | .087                  | 4              | 949330   | 187.80 | 949330-C3    | 204.10 |                         |       |

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CHAMFER CUTTERS

CHAMFER CUTTERS

Pointed & Flat End (cont.)

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| ANGLE<br>PER SIDE<br>A <sub>1</sub> <sup>+0°30'</sup><br>-0°30' | DIA.           | FLUTES | TIP      | TYPE | LOC            |                       | OAL            | UNCOATED |       | AITiN COATED |        | TiB <sub>2</sub> COATED |       |
|-----------------------------------------------------------------|----------------|--------|----------|------|----------------|-----------------------|----------------|----------|-------|--------------|--------|-------------------------|-------|
|                                                                 | D <sub>2</sub> |        | T (MAX.) |      | L <sub>2</sub> | L <sub>4</sub> (MAX.) | L <sub>1</sub> | TOOL #   | PRICE | TOOL #       | PRICE  | TOOL #                  | PRICE |
| 32.5°                                                           | 1/8            | 2      | .010     | I    | .098           |                       | 1-1/2          | 18733    | 22.80 | 18733-C3     | 28.00  |                         |       |
|                                                                 | 1/4            | 3      | .060     | II   | .149           | .047                  | 2-1/2          | 18533    | 41.60 | 18533-C3     | 49.20  |                         |       |
|                                                                 | 1/2            | 4      | .080     | II   | .330           | .063                  | 3              | 18333    | 78.70 | 18333-C3     | 93.80  |                         |       |
| 35°                                                             | 1/8            | 2      | .010     | I    | .089           |                       | 1-1/2          | 18735    | 21.20 | 18735-C3     | 26.40  |                         |       |
|                                                                 | 1/8            | 3      | .040     | II   | .061           | .029                  | 1-1/2          | 968635   | 21.40 | 968635-C3    | 26.60  |                         |       |
|                                                                 | 3/16           | 2      | .010     | I    | .134           |                       | 2              | 72435    | 27.40 | 72435-C3     | 33.00  |                         |       |
|                                                                 | 3/16           | 3      | .040     | II   | .105           | .029                  | 2              | 978135   | 27.40 | 978135-C3    | 33.00  |                         |       |
|                                                                 | 1/4            | 2      | .010     | I    | .179           |                       | 2-1/2          | 47635    | 50.00 | 47635-C3     | 57.60  |                         |       |
|                                                                 | 1/4            | 3      | .060     | II   | .136           | .043                  | 2-1/2          | 18535    | 39.30 | 18535-C3     | 46.90  |                         |       |
|                                                                 | 3/8            | 2      | .010     | I    | .268           |                       | 2-1/2          | 72535    | 53.00 | 72535-C3     | 63.10  |                         |       |
|                                                                 | 3/8            | 3      | .060     | II   | .225           | .043                  | 2-1/2          | 18435    | 53.00 | 18435-C3     | 63.10  |                         |       |
|                                                                 | 1/2            | 2      | .010     | I    | .357           |                       | 3              | 960435   | 84.10 | 960435-C3    | 99.20  |                         |       |
| 37.5°                                                           | 1/8            | 2      | .010     | I    | .081           |                       | 1-1/2          | 18738    | 22.80 | 18738-C3     | 28.00  |                         |       |
|                                                                 | 1/4            | 2      | .010     | I    | .163           |                       | 2-1/2          | 47638    | 53.00 | 47638-C3     | 60.60  |                         |       |
|                                                                 | 1/4            | 3      | .060     | II   | .124           | .039                  | 2-1/2          | 18538    | 41.60 | 18538-C3     | 49.20  |                         |       |
|                                                                 | 1/2            | 4      | .080     | II   | .274           | .052                  | 3              | 18338    | 78.70 | 18338-C3     | 93.80  |                         |       |
| 40°                                                             | 1/8            | 2      | .010     | I    | .074           |                       | 1-1/2          | 18740    | 21.20 | 18740-C3     | 26.40  |                         |       |
|                                                                 | 1/8            | 3      | .040     | II   | .051           | .024                  | 1-1/2          | 968640   | 20.40 | 968640-C3    | 25.60  |                         |       |
|                                                                 | 1/8            | 4      | .040     | II   | .051           | .024                  | 1-1/2          | 866140   | 21.50 | 866140-C3    | 26.70  |                         |       |
|                                                                 | 3/16           | 2      | .010     | I    | .112           |                       | 2              | 72440    | 27.40 | 72440-C3     | 33.00  |                         |       |
|                                                                 | 1/4            | 2      | .010     | I    | .149           |                       | 2-1/2          | 47640    | 50.00 | 47640-C3     | 57.60  |                         |       |
|                                                                 | 1/4            | 3      | .060     | II   | .113           | .036                  | 2-1/2          | 18540    | 39.30 | 18540-C3     | 46.90  |                         |       |
|                                                                 | 1/4            | 4      | .040     | III  | .125           |                       | 2-1/2          | 833140   | 48.70 | 833140-C3    | 56.30  |                         |       |
|                                                                 | 1/4            | 4      | .060     | II   | .113           | .036                  | 2-1/2          | 876440   | 42.70 | 876440-C3    | 50.30  |                         |       |
|                                                                 | 3/8            | 3      | .060     | II   | .188           | .036                  | 2-1/2          | 18440    | 53.00 | 18440-C3     | 63.10  |                         |       |
| 41°                                                             | 1/2            | 4      | .080     | II   | .25            | .048                  | 3              | 18340    | 74.10 | 18340-C3     | 89.20  |                         |       |
|                                                                 | 1/8            | 2      | .010     | I    | .072           |                       | 1-1/2          | 18741    | 20.20 | 18741-C3     | 25.40  | 18741-C8                | 27.80 |
|                                                                 | 1/8            | 3      | .040     | II   | .049           | .023                  | 1-1/2          | 968641   | 23.50 | 968641-C3    | 28.70  |                         |       |
|                                                                 | 3/16           | 2      | .010     | I    | .108           |                       | 2              | 72441    | 30.40 | 72441-C3     | 36.00  |                         |       |
|                                                                 | 3/16           | 3      | .040     | II   | .085           | .023                  | 2              | 978141   | 28.90 | 978141-C3    | 34.50  |                         |       |
|                                                                 | 1/4            | 2      | .010     | I    | .144           |                       | 2-1/2          | 47641    | 43.10 | 47641-C3     | 50.70  |                         |       |
|                                                                 | 1/4            | 3      | .060     | II   | .109           | .035                  | 2-1/2          | 18541    | 38.00 | 18541-C3     | 45.60  |                         |       |
|                                                                 | 3/8            | 2      | .010     | I    | .216           |                       | 2-1/2          | 72541    | 58.90 | 72541-C3     | 69.00  |                         |       |
|                                                                 | 3/8            | 3      | .060     | II   | .181           | .035                  | 2-1/2          | 18441    | 58.90 | 18441-C3     | 69.00  |                         |       |
| 42.5°                                                           | 1/2            | 2      | .010     | I    | .288           |                       | 3              | 960441   | 89.00 | 960441-C3    | 104.10 |                         |       |
|                                                                 | 1/2            | 4      | .080     | II   | .242           | .046                  | 3              | 18341    | 71.30 | 18341-C3     | 86.40  |                         |       |
|                                                                 | 1/8            | 2      | .010     | I    | .068           |                       | 1-1/2          | 18743    | 22.80 | 18743-C3     | 28.00  |                         |       |
|                                                                 | 1/4            | 3      | .060     | II   | .104           | .033                  | 2-1/2          | 18543    | 41.60 | 18543-C3     | 49.20  |                         |       |
|                                                                 | 1/2            | 4      | .080     | II   | .229           | .044                  | 3              | 18343    | 78.70 | 18343-C3     | 93.80  |                         |       |

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Pointed & Flat End (cont.)

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| ANGLE<br>PER SIDE                          | DIA.           | FLUTES | TIP                 | TYPE | LOC            |                       | OAL            |       | UNCOATED |       | AITiN COATED |       | TiB <sub>2</sub> COATED |       |
|--------------------------------------------|----------------|--------|---------------------|------|----------------|-----------------------|----------------|-------|----------|-------|--------------|-------|-------------------------|-------|
| A <sub>1</sub> <sup>+0°30'</sup><br>-0°30' | D <sub>2</sub> |        | T <sub>(MAX.)</sub> |      | L <sub>2</sub> | L <sub>4 (MAX.)</sub> | L <sub>1</sub> |       | TOOL #   | PRICE | TOOL #       | PRICE | TOOL #                  | PRICE |
| 45°                                        | 3 mm           | 2      | .25 mm              | I    | 1.50 mm        |                       | 38 mm          |       | 900245   | 23.60 | 900245-C3    | 28.80 |                         |       |
|                                            | 3 mm           | 3      | 1.00 mm             | II   | 1.00 mm        | .500 mm               | 38 mm          |       | 899545   | 23.60 | 899545-C3    | 28.80 |                         |       |
|                                            | 3 mm           | 4      | 1.00 mm             | III  | 1.00 mm        | .500 mm               | 38 mm          |       | 764845   | 25.30 | 764845-C3    | 30.50 |                         |       |
|                                            | 1/8            | 2      | .010                | I    | .063           |                       | 1-1/2          |       | 18745    | 19.20 | 18745-C3     | 24.40 | 18745-C8                | 26.80 |
|                                            | 1/8            | 2      | .010                | I    | .063           |                       | 3              | LONG! | 50645    | 25.00 | 50645-C3     | 30.20 | 50645-C8                | 32.60 |
|                                            | 1/8            | 3      | .040                | II   | .043           | .020                  | 1-1/2          |       | 968645   | 20.40 | 968645-C3    | 25.60 | 968645-C8               | 28.00 |
|                                            | 1/8            | 3      | .040                | II   | .043           | .020                  | 3              | LONG! | 790245   | 25.40 | 790245-C3    | 30.60 |                         |       |
|                                            | 1/8            | 4      | .010                | I    | .058           |                       | 1-1/2          |       | 744445   | 21.50 | 744445-C3    | 26.70 |                         |       |
|                                            | 1/8            | 4      | .040                | II   | .043           | .020                  | 1-1/2          |       | 866145   | 21.50 | 866145-C3    | 26.70 | 866145-C8               | 29.10 |
|                                            | 1/8            | 4      | .040                | III  | .042           | .020                  | 1-1/2          |       | 802845   | 23.10 | 802845-C3    | 28.30 |                         |       |
|                                            | 4 mm           | 2      | .25 mm              | I    | 2.00 mm        |                       | 50 mm          |       | 878445   | 30.10 | 878445-C3    | 35.70 |                         |       |
|                                            | 4 mm           | 3      | 1.00 mm             | II   | 1.50 mm        | .500 mm               | 50 mm          |       | 863845   | 30.10 | 863845-C3    | 35.70 |                         |       |
|                                            | 3/16           | 2      | .010                | I    | .094           |                       | 2              |       | 72445    | 27.70 | 72445-C3     | 33.30 | 72445-C8                | 35.30 |
|                                            | 3/16           | 2      | .010                | I    | .094           |                       | 4              | LONG! | 986945   | 40.10 | 986945-C3    | 47.70 |                         |       |
|                                            | 3/16           | 3      | .040                | II   | .074           | .020                  | 2              |       | 978145   | 33.00 | 978145-C3    | 38.60 | 978145-C8               | 40.60 |
|                                            | 3/16           | 3      | .040                | II   | .074           | .020                  | 3              | LONG! | 790945   | 33.00 | 790945-C3    | 38.60 |                         |       |
|                                            | 3/16           | 4      | .010                | I    | .089           |                       | 2              |       | 743745   | 34.50 | 743745-C3    | 41.70 |                         |       |
|                                            | 3/16           | 4      | .040                | II   | .074           | .020                  | 2              |       | 848745   | 34.50 | 848745-C3    | 40.10 |                         |       |
|                                            | 3/16           | 4      | .040                | III  | .073           | .020                  | 2              |       | 809745   | 36.10 | 809745-C3    | 41.70 |                         |       |
|                                            | 6 mm           | 2      | .25 mm              | I    | 3.00 mm        |                       | 63 mm          |       | 840045   | 41.80 | 840045-C3    | 49.40 | 840045-C8               | 50.00 |
|                                            | 6 mm           | 3      | 1.50 mm             | II   | 2.25 mm        | .750 mm               | 63 mm          |       | 837745   | 41.80 | 837745-C3    | 49.40 |                         |       |
|                                            | 6 mm           | 4      | 1.50 mm             | II   | 2.25 mm        | .750 mm               | 63 mm          |       | 777645   | 43.70 | 777645-C3    | 51.30 |                         |       |
|                                            | 6 mm           | 4      | 1.50 mm             | III  | 2.25 mm        | .750 mm               | 63 mm          |       | 764545   | 47.10 | 764545-C3    | 54.70 |                         |       |
|                                            | 1/4            | 2      | .010                | I    | .125           |                       | 2-1/2          |       | 47645    | 38.10 | 47645-C3     | 45.70 | 47645-C8                | 46.30 |
|                                            | 1/4            | 2      | .010                | I    | .125           |                       | 4              | LONG! | 790345   | 48.90 | 790345-C3    | 57.80 |                         |       |
|                                            | 1/4            | 3      | .060                | II   | .095           | .030                  | 2-1/2          |       | 18545    | 36.00 | 18545-C3     | 43.60 | 18545-C8                | 44.20 |
|                                            | 1/4            | 3      | .060                | II   | .095           | .030                  | 4              | LONG! | 48545    | 49.80 | 48545-C3     | 54.60 |                         |       |
|                                            | 1/4            | 4      | .010                | I    | .120           |                       | 2-1/2          |       | 743145   | 44.90 | 743145-C3    | 52.50 |                         |       |
|                                            | 1/4            | 4      | .060                | II   | .095           | .030                  | 2-1/2          |       | 876445   | 44.90 | 876445-C3    | 52.50 | 876445-C8               | 53.10 |
|                                            | 1/4            | 4      | .060                | II   | .095           | .030                  | 4              | LONG! | 771545   | 58.00 | 771545-C3    | 66.90 |                         |       |
|                                            | 1/4            | 4      | .040                | III  | .105           | .020                  | 2-1/2          |       | 833145   | 48.70 | 833145-C3    | 56.30 | 833145-C8               | 56.90 |
|                                            | 1/4            | 4      | .060                | III  | .095           | .030                  | 2-1/2          |       | 794145   | 48.70 | 794145-C3    | 56.30 |                         |       |
|                                            | 5/16           | 2      | .010                | I    | .156           |                       | 2-1/2          |       | 880345   | 44.90 | 880345-C3    | 53.80 |                         |       |
|                                            | 5/16           | 3      | .060                | II   | .126           | .030                  | 2-1/2          |       | 977045   | 44.90 | 977045-C3    | 53.80 |                         |       |
|                                            | 5/16           | 4      | .060                | II   | .126           | .030                  | 2-1/2          |       | 873245   | 47.80 | 873245-C3    | 56.70 |                         |       |
|                                            | 5/16           | 4      | .060                | III  | .126           | .030                  | 2-1/2          |       | 777545   | 51.30 | 777545-C3    | 60.20 |                         |       |
|                                            | 8 mm           | 3      | 1.50 mm             | II   | 3.25 mm        | .750 mm               | 63 mm          |       | 868845   | 55.40 | 868845-C3    | 64.30 |                         |       |
|                                            | 3/8            | 2      | .010                | I    | .188           |                       | 2-1/2          |       | 72545    | 53.00 | 72545-C3     | 63.10 | 72545-C8                | 74.10 |
|                                            | 3/8            | 2      | .010                | I    | .188           |                       | 4              | LONG! | 791745   | 76.60 | 791745-C3    | 90.40 |                         |       |
|                                            | 3/8            | 3      | .060                | II   | .158           | .030                  | 2-1/2          |       | 18445    | 48.10 | 18445-C3     | 58.20 | 18445-C8                | 69.20 |
|                                            | 3/8            | 3      | .060                | II   | .158           | .030                  | 4              | LONG! | 981245   | 75.20 | 981245-C3    | 89.00 |                         |       |
|                                            | 3/8            | 4      | .010                | I    | .183           |                       | 2-1/2          |       | 742745   | 55.80 | 742745-C3    | 65.90 |                         |       |
|                                            | 3/8            | 4      | .060                | II   | .158           | .030                  | 2-1/2          |       | 895145   | 55.80 | 895145-C3    | 65.90 |                         |       |
|                                            | 3/8            | 4      | .040                | III  | .167           | .020                  | 2-1/2          |       | 764245   | 59.80 | 764245-C3    | 69.90 |                         |       |
|                                            | 3/8            | 4      | .060                | III  | .158           | .030                  | 2-1/2          |       | 827845   | 59.30 | 827845-C3    | 69.40 |                         |       |

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CHAMFER CUTTERS

CHAMFER CUTTERS

Pointed & Flat End (cont.)

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| ANGLE<br>PER SIDE                          | DIA.           | FLUTES | TIP      | TYPE | LOC            |                       | OAL            |       | UNCOATED |        | AITiN COATED |        | TiB <sub>2</sub> COATED |        |
|--------------------------------------------|----------------|--------|----------|------|----------------|-----------------------|----------------|-------|----------|--------|--------------|--------|-------------------------|--------|
|                                            |                |        |          |      |                |                       |                |       | TOOL #   | PRICE  | TOOL #       | PRICE  | TOOL #                  | PRICE  |
| A <sub>1</sub> <sup>+0°30'</sup><br>-0°30' | D <sub>2</sub> |        | T (MAX.) |      | L <sub>2</sub> | L <sub>4</sub> (MAX.) | L <sub>1</sub> |       |          |        |              |        |                         |        |
| 45°                                        | 10 mm          | 4      | 1.50 mm  | II   | 4.25 mm        | .750 mm               | 75 mm          |       | 871045   | 86.70  | 871045-C3    | 101.80 |                         |        |
|                                            | 12 mm          | 4      | 1.50 mm  | II   | 5.25 mm        | .750 mm               | 75 mm          |       | 881245   | 86.70  | 881245-C3    | 101.80 |                         |        |
|                                            | 1/2            | 2      | .010     | I    | .250           |                       | 3              |       | 960445   | 81.30  | 960445-C3    | 96.40  | 960445-C8               | 106.10 |
|                                            | 1/2            | 3      | .080     | II   | .210           | .040                  | 3              |       | 871845   | 80.00  | 871845-C3    | 95.10  |                         |        |
|                                            | 1/2            | 4      | .010     | I    | .245           |                       | 3              |       | 742245   | 68.00  | 742245-C3    | 83.10  |                         |        |
|                                            | 1/2            | 4      | .080     | II   | .210           | .040                  | 3              |       | 18345    | 67.30  | 18345-C3     | 82.40  | 18345-C8                | 92.10  |
|                                            | 1/2            | 4      | .080     | II   | .210           | .040                  | 6              | LONG! | 982445   | 126.00 | 982445-C3    | 141.10 |                         |        |
|                                            | 1/2            | 4      | .080     | III  | .210           | .040                  | 3              |       | 820245   | 74.80  | 820245-C3    | 89.90  |                         |        |
|                                            | 1/2            | 6      | .080     | II   | .210           | .040                  | 3              |       | 839245   | 75.20  | 839245-C3    | 90.30  |                         |        |
|                                            | 5/8            | 4      | .080     | II   | .273           | .040                  | 3-1/2          |       | 763645   | 121.40 | 763645-C3    | 136.50 |                         |        |
|                                            | 5/8            | 4      | .080     | III  | .273           | .040                  | 3-1/2          |       | 765445   | 122.80 | 765445-C3    | 137.90 |                         |        |
|                                            | 5/8            | 6      | .080     | II   | .273           | .040                  | 3-1/2          |       | 952845   | 125.40 | 952845-C3    | 140.50 |                         |        |
|                                            | 3/4            | 4      | .100     | II   | .325           | .050                  | 4              |       | 764045   | 184.00 | 764045-C3    | 200.30 |                         |        |
|                                            | 3/4            | 4      | .100     | III  | .325           | .050                  | 4              |       | 765145   | 183.60 | 765145-C3    | 199.90 |                         |        |
|                                            | 3/4            | 6      | .100     | II   | .325           | .050                  | 4              |       | 949345   | 187.80 | 949345-C3    | 204.10 |                         |        |
|                                            | 1              | 6      | .120     | II   | .440           | .060                  | 4              |       | 884745   | 333.50 | 884745-C3    | 358.30 |                         |        |
| 50°                                        | 1/8            | 2      | .010     | I    | .052           |                       | 1-1/2          |       | 18750    | 21.20  | 18750-C3     | 26.40  | 18750-C8                | 28.80  |
|                                            | 1/8            | 3      | .040     | II   | .036           | .017                  | 1-1/2          |       | 968650   | 21.40  | 968650-C3    | 26.60  |                         |        |
|                                            | 3/16           | 2      | .010     | I    | .079           |                       | 2              |       | 72450    | 27.40  | 72450-C3     | 33.00  |                         |        |
|                                            | 3/16           | 3      | .040     | II   | .062           | .017                  | 2              |       | 978150   | 34.00  | 978150-C3    | 39.60  |                         |        |
|                                            | 1/4            | 2      | .010     | I    | .105           |                       | 2-1/2          |       | 47650    | 39.70  | 47650-C3     | 47.30  |                         |        |
|                                            | 1/4            | 3      | .060     | II   | .080           | .025                  | 2-1/2          |       | 18550    | 39.30  | 18550-C3     | 46.90  |                         |        |
|                                            | 1/4            | 4      | .060     | II   | .080           | .025                  | 2-1/2          |       | 876450   | 42.70  | 876450-C3    | 50.30  |                         |        |
|                                            | 1/4            | 4      | .040     | III  | .088           | .017                  | 2-1/2          |       | 833150   | 48.70  | 833150-C3    | 56.30  |                         |        |
|                                            | 3/8            | 2      | .010     | I    | .157           |                       | 2-1/2          |       | 72550    | 53.00  | 72550-C3     | 63.10  | 72550-C8                | 74.10  |
|                                            | 3/8            | 3      | .060     | II   | .132           | .025                  | 2-1/2          |       | 18450    | 53.00  | 18450-C3     | 63.10  |                         |        |
|                                            | 3/8            | 4      | .060     | II   | .132           | .025                  | 2-1/2          |       | 895150   | 56.20  | 895150-C3    | 66.30  |                         |        |
|                                            | 1/2            | 2      | .010     | I    | .210           |                       | 3              |       | 960450   | 84.10  | 960450-C3    | 99.20  |                         |        |
|                                            | 1/2            | 4      | .080     | II   | .176           | .034                  | 3              |       | 18350    | 74.10  | 18350-C3     | 89.20  |                         |        |
| 55°                                        | 1/8            | 2      | .010     | I    | .044           |                       | 1-1/2          |       | 18755    | 23.50  | 18755-C3     | 28.70  |                         |        |
|                                            | 3/16           | 2      | .010     | I    | .066           |                       | 2              |       | 72455    | 29.00  | 72455-C3     | 34.60  |                         |        |
|                                            | 1/4            | 2      | .010     | I    | .088           |                       | 2-1/2          |       | 47655    | 55.10  | 47655-C3     | 62.70  |                         |        |
|                                            | 1/4            | 3      | .060     | II   | .067           | .021                  | 2-1/2          |       | 18555    | 43.10  | 18555-C3     | 50.70  |                         |        |
|                                            | 3/8            | 3      | .060     | II   | .110           | .021                  | 2-1/2          |       | 18455    | 55.90  | 18455-C3     | 66.00  |                         |        |
|                                            | 1/2            | 4      | .080     | II   | .147           | .028                  | 3              |       | 18355    | 80.80  | 18355-C3     | 95.90  |                         |        |

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CHAMFER CUTTERS  
Pointed & Flat End (cont.)

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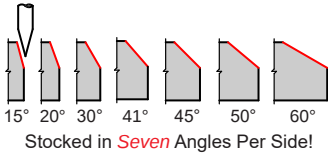
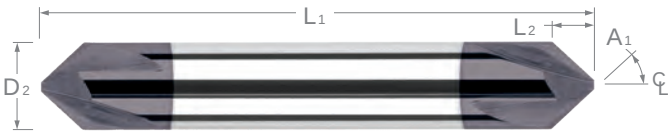
| ANGLE<br>PER SIDE                          | DIA.           | FLUTES | TIP                 | TYPE | LOC            | OAL                   | UNCOATED |        | AITIN COATED |        | TiB <sub>2</sub> COATED |       |
|--------------------------------------------|----------------|--------|---------------------|------|----------------|-----------------------|----------|--------|--------------|--------|-------------------------|-------|
| A <sub>1</sub> <sup>+0°30'</sup><br>-0°30' | D <sub>2</sub> |        | T <sub>(MAX.)</sub> |      | L <sub>2</sub> | L <sub>4 (MAX.)</sub> | TOOL #   | PRICE  | TOOL #       | PRICE  | TOOL #                  | PRICE |
| 60°                                        | 3 mm           | 2      | .120 mm             | I    | .87 mm         |                       | 900260   | 21.00  | 900260-C3    | 26.20  |                         |       |
|                                            | 1/8            | 2      | .010                | I    | .036           | 1-1/2                 | 18760    | 19.20  | 18760-C3     | 24.40  | 18760-C8                | 26.80 |
|                                            | 1/8            | 2      | .010                | I    | .036           | 3                     | 50660    | 25.00  | 50660-C3     | 30.20  |                         |       |
|                                            | 1/8            | 3      | .040                | II   | .025           | .012 1-1/2            | 968660   | 20.40  | 968660-C3    | 25.60  |                         |       |
|                                            | 3/16           | 2      | .010                | I    | .054           | 2                     | 72460    | 26.60  | 72460-C3     | 32.20  |                         |       |
|                                            | 3/16           | 3      | .040                | II   | .043           | .012 2                | 978160   | 33.00  | 978160-C3    | 38.60  |                         |       |
|                                            | 1/4            | 2      | .010                | I    | .072           | 2-1/2                 | 47660    | 38.10  | 47660-C3     | 45.70  |                         |       |
|                                            | 1/4            | 3      | .060                | II   | .055           | .017 2-1/2            | 18560    | 35.80  | 18560-C3     | 43.40  |                         |       |
|                                            | 1/4            | 3      | .060                | II   | .055           | .017 4                | 48560    | 49.80  | 48560-C3     | 54.60  |                         |       |
|                                            | 1/4            | 4      | .060                | II   | .055           | .017 2-1/2            | 876460   | 40.00  | 876460-C3    | 47.60  |                         |       |
|                                            | 1/4            | 4      | .040                | III  | .060           | .012 2-1/2            | 833160   | 41.80  | 833160-C3    | 49.40  |                         |       |
|                                            | 5/16           | 3      | .060                | II   | .073           | .017 2-1/2            | 977060   | 44.90  | 977060-C3    | 53.80  |                         |       |
|                                            | 3/8            | 2      | .010                | I    | .108           | 2-1/2                 | 72560    | 51.10  | 72560-C3     | 61.20  |                         |       |
|                                            | 3/8            | 3      | .060                | II   | .091           | .017 2-1/2            | 18460    | 48.10  | 18460-C3     | 58.20  | 18460-C8                | 69.20 |
|                                            | 3/8            | 4      | .060                | II   | .091           | .017 2-1/2            | 895160   | 52.60  | 895160-C3    | 62.70  |                         |       |
|                                            | 3/8            | 4      | .060                | III  | .091           | .017 2-1/2            | 827860   | 58.70  | 827860-C3    | 68.80  |                         |       |
|                                            | 1/2            | 2      | .010                | I    | .144           | 3                     | 960460   | 81.30  | 960460-C3    | 96.40  |                         |       |
|                                            | 1/2            | 4      | .080                | II   | .121           | .023 3                | 18360    | 67.30  | 18360-C3     | 82.40  |                         |       |
|                                            | 1/2            | 4      | .080                | III  | .121           | .023 3                | 820260   | 72.20  | 820260-C3    | 87.30  |                         |       |
|                                            | 5/8            | 6      | .080                | II   | .157           | .023 3-1/2            | 952860   | 125.40 | 952860-C3    | 140.50 |                         |       |
|                                            | 3/4            | 6      | .100                | II   | .188           | .029 4                | 949360   | 187.80 | 949360-C3    | 204.10 |                         |       |
| 65°                                        | 1/8            | 2      | .010                | I    | .029           | 1-1/2                 | 18765    | 22.10  | 18765-C3     | 27.30  |                         |       |
|                                            | 3/16           | 2      | .010                | I    | .044           | 2                     | 72465    | 29.00  | 72465-C3     | 34.60  |                         |       |
|                                            | 1/4            | 2      | .010                | I    | .058           | 2-1/2                 | 47665    | 53.00  | 47665-C3     | 60.60  |                         |       |
|                                            | 1/4            | 3      | .060                | II   | .044           | .014 2-1/2            | 18565    | 41.60  | 18565-C3     | 49.20  |                         |       |
|                                            | 3/8            | 3      | .060                | II   | .073           | .014 2-1/2            | 18465    | 55.90  | 18465-C3     | 66.00  |                         |       |
|                                            | 1/2            | 4      | .080                | II   | .098           | .019 3                | 18365    | 78.70  | 18365-C3     | 93.80  |                         |       |
| 70°                                        | 1/8            | 2      | .010                | I    | .023           | 1-1/2                 | 18770    | 21.20  | 18770-C3     | 26.40  |                         |       |
|                                            | 3/16           | 2      | .010                | I    | .034           | 2                     | 72470    | 27.40  | 72470-C3     | 33.00  |                         |       |
|                                            | 1/4            | 2      | .010                | I    | .045           | 2-1/2                 | 47670    | 50.00  | 47670-C3     | 57.60  |                         |       |
|                                            | 1/4            | 3      | .060                | II   | .035           | .011 2-1/2            | 18570    | 39.30  | 18570-C3     | 46.90  |                         |       |
|                                            | 3/8            | 3      | .060                | II   | .057           | .011 2-1/2            | 18470    | 57.10  | 18470-C3     | 67.20  |                         |       |
|                                            | 1/2            | 4      | .080                | II   | .076           | .015 3                | 18370    | 74.10  | 18370-C3     | 89.20  |                         |       |
| 75°                                        | 1/8            | 2      | .010                | I    | .017           | 1-1/2                 | 18775    | 23.50  | 18775-C3     | 28.70  | 18775-C8                | 31.10 |
|                                            | 1/8            | 3      | .040                | II   | .011           | .005 1-1/2            | 968675   | 23.50  | 968675-C3    | 28.70  |                         |       |
|                                            | 3/16           | 2      | .010                | I    | .025           | 2                     | 72475    | 30.40  | 72475-C3     | 36.00  |                         |       |
|                                            | 3/16           | 3      | .040                | II   | .020           | .005 2                | 978175   | 35.90  | 978175-C3    | 40.90  |                         |       |
|                                            | 1/4            | 2      | .010                | I    | .033           | 2-1/2                 | 47675    | 43.10  | 47675-C3     | 50.70  |                         |       |
|                                            | 1/4            | 3      | .060                | II   | .025           | .008 2-1/2            | 18575    | 43.80  | 18575-C3     | 51.40  |                         |       |
|                                            | 1/4            | 4      | .060                | II   | .025           | .008 2-1/2            | 876475   | 47.20  | 876475-C3    | 54.80  |                         |       |
|                                            | 3/8            | 2      | .010                | I    | .050           | 2-1/2                 | 72575    | 58.90  | 72575-C3     | 69.00  |                         |       |
|                                            | 3/8            | 3      | .060                | II   | .042           | .008 2-1/2            | 18475    | 58.90  | 18475-C3     | 69.00  |                         |       |
|                                            | 3/8            | 4      | .060                | III  | .042           | .008 2-1/2            | 827875   | 69.50  | 827875-C3    | 79.60  |                         |       |
|                                            | 1/2            | 2      | .010                | I    | .067           | 3                     | 960475   | 93.40  | 960475-C3    | 108.50 |                         |       |
|                                            | 1/2            | 4      | .080                | II   | .056           | .011 3                | 18375    | 82.50  | 18375-C3     | 97.60  |                         |       |
| 80°                                        | 1/8            | 2      | .010                | I    | .011           | 1-1/2                 | 18780    | 23.30  | 18780-C3     | 28.50  |                         |       |
|                                            | 1/4            | 3      | .060                | II   | .017           | .005 2-1/2            | 18580    | 31.20  | 18580-C3     | 38.80  |                         |       |
|                                            | 1/2            | 4      | .080                | II   | .037           | .007 3                | 18380    | 96.80  | 18380-C3     | 111.90 |                         |       |

CHAMFER CUTTERS

NEW

CHAMFER CUTTERS

Pointed & Flat End – Double-Ended



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

CHAMFER CUTTERS

| ANGLE PER SIDE     | DIAMETER | FLUTES | TIP      | TYPE | LENGTH OF CUT |           | OVERALL LENGTH | UNCOATED |        | AItIN COATED |        |
|--------------------|----------|--------|----------|------|---------------|-----------|----------------|----------|--------|--------------|--------|
| A1 +0°30' / -0°30' | D2       |        | T (MAX.) |      | L2            | L4 (MAX.) | L1             | TOOL #   | PRICE  | TOOL #       | PRICE  |
| 15°                | 1/8      | 2      | .010     | I    | .233          |           | 1-1/2          | 988415   | 38.80  | 988415-C3    | 45.20  |
|                    | 1/4      | 2      | .010     | I    | .467          |           | 2-1/2          | 977615   | 57.00  | 977615-C3    | 67.10  |
|                    | 1/4      | 3      | .060     | II   | .355          | .112      | 2-1/2          | 891015   | 63.40  | 891015-C3    | 73.50  |
|                    | 3/8      | 2      | .010     | I    | .700          |           | 3              | 998315   | 82.60  | 998315-C3    | 95.20  |
|                    | 3/8      | 3      | .060     | II   | .588          | .112      | 2-1/2          | 934015   | 95.40  | 934015-C3    | 110.50 |
|                    | 1/2      | 4      | .080     | II   | .784          | .149      | 3              | 18615    | 115.00 | 18615-C3     | 135.70 |
| 20°                | 1/8      | 2      | .010     | I    | .172          |           | 1-1/2          | 988420   | 38.80  | 988420-C3    | 45.20  |
|                    | 1/4      | 2      | .010     | I    | .343          |           | 2-1/2          | 977620   | 57.00  | 977620-C3    | 67.10  |
|                    | 1/4      | 3      | .060     | II   | .261          | .082      | 2-1/2          | 891020   | 63.40  | 891020-C3    | 73.50  |
|                    | 3/8      | 2      | .010     | I    | .515          |           | 2-1/2          | 998320   | 82.60  | 998320-C3    | 97.70  |
|                    | 3/8      | 3      | .060     | II   | .433          | .082      | 2-1/2          | 934020   | 95.40  | 934020-C3    | 110.50 |
|                    | 1/2      | 4      | .080     | II   | .577          | .110      | 3              | 18620    | 115.00 | 18620-C3     | 135.70 |
| 30°                | 1/8      | 2      | .010     | I    | .108          |           | 1-1/2          | 988430   | 33.00  | 988430-C3    | 39.40  |
|                    | 3/16     | 2      | .010     | I    | .162          |           | 2              | 902330   | 33.00  | 902330-C3    | 40.60  |
|                    | 3/16     | 3      | .040     | II   | .128          | .035      | 2              | 897130   | 44.20  | 897130-C3    | 51.80  |
|                    | 1/4      | 2      | .010     | I    | .217          |           | 2-1/2          | 977630   | 50.90  | 977630-C3    | 61.00  |
|                    | 1/4      | 3      | .060     | II   | .165          | .052      | 2-1/2          | 891030   | 59.80  | 891030-C3    | 69.90  |
|                    | 3/8      | 2      | .010     | I    | .325          |           | 2-1/2          | 998330   | 76.60  | 998330-C3    | 91.70  |
|                    | 3/8      | 3      | .060     | II   | .273          | .052      | 2-1/2          | 934030   | 83.90  | 934030-C3    | 99.00  |
|                    | 1/2      | 2      | .010     | I    | .433          |           | 3              | 905830   | 103.60 | 905830-C3    | 124.30 |
|                    | 1/2      | 4      | .080     | II   | .364          | .069      | 3              | 18630    | 105.50 | 18630-C3     | 126.20 |

continued on next page

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

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

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

CHAMFER CUTTERS

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

continued from previous page

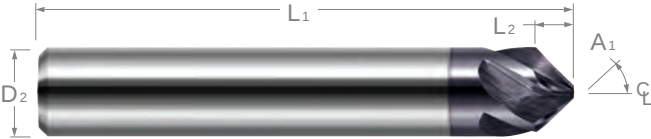
NEW  
NEW  
NEW

| ANGLE<br>PER SIDE                                  | DIAMETER       | FLUTES | TIP                 | TYPE | LENGTH<br>OF CUT |                       | OVERALL<br>LENGTH | UNCOATED |        | A1TIN COATED |        |
|----------------------------------------------------|----------------|--------|---------------------|------|------------------|-----------------------|-------------------|----------|--------|--------------|--------|
| A <sub>1</sub> <sup>+0°30'</sup> <sub>-0°30'</sub> | D <sub>2</sub> |        | T <sub>(MAX.)</sub> |      | L <sub>2</sub>   | L <sub>4 (MAX.)</sub> | L <sub>1</sub>    | TOOL #   | PRICE  | TOOL #       | PRICE  |
| 41°                                                | 1/4            | 4      | .060                | II   | .109             | .035                  | 2-1/2             | 842441   | 63.80  | 842441-C3    | 74.20  |
|                                                    | 3/8            | 4      | .060                | II   | .181             | .035                  | 2-1/2             | 833641   | 89.30  | 833641-C3    | 104.40 |
|                                                    | 1/2            | 4      | .080                | II   | .242             | .046                  | 3                 | 18641    | 105.50 | 18641-C3     | 126.20 |
| 45°                                                | 1/8            | 2      | .010                | I    | .063             |                       | 1-1/2             | 988445   | 33.00  | 988445-C3    | 39.40  |
|                                                    | 1/8            | 3      | .040                | II   | .043             | .020                  | 1-1/2             | 873945   | 42.70  | 873945-C3    | 49.10  |
|                                                    | 1/8            | 4      | .040                | II   | .043             | .020                  | 1-1/2             | 808245   | 44.70  | 808245-C3    | 51.10  |
|                                                    | 1/8            | 4      | .040                | III  | .043             | .020                  | 1-1/2             | 794245   | 47.30  | 794245-C3    | 53.70  |
|                                                    | 3/16           | 2      | .010                | I    | .094             |                       | 2                 | 902345   | 33.00  | 902345-C3    | 40.60  |
|                                                    | 3/16           | 3      | .040                | II   | .074             | .020                  | 2                 | 897145   | 42.70  | 897145-C3    | 50.30  |
|                                                    | 3/16           | 4      | .040                | II   | .074             | .020                  | 2                 | 808145   | 45.10  | 808145-C3    | 50.50  |
|                                                    | 3/16           | 4      | .040                | III  | .073             | .020                  | 2                 | 754545   | 47.40  | 754545-C3    | 55.00  |
|                                                    | 1/4            | 2      | .010                | I    | .125             |                       | 2-1/2             | 977645   | 50.90  | 977645-C3    | 61.00  |
|                                                    | 1/4            | 3      | .060                | II   | .095             | .030                  | 2-1/2             | 891045   | 59.80  | 891045-C3    | 69.90  |
|                                                    | 1/4            | 4      | .060                | II   | .095             | .030                  | 2-1/2             | 842445   | 63.80  | 842445-C3    | 73.90  |
|                                                    | 1/4            | 4      | .040                | III  | .105             | .020                  | 2-1/2             | 790045   | 65.30  | 790045-C3    | 75.40  |
|                                                    | 5/16           | 3      | .060                | II   | .126             | .030                  | 2-1/2             | 966645   | 65.90  | 966645-C3    | 78.50  |
|                                                    | 3/8            | 2      | .010                | I    | .188             |                       | 2-1/2             | 998345   | 76.60  | 998345-C3    | 91.70  |
|                                                    | 3/8            | 3      | .060                | II   | .158             | .030                  | 2-1/2             | 934045   | 83.90  | 934045-C3    | 99.00  |
|                                                    | 3/8            | 4      | .060                | II   | .158             | .030                  | 2-1/2             | 833645   | 89.30  | 833645-C3    | 104.40 |
|                                                    | 3/8            | 4      | .040                | III  | .167             | .030                  | 2-1/2             | 752845   | 92.50  | 752845-C3    | 107.60 |
|                                                    | 1/2            | 2      | .010                | I    | .250             |                       | 3                 | 905845   | 103.60 | 905845-C3    | 124.30 |
|                                                    | 1/2            | 4      | .080                | II   | .210             | .040                  | 3                 | 18645    | 105.50 | 18645-C3     | 126.20 |
|                                                    | 1/2            | 4      | .080                | III  | .210             | .040                  | 3                 | 788045   | 110.50 | 788045-C3    | 131.20 |
|                                                    | 5/8            | 4      | .080                | II   | .273             | .040                  | 3-1/2             | 976445   | 152.70 | 976445-C3    | 175.20 |
|                                                    | 3/4            | 4      | .100                | II   | .325             | .050                  | 4                 | 984645   | 194.00 | 984645-C3    | 220.00 |
| 50°                                                | 1/8            | 2      | .010                | I    | .052             |                       | 1-1/2             | 988450   | 33.00  | 988450-C3    | 39.40  |
|                                                    | 1/4            | 2      | .010                | I    | .105             |                       | 2-1/2             | 977650   | 51.90  | 977650-C3    | 62.00  |
|                                                    | 1/4            | 3      | .060                | II   | .080             | .025                  | 2-1/2             | 891050   | 61.90  | 891050-C3    | 72.00  |
|                                                    | 3/8            | 2      | .010                | I    | .157             |                       | 2-1/2             | 998350   | 78.10  | 998350-C3    | 93.20  |
|                                                    | 3/8            | 3      | .060                | II   | .132             | .025                  | 2-1/2             | 934050   | 86.70  | 934050-C3    | 101.80 |
|                                                    | 1/2            | 2      | .010                | I    | .210             |                       | 3                 | 905850   | 103.60 | 905850-C3    | 124.30 |
|                                                    | 1/2            | 4      | .080                | II   | .173             | .034                  | 3                 | 18650    | 109.20 | 18650-C3     | 129.90 |
| 60°                                                | 1/8            | 2      | .010                | I    | .036             |                       | 1-1/2             | 988460   | 33.00  | 988460-C3    | 39.40  |
|                                                    | 3/16           | 2      | .010                | I    | .054             |                       | 2                 | 902360   | 33.00  | 902360-C3    | 40.60  |
|                                                    | 1/4            | 2      | .010                | I    | .072             |                       | 2-1/2             | 977660   | 50.90  | 977660-C3    | 61.00  |
|                                                    | 1/4            | 3      | .060                | II   | .055             | .017                  | 2-1/2             | 891060   | 59.80  | 891060-C3    | 69.90  |
|                                                    | 3/8            | 2      | .010                | I    | .108             |                       | 2-1/2             | 998360   | 76.60  | 998360-C3    | 91.70  |
|                                                    | 3/8            | 3      | .060                | II   | .091             | .017                  | 2-1/2             | 934060   | 83.90  | 934060-C3    | 99.00  |
|                                                    | 1/2            | 2      | .010                | I    | .144             |                       | 3                 | 905860   | 103.60 | 905860-C3    | 124.30 |
|                                                    | 1/2            | 4      | .080                | II   | .121             | .023                  | 3                 | 18660    | 105.50 | 18660-C3     | 126.20 |

CHAMFER CUTTERS

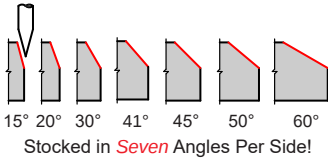
CHAMFER CUTTERS

Pointed & Flat End – Helical Flutes



Free Cutting Action  
for Excellent  
Surface Finish

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



CHAMFER CUTTERS

| ANGLE PER SIDE     | DIAMETER | FLUTES | TIP  | TYPE | LENGTH OF CUT |           |             | UNCOATED |       | A1TiN COATED |       |
|--------------------|----------|--------|------|------|---------------|-----------|-------------|----------|-------|--------------|-------|
| A1 +0°15' / -0°15' | D2 (h6)  |        | T*   |      | L2            | L4 (MAX.) | L1          | TOOL #   | PRICE | TOOL #       | PRICE |
| 15°                | 1/8      | 3      | .040 | II   | .159          | .078      | 1-1/2       | 831308   | 24.40 | 831308-C3    | 29.60 |
|                    | 1/4      | 3      | .060 | II   | .355          | .116      | 2-1/2       | 831316   | 41.60 | 831316-C3    | 48.60 |
|                    | 1/4      | 5      | .060 | II   | .355          | .116      | 2-1/2 LONG! | 832516   | 43.90 | 832516-C3    | 50.90 |
|                    | 3/8      | 3      | .070 | II   | .569          | .134      | 2-1/2       | 831324   | 56.70 | 831324-C3    | 65.00 |
|                    | 3/8      | 5      | .070 | II   | .569          | .134      | 2-1/2       | 832524   | 57.90 | 832524-C3    | 67.10 |
|                    | 1/2      | 3      | .080 | II   | .784          | .153      | 3           | 831332   | 79.50 | 831332-C3    | 90.70 |
|                    | 1/2      | 5      | .080 | II   | .784          | .153      | 3           | 832532   | 80.30 | 832532-C3    | 93.10 |
| 20°                | 1/8      | 3      | .040 | II   | .117          | .085      | 1-1/2       | 844608   | 24.40 | 844608-C3    | 29.60 |
|                    | 1/4      | 3      | .060 | II   | .261          | .085      | 2-1/2       | 844616   | 41.60 | 844616-C3    | 48.60 |
|                    | 1/4      | 5      | .060 | II   | .261          | .085      | 2-1/2       | 851416   | 44.80 | 851416-C3    | 50.90 |
|                    | 3/8      | 3      | .070 | II   | .419          | .099      | 2-1/2       | 844624   | 55.60 | 844624-C3    | 65.00 |
|                    | 3/8      | 5      | .070 | II   | .419          | .099      | 2-1/2       | 851424   | 59.00 | 851424-C3    | 67.10 |
|                    | 1/2      | 3      | .080 | II   | .577          | .113      | 3           | 844632   | 78.00 | 844632-C3    | 90.70 |
|                    | 1/2      | 5      | .080 | II   | .577          | .113      | 3           | 851432   | 80.30 | 851432-C3    | 93.10 |

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

continued on next page

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

2 FLUTES 4 FLUTES

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

3 FLUTES 5 FLUTES

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

5 FLUTES

CHAMFER CUTTERS

Pointed & Flat End – Helical Flutes (cont.)

continued from previous page

| ANGLE<br>PER SIDE   | DIAMETER | FLUTES | TIP  | TYPE | LENGTH<br>OF CUT |           | OAL   |       | UNCOATED        |        | A1TiN COATED |        |
|---------------------|----------|--------|------|------|------------------|-----------|-------|-------|-----------------|--------|--------------|--------|
|                     |          |        |      |      |                  |           |       |       | TOOL #          | PRICE  | TOOL #       | PRICE  |
| A1 +0°15'<br>-0°15' | D2 (h6)  |        | T*   |      | L2               | L4 (MAX.) | L1    |       |                 |        |              |        |
| 30°                 | 1/8      | 2      | .010 | I    | .100             |           | 1-1/2 |       | 900108          | 24.40  | 900108-C3    | 29.40  |
|                     | 1/8      | 3      | .040 | II   | .074             | .036      | 1-1/2 |       | 916508          | 24.90  | 916508-C3    | 29.90  |
|                     | 1/8      | 4      | .010 | I    | .100             |           | 1-1/2 |       | 889708          | 26.90  | 889708-C3    | 32.10  |
|                     | 1/8      | 5      | .040 | II   | .074             | .036      | 1-1/2 |       | 899008          | 26.90  | 899008-C3    | 31.70  |
|                     | 3/16     | 2      | .010 | I    | .154             |           | 2     |       | 900112          | 33.70  | 900112-C3    | 38.10  |
|                     | 3/16     | 3      | .050 | II   | .119             | .045      | 2     |       | 916512          | 33.70  | 916512-C3    | 38.10  |
|                     | 3/16     | 4      | .010 | I    | .154             |           | 2     |       | 889712          | 35.20  | 889712-C3    | 40.40  |
|                     | 3/16     | 5      | .050 | II   | .119             | .045      | 2     |       | 899012          | 35.90  | 899012-C3    | 40.40  |
|                     | 1/4      | 2      | .010 | I    | .208             |           | 2-1/2 |       | 900116          | 41.60  | 900116-C3    | 48.60  |
|                     | 1/4      | 3      | .060 | II   | .164             | .054      | 2-1/2 |       | 916516          | 38.90  | 916516-C3    | 45.50  |
|                     | 1/4      | 4      | .010 | I    | .208             |           | 2-1/2 |       | 889716          | 43.90  | 889716-C3    | 50.90  |
|                     | 1/4      | 5      | .060 | II   | .164             | .054      | 2-1/2 |       | 899016          | 42.50  | 899016-C3    | 47.70  |
|                     | 3/8      | 2      | .010 | I    | .316             |           | 2-1/2 |       | 900124          | 55.60  | 900124-C3    | 65.00  |
|                     | 3/8      | 3      | .070 | II   | .264             | .062      | 2-1/2 |       | 916524          | 52.20  | 916524-C3    | 60.90  |
|                     | 3/8      | 4      | .010 | I    | .316             |           | 2-1/2 |       | 889724          | 55.60  | 889724-C3    | 65.00  |
|                     | 3/8      | 5      | .070 | II   | .264             | .062      | 2-1/2 |       | 899024          | 52.20  | 899024-C3    | 60.90  |
|                     | 1/2      | 2      | .010 | I    | .424             |           | 3     |       | 900132          | 78.00  | 900132-C3    | 90.70  |
|                     | 1/2      | 3      | .080 | II   | .364             | .071      | 3     |       | 916532          | 73.20  | 916532-C3    | 85.20  |
|                     | 1/2      | 4      | .010 | I    | .424             |           | 3     |       | 889732          | 78.00  | 889732-C3    | 90.70  |
|                     | 1/2      | 5      | .080 | II   | .364             | .071      | 3     |       | 899032          | 73.20  | 899032-C3    | 85.20  |
|                     | 5/8      | 3      | .090 | II   | .463             | .080      | 3     |       | 916540          | 75.40  | 916540-C3    | 87.50  |
|                     | 5/8      | 5      | .090 | II   | .463             | .080      | 3     |       | 899040          | 132.00 | 899040-C3    | 141.40 |
|                     | 3/4      | 3      | .100 | II   | .562             | .088      | 3     |       | 916548          | 187.00 | 916548-C3    | 201.70 |
|                     | 3/4      | 4      | .015 | I    | .637             |           | 3     |       | 889748          | 193.70 | 889748-C3    | 212.80 |
|                     | 3/4      | 5      | .100 | II   | .562             | .088      | 3     |       | 899048          | 189.50 | 899048-C3    | 198.30 |
| NEW<br>NEW<br>NEW   | 41°      | 1/4    | 5    | .060 | II               | .109      | .036  | 2-1/2 | 738216          | 43.50  | 738216-C3    | 51.10  |
|                     |          | 3/8    | 5    | .070 | II               | .153      | .041  | 2-1/2 | 738224          | 53.20  | 738224-C3    | 63.30  |
|                     |          | 1/2    | 5    | .080 | II               | .210      | .047  | 3     | 738232          | 74.20  | 738232-C3    | 89.30  |
| NEW                 | 45°      | 1/8    | 2    | .010 | I                | .058      |       | 1-1/2 | 860508          | 24.40  | 860508-C3    | 27.20  |
|                     |          | 1/8    | 3    | .040 | II               | .043      | .021  | 1-1/2 | 897208          | 24.40  | 897208-C3    | 29.40  |
|                     |          | 1/8    | 4    | .010 | I                | .058      |       | 1-1/2 | 859708          | 26.90  | 859708-C3    | 32.10  |
|                     |          | 1/8    | 4    | .010 | I                | .058      |       | 3     | LONG!<br>765008 | 29.70  | 765008-C3    | 34.90  |
|                     |          | 1/8    | 5    | .040 | II               | .043      | .021  | 1-1/2 | 908408          | 26.90  | 908408-C3    | 31.70  |
|                     |          | 1/8    | 5    | .040 | II               | .043      | .021  | 3     | LONG!<br>789008 | 29.70  | 789008-C3    | 34.90  |
|                     |          | 1/8    | 5    | .040 | III              | .043      | .021  | 1-1/2 | 773608          | 26.90  | 773608-C3    | 32.10  |
|                     |          | 3/16   | 2    | .010 | I                | .089      |       | 2     | 860512          | 33.00  | 860512-C3    | 38.10  |
|                     |          | 3/16   | 3    | .050 | II               | .069      | .026  | 2     | 897212          | 33.00  | 897212-C3    | 38.10  |
|                     |          | 3/16   | 4    | .010 | I                | .089      |       | 2     | 859712          | 35.20  | 859712-C3    | 40.40  |
|                     |          | 3/16   | 5    | .050 | II               | .069      | .026  | 2     | 908412          | 35.20  | 908412-C3    | 40.40  |
|                     |          | 3/16   | 5    | .050 | III              | .069      | .026  | 2     | 773612          | 35.20  | 773612-C3    | 40.80  |
|                     |          | 1/4    | 2    | .010 | I                | .120      |       | 2-1/2 | 860516          | 41.60  | 860516-C3    | 48.60  |
|                     |          | 1/4    | 3    | .060 | II               | .095      | .031  | 2-1/2 | 897216          | 38.90  | 897216-C3    | 45.50  |
|                     |          | 1/4    | 3    | .060 | II               | .095      | .031  | 4     | LONG!<br>765316 | 50.70  | 765316-C3    | 59.60  |
|                     |          | 1/4    | 4    | .010 | I                | .120      |       | 2-1/2 | 859716          | 43.90  | 859716-C3    | 50.90  |
|                     |          | 1/4    | 4    | .010 | I                | .120      |       | 4     | LONG!<br>765016 | 49.80  | 765016-C3    | 58.70  |
|                     |          | 1/4    | 5    | .060 | II               | .095      | .031  | 2-1/2 | 908416          | 41.30  | 908416-C3    | 47.70  |
|                     |          | 1/4    | 5    | .060 | II               | .095      | .031  | 4     | LONG!<br>789016 | 49.80  | 789016-C3    | 58.70  |
|                     |          | 1/4    | 5    | .060 | III              | .095      | .031  | 2-1/2 | 773616          | 42.30  | 773616-C3    | 49.90  |

\* Tolerance for Type I is +.000"/-.005". Tolerance for type II is +.002"/-.002". continued on next page

CHAMFER CUTTERS

Pointed & Flat End – Helical Flutes (cont.)

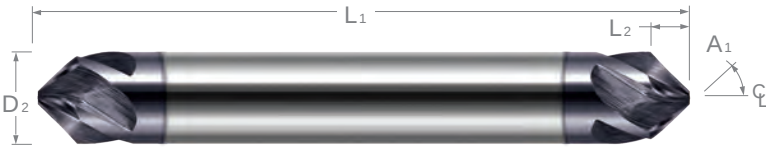
continued from previous page

| ANGLE<br>PER SIDE                                  | DIAMETER            | FLUTES | TIP  | TYPE | LENGTH<br>OF CUT |                       | OAL            | UNCOATED     |        | AIRTIN COATED |        |
|----------------------------------------------------|---------------------|--------|------|------|------------------|-----------------------|----------------|--------------|--------|---------------|--------|
|                                                    |                     |        |      |      |                  |                       |                | TOOL #       | PRICE  | TOOL #        | PRICE  |
| A <sub>1</sub> <sup>+0°15'</sup> <sub>-0°15'</sub> | D <sub>2</sub> (h6) |        | T*   |      | L <sub>2</sub>   | L <sub>4</sub> (MAX.) | L <sub>1</sub> |              |        |               |        |
| 45°                                                | 5/16                | 3      | .060 | II   | .126             | .031                  | 2-1/2          | 897220       | 50.60  | 897220-C3     | 59.50  |
|                                                    | 5/16                | 5      | .060 | II   | .126             | .031                  | 2-1/2          | 908420       | 50.60  | 908420-C3     | 59.50  |
|                                                    | 3/8                 | 2      | .010 | I    | .183             |                       | 2-1/2          | 860524       | 55.60  | 860524-C3     | 65.00  |
|                                                    | 3/8                 | 3      | .070 | II   | .153             | .036                  | 2-1/2          | 897224       | 52.20  | 897224-C3     | 60.90  |
|                                                    | 3/8                 | 4      | .010 | I    | .183             |                       | 2-1/2          | 859724       | 55.60  | 859724-C3     | 65.00  |
|                                                    | 3/8                 | 5      | .070 | II   | .153             | .036                  | 2-1/2          | 908424       | 52.20  | 908424-C3     | 60.90  |
|                                                    | 3/8                 | 5      | .070 | II   | .153             | .036                  | 4              | LONG! 789024 | 49.80  | 789024-C3     | 63.60  |
|                                                    | 3/8                 | 5      | .070 | III  | .153             | .036                  | 2-1/2          | 773624       | 52.20  | 773624-C3     | 62.30  |
|                                                    | 1/2                 | 2      | .010 | I    | .245             |                       | 3              | 860532       | 78.00  | 860532-C3     | 90.70  |
|                                                    | 1/2                 | 3      | .080 | II   | .210             | .041                  | 3              | 897232       | 73.20  | 897232-C3     | 85.20  |
|                                                    | 1/2                 | 4      | .010 | I    | .245             |                       | 3              | 859732       | 78.00  | 859732-C3     | 90.70  |
|                                                    | 1/2                 | 5      | .080 | II   | .210             | .041                  | 3              | 908432       | 73.20  | 908432-C3     | 85.20  |
|                                                    | 1/2                 | 5      | .080 | III  | .210             | .041                  | 3              | 773632       | 74.90  | 773632-C3     | 90.00  |
|                                                    | 5/8                 | 3      | .090 | II   | .268             | .046                  | 3              | 897240       | 129.60 | 897240-C3     | 139.00 |
|                                                    | 5/8                 | 5      | .090 | II   | .268             | .046                  | 3              | 908440       | 128.30 | 908440-C3     | 141.40 |
|                                                    | 3/4                 | 3      | .100 | II   | .325             | .051                  | 3              | 897248       | 181.70 | 897248-C3     | 201.70 |
|                                                    | 3/4                 | 4      | .015 | I    | .368             |                       | 3              | 859748       | 193.70 | 859748-C3     | 208.80 |
|                                                    | 3/4                 | 5      | .100 | II   | .325             | .051                  | 3              | 908448       | 184.10 | 908448-C3     | 198.30 |
| 50°                                                | 1/4                 | 3      | .060 | II   | .080             | .026                  | 2-1/2          | 875016       | 41.60  | 875016-C3     | 48.60  |
|                                                    | 1/4                 | 5      | .060 | II   | .080             | .026                  | 2-1/2          | 871116       | 44.80  | 871116-C3     | 50.90  |
|                                                    | 3/8                 | 3      | .070 | II   | .128             | .030                  | 2-1/2          | 875024       | 55.60  | 875024-C3     | 65.00  |
|                                                    | 3/8                 | 5      | .070 | II   | .128             | .030                  | 2-1/2          | 871124       | 57.90  | 871124-C3     | 67.10  |
|                                                    | 1/2                 | 3      | .080 | II   | .176             | .034                  | 3              | 875032       | 78.00  | 875032-C3     | 90.70  |
|                                                    | 1/2                 | 5      | .080 | II   | .176             | .034                  | 3              | 871132       | 81.90  | 871132-C3     | 93.10  |
| 60°                                                | 1/8                 | 2      | .010 | I    | .033             |                       | 1-1/2          | 872108       | 26.90  | 872108-C3     | 31.70  |
|                                                    | 1/8                 | 4      | .010 | I    | .033             |                       | 1-1/2          | 888808       | 26.90  | 888808-C3     | 32.10  |
|                                                    | 1/8                 | 5      | .040 | II   | .025             | .012                  | 1-1/2          | 867608       | 26.90  | 867608-C3     | 32.10  |
|                                                    | 3/16                | 2      | .010 | I    | .051             |                       | 2              | 872112       | 33.70  | 872112-C3     | 38.90  |
|                                                    | 3/16                | 4      | .010 | I    | .051             |                       | 2              | 888812       | 33.70  | 888812-C3     | 38.10  |
|                                                    | 1/4                 | 2      | .010 | I    | .069             |                       | 2-1/2          | 872116       | 41.60  | 872116-C3     | 49.60  |
|                                                    | 1/4                 | 3      | .060 | II   | .057             | .018                  | 2-1/2          | 863416       | 40.00  | 863416-C3     | 45.50  |
|                                                    | 1/4                 | 4      | .010 | I    | .069             |                       | 2-1/2          | 888816       | 43.90  | 888816-C3     | 50.90  |
|                                                    | 1/4                 | 5      | .060 | II   | .057             | .018                  | 2-1/2          | 867616       | 42.50  | 867616-C3     | 47.70  |
|                                                    | 3/8                 | 2      | .010 | I    | .105             |                       | 2-1/2          | 872124       | 56.70  | 872124-C3     | 66.20  |
|                                                    | 3/8                 | 3      | .070 | II   | .091             | .021                  | 2-1/2          | 863424       | 52.20  | 863424-C3     | 60.90  |
|                                                    | 3/8                 | 4      | .010 | I    | .105             |                       | 2-1/2          | 888824       | 59.00  | 888824-C3     | 67.10  |
|                                                    | 3/8                 | 5      | .070 | II   | .091             | .021                  | 2-1/2          | 867624       | 55.90  | 867624-C3     | 63.10  |
|                                                    | 1/2                 | 2      | .010 | I    | .141             |                       | 3              | 872132       | 78.00  | 872132-C3     | 92.50  |
|                                                    | 1/2                 | 3      | .080 | II   | .126             | .024                  | 3              | 863432       | 75.30  | 863432-C3     | 87.70  |
|                                                    | 1/2                 | 4      | .010 | I    | .141             |                       | 3              | 888832       | 78.00  | 888832-C3     | 90.70  |
|                                                    | 1/2                 | 5      | .080 | II   | .126             | .024                  | 3              | 867632       | 77.60  | 867632-C3     | 87.50  |
|                                                    | 5/8                 | 3      | .090 | II   | .157             | .027                  | 3              | 863440       | 129.60 | 863440-C3     | 143.10 |
|                                                    | 5/8                 | 5      | .090 | II   | .157             | .027                  | 3              | 867640       | 132.00 | 867640-C3     | 141.40 |
|                                                    | 3/4                 | 3      | .100 | II   | .195             | .029                  | 3              | 863448       | 187.00 | 863448-C3     | 201.70 |
|                                                    | 3/4                 | 4      | .015 | I    | .212             |                       | 3              | 888848       | 197.40 | 888848-C3     | 208.80 |
|                                                    | 3/4                 | 5      | .100 | II   | .195             | .029                  | 3              | 867648       | 189.50 | 867648-C3     | 204.10 |

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

CHAMFER CUTTERS

Pointed & Flat End – Helical Flutes – Double-Ended



Free Cutting Action  
for Excellent  
Surface Finish

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

| ANGLE PER SIDE   | DIAMETER | FLUTES | TIP  | TYPE | LENGTH OF CUT |           | OVERALL LENGTH | UNCOATED |        | AITiN COATED |        |
|------------------|----------|--------|------|------|---------------|-----------|----------------|----------|--------|--------------|--------|
| A1 +0°15' -0°15' | D2 (h6)  |        | T*   |      | L2            | L4 (MAX.) | L1             | TOOL #   | PRICE  | TOOL #       | PRICE  |
| 45°              | 1/4      | 4      | .010 | I    | .120          |           | 2-1/2          | 785016   | 61.00  | 785016-C3    | 71.10  |
|                  | 1/4      | 5      | .060 | II   | .095          | .031      | 2-1/2          | 784916   | 58.60  | 784916-C3    | 68.70  |
|                  | 3/8      | 4      | .010 | I    | .183          |           | 2-1/2          | 785024   | 76.50  | 785024-C3    | 91.60  |
|                  | 3/8      | 5      | .070 | II   | .153          | .036      | 2-1/2          | 784924   | 71.70  | 784924-C3    | 86.80  |
|                  | 1/2      | 4      | .010 | I    | .245          |           | 3              | 785032   | 107.30 | 785032-C3    | 128.00 |
|                  | 1/2      | 5      | .080 | II   | .210          | .041      | 3              | 784932   | 100.70 | 784932-C3    | 121.40 |

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

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

4 FLUTES

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

5 FLUTES

DISTANCE TO THEO. SHARP CORNER



The Multiple Uses of a Chamfer Mill

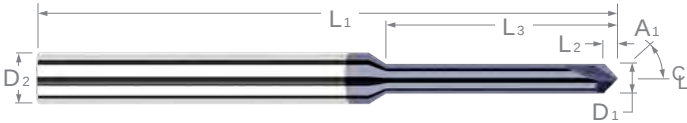
Did you know that a Chamfer Cutter, or Chamfer Mill, is one of the most versatile tools you can have in your carousel? Learn how this single tool can perform several different machining operations in our "In the Loupe" blog post **The Multiple Uses of a Chamfer Mill.**

[Read more on harveyperformance.com/in-the-loupe/](https://www.harveyperformance.com/in-the-loupe/)

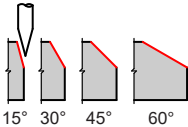
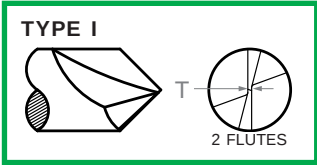
CHAMFER CUTTERS

CHAMFER CUTTERS

Pointed – Long Reach



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



Stocked in **Four** Angles Per Side!

CHAMFER CUTTERS

| ANGLE<br>PER SIDE              | NECK<br>DIAMETER               | OVERALL<br>REACH               | LENGTH<br>OF CUT | TIP      | SHANK<br>DIAMETER | OVERALL<br>LENGTH | UNCOATED |       | AItin COATED |       |
|--------------------------------|--------------------------------|--------------------------------|------------------|----------|-------------------|-------------------|----------|-------|--------------|-------|
| A1 <sup>+0°30'</sup><br>-0°30' | D1 <sup>+.000"</sup><br>-.001" | L3 <sup>+.010"</sup><br>-.000" | L2               | T (MAX.) | D2                | L1                | 2 FL     | PRICE | 2 FL         | PRICE |
| 15°                            | .031 (1/32)                    | .156 (5x)                      | .058             | .005     | 1/8               | 2-1/2             | 56815    | 29.20 | 56815-C3     | 34.40 |
|                                | .031 (1/32)                    | .250 (8x)                      | .058             | .005     | 1/8               | 2-1/2             | 57215    | 31.70 | 57215-C3     | 36.90 |
|                                | .062 (1/16)                    | .312 (5x)                      | .116             | .006     | 1/8               | 2-1/2             | 54715    | 29.20 | 54715-C3     | 34.40 |
|                                | .062 (1/16)                    | .500 (8x)                      | .116             | .006     | 1/8               | 2-1/2             | 55615    | 31.70 | 55615-C3     | 36.90 |
|                                | .093 (3/32)                    | .500 (5x)                      | .174             | .006     | 1/8               | 2-1/2             | 52115    | 29.50 | 52115-C3     | 34.70 |
|                                | .093 (3/32)                    | .750 (8x)                      | .174             | .006     | 1/8               | 2-1/2             | 53515    | 32.00 | 53515-C3     | 37.20 |
| 30°                            | .031 (1/32)                    | .093 (3x)                      | .027             | .005     | 1/8               | 1-1/2             | 994830   | 27.40 | 994830-C3    | 32.60 |
|                                | .031 (1/32)                    | .156 (5x)                      | .027             | .005     | 1/8               | 2-1/2             | 56830    | 29.50 | 56830-C3     | 34.70 |
|                                | .031 (1/32)                    | .250 (8x)                      | .027             | .005     | 1/8               | 2-1/2             | 57230    | 31.70 | 57230-C3     | 36.90 |
|                                | .047 (3/64)                    | .140 (3x)                      | .041             | .005     | 1/8               | 1-1/2             | 911030   | 27.60 | 911030-C3    | 32.80 |
|                                | .047 (3/64)                    | .250 (5x)                      | .041             | .005     | 1/8               | 2-1/2             | 996830   | 28.90 | 996830-C3    | 34.10 |
|                                | .047 (3/64)                    | .375 (8x)                      | .041             | .005     | 1/8               | 2-1/2             | 999230   | 29.20 | 999230-C3    | 34.40 |
|                                | .062 (1/16)                    | .187 (3x)                      | .054             | .006     | 1/8               | 1-1/2             | 998930   | 27.40 | 998930-C3    | 32.60 |
|                                | .062 (1/16)                    | .312 (5x)                      | .054             | .006     | 1/8               | 2-1/2             | 54730    | 29.20 | 54730-C3     | 34.40 |
|                                | .062 (1/16)                    | .500 (8x)                      | .054             | .006     | 1/8               | 2-1/2             | 55630    | 31.70 | 55630-C3     | 36.90 |
|                                | .078 (5/64)                    | .406 (5x)                      | .068             | .006     | 1/8               | 2-1/2             | 996930   | 28.90 | 996930-C3    | 34.10 |
|                                | .093 (3/32)                    | .279 (3x)                      | .081             | .006     | 1/8               | 1-1/2             | 995330   | 27.60 | 995330-C3    | 32.80 |
|                                | .093 (3/32)                    | .500 (5x)                      | .081             | .006     | 1/8               | 2-1/2             | 52130    | 29.20 | 52130-C3     | 34.40 |
|                                | .093 (3/32)                    | .750 (8x)                      | .081             | .006     | 1/8               | 2-1/2             | 53530    | 32.00 | 53530-C3     | 37.20 |
| 45°                            | .015 (1/64)                    | .078 (5x)                      | .008             | .003     | 1/8               | 2-1/2             | 997545   | 33.10 | 997545-C3    | 38.30 |
|                                | .015 (1/64)                    | .125 (8x)                      | .008             | .003     | 1/8               | 2-1/2             | 995945   | 36.90 | 995945-C3    | 42.10 |
|                                | .020                           | .060 (3x)                      | .010             | .003     | 1/8               | 1-1/2             | 794045   | 32.50 | 794045-C3    | 37.70 |
|                                | .020                           | .100 (5x)                      | .010             | .003     | 1/8               | 2-1/2             | 940245   | 32.50 | 940245-C3    | 37.70 |
|                                | .020                           | .160 (8x)                      | .010             | .003     | 1/8               | 2-1/2             | 948545   | 36.30 | 948545-C3    | 41.50 |
|                                | .020                           | .200 (10x)                     | .010             | .003     | 1/8               | 2-1/2             | 765545   | 38.10 | 765545-C3    | 43.30 |
|                                | .025                           | .125 (5x)                      | .013             | .003     | 1/8               | 2-1/2             | 821945   | 32.50 | 821945-C3    | 37.70 |
|                                | .031 (1/32)                    | .093 (3x)                      | .016             | .005     | 1/8               | 1-1/2             | 994845   | 27.80 | 994845-C3    | 33.00 |
|                                | .031 (1/32)                    | .125 (4x)                      | .016             | .005     | 1/8               | 2-1/2             | 862745   | 29.50 | 862745-C3    | 34.70 |
|                                | .031 (1/32)                    | .156 (5x)                      | .016             | .005     | 1/8               | 2-1/2             | 56845    | 29.20 | 56845-C3     | 34.40 |
|                                | .031 (1/32)                    | .187 (6x)                      | .016             | .005     | 1/8               | 2-1/2             | 870845   | 30.70 | 870845-C3    | 35.90 |
|                                | .031 (1/32)                    | .218 (7x)                      | .016             | .005     | 1/8               | 2-1/2             | 855445   | 30.70 | 855445-C3    | 35.90 |
|                                | .031 (1/32)                    | .250 (8x)                      | .016             | .005     | 1/8               | 2-1/2             | 57245    | 31.70 | 57245-C3     | 36.90 |
|                                | .031 (1/32)                    | .312 (10x)                     | .016             | .005     | 1/8               | 2-1/2             | 838445   | 33.40 | 838445-C3    | 38.60 |
|                                | .031 (1/32)                    | .375 (12x)                     | .016             | .005     | 1/8               | 2-1/2             | 998245   | 35.30 | 998245-C3    | 40.50 |
|                                | .031 (1/32)                    | .470 (15x)                     | .016             | .005     | 1/8               | 2-1/2             | 918245   | 38.10 | 918245-C3    | 43.30 |
|                                | .039                           | .203 (5x)                      | .020             | .005     | 1/8               | 2-1/2             | 788445   | 29.40 | 788445-C3    | 34.60 |
|                                | .039                           | .325 (8x)                      | .020             | .005     | 1/8               | 2-1/2             | 725245   | 31.70 | 725245-C3    | 36.90 |
|                                |                                |                                |                  |          |                   |                   |          |       |              |       |
|                                |                                |                                |                  |          |                   |                   |          |       |              |       |

continued on next page

CHAMFER CUTTERS

Pointed Long Reach (cont.)

continued from previous page

| ANGLE<br>PER SIDE                          | NECK<br>DIAMETER                             | OVERALL<br>REACH                             | LENGTH<br>OF CUT | TIP      | SHANK<br>DIAMETER | OVERALL<br>LENGTH | UNCOATED |       | AItIn COATED |       |
|--------------------------------------------|----------------------------------------------|----------------------------------------------|------------------|----------|-------------------|-------------------|----------|-------|--------------|-------|
| A <sub>1</sub> <sup>+0°30'</sup><br>-0°30' | D <sub>1</sub> <sup>+ .000"</sup><br>- .001" | L <sub>3</sub> <sup>+ .010"</sup><br>- .000" | L <sub>2</sub>   | T (MAX.) | D <sub>2</sub>    | L <sub>1</sub>    | 2 FL     | PRICE | 2 FL         | PRICE |
| 45°                                        | .040                                         | .203 (5x)                                    | .020             | .005     | 1/8               | 2-1/2             | 830645   | 29.40 | 830645-C3    | 34.60 |
|                                            | .047 (3/64)                                  | .141 (3x)                                    | .024             | .005     | 1/8               | 1-1/2             | 911045   | 27.10 | 911045-C3    | 32.30 |
|                                            | .047 (3/64)                                  | .187 (4x)                                    | .024             | .005     | 1/8               | 2-1/2             | 788745   | 28.20 | 788745-C3    | 33.40 |
|                                            | .047 (3/64)                                  | .250 (5x)                                    | .024             | .005     | 1/8               | 2-1/2             | 996845   | 29.40 | 996845-C3    | 34.60 |
|                                            | .047 (3/64)                                  | .281 (6x)                                    | .024             | .005     | 1/8               | 2-1/2             | 772545   | 30.80 | 772545-C3    | 36.00 |
|                                            | .047 (3/64)                                  | .375 (8x)                                    | .024             | .005     | 1/8               | 2-1/2             | 999245   | 31.70 | 999245-C3    | 36.90 |
|                                            | .047 (3/64)                                  | .570 (12x)                                   | .024             | .005     | 1/8               | 2-1/2             | 919045   | 34.60 | 919045-C3    | 39.80 |
|                                            | .047 (3/64)                                  | .710 (15x)                                   | .024             | .005     | 1/8               | 2-1/2             | 725345   | 38.10 | 725345-C3    | 43.30 |
|                                            | .050                                         | .250 (5x)                                    | .025             | .005     | 1/8               | 2-1/2             | 788645   | 29.20 | 788645-C3    | 34.40 |
|                                            | .060                                         | .312 (5x)                                    | .030             | .006     | 1/8               | 2-1/2             | 788545   | 29.50 | 788545-C3    | 34.70 |
|                                            | .062 (1/16)                                  | .187 (3x)                                    | .031             | .006     | 1/8               | 1-1/2             | 998945   | 27.80 | 998945-C3    | 33.00 |
|                                            | .062 (1/16)                                  | .250 (4x)                                    | .031             | .006     | 1/8               | 2-1/2             | 853945   | 29.20 | 853945-C3    | 34.40 |
|                                            | .062 (1/16)                                  | .312 (5x)                                    | .031             | .006     | 1/8               | 2-1/2             | 54745    | 29.20 | 54745-C3     | 34.40 |
|                                            | .062 (1/16)                                  | .375 (6x)                                    | .031             | .006     | 1/8               | 2-1/2             | 846045   | 30.40 | 846045-C3    | 35.60 |
|                                            | .062 (1/16)                                  | .437 (7x)                                    | .031             | .006     | 1/8               | 2-1/2             | 869745   | 30.40 | 869745-C3    | 35.60 |
|                                            | .062 (1/16)                                  | .500 (8x)                                    | .031             | .006     | 1/8               | 2-1/2             | 55645    | 31.70 | 55645-C3     | 36.90 |
|                                            | .062 (1/16)                                  | .625 (10x)                                   | .031             | .006     | 1/8               | 2-1/2             | 844145   | 33.40 | 844145-C3    | 38.60 |
|                                            | .062 (1/16)                                  | .750 (12x)                                   | .031             | .006     | 1/8               | 2-1/2             | 997245   | 35.30 | 997245-C3    | 40.50 |
|                                            | .062 (1/16)                                  | .950 (15x)                                   | .031             | .006     | 1/8               | 2-1/2             | 913345   | 38.10 | 913345-C3    | 43.30 |
|                                            | .078 (5/64)                                  | .234 (3x)                                    | .039             | .006     | 1/8               | 1-1/2             | 906645   | 27.10 | 906645-C3    | 32.30 |
|                                            | .078 (5/64)                                  | .312 (4x)                                    | .039             | .006     | 1/8               | 2-1/2             | 787045   | 28.20 | 787045-C3    | 33.40 |
|                                            | .078 (5/64)                                  | .406 (5x)                                    | .039             | .006     | 1/8               | 2-1/2             | 996945   | 29.40 | 996945-C3    | 34.60 |
|                                            | .078 (5/64)                                  | .625 (8x)                                    | .039             | .006     | 1/8               | 2-1/2             | 999545   | 31.70 | 999545-C3    | 36.90 |
|                                            | .078 (5/64)                                  | .800 (10x)                                   | .039             | .006     | 1/8               | 2-1/2             | 764145   | 34.10 | 764145-C3    | 39.30 |
|                                            | .078 (5/64)                                  | .940 (12x)                                   | .039             | .006     | 1/8               | 2-1/2             | 924045   | 34.60 | 924045-C3    | 39.80 |
|                                            | .093 (3/32)                                  | .279 (3x)                                    | .047             | .006     | 1/8               | 1-1/2             | 995345   | 27.80 | 995345-C3    | 33.00 |
|                                            | .093 (3/32)                                  | .375 (4x)                                    | .047             | .006     | 1/8               | 2-1/2             | 874345   | 29.20 | 874345-C3    | 34.40 |
|                                            | .093 (3/32)                                  | .500 (5x)                                    | .047             | .006     | 1/8               | 2-1/2             | 52145    | 29.20 | 52145-C3     | 34.40 |
|                                            | .093 (3/32)                                  | .585 (6x)                                    | .047             | .006     | 1/8               | 2-1/2             | 849445   | 30.70 | 849445-C3    | 35.90 |
|                                            | .093 (3/32)                                  | .670 (7x)                                    | .047             | .006     | 1/8               | 2-1/2             | 843045   | 30.70 | 843045-C3    | 35.90 |
|                                            | .093 (3/32)                                  | .750 (8x)                                    | .047             | .006     | 1/8               | 2-1/2             | 53545    | 31.70 | 53545-C3     | 36.90 |
|                                            | .093 (3/32)                                  | .950 (10x)                                   | .047             | .006     | 1/8               | 2-1/2             | 825645   | 33.40 | 825645-C3    | 38.60 |
|                                            | .093 (3/32)                                  | 1.125 (12x)                                  | .047             | .006     | 1/8               | 2-1/2             | 999645   | 35.30 | 999645-C3    | 40.50 |
|                                            | .093 (3/32)                                  | 1.400 (15x)                                  | .047             | .006     | 1/8               | 2-1/2             | 902845   | 38.10 | 902845-C3    | 43.30 |
|                                            | .118                                         | .591 (5x)                                    | .059             | .006     | 1/8               | 2-1/2             | 788345   | 29.50 | 788345-C3    | 34.70 |
|                                            | .118                                         | .950 (8x)                                    | .059             | .006     | 1/8               | 2-1/2             | 725145   | 32.00 | 725145-C3    | 37.20 |
| 60°                                        | .031 (1/32)                                  | .156 (5x)                                    | .009             | .005     | 1/8               | 2-1/2             | 56860    | 29.50 | 56860-C3     | 34.70 |
|                                            | .031 (1/32)                                  | .250 (8x)                                    | .009             | .005     | 1/8               | 2-1/2             | 57260    | 31.70 | 57260-C3     | 36.90 |
|                                            | .062 (1/16)                                  | .312 (5x)                                    | .018             | .006     | 1/8               | 2-1/2             | 54760    | 29.50 | 54760-C3     | 34.70 |
|                                            | .062 (1/16)                                  | .500 (8x)                                    | .018             | .006     | 1/8               | 2-1/2             | 55660    | 32.00 | 55660-C3     | 37.20 |
|                                            | .093 (3/32)                                  | .500 (5x)                                    | .027             | .006     | 1/8               | 2-1/2             | 52160    | 29.50 | 52160-C3     | 34.70 |
|                                            | .093 (3/32)                                  | .750 (8x)                                    | .027             | .006     | 1/8               | 2-1/2             | 53560    | 31.70 | 53560-C3     | 36.90 |

CHAMFER CUTTERS

CHAMFER CUTTERS

Back Chamfer Cutters



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



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

CHAMFER CUTTERS

| HEAD DIAMETER                                      | AXIAL LOC      | NECK DIAMETER  | NECK LENGTH                                        | FLUTES | SHANK DIAMETER | OVERALL LENGTH | UNCOATED |       | A1TIN COATED |       |
|----------------------------------------------------|----------------|----------------|----------------------------------------------------|--------|----------------|----------------|----------|-------|--------------|-------|
| D <sub>1</sub> <sup>+.000"</sup> <sub>-.001"</sub> | L <sub>2</sub> | D <sub>3</sub> | L <sub>3</sub> <sup>+.010"</sup> <sub>-.000"</sub> |        | D <sub>2</sub> | L <sub>1</sub> | TOOL #   | PRICE | TOOL #       | PRICE |
| .055                                               | .010           | .033           | <b>.093</b> (1.5x)                                 | 4      | 1/8            | 1-1/2          | 943355   | 68.50 | 943355-C3    | 73.70 |
| .055                                               | .010           | .033           | <b>.156</b> (3x)                                   | 4      | 1/8            | 1-1/2          | 938155   | 68.50 | 938155-C3    | 73.70 |
| .055                                               | .010           | .033           | <b>.250</b> (4.5x)                                 | 4      | 1/8            | 1-1/2          | 910355   | 67.90 | 910355-C3    | 73.10 |
| .080                                               | .014           | .047           | <b>.070</b> (0.8x)                                 | 4      | 1/8            | 1-1/2          | 906080   | 67.20 | 906080-C3    | 72.40 |
| .080                                               | .014           | .047           | <b>.140</b> (1.5x)                                 | 4      | 1/8            | 1-1/2          | 943380   | 67.20 | 943380-C3    | 72.40 |
| .080                                               | .014           | .047           | <b>.250</b> (4x)                                   | 4      | 1/8            | 1-1/2          | 938180   | 67.20 | 938180-C3    | 72.40 |
| .080                                               | .014           | .047           | <b>.375</b> (4.5x)                                 | 4      | 1/8            | 1-1/2          | 910380   | 66.60 | 910380-C3    | 71.80 |
| .115                                               | .020           | .068           | <b>.109</b> (0.8x)                                 | 4      | 1/8            | 1-1/2          | 906015   | 65.80 | 906015-C3    | 71.00 |
| .115                                               | .020           | .068           | <b>.218</b> (1.5x)                                 | 4      | 1/8            | 1-1/2          | 943410   | 65.80 | 943410-C3    | 71.00 |
| .115                                               | .020           | .068           | <b>.312</b> (2.5x)                                 | 4      | 1/8            | 1-1/2          | 772010   | 65.80 | 772010-C3    | 71.00 |
| .115                                               | .020           | .068           | <b>.375</b> (3x)                                   | 4      | 1/8            | 1-1/2          | 938210   | 65.80 | 938210-C3    | 71.00 |
| .115                                               | .020           | .068           | <b>.562</b> (5x)                                   | 4      | 1/8            | 2              | 910410   | 67.90 | 910410-C3    | 73.10 |

| D <sub>1</sub> <sup>+.000"</sup> <sub>-.002"</sub> | L <sub>2</sub> | D <sub>3</sub> | L <sub>3</sub> <sup>+.030"</sup> <sub>-.000"</sub> |   | D <sub>2</sub> | L <sub>1</sub> | TOOL # | PRICE | TOOL #    | PRICE |
|----------------------------------------------------|----------------|----------------|----------------------------------------------------|---|----------------|----------------|--------|-------|-----------|-------|
| .125                                               | .022           | .075           | <b>.218</b> (3x)                                   | 5 | 1/8            | 1-1/2          | 943415 | 67.00 | 943415-C3 | 72.20 |
| .125                                               | .022           | .075           | <b>.375</b> (5x)                                   | 5 | 1/8            | 1-1/2          | 938215 | 69.30 | 938215-C3 | 74.50 |
| .135                                               | .024           | .081           | <b>.125</b> (0.8x)                                 | 5 | 3/16           | 2              | 906119 | 76.40 | 906119-C3 | 82.00 |
| .135                                               | .024           | .081           | <b>.250</b> (1.5x)                                 | 5 | 3/16           | 2              | 943420 | 76.40 | 943420-C3 | 82.00 |
| .135                                               | .024           | .081           | <b>.406</b> (3x)                                   | 5 | 3/16           | 2              | 938220 | 76.40 | 938220-C3 | 82.00 |
| .135                                               | .024           | .081           | <b>.625</b> (5x)                                   | 5 | 3/16           | 2              | 910420 | 75.70 | 910420-C3 | 81.30 |
| .165                                               | .029           | .101           | <b>.156</b> (0.8x)                                 | 5 | 3/16           | 2              | 906130 | 76.40 | 906130-C3 | 82.00 |
| .165                                               | .029           | .101           | <b>.312</b> (2x)                                   | 5 | 3/16           | 2              | 943430 | 76.40 | 943430-C3 | 82.00 |
| .165                                               | .029           | .101           | <b>.500</b> (3x)                                   | 5 | 3/16           | 2              | 938230 | 76.40 | 938230-C3 | 82.00 |
| .165                                               | .029           | .101           | <b>.750</b> (4.5x)                                 | 5 | 3/16           | 2              | 910430 | 75.70 | 910430-C3 | 81.30 |
| .187                                               | .033           | .115           | <b>.375</b> (3x)                                   | 5 | 3/16           | 2              | 943435 | 77.60 | 943435-C3 | 83.20 |
| .187                                               | .033           | .115           | <b>.562</b> (5x)                                   | 5 | 3/16           | 2              | 938235 | 77.00 | 938235-C3 | 82.60 |
| .210                                               | .037           | .130           | <b>.187</b> (0.8x)                                 | 5 | 1/4            | 2-1/2          | 906140 | 86.60 | 906140-C3 | 94.20 |
| .210                                               | .037           | .130           | <b>.375</b> (1.5x)                                 | 5 | 1/4            | 2-1/2          | 943440 | 86.60 | 943440-C3 | 94.20 |
| .210                                               | .037           | .130           | <b>.500</b> (2x)                                   | 5 | 1/4            | 2-1/2          | 772140 | 86.60 | 772140-C3 | 94.20 |
| .210                                               | .037           | .130           | <b>.625</b> (3x)                                   | 5 | 1/4            | 2-1/2          | 938240 | 86.60 | 938240-C3 | 94.20 |
| .210                                               | .037           | .130           | <b>1.000</b> (5x)                                  | 5 | 1/4            | 2-1/2          | 910440 | 85.80 | 910440-C3 | 93.40 |
| .250                                               | .044           | .156           | <b>.250</b> (1x)                                   | 5 | 1/4            | 2-1/2          | 906116 | 86.60 | 906116-C3 | 94.20 |
| .250                                               | .044           | .156           | <b>.437</b> (2x)                                   | 5 | 1/4            | 2-1/2          | 943416 | 86.60 | 943416-C3 | 94.20 |
| .250                                               | .044           | .156           | <b>.625</b> (2.5x)                                 | 5 | 1/4            | 2-1/2          | 772116 | 86.60 | 772116-C3 | 94.20 |
| .250                                               | .044           | .156           | <b>.750</b> (3x)                                   | 5 | 1/4            | 2-1/2          | 938216 | 86.60 | 938216-C3 | 94.20 |
| .250                                               | .044           | .156           | <b>1.250</b> (5x)                                  | 5 | 1/4            | 3              | 910450 | 88.70 | 910450-C3 | 96.30 |

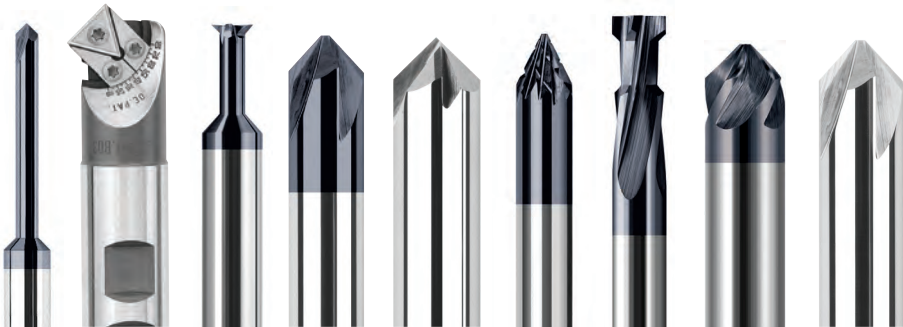
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# CHAMFER CUTTERS

## Back Chamfer Cutters (cont.)

continued from previous page

| HEAD<br>DIAMETER                                   | AXIAL<br>LOC   | NECK<br>DIAMETER | NECK<br>LENGTH                                     | FLUTES | SHANK<br>DIAMETER | OVERALL<br>LENGTH | UNCOATED |        | A1TiN COATED |        |
|----------------------------------------------------|----------------|------------------|----------------------------------------------------|--------|-------------------|-------------------|----------|--------|--------------|--------|
|                                                    |                |                  |                                                    |        |                   |                   | TOOL #   | PRICE  | TOOL #       | PRICE  |
| D <sub>1</sub> <sup>+.000"</sup> <sub>-.002"</sub> | L <sub>2</sub> | D <sub>3</sub>   | L <sub>3</sub> <sup>+.030"</sup> <sub>-.000"</sub> |        | D <sub>2</sub>    | L <sub>1</sub>    |          |        |              |        |
| .312                                               | .055           | .196             | <b>.281</b> (0.8x)                                 | 6      | 5/16              | 2-1/2             | 906120   | 91.50  | 906120-C3    | 100.40 |
| .312                                               | .055           | .196             | <b>.562</b> (2x)                                   | 6      | 5/16              | 2-1/2             | 943460   | 91.50  | 943460-C3    | 100.40 |
| .312                                               | .055           | .196             | <b>1.000</b> (3x)                                  | 6      | 5/16              | 2-1/2             | 938260   | 91.50  | 938260-C3    | 100.40 |
| .312                                               | .055           | .196             | <b>1.500</b> (5x)                                  | 6      | 5/16              | 3                 | 910460   | 93.90  | 910460-C3    | 102.80 |
| .375                                               | .066           | .237             | <b>.375</b> (1x)                                   | 6      | 3/8               | 2-1/2             | 906124   | 98.70  | 906124-C3    | 108.80 |
| .375                                               | .066           | .237             | <b>.750</b> (2x)                                   | 6      | 3/8               | 2-1/2             | 943470   | 98.70  | 943470-C3    | 108.80 |
| .375                                               | .066           | .237             | <b>1.125</b> (3x)                                  | 6      | 3/8               | 2-1/2             | 938270   | 98.70  | 938270-C3    | 108.80 |
| .375                                               | .066           | .237             | <b>1.870</b> (5x)                                  | 6      | 3/8               | 4                 | 910470   | 103.90 | 910470-C3    | 112.30 |
| .500                                               | .088           | .317             | <b>.500</b> (1x)                                   | 6      | 1/2               | 3                 | 906132   | 136.10 | 906132-C3    | 151.20 |
| .500                                               | .088           | .317             | <b>1.000</b> (2x)                                  | 6      | 1/2               | 3                 | 943480   | 136.10 | 943480-C3    | 151.20 |
| .500                                               | .088           | .317             | <b>1.500</b> (3x)                                  | 6      | 1/2               | 3                 | 938280   | 136.10 | 938280-C3    | 151.20 |
| .500                                               | .088           | .317             | <b>2.500</b> (5x)                                  | 6      | 1/2               | 4                 | 910480   | 140.80 | 910480-C3    | 155.90 |



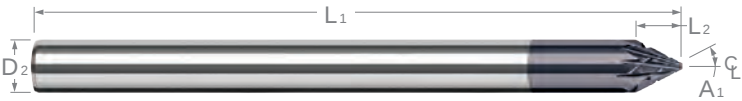
Check Out All of Our Chamfering Solutions!

CHAMFER CUTTERS

CHAMFER CUTTERS

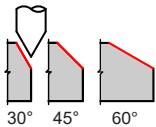
Deburring Chamfer Cutters

CHAMFER CUTTERS



End Mill Tolerances with Bur-Style Geometry!

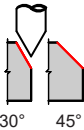
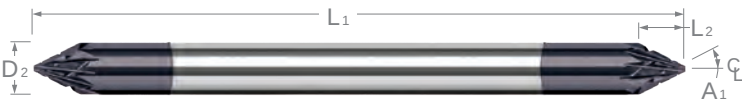
- Deburr in your CNC machine with these high precision burs held to end mill tolerances
- Stop scrapping expensive parts due to handheld operator errors
- High flute count allows for increased feeds which reduces cycle times
- Achieve better finish than with milling type cutters
- Tight end mill tolerances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



Stocked in **Three** Angles Per Side!

Single-Ended

| ANGLE PER SIDE                                     | LOC            | RIGHT HAND TEETH | LEFT HAND TEETH | MINOR DIA.  | SHANK DIA.     | OAL            | UNCOATED |       | AITiN COATED |       | AMORPHOUS DIAMOND |       |
|----------------------------------------------------|----------------|------------------|-----------------|-------------|----------------|----------------|----------|-------|--------------|-------|-------------------|-------|
| A <sub>1</sub> <sup>+0°30'</sup> <sub>-0°30'</sub> | L <sub>2</sub> |                  |                 |             | D <sub>2</sub> | L <sub>1</sub> | TOOL #   | PRICE | TOOL #       | PRICE | TOOL #            | PRICE |
| 30°                                                | .099           | 12               | 6               | .012 (Max.) | 1/8            | 2-1/2          | 58130    | 26.90 | 58130-C3     | 32.10 |                   |       |
|                                                    | .207           | 12               | 6               | .012 (Max.) | 1/4            | 2-1/2          | 994030   | 38.30 | 994030-C3    | 45.90 |                   |       |
| 45°                                                | .057           | 12               | 6               | .012 (Max.) | 1/8            | 2-1/2          | 58145    | 26.90 | 58145-C3     | 32.10 | 58145-C4          | 40.00 |
|                                                    | .088           | 12               | 6               | .012 (Max.) | 3/16           | 2-1/2          | 891145   | 33.70 | 891145-C3    | 39.30 | 891145-C4         | 51.80 |
|                                                    | .120           | 12               | 6               | .012 (Max.) | 1/4            | 2-1/2          | 994045   | 38.30 | 994045-C3    | 45.90 | 994045-C4         | 58.90 |
|                                                    | .181           | 14               | 7               | .013 (Max.) | 3/8            | 2-1/2          | 784445   | 54.20 | 784445-C3    | 64.30 | 784445-C4         | 79.00 |
| 60°                                                | .033           | 12               | 6               | .012 (Max.) | 1/8            | 2-1/2          | 58160    | 27.20 | 58160-C3     | 32.40 |                   |       |



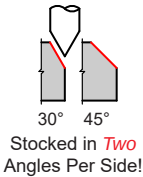
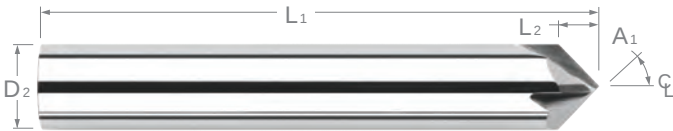
Stocked in **Two** Angles Per Side!

Double-Ended

| ANGLE PER SIDE                                     | LENGTH OF CUT  | RIGHT HAND TEETH | LEFT HAND TEETH | MINOR DIAMETER | SHANK DIAMETER | OVERALL LENGTH | UNCOATED |       | AITiN COATED |       |
|----------------------------------------------------|----------------|------------------|-----------------|----------------|----------------|----------------|----------|-------|--------------|-------|
| A <sub>1</sub> <sup>+0°30'</sup> <sub>-0°30'</sub> | L <sub>2</sub> |                  |                 |                | D <sub>2</sub> | L <sub>1</sub> | TOOL #   | PRICE | TOOL #       | PRICE |
| 30°                                                | .099           | 12               | 6               | .012 (Max.)    | 1/8            | 2-1/2          | 898330   | 40.50 | 898330-C3    | 46.90 |
| 45°                                                | .057           | 12               | 6               | .012 (Max.)    | 1/8            | 2-1/2          | 898345   | 40.50 | 898345-C3    | 46.90 |
|                                                    | .088           | 12               | 6               | .012 (Max.)    | 3/16           | 2-1/2          | 879745   | 48.70 | 879745-C3    | 56.30 |
|                                                    | .120           | 12               | 6               | .012 (Max.)    | 1/4            | 2-1/2          | 867545   | 57.60 | 867545-C3    | 67.70 |
|                                                    | .181           | 14               | 7               | .013 (Max.)    | 3/8            | 2-1/2          | 788145   | 74.20 | 788145-C3    | 89.30 |

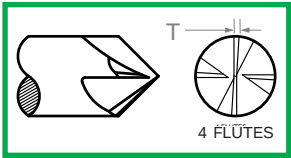
CHAMFER CUTTERS

Cobalt – Pointed



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

| ANGLE PER SIDE                                                             | LENGTH OF CUT  | TIP                 | SHANK DIAMETER | OVERALL LENGTH | UNCOATED |       |
|----------------------------------------------------------------------------|----------------|---------------------|----------------|----------------|----------|-------|
|                                                                            |                |                     |                |                | 4 FL     | PRICE |
| $A_1 \begin{smallmatrix} +0^{\circ}30' \\ -0^{\circ}30' \end{smallmatrix}$ | L <sub>2</sub> | T <sub>(MAX.)</sub> | D <sub>2</sub> | L <sub>1</sub> |          |       |
| 30°                                                                        | .217           | .010                | 1/4            | 2              | 18116    | 42.30 |
|                                                                            | .325           | .010                | 3/8            | 2-1/2          | 18124    | 51.90 |
|                                                                            | .433           | .010                | 1/2            | 3              | 18132    | 65.70 |
| 45°                                                                        | .125           | .010                | 1/4            | 2              | 18016    | 42.30 |
|                                                                            | .188           | .010                | 3/8            | 2-1/2          | 18024    | 50.90 |
|                                                                            | .250           | .010                | 1/2            | 3              | 18032    | 65.70 |



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CHAMFER CUTTERS

Adjustable Chamfer Cutters

CHAMFER CUTTERS



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

| SHANK DIAMETER | OVERALL LENGTH | TOOL # | PRICE  |
|----------------|----------------|--------|--------|
| 3/4            | 3-3/4          | 81250  | 376.40 |
| 1              | 3-3/4          | 81260  | 376.40 |

| DESCRIPTION                                  | TOOL # | PRICE |             |
|----------------------------------------------|--------|-------|-------------|
| TPET-321 Insert with TiN Coating             | 60031  | 14.10 | (Box of 10) |
| TPET-321-AL Insert for Non-Ferrous Materials | 60038  | 15.60 | (Box of 10) |
| Clamp Plate (Replacement)                    | 81245  | 21.90 | (Each)      |
| Screw (Replacement)                          | 81247  | 8.10  | (Each)      |
| Seat Pocket (Replacement)                    | 81249  | 80.00 | (Each)      |

| SPEEDS & FEEDS (Adjustable Chamfer Cutter) |                |                   |                |  |  |
|--------------------------------------------|----------------|-------------------|----------------|--|--|
| MATERIAL                                   | SPEED (RPM)    | FEED (Inches/Min) | DEPTH (Inches) |  |  |
| STEEL                                      | 600–2000       | 1"– 4"            | 1/8" MAX.      |  |  |
| ALUMINUM                                   | 1000–6000 MAX. | 3"– 8"            | 1/8" MAX.      |  |  |

AXIAL DOC ON INSERT\*

RADIAL DOC ON INSERT\*

MINIMUM CUTTER DIAMETER\*

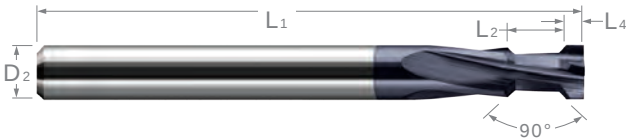
MAXIMUM CUTTER DIAMETER\*

\* CORNER RADIUS NOT INCLUDED IN DIMENSIONS

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

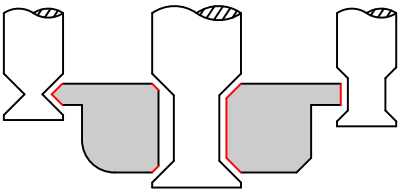
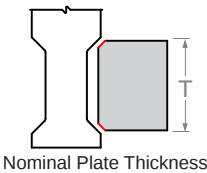
CHAMFER CUTTERS

Plate Chamfer Cutters



Cutting Along Entirety of Concave Form

- Tool designed to chamfer top and bottom in a single pass
- Cutting along entirety of concave form (L<sub>2</sub>) only
- Minor diameter (D<sub>3</sub>) relieved for light profiling and trimming edges
- 10° helix
- 4 flutes
- Solid carbide
- CNC ground in the USA



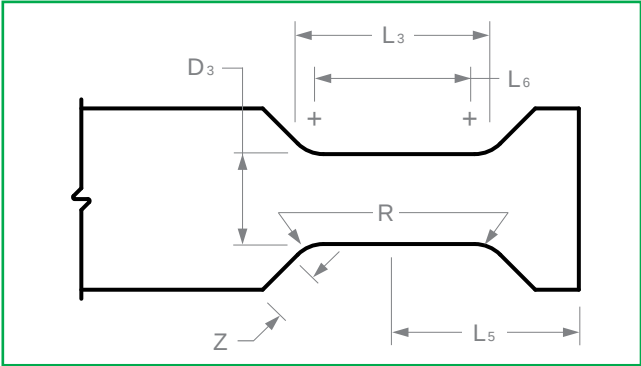
Capable of Performing Full Form Engagement, Light Profiling, & Edge Trimming

| MAX<br>OPENING<br>WIDTH                      | MIN<br>OPENING<br>WIDTH | CHAMFER<br>LENGTH | MINOR<br>DIA.                                | MINOR<br>DIA.<br>LENGTH | RADIUS   | END<br>LENGTH  | END TO<br>CENTER                             | NOMINAL<br>PLATE<br>THICKNESS* | SHANK<br>DIA.  | OAL            | UNCOATED |        | AItiN COATED |        |
|----------------------------------------------|-------------------------|-------------------|----------------------------------------------|-------------------------|----------|----------------|----------------------------------------------|--------------------------------|----------------|----------------|----------|--------|--------------|--------|
| L <sub>2</sub> <sup>+ .001"</sup><br>- .001" | L <sub>3</sub>          | Z                 | D <sub>3</sub> <sup>+ .000"</sup><br>- .002" | L <sub>6</sub>          | R (MAX.) | L <sub>4</sub> | L <sub>5</sub> <sup>+ .001"</sup><br>- .001" | T                              | D <sub>2</sub> | L <sub>1</sub> | 4 FL     | PRICE  | 4 FL         | PRICE  |
| .037                                         | .010                    | .019              | .096                                         | .008                    | .005     | .040           | .059                                         | .031                           | 1/8            | 1-1/2          | 955202   | 58.00  | 955202-C3    | 63.20  |
| .068                                         | .037                    | .022              | .091                                         | .029                    | .006     | .040           | .074                                         | .062                           | 1/8            | 1-1/2          | 955204   | 58.00  | 955204-C3    | 63.20  |
| .074                                         | .012                    | .044              | .184                                         | .001                    | .008     | .060           | .097                                         | .068                           | 1/4            | 2-1/2          | 971104   | 64.20  | 971104-C3    | 71.80  |
| .099                                         | .037                    | .044              | .184                                         | .026                    | .008     | .060           | .110                                         | .093                           | 1/4            | 2-1/2          | 971106   | 64.20  | 971106-C3    | 71.80  |
| .135                                         | .104                    | .022              | .091                                         | .096                    | .005     | .040           | .108                                         | .125                           | 1/8            | 1-1/2          | 955208   | 58.00  | 955208-C3    | 63.20  |
| .135                                         | .073                    | .044              | .184                                         | .062                    | .008     | .060           | .128                                         | .125                           | 1/4            | 2-1/2          | 971108   | 64.20  | 971108-C3    | 71.80  |
| .197                                         | .135                    | .044              | .184                                         | .124                    | .008     | .060           | .159                                         | .187                           | 1/4            | 2-1/2          | 971112   | 64.20  | 971112-C3    | 71.80  |
| .197                                         | .105                    | .065              | .278                                         | .093                    | .008     | .060           | .159                                         | .187                           | 3/8            | 2-1/2          | 980812   | 80.30  | 980812-C3    | 90.40  |
| .260                                         | .198                    | .044              | .184                                         | .187                    | .008     | .060           | .190                                         | .250                           | 1/4            | 2-1/2          | 971116   | 64.20  | 971116-C3    | 71.80  |
| .260                                         | .137                    | .087              | .372                                         | .126                    | .008     | .060           | .190                                         | .250                           | 1/2            | 3              | 965916   | 122.40 | 965916-C3    | 137.50 |
| .385                                         | .293                    | .065              | .278                                         | .281                    | .008     | .060           | .253                                         | .375                           | 3/8            | 2-1/2          | 980824   | 80.30  | 980824-C3    | 90.40  |
| .385                                         | .262                    | .087              | .372                                         | .251                    | .008     | .060           | .253                                         | .375                           | 1/2            | 3              | 965924   | 122.40 | 965924-C3    | 137.50 |
| .510                                         | .387                    | .087              | .372                                         | .376                    | .008     | .060           | .315                                         | .500                           | 1/2            | 3              | 965932   | 122.40 | 965932-C3    | 137.50 |

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



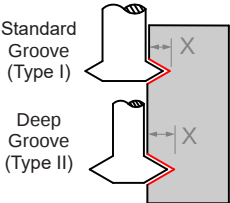
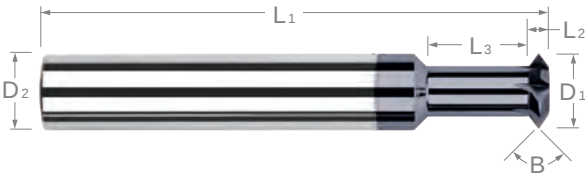
For additional tool dimensions, scan the QR code or visit [harveytool.com/resources](https://harveytool.com/resources)



CHAMFER CUTTERS

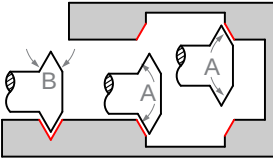
DOUBLE ANGLE SHANK CUTTERS

Pointed



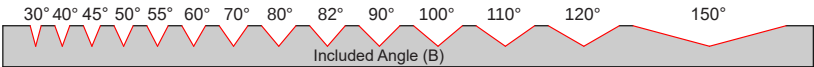
- Ideal for back chamfering, chamfering, deburring, and milling a "V-groove"
- Reduced neck for long reach machining
- Tip of included angle ground to a point
- 60° angle can also be used for thread milling
- Solid carbide
- CNC ground in the USA

Great for Chamfering and Deburring



Included Angle Conversion

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



Stocked in **Fourteen** Included Angles!

| INCL. ANGLE | CUTTER DIA.<br>$D_1 \begin{smallmatrix} +.000'' \\ -.002'' \end{smallmatrix}$ | CUTTER WIDTH<br>$L_2$ | NECK DIA. | NECK LENGTH<br>$L_3 \begin{smallmatrix} +.020'' \\ -.000'' \end{smallmatrix}$ | TYPE | FLUTES | SHANK DIA.<br>$D_2$ | OAL<br>$L_1$ | UNCOATED |        | A1TiN COATED |        | A1TiN NANO COATED |       |
|-------------|-------------------------------------------------------------------------------|-----------------------|-----------|-------------------------------------------------------------------------------|------|--------|---------------------|--------------|----------|--------|--------------|--------|-------------------|-------|
|             |                                                                               |                       |           |                                                                               |      |        |                     |              | TOOL #   | PRICE  | TOOL #       | PRICE  | TOOL #            | PRICE |
| 30°         | 1/16                                                                          | .008                  | 1/32      | .093                                                                          | I    | 2      | 1/8                 | 1-1/2        | 66062    | 52.50  | 66062-C3     | 57.70  |                   |       |
|             | 5/64                                                                          | .010                  | .039      | .118                                                                          | I    | 2      | 1/8                 | 1-1/2        | 66078    | 52.50  | 66078-C3     | 57.70  |                   |       |
|             | 3/32                                                                          | .012                  | 3/64      | .141                                                                          | I    | 2      | 1/8                 | 1-1/2        | 66093    | 52.50  | 66093-C3     | 57.70  |                   |       |
|             | 1/8                                                                           | .017                  | 1/16      | .187                                                                          | I    | 4      | 1/8                 | 1-1/2        | 66108    | 51.20  | 66108-C3     | 56.40  |                   |       |
|             | 1/8                                                                           | .017                  | 1/16      | .500                                                                          | I    | 4      | 1/8                 | 1-1/2        | 934308   | 52.50  | 934308-C3    | 57.70  |                   |       |
|             | 3/16                                                                          | .025                  | 3/32      | .312                                                                          | I    | 4      | 3/16                | 2            | 66112    | 53.10  | 66112-C3     | 58.70  |                   |       |
|             | 1/4                                                                           | .033                  | 1/8       | .312                                                                          | I    | 4      | 1/4                 | 2            | 66116    | 67.40  | 66116-C3     | 75.00  |                   |       |
|             | 1/4                                                                           | .033                  | 1/8       | .625                                                                          | I    | 4      | 1/4                 | 2            | 921716   | 79.50  | 921716-C3    | 87.10  |                   |       |
|             | 3/8                                                                           | .033                  | 1/4       | .500                                                                          | I    | 6      | 3/8                 | 2-1/2        | 66105    | 90.50  | 66105-C3     | 100.60 |                   |       |
|             | 3/8                                                                           | .033                  | 1/4       | 1.500                                                                         | I    | 6      | 3/8                 | 3-1/2        | 934324   | 105.60 | 934324-C3    | 115.70 |                   |       |
|             | 1/2                                                                           | .050                  | 5/16      | .500                                                                          | I    | 6      | 1/2                 | 3            | 66110    | 122.30 | 66110-C3     | 137.40 |                   |       |
|             | 1/2                                                                           | .050                  | 5/16      | 1.500                                                                         | I    | 6      | 1/2                 | 4            | 934332   | 156.00 | 934332-C3    | 171.10 |                   |       |
| 40°         | 1/4                                                                           | .045                  | 1/8       | .312                                                                          | I    | 4      | 1/4                 | 2            | 29720    | 67.90  | 29720-C3     | 75.50  |                   |       |
|             | 1/4                                                                           | .045                  | 1/8       | .625                                                                          | I    | 4      | 1/4                 | 2            | 918116   | 80.50  | 918116-C3    | 88.10  |                   |       |
|             | 3/8                                                                           | .045                  | 1/4       | .500                                                                          | I    | 6      | 3/8                 | 2-1/2        | 909924   | 87.50  | 909924-C3    | 97.60  |                   |       |
|             | 3/8                                                                           | .045                  | 1/4       | 1.500                                                                         | I    | 6      | 3/8                 | 3-1/2        | 967505   | 108.70 | 967505-C3    | 118.80 |                   |       |
|             | 1/2                                                                           | .068                  | 5/16      | .500                                                                          | I    | 6      | 1/2                 | 3            | 909932   | 117.00 | 909932-C3    | 132.10 |                   |       |
|             | 1/2                                                                           | .068                  | 5/16      | 1.500                                                                         | I    | 6      | 1/2                 | 4            | 967510   | 152.10 | 967510-C3    | 167.20 |                   |       |
| 45°         | 1/8                                                                           | .026                  | 1/16      | .187                                                                          | I    | 4      | 1/8                 | 1-1/2        | 905608   | 52.50  | 905608-C3    | 57.70  |                   |       |
|             | 3/16                                                                          | .039                  | 3/32      | .312                                                                          | I    | 4      | 3/16                | 2            | 905612   | 53.10  | 905612-C3    | 58.70  |                   |       |
|             | 3/16                                                                          | .039                  | 3/32      | .750                                                                          | I    | 4      | 3/16                | 2-1/2        | 984902   | 61.90  | 984902-C3    | 67.50  |                   | NEW   |
|             | 1/4                                                                           | .052                  | 1/8       | .312                                                                          | I    | 4      | 1/4                 | 2            | 29723    | 67.40  | 29723-C3     | 75.00  |                   |       |
|             | 1/4                                                                           | .052                  | 1/8       | .625                                                                          | I    | 4      | 1/4                 | 2            | 917016   | 79.50  | 917016-C3    | 87.10  |                   |       |
|             | 1/4                                                                           | .052                  | 1/8       | 1.000                                                                         | I    | 4      | 1/4                 | 3            | 984903   | 82.60  | 984903-C3    | 90.20  |                   |       |
|             | 3/8                                                                           | .052                  | 1/4       | .500                                                                          | I    | 6      | 3/8                 | 2-1/2        | 905624   | 85.40  | 905624-C3    | 95.50  |                   |       |
|             | 3/8                                                                           | .052                  | 1/4       | 1.000                                                                         | I    | 6      | 3/8                 | 2-1/2        | 917024   | 97.40  | 917024-C3    | 107.50 |                   |       |
|             | 3/8                                                                           | .052                  | 1/4       | 1.500                                                                         | I    | 6      | 3/8                 | 3-1/2        | 984905   | 106.10 | 984905-C3    | 116.20 |                   |       |
|             | 1/2                                                                           | .078                  | 5/16      | .500                                                                          | I    | 6      | 1/2                 | 3            | 905632   | 116.40 | 905632-C3    | 131.50 |                   |       |
|             | 1/2                                                                           | .078                  | 5/16      | 1.500                                                                         | I    | 6      | 1/2                 | 4            | 984910   | 151.40 | 984910-C3    | 166.50 |                   |       |

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| INCL.<br>ANGLE                                                     | CUTTER<br>DIA.                                                            | CUTTER<br>WIDTH | NECK<br>DIA. | NECK<br>LENGTH                                                            | TYPE | FLUTES | SHANK<br>DIA.  | OAL            | UNCOATED |        | AITIN COATED |        | AITIN NANO<br>COATED |       |
|--------------------------------------------------------------------|---------------------------------------------------------------------------|-----------------|--------------|---------------------------------------------------------------------------|------|--------|----------------|----------------|----------|--------|--------------|--------|----------------------|-------|
| B $\begin{smallmatrix} +1^{\circ} \\ -1^{\circ} \end{smallmatrix}$ | D <sub>1</sub> $\begin{smallmatrix} +.000'' \\ -.002'' \end{smallmatrix}$ | L <sub>2</sub>  |              | L <sub>3</sub> $\begin{smallmatrix} +.020'' \\ -.000'' \end{smallmatrix}$ |      |        | D <sub>2</sub> | L <sub>1</sub> | TOOL #   | PRICE  | TOOL #       | PRICE  | TOOL #               | PRICE |
| 50°                                                                | 1/8                                                                       | .029            | 1/16         | .187                                                                      | I    | 4      | 1/8            | 1-1/2          | 985801   | 51.70  | 985801-C3    | 56.90  |                      |       |
|                                                                    | 1/8                                                                       | .029            | 1/16         | .500                                                                      | I    | 4      | 1/8            | 1-1/2          | 974401   | 61.70  | 974401-C3    | 66.90  |                      |       |
|                                                                    | 3/16                                                                      | .044            | 3/32         | .312                                                                      | I    | 4      | 3/16           | 2              | 985802   | 54.10  | 985802-C3    | 59.70  |                      |       |
|                                                                    | 3/16                                                                      | .044            | 3/32         | .750                                                                      | I    | 4      | 3/16           | 2-1/2          | 974402   | 62.90  | 974402-C3    | 68.50  |                      |       |
|                                                                    | 1/4                                                                       | .058            | 1/8          | .312                                                                      | I    | 4      | 1/4            | 2              | 29725    | 71.70  | 29725-C3     | 79.30  |                      |       |
|                                                                    | 1/4                                                                       | .058            | 1/8          | 1.000                                                                     | I    | 4      | 1/4            | 3              | 974403   | 84.60  | 974403-C3    | 92.20  |                      |       |
|                                                                    | 3/8                                                                       | .058            | 1/4          | .500                                                                      | I    | 6      | 3/8            | 2-1/2          | 985805   | 89.90  | 985805-C3    | 100.00 |                      |       |
|                                                                    | 3/8                                                                       | .058            | 1/4          | 1.500                                                                     | I    | 6      | 3/8            | 3-1/2          | 974405   | 110.30 | 974405-C3    | 120.40 |                      |       |
|                                                                    | 1/2                                                                       | .088            | 5/16         | .500                                                                      | I    | 6      | 1/2            | 3              | 985810   | 122.60 | 985810-C3    | 137.70 |                      |       |
|                                                                    | 1/2                                                                       | .088            | 5/16         | 1.500                                                                     | I    | 6      | 1/2            | 4              | 974410   | 154.30 | 974410-C3    | 169.40 |                      |       |
| 55°                                                                | 1/4                                                                       | .065            | 1/8          | .312                                                                      | I    | 4      | 1/4            | 2              | 29728    | 72.10  | 29728-C3     | 79.70  |                      |       |
| 60°                                                                | 1/16                                                                      | .018            | 1/32         | .093                                                                      | I    | 2      | 1/8            | 1-1/2          | 47362    | 50.90  | 47362-C3     | 56.10  |                      |       |
|                                                                    | 1/16                                                                      | .018            | 1/32         | .156                                                                      | I    | 2      | 1/8            | 1-1/2          | 965562   | 50.90  | 965562-C3    | 56.10  |                      |       |
|                                                                    | 5/64                                                                      | .023            | .039         | .118                                                                      | I    | 2      | 1/8            | 1-1/2          | 47378    | 50.90  | 47378-C3     | 56.10  |                      |       |
|                                                                    | 3/32                                                                      | .027            | 3/64         | .141                                                                      | I    | 2      | 1/8            | 1-1/2          | 47393    | 50.90  | 47393-C3     | 56.10  |                      |       |
|                                                                    | 3/32                                                                      | .027            | 3/64         | .250                                                                      | I    | 2      | 1/8            | 1-1/2          | 965593   | 50.90  | 965593-C3    | 56.10  |                      |       |
|                                                                    | 1/8                                                                       | .036            | 1/16         | .125                                                                      | I    | 4      | 1/8            | 1-1/2          | 937501   | 47.00  | 937501-C3    | 52.20  |                      |       |
|                                                                    | 1/8                                                                       | .036            | 1/16         | .187                                                                      | I    | 4      | 1/8            | 1-1/2          | 16201    | 47.00  | 16201-C3     | 52.20  |                      |       |
|                                                                    | 1/8                                                                       | .036            | 1/16         | .312                                                                      | I    | 4      | 1/8            | 1-1/2          | 984401   | 52.80  | 984401-C3    | 58.00  |                      |       |
|                                                                    | 1/8                                                                       | .036            | 1/16         | .500                                                                      | I    | 4      | 1/8            | 2              | 27501    | 57.50  | 27501-C3     | 62.70  |                      |       |
|                                                                    | 1/8                                                                       | .036            | 1/16         | .875                                                                      | I    | 4      | 1/8            | 2              | 981001   | 62.80  | 981001-C3    | 68.00  |                      |       |
|                                                                    | 5/32                                                                      | .045            | 5/64         | .250                                                                      | I    | 4      | 3/16           | 2              | 16256    | 50.90  | 16256-C3     | 56.50  |                      |       |
|                                                                    | 5/32                                                                      | .045            | 5/64         | .625                                                                      | I    | 4      | 3/16           | 2-1/2          | 27556    | 57.50  | 27556-C3     | 63.10  |                      |       |
|                                                                    | 3/16                                                                      | .055            | 3/32         | .187                                                                      | I    | 4      | 3/16           | 2              | 937502   | 50.00  | 937502-C3    | 55.60  |                      |       |
|                                                                    | 3/16                                                                      | .055            | 3/32         | .312                                                                      | I    | 4      | 3/16           | 2              | 16202    | 50.00  | 16202-C3     | 55.60  |                      |       |
|                                                                    | 3/16                                                                      | .055            | 3/32         | .500                                                                      | I    | 4      | 3/16           | 2              | 984402   | 57.90  | 984402-C3    | 63.50  |                      |       |
|                                                                    | 3/16                                                                      | .055            | 3/32         | .750                                                                      | I    | 4      | 3/16           | 2-1/2          | 27502    | 61.50  | 27502-C3     | 67.10  |                      |       |
|                                                                    | 3/16                                                                      | .055            | 3/32         | 1.000                                                                     | I    | 4      | 3/16           | 2-1/2          | 925502   | 64.30  | 925502-C3    | 69.90  |                      |       |
|                                                                    | 1/4                                                                       | .072            | 1/8          | .187                                                                      | I    | 4      | 1/4            | 2              | 937503   | 67.40  | 937503-C3    | 75.00  |                      |       |
|                                                                    | 1/4                                                                       | .072            | 1/8          | .312                                                                      | I    | 4      | 1/4            | 2              | 16203    | 67.40  | 16203-C3     | 75.00  |                      |       |
|                                                                    | 1/4                                                                       | .072            | 1/8          | .312                                                                      | I    | 6      | 1/4            | 2              | 808016   | 72.30  | 808016-C3    | 79.90  |                      |       |
|                                                                    | 1/4                                                                       | .072            | 1/8          | .625                                                                      | I    | 4      | 1/4            | 2-1/2          | 984403   | 75.70  | 984403-C3    | 83.30  |                      |       |
|                                                                    | 1/4                                                                       | .072            | 1/8          | 1.000                                                                     | I    | 4      | 1/4            | 3              | 27503    | 80.80  | 27503-C3     | 88.40  |                      |       |
|                                                                    | 1/4                                                                       | .072            | 1/8          | 1.312                                                                     | I    | 4      | 1/4            | 3              | 925503   | 81.20  | 925503-C3    | 88.80  |                      |       |
|                                                                    | 1/4                                                                       | .072            | 1/8          | 1.750                                                                     | I    | 4      | 1/4            | 3              | 981003   | 82.30  | 981003-C3    | 89.90  |                      |       |
|                                                                    | 5/16                                                                      | .072            | 3/16         | .375                                                                      | I    | 6      | 5/16           | 2-1/2          | 16272    | 81.80  | 16272-C3     | 90.70  |                      |       |
|                                                                    | 5/16                                                                      | .072            | 3/16         | .875                                                                      | I    | 6      | 5/16           | 2-1/2          | 984472   | 84.20  | 984472-C3    | 93.10  |                      |       |
|                                                                    | 3/8                                                                       | .072            | 1/4          | .312                                                                      | I    | 6      | 3/8            | 2-1/2          | 937505   | 86.10  | 937505-C3    | 96.20  |                      |       |
|                                                                    | 3/8                                                                       | .072            | 1/4          | .500                                                                      | I    | 6      | 3/8            | 2-1/2          | 16205    | 86.10  | 16205-C3     | 96.20  |                      |       |
|                                                                    | 3/8                                                                       | .072            | 1/4          | .750                                                                      | I    | 6      | 3/8            | 2-1/2          | 773305   | 91.50  | 773305-C3    | 101.60 |                      |       |
|                                                                    | 3/8                                                                       | .072            | 1/4          | 1.000                                                                     | I    | 6      | 3/8            | 2-1/2          | 984405   | 97.00  | 984405-C3    | 107.10 |                      |       |
|                                                                    | 3/8                                                                       | .072            | 1/4          | 1.500                                                                     | I    | 6      | 3/8            | 3-1/2          | 27505    | 107.80 | 27505-C3     | 117.90 |                      |       |
|                                                                    | 3/8                                                                       | .072            | 1/4          | 2.000                                                                     | I    | 6      | 3/8            | 3-1/2          | 925505   | 112.90 | 925505-C3    | 123.00 |                      |       |
|                                                                    | 1/2                                                                       | .109            | 5/16         | .500                                                                      | I    | 6      | 1/2            | 3              | 16210    | 117.90 | 16210-C3     | 133.00 |                      |       |
|                                                                    | 1/2                                                                       | .109            | 5/16         | .750                                                                      | I    | 6      | 1/2            | 3              | 773310   | 122.50 | 773310-C3    | 137.60 |                      |       |
|                                                                    | 1/2                                                                       | .109            | 5/16         | 1.000                                                                     | I    | 6      | 1/2            | 3              | 984410   | 128.40 | 984410-C3    | 143.50 |                      |       |
|                                                                    | 1/2                                                                       | .109            | 5/16         | 1.250                                                                     | I    | 6      | 1/2            | 3-1/2          | 762310   | 139.30 | 762310-C3    | 154.40 |                      |       |
|                                                                    | 1/2                                                                       | .109            | 5/16         | 1.500                                                                     | I    | 6      | 1/2            | 4              | 27510    | 150.20 | 27510-C3     | 165.30 |                      |       |
|                                                                    | 1/2                                                                       | .109            | 5/16         | 2.000                                                                     | I    | 6      | 1/2            | 4              | 925510   | 154.10 | 925510-C3    | 169.20 |                      |       |
|                                                                    | 1/2                                                                       | .109            | 5/16         | 2.625                                                                     | I    | 6      | 1/2            | 4              | 981010   | 158.10 | 981010-C3    | 173.20 |                      |       |
|                                                                    | 5/8                                                                       | .144            | 3/8          | .750                                                                      | I    | 6      | 5/8            | 3-1/2          | 16215    | 212.20 | 16215-C3     | 227.30 |                      |       |

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| INCL.<br>ANGLE | CUTTER<br>DIA.                                                     | CUTTER<br>WIDTH                                                         | NECK<br>DIA.   | NECK<br>LENGTH                                                          | TYPE  | FLUTES | SHANK<br>DIA.  | OAL            | UNCOATED |        | AITIN COATED |           | AITIN NANO<br>COATED |       |
|----------------|--------------------------------------------------------------------|-------------------------------------------------------------------------|----------------|-------------------------------------------------------------------------|-------|--------|----------------|----------------|----------|--------|--------------|-----------|----------------------|-------|
|                |                                                                    |                                                                         |                |                                                                         |       |        |                |                | TOOL #   | PRICE  | TOOL #       | PRICE     | TOOL #               | PRICE |
| 70°            | B $\begin{smallmatrix} +1^{\circ} \\ -1^{\circ} \end{smallmatrix}$ | D <sub>1</sub> $\begin{smallmatrix} +.000" \\ -.002" \end{smallmatrix}$ | L <sub>2</sub> | L <sub>3</sub> $\begin{smallmatrix} +.020" \\ -.000" \end{smallmatrix}$ |       |        | D <sub>2</sub> | L <sub>1</sub> |          |        |              |           |                      |       |
|                |                                                                    |                                                                         |                |                                                                         |       |        |                |                |          |        |              |           |                      |       |
| 70°            |                                                                    | 1/4                                                                     | .088           | 1/8                                                                     | .312  | I      | 4              | 1/4            | 2        | 871903 | 72.10        | 871903-C3 | 79.70                |       |
|                |                                                                    | 3/8                                                                     | .088           | 1/4                                                                     | 1.500 | I      | 6              | 3/8            | 3-1/2    | 791005 | 113.80       | 791005-C3 | 123.90               |       |
| 80°            |                                                                    | 1/4                                                                     | .105           | 1/8                                                                     | .312  | I      | 4              | 1/4            | 2        | 29740  | 72.10        | 29740-C3  | 79.70                |       |
|                |                                                                    | 3/8                                                                     | .105           | 1/4                                                                     | 1.500 | I      | 6              | 3/8            | 3-1/2    | 792005 | 116.00       | 792005-C3 | 126.10               |       |
| 82°            |                                                                    | 1/4                                                                     | .109           | 1/8                                                                     | .312  | I      | 4              | 1/4            | 2        | 29741  | 72.10        | 29741-C3  | 79.70                |       |
|                |                                                                    | 3/8                                                                     | .109           | 1/4                                                                     | 1.500 | I      | 6              | 3/8            | 3-1/2    | 920805 | 116.00       | 920805-C3 | 126.10               |       |
|                |                                                                    | 1/2                                                                     | .163           | 5/16                                                                    | 1.500 | I      | 6              | 1/2            | 4        | 920810 | 158.60       | 920810-C3 | 173.70               |       |
|                |                                                                    |                                                                         |                |                                                                         |       |        |                |                |          |        |              |           |                      |       |
| 90°            |                                                                    | 1/32                                                                    | .015           | .016                                                                    | .062  | I      | 2              | 1/8            | 1-1/2    | 807002 | 46.70        | 807002-C3 | 51.90                |       |
|                |                                                                    | 1/32                                                                    | .015           | .016                                                                    | .093  | I      | 2              | 1/8            | 1-1/2    | 45131  | 45.80        | 45131-C3  | 51.00                |       |
|                |                                                                    | 1/32                                                                    | .015           | .016                                                                    | .125  | I      | 2              | 1/8            | 1-1/2    | 71604  | 46.70        | 71604-C3  | 51.90                |       |
|                |                                                                    | 1/16                                                                    | .031           | 1/32                                                                    | .062  | I      | 2              | 1/8            | 1-1/2    | 946862 | 45.80        | 946862-C3 | 51.00                |       |
|                |                                                                    | 1/16                                                                    | .031           | 1/32                                                                    | .093  | I      | 2              | 1/8            | 1-1/2    | 19162  | 45.80        | 19162-C3  | 51.00                |       |
|                |                                                                    | 1/16                                                                    | .031           | 1/32                                                                    | .093  | I      | 4              | 1/8            | 1-1/2    | 838804 | 45.80        | 838804-C3 | 51.00                |       |
|                |                                                                    | 1/16                                                                    | .031           | 1/32                                                                    | .125  | I      | 2              | 1/8            | 1-1/2    | 807662 | 45.80        | 807662-C3 | 51.00                |       |
|                |                                                                    | 1/16                                                                    | .031           | 1/32                                                                    | .156  | I      | 2              | 1/8            | 1-1/2    | 45162  | 50.90        | 45162-C3  | 56.10                |       |
|                |                                                                    | 1/16                                                                    | .031           | 1/32                                                                    | .156  | I      | 4              | 1/8            | 1-1/2    | 832404 | 53.50        | 832404-C3 | 58.70                |       |
|                |                                                                    | 1/16                                                                    | .031           | 1/32                                                                    | .187  | I      | 2              | 1/8            | 1-1/2    | 822104 | 55.80        | 822104-C3 | 61.00                |       |
|                |                                                                    | 1/16                                                                    | .031           | 1/32                                                                    | .250  | I      | 2              | 1/8            | 1-1/2    | 71662  | 55.80        | 71662-C3  | 61.00                |       |
|                |                                                                    | 1/16                                                                    | .031           | 1/32                                                                    | .250  | I      | 4              | 1/8            | 1-1/2    | 792962 | 56.90        | 792962-C3 | 62.10                |       |
|                |                                                                    | 1/16                                                                    | .031           | 1/32                                                                    | .312  | I      | 2              | 1/8            | 1-1/2    | 857862 | 55.80        | 857862-C3 | 61.00                |       |
|                |                                                                    | 1/16                                                                    | .031           | 1/32                                                                    | .375  | I      | 2              | 1/8            | 1-1/2    | 963662 | 55.80        | 963662-C3 | 61.00                |       |
|                |                                                                    | 1/16                                                                    | .031           | 1/32                                                                    | .437  | I      | 2              | 1/8            | 1-1/2    | 855762 | 56.90        | 855762-C3 | 62.10                |       |
|                |                                                                    | 5/64                                                                    | .039           | .039                                                                    | .078  | I      | 2              | 1/8            | 1-1/2    | 946878 | 45.80        | 946878-C3 | 51.00                |       |
|                |                                                                    | 5/64                                                                    | .039           | .039                                                                    | .093  | I      | 2              | 1/8            | 1-1/2    | 807105 | 45.80        | 807105-C3 | 51.00                |       |
|                |                                                                    | 5/64                                                                    | .039           | .039                                                                    | .118  | I      | 2              | 1/8            | 1-1/2    | 19178  | 45.80        | 19178-C3  | 51.00                |       |
|                |                                                                    | 5/64                                                                    | .039           | .039                                                                    | .125  | I      | 2              | 1/8            | 1-1/2    | 807005 | 45.80        | 807005-C3 | 51.00                |       |
|                |                                                                    | 5/64                                                                    | .039           | .039                                                                    | .187  | I      | 2              | 1/8            | 1-1/2    | 45178  | 50.90        | 45178-C3  | 56.10                |       |
|                |                                                                    | 5/64                                                                    | .039           | .039                                                                    | .187  | I      | 4              | 1/8            | 1-1/2    | 832405 | 53.50        | 832405-C3 | 58.70                |       |
|                |                                                                    | 5/64                                                                    | .039           | .039                                                                    | .250  | I      | 2              | 1/8            | 1-1/2    | 822178 | 53.50        | 822178-C3 | 63.40                |       |
|                |                                                                    | 5/64                                                                    | .039           | .039                                                                    | .312  | I      | 2              | 1/8            | 1-1/2    | 71678  | 55.80        | 71678-C3  | 61.00                |       |
|                |                                                                    | 5/64                                                                    | .039           | .039                                                                    | .312  | I      | 4              | 1/8            | 1-1/2    | 792978 | 56.90        | 792978-C3 | 62.10                |       |
|                |                                                                    | 5/64                                                                    | .039           | .039                                                                    | .375  | I      | 2              | 1/8            | 1-1/2    | 771978 | 56.90        | 771978-C3 | 62.10                |       |
|                |                                                                    | 5/64                                                                    | .039           | .039                                                                    | .500  | I      | 2              | 1/8            | 1-1/2    | 963678 | 55.80        | 963678-C3 | 61.00                |       |
|                |                                                                    | 3/32                                                                    | .047           | 3/64                                                                    | .093  | I      | 2              | 1/8            | 1-1/2    | 946893 | 45.80        | 946893-C3 | 51.00                |       |
|                |                                                                    | 3/32                                                                    | .047           | 3/64                                                                    | .125  | I      | 2              | 1/8            | 1-1/2    | 807106 | 45.80        | 807106-C3 | 51.00                |       |
|                |                                                                    | 3/32                                                                    | .047           | 3/64                                                                    | .141  | I      | 2              | 1/8            | 1-1/2    | 19193  | 45.80        | 19193-C3  | 51.00                |       |
|                |                                                                    | 3/32                                                                    | .047           | 3/64                                                                    | .141  | I      | 4              | 1/8            | 1-1/2    | 838806 | 45.80        | 838806-C3 | 51.00                |       |
|                |                                                                    | 3/32                                                                    | .047           | 3/64                                                                    | .187  | I      | 2              | 1/8            | 1-1/2    | 807693 | 45.80        | 807693-C3 | 51.00                |       |
|                |                                                                    | 3/32                                                                    | .047           | 3/64                                                                    | .250  | I      | 2              | 1/8            | 1-1/2    | 45193  | 50.90        | 45193-C3  | 56.10                |       |
|                |                                                                    | 3/32                                                                    | .047           | 3/64                                                                    | .250  | I      | 4              | 1/8            | 1-1/2    | 832406 | 53.50        | 832406-C3 | 58.70                |       |
|                |                                                                    | 3/32                                                                    | .047           | 3/64                                                                    | .312  | I      | 2              | 1/8            | 1-1/2    | 807493 | 55.80        | 807493-C3 | 61.00                |       |
|                |                                                                    | 3/32                                                                    | .047           | 3/64                                                                    | .375  | I      | 2              | 1/8            | 1-1/2    | 71693  | 55.80        | 71693-C3  | 61.00                |       |
|                |                                                                    | 3/32                                                                    | .047           | 3/64                                                                    | .375  | I      | 4              | 1/8            | 1-1/2    | 792906 | 55.80        | 792906-C3 | 61.00                |       |
|                |                                                                    | 3/32                                                                    | .047           | 3/64                                                                    | .500  | I      | 2              | 1/8            | 1-1/2    | 857893 | 55.80        | 857893-C3 | 61.00                |       |
|                |                                                                    | 3/32                                                                    | .047           | 3/64                                                                    | .625  | I      | 2              | 1/8            | 2        | 963693 | 57.90        | 963693-C3 | 63.10                |       |
|                |                                                                    | 3/32                                                                    | .047           | 3/64                                                                    | .750  | I      | 2              | 1/8            | 2        | 855793 | 60.30        | 855793-C3 | 65.50                |       |
|                |                                                                    | 3 mm                                                                    | .059           | .059                                                                    | .187  | I      | 2              | 1/8            | 1-1/2    | 1913M  | 46.50        | 1913M-C3  | 51.70                |       |
|                |                                                                    | 3 mm                                                                    | .059           | .059                                                                    | .250  | I      | 2              | 1/8            | 1-1/2    | 80763M | 54.50        | 80763M-C3 | 59.70                |       |
|                |                                                                    | 3 mm                                                                    | .059           | .059                                                                    | .312  | I      | 2              | 1/8            | 1-1/2    | 4513M  | 53.50        | 4513M-C3  | 58.70                |       |
|                |                                                                    | 3 mm                                                                    | .059           | .059                                                                    | .438  | I      | 2              | 1/8            | 1-1/2    | 82213M | 61.30        | 82213M-C3 | 66.50                |       |

NEW

continued on next page



DOUBLE ANGLE SHANK CUTTERS

Pointed (cont.)

continued from previous page

| INCL. ANGLE                     | CUTTER DIA.                                          | CUTTER WIDTH   | NECK DIA. | NECK LENGTH                                          | TYPE | FLUTES | SHANK DIA.     | OAL            | UNCOATED |           | AITIN COATED |           | AITIN NANO COATED |        |
|---------------------------------|------------------------------------------------------|----------------|-----------|------------------------------------------------------|------|--------|----------------|----------------|----------|-----------|--------------|-----------|-------------------|--------|
| B <sup>+1°</sup> <sub>-1°</sub> | D <sub>1</sub> <sup>+ .000"</sup> <sub>- .002"</sub> | L <sub>2</sub> |           | L <sub>3</sub> <sup>+ .020"</sup> <sub>- .000"</sub> |      |        | D <sub>2</sub> | L <sub>1</sub> | TOOL #   | PRICE     | TOOL #       | PRICE     | TOOL #            | PRICE  |
| 90°                             | 1/4                                                  | .125           | 1/8       | .500                                                 | I    | 4      | 1/4            | 2              | 807316   | 59.20     | 807316-C3    | 66.80     |                   |        |
|                                 | 1/4                                                  | .125           | 1/8       | .625                                                 | I    | 4      | 1/4            | 2-1/2          | 72603    | 65.00     | 72603-C3     | 72.60     |                   |        |
|                                 | 1/4                                                  | .125           | 1/8       | .625                                                 | I    | 6      | 1/4            | 2-1/2          | 847416   | 68.30     | 847416-C3    | 75.90     |                   |        |
|                                 | 1/4                                                  | .125           | 1/8       | .750                                                 | I    | 4      | 1/4            | 2-1/2          | 807216   | 65.00     | 807216-C3    | 72.60     |                   |        |
|                                 | 1/4                                                  | .125           | 1/8       | 1.000                                                | I    | 4      | 1/4            | 3              | 19503    | 71.10     | 19503-C3     | 78.70     |                   |        |
|                                 | 1/4                                                  | .125           | 1/8       | 1.000                                                | I    | 6      | 1/4            | 3              | 822616   | 74.40     | 822616-C3    | 79.50     |                   |        |
|                                 | 1/4                                                  | .125           | 1/8       | 1.250                                                | I    | 4      | 1/4            | 3              | 822216   | 76.00     | 822216-C3    | 83.60     |                   |        |
|                                 | 1/4                                                  | .125           | 1/8       | 1.312                                                | I    | 4      | 1/4            | 3              | 71703    | 76.00     | 71703-C3     | 83.60     |                   |        |
|                                 | 1/4                                                  | .125           | 1/8       | 1.500                                                | I    | 4      | 1/4            | 3              | 821816   | 78.30     | 821816-C3    | 85.90     |                   |        |
|                                 | 1/4                                                  | .125           | 1/8       | 1.750                                                | I    | 4      | 1/4            | 3              | 26803    | 78.30     | 26803-C3     | 85.90     |                   |        |
|                                 | 1/4                                                  | .125           | 1/8       | 2.125                                                | I    | 4      | 1/4            | 4              | 963703   | 84.70     | 963703-C3    | 93.60     |                   |        |
|                                 | 5/16                                                 | .125           | 3/16      | .250                                                 | I    | 6      | 5/16           | 2-1/2          | 946904   | 79.20     | 946904-C3    | 88.10     |                   |        |
|                                 | 5/16                                                 | .125           | 3/16      | .375                                                 | I    | 6      | 5/16           | 2-1/2          | 19272    | 81.80     | 19272-C3     | 90.70     |                   |        |
|                                 | 5/16                                                 | .125           | 3/16      | .375                                                 | I    | 8      | 5/16           | 2-1/2          | 838820   | 90.50     | 838820-C3    | 99.40     |                   |        |
|                                 | 5/16                                                 | .125           | 3/16      | .625                                                 | I    | 6      | 5/16           | 2-1/2          | 833572   | 82.90     | 833572-C3    | 91.80     |                   |        |
|                                 | 5/16                                                 | .125           | 3/16      | .625                                                 | I    | 8      | 5/16           | 2-1/2          | 754920   | 89.60     | 754920-C3    | 98.50     |                   |        |
|                                 | 5/16                                                 | .125           | 3/16      | .875                                                 | I    | 6      | 5/16           | 2-1/2          | 72672    | 82.90     | 72672-C3     | 91.80     |                   |        |
|                                 | 5/16                                                 | .125           | 3/16      | .875                                                 | I    | 8      | 5/16           | 2-1/2          | 847420   | 91.30     | 847420-C3    | 100.20    |                   |        |
|                                 | 5/16                                                 | .125           | 3/16      | 1.000                                                | I    | 6      | 5/16           | 3              | 807220   | 88.80     | 807220-C3    | 97.70     |                   |        |
|                                 | 5/16                                                 | .125           | 3/16      | 1.250                                                | I    | 6      | 5/16           | 3              | 19572    | 88.80     | 19572-C3     | 97.70     |                   |        |
|                                 | 5/16                                                 | .125           | 3/16      | 1.250                                                | I    | 8      | 5/16           | 3              | 822620   | 93.00     | 822620-C3    | 101.90    |                   |        |
|                                 | 5/16                                                 | .125           | 3/16      | 1.500                                                | I    | 6      | 5/16           | 3              | 772873   | 90.30     | 772873-C3    | 99.20     |                   |        |
|                                 | 5/16                                                 | .125           | 3/16      | 1.625                                                | I    | 6      | 5/16           | 3              | 71772    | 92.20     | 71772-C3     | 101.10    |                   |        |
|                                 | 5/16                                                 | .125           | 3/16      | 2.125                                                | I    | 6      | 5/16           | 3              | 26872    | 95.50     | 26872-C3     | 104.40    |                   |        |
|                                 | 3/8                                                  | .125           | 1/4       | .312                                                 | I    | 6      | 3/8            | 2-1/2          | 946905   | 79.50     | 946905-C3    | 89.60     |                   |        |
|                                 | 3/8                                                  | .125           | 1/4       | .375                                                 | I    | 6      | 3/8            | 2-1/2          | 807124   | 82.10     | 807124-C3    | 92.20     |                   |        |
|                                 | 3/8                                                  | .125           | 1/4       | .500                                                 | I    | 6      | 3/8            | 2-1/2          | 19205    | 83.60     | 19205-C3     | 92.20     | 19205-C6          | 96.20  |
|                                 | 3/8                                                  | .250           | 1/8       | .500                                                 | II   | 6      | 3/8            | 2-1/2          | 759924   | 90.80     | 759924-C3    | 100.90    |                   |        |
|                                 | 3/8                                                  | .125           | 1/4       | .500                                                 | I    | 8      | 3/8            | 2-1/2          | 838824   | 87.80     | 838824-C3    | 97.90     | 838824-C6         | 100.40 |
|                                 | 3/8                                                  | .125           | 1/4       | .750                                                 | I    | 6      | 3/8            | 2-1/2          | 807324   | 88.40     | 807324-C3    | 98.50     |                   |        |
|                                 | 3/8                                                  | .125           | 1/4       | 1.000                                                | I    | 6      | 3/8            | 2-1/2          | 72605    | 93.00     | 72605-C3     | 103.10    |                   |        |
|                                 | 3/8                                                  | .125           | 1/4       | 1.000                                                | I    | 8      | 3/8            | 2-1/2          | 847424   | 102.70    | 847424-C3    | 112.80    |                   |        |
|                                 | 3/8                                                  | .125           | 1/4       | 1.250                                                | I    | 6      | 3/8            | 3              | 807224   | 104.00    | 807224-C3    | 114.10    |                   |        |
|                                 | 3/8                                                  | .125           | 1/4       | 1.500                                                | I    | 6      | 3/8            | 3-1/2          | 19505    | 105.20    | 19505-C3     | 115.30    |                   |        |
|                                 | 3/8                                                  | .125           | 1/4       | 1.500                                                | I    | 8      | 3/8            | 3-1/2          | 822624   | 109.40    | 822624-C3    | 114.40    |                   |        |
|                                 | 3/8                                                  | .125           | 1/4       | 1.750                                                | I    | 6      | 3/8            | 3-1/2          | 822224   | 110.30    | 822224-C3    | 120.40    |                   |        |
|                                 | 3/8                                                  | .125           | 1/4       | 2.000                                                | I    | 6      | 3/8            | 3-1/2          | 71705    | 110.30    | 71705-C3     | 120.40    |                   |        |
|                                 | 3/8                                                  | .125           | 1/4       | 2.312                                                | I    | 6      | 3/8            | 3-1/2          | 26805    | 113.20    | 26805-C3     | 123.30    |                   |        |
|                                 | 3/8                                                  | .125           | 1/4       | 2.625                                                | I    | 6      | 3/8            | 4              | 963705   | 119.90    | 963705-C3    | 133.70    |                   |        |
|                                 | .393                                                 | .133           | .260      | .500                                                 | I    | 6      | 7/16           | 2-3/4          | 19279    | 125.80    | 19279-C3     | 138.40    |                   |        |
| .393                            | .133                                                 | .260           | 1.500     | I                                                    | 6    | 7/16   | 3-1/2          | 19579          | 145.70   | 19579-C3  | 160.80       |           |                   |        |
| 7/16                            | .157                                                 | 9/32           | .500      | I                                                    | 6    | 7/16   | 2-3/4          | 19208          | 123.40   | 19208-C3  | 136.00       |           |                   |        |
| 7/16                            | .157                                                 | 9/32           | 1.500     | I                                                    | 6    | 7/16   | 3-1/2          | 19508          | 143.00   | 19508-C3  | 158.10       |           |                   |        |
| 1/2                             | .187                                                 | 5/16           | .312      | I                                                    | 6    | 1/2    | 3              | 946910         | 108.20   | 946910-C3 | 123.30       |           |                   |        |
| 1/2                             | .187                                                 | 5/16           | .500      | I                                                    | 6    | 1/2    | 3              | 19210          | 111.80   | 19210-C3  | 126.90       | 19210-C6  | 128.10            |        |
| 1/2                             | .187                                                 | 5/16           | .500      | I                                                    | 8    | 1/2    | 3              | 838832         | 117.30   | 838832-C3 | 132.40       | 838832-C6 | 133.60            |        |
| 1/2                             | .187                                                 | 5/16           | .750      | I                                                    | 6    | 1/2    | 3              | 807332         | 114.90   | 807332-C3 | 130.00       |           |                   |        |
| 1/2                             | .187                                                 | 5/16           | 1.000     | I                                                    | 6    | 1/2    | 3              | 72610          | 121.80   | 72610-C3  | 136.90       |           |                   |        |
| 1/2                             | .187                                                 | 5/16           | 1.000     | I                                                    | 8    | 1/2    | 3              | 847432         | 123.80   | 847432-C3 | 138.90       |           |                   |        |
| 1/2                             | .187                                                 | 5/16           | 1.250     | I                                                    | 6    | 1/2    | 3-1/2          | 822432         | 124.90   | 822432-C3 | 133.50       |           |                   |        |

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DOUBLE ANGLE SHANK CUTTERS

DOUBLE ANGLE SHANK CUTTERS

Pointed (cont.)

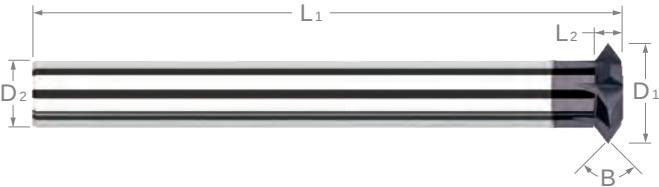
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| INCL. ANGLE                     | CUTTER DIA.                                         | CUTTER WIDTH   | NECK DIA. | NECK LENGTH                                         | TYPE | FLUTES | SHANK DIA.     | OAL            | UNCOATED |        | AITIN COATED |        | AITIN NANO COATED |       |
|---------------------------------|-----------------------------------------------------|----------------|-----------|-----------------------------------------------------|------|--------|----------------|----------------|----------|--------|--------------|--------|-------------------|-------|
| B <sup>+1°</sup> <sub>-1°</sub> | D <sub>1</sub> <sup>+0.000"</sup> <sub>-.002"</sub> | L <sub>2</sub> |           | L <sub>3</sub> <sup>+0.020"</sup> <sub>±.000"</sub> |      |        | D <sub>2</sub> | L <sub>1</sub> | TOOL #   | PRICE  | TOOL #       | PRICE  | TOOL #            | PRICE |
| 90°                             | 1/2                                                 | .187           | 5/16      | 1.500                                               | I    | 6      | 1/2            | 4              | 19510    | 143.00 | 19510-C3     | 158.10 |                   |       |
|                                 | 1/2                                                 | .187           | 5/16      | 1.500                                               | I    | 8      | 1/2            | 4              | 807932   | 148.60 | 807932-C3    | 163.70 |                   |       |
|                                 | 1/2                                                 | .187           | 5/16      | 1.750                                               | I    | 6      | 1/2            | 4              | 822232   | 145.70 | 822232-C3    | 160.80 |                   |       |
|                                 | 1/2                                                 | .187           | 5/16      | 2.000                                               | I    | 6      | 1/2            | 4              | 71710    | 148.00 | 71710-C3     | 163.10 |                   |       |
|                                 | 1/2                                                 | .187           | 5/16      | 2.312                                               | I    | 6      | 1/2            | 4              | 821810   | 149.30 | 821810-C3    | 164.40 |                   |       |
|                                 | 1/2                                                 | .187           | 5/16      | 2.625                                               | I    | 6      | 1/2            | 4              | 26810    | 152.00 | 26810-C3     | 167.10 |                   |       |
|                                 | 1/2                                                 | .187           | 5/16      | 3.125                                               | I    | 6      | 1/2            | 6              | 963710   | 159.00 | 963710-C3    | 174.10 |                   |       |
|                                 | 1/2                                                 | .333           | .167      | .500                                                | II   | 6      | 1/2            | 3              | 759932   | 115.20 | 759932-C3    | 130.30 |                   |       |
|                                 | 5/8                                                 | .250           | 3/8       | .750                                                | I    | 6      | 5/8            | 3-1/2          | 19215    | 212.70 | 19215-C3     | 227.80 |                   |       |
|                                 | 5/8                                                 | .250           | 3/8       | 1.250                                               | I    | 6      | 5/8            | 3-1/2          | 72615    | 218.60 | 72615-C3     | 233.70 |                   |       |
| 100°                            | 1/8                                                 | .075           | 1/16      | .187                                                | I    | 4      | 1/8            | 1-1/2          | 983401   | 50.50  | 983401-C3    | 55.70  |                   |       |
|                                 | 1/8                                                 | .075           | 1/16      | .500                                                | I    | 4      | 1/8            | 1-1/2          | 969901   | 60.80  | 969901-C3    | 66.00  |                   |       |
|                                 | 3/16                                                | .113           | 3/32      | .312                                                | I    | 4      | 3/16           | 2              | 983402   | 52.10  | 983402-C3    | 57.70  |                   |       |
|                                 | 3/16                                                | .113           | 3/32      | .750                                                | I    | 4      | 3/16           | 2-1/2          | 969902   | 63.20  | 969902-C3    | 68.80  |                   |       |
|                                 | 1/4                                                 | .149           | 1/8       | .312                                                | I    | 4      | 1/4            | 2              | 29750    | 72.60  | 29750-C3     | 80.20  |                   |       |
|                                 | 1/4                                                 | .149           | 1/8       | 1.000                                               | I    | 4      | 1/4            | 3              | 969903   | 84.80  | 969903-C3    | 92.40  |                   |       |
|                                 | 3/8                                                 | .149           | 1/4       | .500                                                | I    | 6      | 3/8            | 2-1/2          | 983405   | 85.80  | 983405-C3    | 95.90  |                   |       |
|                                 | 3/8                                                 | .149           | 1/4       | 1.500                                               | I    | 6      | 3/8            | 3-1/2          | 969905   | 110.80 | 969905-C3    | 120.90 |                   |       |
|                                 | 1/2                                                 | .224           | 5/16      | .500                                                | I    | 6      | 1/2            | 3              | 983410   | 114.10 | 983410-C3    | 129.20 |                   |       |
|                                 | 1/2                                                 | .224           | 5/16      | 1.500                                               | I    | 6      | 1/2            | 4              | 969910   | 147.70 | 969910-C3    | 162.80 |                   |       |
| 110°                            | 1/4                                                 | .179           | 1/8       | .312                                                | I    | 4      | 1/4            | 2              | 830503   | 76.10  | 830503-C3    | 83.70  |                   |       |
| 120°                            | 1/8                                                 | .109           | 1/16      | .125                                                | I    | 4      | 1/8            | 1-1/2          | 903608   | 47.00  | 903608-C3    | 52.20  |                   |       |
|                                 | 1/8                                                 | .109           | 1/16      | .187                                                | I    | 4      | 1/8            | 1-1/2          | 39108    | 47.00  | 39108-C3     | 52.20  |                   |       |
|                                 | 1/8                                                 | .109           | 1/16      | .500                                                | I    | 4      | 1/8            | 2              | 989401   | 55.80  | 989401-C3    | 61.00  |                   |       |
|                                 | 3/16                                                | .163           | 3/32      | .187                                                | I    | 4      | 3/16           | 2              | 903612   | 50.50  | 903612-C3    | 56.10  |                   |       |
|                                 | 3/16                                                | .163           | 3/32      | .312                                                | I    | 4      | 3/16           | 2              | 39112    | 51.20  | 39112-C3     | 56.80  |                   |       |
|                                 | 3/16                                                | .163           | 3/32      | .750                                                | I    | 4      | 3/16           | 2-1/2          | 989402   | 60.10  | 989402-C3    | 65.70  |                   |       |
|                                 | 1/4                                                 | .216           | 1/8       | .187                                                | I    | 4      | 1/4            | 2              | 903616   | 66.70  | 903616-C3    | 74.30  |                   |       |
|                                 | 1/4                                                 | .216           | 1/8       | .312                                                | I    | 4      | 1/4            | 2              | 39116    | 67.40  | 39116-C3     | 75.00  |                   |       |
|                                 | 1/4                                                 | .216           | 1/8       | .625                                                | I    | 4      | 1/4            | 2-1/2          | 910716   | 65.00  | 910716-C3    | 72.60  |                   |       |
|                                 | 1/4                                                 | .216           | 1/8       | 1.000                                               | I    | 4      | 1/4            | 3              | 989403   | 76.60  | 989403-C3    | 84.20  |                   |       |
|                                 | 3/8                                                 | .216           | 1/4       | .500                                                | I    | 6      | 3/8            | 2-1/2          | 39124    | 88.20  | 39124-C3     | 98.30  |                   |       |
|                                 | 3/8                                                 | .216           | 1/4       | 1.000                                               | I    | 6      | 3/8            | 2-1/2          | 910724   | 97.80  | 910724-C3    | 107.90 |                   |       |
|                                 | 3/8                                                 | .216           | 1/4       | 1.500                                               | I    | 6      | 3/8            | 3-1/2          | 989405   | 110.30 | 989405-C3    | 120.40 |                   |       |
|                                 | 1/2                                                 | .325           | 5/16      | .500                                                | I    | 6      | 1/2            | 3              | 39132    | 117.30 | 39132-C3     | 132.40 |                   |       |
|                                 | 1/2                                                 | .325           | 5/16      | 1.000                                               | I    | 6      | 1/2            | 3              | 910732   | 127.40 | 910732-C3    | 142.50 |                   |       |
|                                 | 1/2                                                 | .325           | 5/16      | 1.500                                               | I    | 6      | 1/2            | 4              | 989410   | 149.70 | 989410-C3    | 164.80 |                   |       |
| 150°                            | 1/4                                                 | .467           | 1/8       | .312                                                | I    | 4      | 1/4            | 2              | 826003   | 76.10  | 826003-C3    | 83.70  |                   |       |
|                                 | 3/8                                                 | .467           | 1/4       | .500                                                | I    | 6      | 3/8            | 2-1/2          | 826005   | 98.80  | 826005-C3    | 108.90 |                   |       |

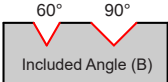
DOUBLE ANGLE SHANK CUTTERS

DOUBLE ANGLE SHANK CUTTERS

Pointed - Reduced Shank



- Ideal for back chamfering, chamfering, deburring, and milling a "V-groove"
- Reduced straight shank allows any chucking depth
- Tip of included angle ground to a point
- 60° angle can also be used for thread milling
- Solid carbide head brazed onto steel shank
- CNC ground in the USA



Stocked in **Two** Included Angles!

| INCL.<br>ANGLE                                                 | CUTTER<br>DIAMETER                                            | CUTTER<br>WIDTH | FLUTES | SHANK<br>DIAMETER | OVERALL<br>LENGTH | UNCOATED |        | A1TiN COATED |        |
|----------------------------------------------------------------|---------------------------------------------------------------|-----------------|--------|-------------------|-------------------|----------|--------|--------------|--------|
|                                                                |                                                               |                 |        |                   |                   | TOOL #   | PRICE  | TOOL #       | PRICE  |
| B $\begin{smallmatrix} +1^\circ \\ -1^\circ \end{smallmatrix}$ | D1 $\begin{smallmatrix} +.000'' \\ -.002'' \end{smallmatrix}$ | L2              |        | D2                | L1                |          |        |              |        |
| 60°                                                            | 1/4                                                           | .072            | 6      | 1/8               | 2.572             | 866403   | 95.30  | 866403-C3    | 102.50 |
|                                                                | 3/8                                                           | .108            | 8      | 3/16              | 3.108             | 866405   | 133.80 | 866405-C3    | 143.30 |
|                                                                | 1/2                                                           | .144            | 8      | 1/4               | 3.144             | 866410   | 150.80 | 866410-C3    | 165.90 |
|                                                                | 3/4                                                           | .144            | 8      | 1/2               | 3.644             | 16220    | 159.20 | 16220-C3     | 175.50 |
|                                                                | 3/4                                                           | .144            | 8      | 1/2               | 6.144             | 27520    | 166.70 | 27520-C3     | 190.30 |
|                                                                | 1                                                             | .217            | 8      | 5/8               | 4.217             | 16230    | 175.20 | 16230-C3     | 200.00 |
| 90°                                                            | 1/4                                                           | .125            | 6      | 1/8               | 2.625             | 875503   | 95.30  | 875503-C3    | 102.90 |
|                                                                | 1/4                                                           | .125            | 6      | 1/8               | 4.125             | 777903   | 96.40  | 777903-C3    | 104.40 |
|                                                                | 5/16                                                          | .155            | 8      | 4 mm              | 3.155             | 877572   | 115.50 | 877572-C3    | 124.40 |
|                                                                | 3/8                                                           | .188            | 8      | 3/16              | 3.188             | 875505   | 133.80 | 875505-C3    | 150.10 |
|                                                                | 7/16                                                          | .201            | 8      | 15/64             | 3.201             | 877508   | 142.30 | 877508-C3    | 157.40 |
|                                                                | 1/2                                                           | .250            | 8      | 1/4               | 3.250             | 875510   | 150.80 | 875510-C3    | 165.90 |
|                                                                | 1/2                                                           | .250            | 8      | 1/4               | 6.250             | 777910   | 158.00 | 777910-C3    | 186.90 |
|                                                                | 5/8                                                           | .313            | 8      | 5/16              | 3.313             | 875515   | 153.00 | 875515-C3    | 169.30 |
|                                                                | 3/4                                                           | .250            | 8      | 1/2               | 3.750             | 19220    | 158.70 | 19220-C3     | 175.00 |
|                                                                | 3/4                                                           | .250            | 8      | 1/2               | 6.250             | 19520    | 166.00 | 19520-C3     | 189.60 |
|                                                                | 1                                                             | .375            | 8      | 5/8               | 4.375             | 19230    | 175.50 | 19230-C3     | 200.30 |
|                                                                | 1-1/4                                                         | .500            | 8      | 3/4               | 4.500             | 875520   | 217.10 | 875520-C3    | 248.80 |

DOUBLE ANGLE SHANK CUTTERS

NEW  
NEW  
NEW

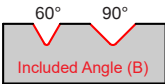
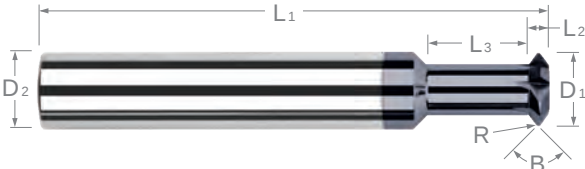


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DOUBLE ANGLE SHANK CUTTERS

Tip Radius



- Ideal for back chamfering, chamfering, deburring, and milling a "V-groove"
- Radius on tip for improved strength and wear resistance
- Reduced neck for long reach machining
- Solid carbide
- CNC ground in the USA

Stocked in **Two** Included Angles!

| INCL.<br>ANGLE | CUTTER<br>DIA.                           | RADIUS                                  | CUTTER<br>WIDTH | NECK<br>DIAMETER | NECK<br>LENGTH                           | FLUTES | SHANK<br>DIA. | OAL   | UNCOATED |        | AISI IN COATED |        |
|----------------|------------------------------------------|-----------------------------------------|-----------------|------------------|------------------------------------------|--------|---------------|-------|----------|--------|----------------|--------|
|                |                                          |                                         |                 |                  |                                          |        |               |       | TOOL #   | PRICE  | TOOL #         | PRICE  |
| 60°            | D1 <sup>+ .000"</sup> <sub>- .002"</sub> | R <sup>+ .001"</sup> <sub>- .001"</sub> | L2              |                  | L3 <sup>+ .020"</sup> <sub>- .000"</sub> |        | D2            | L1    |          |        |                |        |
|                | 1/8                                      | .005                                    | .042            | 1/16             | .187                                     | 4      | 1/8           | 1-1/2 | 922508   | 59.30  | 922508-C3      | 64.50  |
|                | 3/16                                     | .005                                    | .060            | 3/32             | .312                                     | 4      | 3/16          | 2     | 922512   | 62.50  | 922512-C3      | 68.10  |
|                | 1/4                                      | .005                                    | .078            | 1/8              | .312                                     | 4      | 1/4           | 2     | 922516   | 80.00  | 922516-C3      | 87.60  |
|                | 1/4                                      | .010                                    | .084            | 1/8              | .312                                     | 4      | 1/4           | 2     | 934716   | 80.00  | 934716-C3      | 87.60  |
|                | 1/4                                      | .010                                    | .084            | 1/8              | 1.000                                    | 4      | 1/4           | 3     | 930516   | 89.80  | 930516-C3      | 97.40  |
|                | 3/8                                      | .010                                    | .084            | 1/4              | .500                                     | 6      | 3/8           | 2-1/2 | 934724   | 107.40 | 934724-C3      | 117.50 |
|                | 3/8                                      | .015                                    | .089            | 1/4              | .500                                     | 6      | 3/8           | 2-1/2 | 911224   | 107.40 | 911224-C3      | 117.50 |
| 90°            | 1/2                                      | .010                                    | .120            | 5/16             | .500                                     | 6      | 1/2           | 3     | 934732   | 133.30 | 934732-C3      | 148.40 |
|                | 1/2                                      | .015                                    | .126            | 5/16             | .500                                     | 6      | 1/2           | 3     | 911232   | 133.30 | 911232-C3      | 148.40 |
|                | 1/16                                     | .005                                    | .035            | 1/32             | .093                                     | 2      | 1/8           | 1-1/2 | 45804    | 61.10  | 45804-C3       | 66.30  |
|                | 5/64                                     | .005                                    | .043            | .039             | .118                                     | 2      | 1/8           | 1-1/2 | 45805    | 61.10  | 45805-C3       | 66.30  |
|                | 3/32                                     | .005                                    | .050            | 3/64             | .141                                     | 2      | 1/8           | 1-1/2 | 45806    | 61.10  | 45806-C3       | 66.30  |
|                | 1/8                                      | .005                                    | .067            | 1/16             | .187                                     | 4      | 1/8           | 1-1/2 | 45808    | 61.10  | 45808-C3       | 66.30  |
|                | 1/8                                      | .005                                    | .067            | 1/16             | .312                                     | 4      | 1/8           | 1-1/2 | 898408   | 68.70  | 898408-C3      | 73.90  |
|                | 1/8                                      | .005                                    | .067            | 1/16             | .500                                     | 4      | 1/8           | 1-1/2 | 928708   | 75.30  | 928708-C3      | 80.50  |
|                | 1/8                                      | .010                                    | .071            | 1/16             | .187                                     | 4      | 1/8           | 1-1/2 | 46608    | 61.60  | 46608-C3       | 66.80  |
|                | 5/32                                     | .005                                    | .082            | 5/64             | .250                                     | 4      | 3/16          | 2     | 45810    | 64.30  | 45810-C3       | 69.90  |
|                | 5/32                                     | .005                                    | .082            | 5/64             | .625                                     | 4      | 3/16          | 2-1/2 | 928710   | 72.00  | 928710-C3      | 77.60  |
|                | 3/16                                     | .005                                    | .099            | 3/32             | .187                                     | 4      | 3/16          | 2     | 755212   | 64.90  | 755212-C3      | 70.50  |
|                | 3/16                                     | .005                                    | .099            | 3/32             | .312                                     | 4      | 3/16          | 2     | 45812    | 64.30  | 45812-C3       | 69.90  |
|                | 3/16                                     | .005                                    | .099            | 3/32             | .500                                     | 4      | 3/16          | 2     | 898412   | 68.20  | 898412-C3      | 73.80  |
|                | 3/16                                     | .005                                    | .099            | 3/32             | .750                                     | 4      | 3/16          | 2-1/2 | 928712   | 72.00  | 928712-C3      | 77.60  |
|                | 3/16                                     | .010                                    | .103            | 3/32             | .312                                     | 4      | 3/16          | 2     | 46612    | 64.30  | 46612-C3       | 69.90  |
|                | 1/4                                      | .005                                    | .129            | 1/8              | .312                                     | 4      | 1/4           | 2     | 45816    | 74.10  | 45816-C3       | 81.70  |
|                | 1/4                                      | .005                                    | .129            | 1/8              | .625                                     | 4      | 1/4           | 2-1/2 | 898416   | 79.40  | 898416-C3      | 87.00  |
|                | 1/4                                      | .005                                    | .129            | 1/8              | 1.000                                    | 4      | 1/4           | 3     | 928716   | 86.50  | 928716-C3      | 94.10  |
|                | 1/4                                      | .010                                    | .133            | 1/8              | .312                                     | 4      | 1/4           | 2     | 46616    | 74.10  | 46616-C3       | 81.70  |
|                | 1/4                                      | .010                                    | .133            | 1/8              | .625                                     | 4      | 1/4           | 2-1/2 | 890716   | 79.40  | 890716-C3      | 87.00  |
|                | 1/4                                      | .010                                    | .133            | 1/8              | 1.000                                    | 4      | 1/4           | 3     | 931916   | 86.50  | 931916-C3      | 94.10  |
|                | 1/4                                      | .015                                    | .137            | 1/8              | .312                                     | 4      | 1/4           | 2     | 988616   | 74.80  | 988616-C3      | 82.40  |
|                | 1/4                                      | .020                                    | .142            | 1/8              | .312                                     | 4      | 1/4           | 2     | 831016   | 74.10  | 831016-C3      | 81.70  |
|                | 5/16                                     | .005                                    | .130            | 3/16             | 1.250                                    | 6      | 5/16          | 3     | 928720   | 91.60  | 928720-C3      | 100.50 |
|                | 5/16                                     | .010                                    | .134            | 3/16             | .375                                     | 6      | 5/16          | 2-1/2 | 46620    | 93.20  | 46620-C3       | 102.10 |
|                | 5/16                                     | .010                                    | .134            | 3/16             | .875                                     | 6      | 5/16          | 2-1/2 | 890720   | 94.50  | 890720-C3      | 103.40 |
|                | 5/16                                     | .010                                    | .134            | 3/16             | 1.250                                    | 6      | 5/16          | 3     | 931920   | 94.10  | 931920-C3      | 103.00 |

continued on next page

DOUBLE ANGLE SHANK CUTTERS

DOUBLE ANGLE SHANK CUTTERS

Tip Radius (cont.)

continued from previous page

| INCL.<br>ANGLE                    | CUTTER<br>DIA.                                         | RADIUS                                    | CUTTER<br>WIDTH | NECK<br>DIAMETER | NECK<br>LENGTH                                         | FLUTES | SHANK<br>DIA.  | OAL            | UNCOATED |        | AlTiN COATED |        |
|-----------------------------------|--------------------------------------------------------|-------------------------------------------|-----------------|------------------|--------------------------------------------------------|--------|----------------|----------------|----------|--------|--------------|--------|
|                                   |                                                        |                                           |                 |                  |                                                        |        |                |                | TOOL #   | PRICE  | TOOL #       | PRICE  |
| B <sup>+1°</sup> / <sub>-1°</sub> | D <sub>1</sub> <sup>+0.000"</sup> / <sub>-0.002"</sub> | R <sup>+0.001"</sup> / <sub>-0.001"</sub> | L <sub>2</sub>  |                  | L <sub>3</sub> <sup>+0.020"</sup> / <sub>-0.000"</sub> |        | D <sub>2</sub> | L <sub>1</sub> |          |        |              |        |
| 90°                               | 3/8                                                    | .010                                      | .133            | 1/4              | .500                                                   | 6      | 3/8            | 2-1/2          | 46624    | 100.30 | 46624-C3     | 110.40 |
|                                   | 3/8                                                    | .010                                      | .133            | 1/4              | 1.000                                                  | 6      | 3/8            | 2-1/2          | 890724   | 102.00 | 890724-C3    | 112.10 |
|                                   | 3/8                                                    | .010                                      | .133            | 1/4              | 1.500                                                  | 6      | 3/8            | 3-1/2          | 931924   | 121.00 | 931924-C3    | 131.10 |
|                                   | 3/8                                                    | .015                                      | .137            | 1/4              | .500                                                   | 6      | 3/8            | 2-1/2          | 988624   | 99.40  | 988624-C3    | 109.50 |
|                                   | 3/8                                                    | .015                                      | .137            | 1/4              | 1.000                                                  | 6      | 3/8            | 2-1/2          | 894124   | 102.00 | 894124-C3    | 112.10 |
|                                   | 3/8                                                    | .015                                      | .137            | 1/4              | 1.500                                                  | 6      | 3/8            | 3-1/2          | 923524   | 121.00 | 923524-C3    | 131.10 |
|                                   | 3/8                                                    | .020                                      | .142            | 1/4              | .500                                                   | 6      | 3/8            | 2-1/2          | 831024   | 99.40  | 831024-C3    | 109.50 |
|                                   | 1/2                                                    | .010                                      | .196            | 5/16             | .500                                                   | 6      | 1/2            | 3              | 46632    | 128.70 | 46632-C3     | 143.80 |
|                                   | 1/2                                                    | .010                                      | .196            | 5/16             | 1.000                                                  | 6      | 1/2            | 3              | 890732   | 131.20 | 890732-C3    | 146.30 |
|                                   | 1/2                                                    | .010                                      | .196            | 5/16             | 1.500                                                  | 6      | 1/2            | 4              | 931932   | 158.20 | 931932-C3    | 173.30 |
|                                   | 1/2                                                    | .015                                      | .200            | 5/16             | .500                                                   | 6      | 1/2            | 3              | 988632   | 128.70 | 988632-C3    | 143.80 |
|                                   | 1/2                                                    | .015                                      | .200            | 5/16             | 1.000                                                  | 6      | 1/2            | 3              | 894132   | 131.20 | 894132-C3    | 146.30 |
|                                   | 1/2                                                    | .015                                      | .200            | 5/16             | 1.500                                                  | 6      | 1/2            | 4              | 923532   | 158.20 | 923532-C3    | 173.30 |

DOUBLE ANGLE SHANK CUTTERS

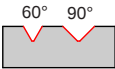
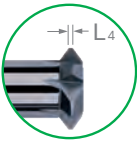
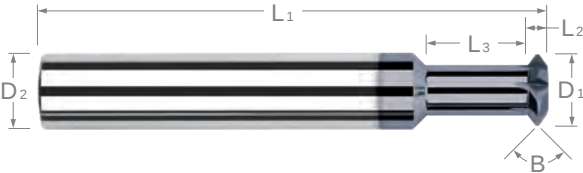


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DOUBLE ANGLE SHANK CUTTERS

Tip Flat



- Ideal for back chamfering, chamfering, deburring, and milling a “V-groove”
- Flat on tip for improved strength and wear resistance
- Reduced neck for long reach machining
- Solid carbide
- CNC ground in the USA

Included Angle (B)

Stocked in **Two** Included Angles!

| INCL. ANGLE                     | CUTTER DIA.                                         | TIP FLAT                                            | CUTTER WIDTH   | NECK DIAMETER | NECK LENGTH                                         | FLUTES | SHANK DIA.     | OAL            | UNCOATED |        | AITiN COATED |        |
|---------------------------------|-----------------------------------------------------|-----------------------------------------------------|----------------|---------------|-----------------------------------------------------|--------|----------------|----------------|----------|--------|--------------|--------|
| B <sup>+1°</sup> <sub>-1°</sub> | D <sub>1</sub> <sup>+0.000"</sup> <sub>-.002"</sub> | L <sub>4</sub> <sup>+0.001"</sup> <sub>-.001"</sub> | L <sub>2</sub> |               | L <sub>3</sub> <sup>+0.020"</sup> <sub>-.000"</sub> |        | D <sub>2</sub> | L <sub>1</sub> | TOOL #   | PRICE  | TOOL #       | PRICE  |
| 60°                             | 1/8                                                 | .010                                                | .046           | 1/16          | .187                                                | 4      | 1/8            | 1-1/2          | 778008   | 49.10  | 778008-C3    | 54.30  |
|                                 | 3/16                                                | .010                                                | .065           | 3/32          | .312                                                | 4      | 3/16           | 2              | 778012   | 52.20  | 778012-C3    | 57.80  |
|                                 | 1/4                                                 | .010                                                | .082           | 1/8           | .312                                                | 4      | 1/4            | 2              | 778016   | 69.80  | 778016-C3    | 77.40  |
|                                 | 3/8                                                 | .010                                                | .082           | 1/4           | .500                                                | 6      | 3/8            | 2-1/2          | 778024   | 89.10  | 778024-C3    | 99.20  |
|                                 | 1/2                                                 | .010                                                | .119           | 5/16          | .500                                                | 6      | 1/2            | 3              | 778032   | 122.00 | 778032-C3    | 137.10 |
| 90°                             | 1/8                                                 | .010                                                | .073           | 1/16          | .187                                                | 4      | 1/8            | 1-1/2          | 776608   | 47.30  | 776608-C3    | 52.50  |
|                                 | 1/8                                                 | .010                                                | .073           | 1/16          | .500                                                | 4      | 1/8            | 1-1/2          | 775108   | 61.50  | 775108-C3    | 66.70  |
|                                 | 3/16                                                | .010                                                | .105           | 3/32          | .312                                                | 4      | 3/16           | 2              | 776612   | 49.40  | 776612-C3    | 55.00  |
|                                 | 3/16                                                | .010                                                | .105           | 3/32          | .750                                                | 4      | 3/16           | 2-1/2          | 775112   | 62.40  | 775112-C3    | 68.00  |
|                                 | 1/4                                                 | .010                                                | .135           | 1/8           | .312                                                | 4      | 1/4            | 2              | 776616   | 60.50  | 776616-C3    | 68.10  |
|                                 | 1/4                                                 | .010                                                | .135           | 1/8           | 1.000                                               | 4      | 1/4            | 3              | 775116   | 73.60  | 775116-C3    | 81.20  |
|                                 | 3/8                                                 | .010                                                | .135           | 1/4           | .500                                                | 6      | 3/8            | 2-1/2          | 776624   | 86.50  | 776624-C3    | 96.60  |
|                                 | 3/8                                                 | .010                                                | .135           | 1/4           | 1.500                                               | 6      | 3/8            | 3-1/2          | 775124   | 108.80 | 775124-C3    | 118.90 |
|                                 | 1/2                                                 | .010                                                | .198           | 5/16          | .500                                                | 6      | 1/2            | 3              | 776632   | 115.70 | 776632-C3    | 130.80 |
|                                 | 1/2                                                 | .010                                                | .198           | 5/16          | 1.500                                               | 6      | 1/2            | 4              | 775132   | 148.00 | 775132-C3    | 163.10 |

DOUBLE ANGLE SHANK CUTTERS

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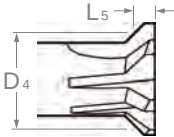
Customizable Running Parameters  
For Optimized Machining



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BACK DEBURRING MILLS



- Ideal for deburring on backside of small holes and tight pockets
- Slightly undersized to fit in common hole sizes
- 90° included angle, cutting on angle only
- Design has smaller radial projection than double angle shank cutters and back chamfer cutters, which results in increased neck diameter and improved strength
- Left hand shear flute / right hand cut evacuates chip away from part
- Multiple flutes for improved finish
- Solid carbide • CNC ground in the USA

Reach Through  
Miniature Holes and  
Slots to Remove Burr  
on Backside of Part



| HEAD DIA.                                            | AXIAL LOC      | NECK DIA.      | NECK LENGTH                                          | CHAMFER CENTER LENGTH                                  | CHAMFER CENTER DIAMETER | FLUTES | SHANK DIA.     | OAL            | UNCOATED |       | AItin COATED |       |
|------------------------------------------------------|----------------|----------------|------------------------------------------------------|--------------------------------------------------------|-------------------------|--------|----------------|----------------|----------|-------|--------------|-------|
| D <sub>1</sub> <sup>+0.000"</sup> <sub>-0.001"</sub> | L <sub>2</sub> | D <sub>3</sub> | L <sub>3</sub> <sup>+0.010"</sup> <sub>-0.000"</sub> | L <sub>5</sub> <sup>+0.0005"</sup> <sub>-0.0005"</sub> | D <sub>4</sub> (Max.)   |        | D <sub>2</sub> | L <sub>1</sub> | TOOL #   | PRICE | TOOL #       | PRICE |
| .028                                                 | .0029          | .021           | .093                                                 | .0215                                                  | .0261                   | 3      | 1/8            | 2              | 846328   | 68.70 | 846328-C3    | 73.90 |
| .028                                                 | .0029          | .021           | .125                                                 | .0215                                                  | .0261                   | 3      | 1/8            | 2              | 65728    | 68.70 | 65728-C3     | 73.90 |
| .028                                                 | .0029          | .021           | .250                                                 | .0215                                                  | .0261                   | 3      | 1/8            | 2              | 57028    | 68.70 | 57028-C3     | 73.90 |
| .040                                                 | .0048          | .028           | .125                                                 | .0324                                                  | .0362                   | 4      | 1/8            | 2              | 846340   | 63.90 | 846340-C3    | 69.10 |
| .040                                                 | .0048          | .028           | .187                                                 | .0324                                                  | .0362                   | 4      | 1/8            | 2              | 65740    | 63.90 | 65740-C3     | 69.10 |
| .040                                                 | .0048          | .028           | .312                                                 | .0324                                                  | .0362                   | 4      | 1/8            | 2              | 57040    | 63.90 | 57040-C3     | 69.10 |
| .055                                                 | .0045          | .043           | .187                                                 | .0423                                                  | .0515                   | 4      | 1/8            | 2              | 846355   | 63.90 | 846355-C3    | 69.10 |
| .055                                                 | .0045          | .043           | .281                                                 | .0423                                                  | .0515                   | 4      | 1/8            | 2              | 65755    | 63.90 | 65755-C3     | 69.10 |
| .055                                                 | .0045          | .043           | .437                                                 | .0423                                                  | .0515                   | 4      | 1/8            | 2              | 57055    | 63.90 | 57055-C3     | 69.10 |
| .080                                                 | .0077          | .060           | .250                                                 | .0638                                                  | .0733                   | 5      | 1/8            | 2              | 846380   | 57.80 | 846380-C3    | 63.00 |
| .080                                                 | .0077          | .060           | .375                                                 | .0638                                                  | .0733                   | 5      | 1/8            | 2              | 65780    | 57.80 | 65780-C3     | 63.00 |
| .080                                                 | .0077          | .060           | .625                                                 | .0638                                                  | .0733                   | 5      | 1/8            | 2              | 57080    | 57.80 | 57080-C3     | 63.00 |
| .115                                                 | .0111          | .087           | .375                                                 | .0655                                                  | .1049                   | 5      | 1/8            | 2              | 846410   | 57.80 | 846410-C3    | 63.00 |
| .115                                                 | .0111          | .087           | .562                                                 | .0655                                                  | .1049                   | 5      | 1/8            | 2              | 65810    | 57.80 | 65810-C3     | 63.00 |
| .115                                                 | .0111          | .087           | 1.000                                                | .0655                                                  | .1049                   | 5      | 1/8            | 2              | 57110    | 57.80 | 57110-C3     | 63.00 |

| D <sub>1</sub> <sup>+0.000"</sup> <sub>-0.002"</sub> | L <sub>2</sub> | D <sub>3</sub> | L <sub>3</sub> <sup>+0.010"</sup> <sub>-0.000"</sub> | L <sub>5</sub> <sup>+0.0005"</sup> <sub>-0.0005"</sub> | D <sub>4</sub> (Max.) |    | D <sub>2</sub> | L <sub>1</sub> | TOOL # | PRICE  | TOOL #    | PRICE  |
|------------------------------------------------------|----------------|----------------|------------------------------------------------------|--------------------------------------------------------|-----------------------|----|----------------|----------------|--------|--------|-----------|--------|
| .125                                                 | .0111          | .097           | .375                                                 | .0655                                                  | .1139                 | 6  | 1/8            | 2              | 846425 | 57.80  | 846425-C3 | 63.00  |
| .135                                                 | .0111          | .107           | .437                                                 | .0655                                                  | .1249                 | 5  | 3/16           | 2              | 846420 | 58.60  | 846420-C3 | 64.20  |
| .135                                                 | .0111          | .107           | .625                                                 | .0655                                                  | .1249                 | 5  | 3/16           | 2-1/2          | 65820  | 59.50  | 65820-C3  | 65.10  |
| .135                                                 | .0111          | .107           | 1.125                                                | .0655                                                  | .1249                 | 5  | 3/16           | 2-1/2          | 57120  | 59.50  | 57120-C3  | 65.10  |
| .165                                                 | .0191          | .121           | .500                                                 | .0695                                                  | .1469                 | 6  | 3/16           | 2              | 846430 | 58.60  | 846430-C3 | 64.20  |
| .165                                                 | .0191          | .121           | .750                                                 | .0695                                                  | .1469                 | 6  | 3/16           | 2-1/2          | 65830  | 59.50  | 65830-C3  | 65.10  |
| .165                                                 | .0191          | .121           | 1.375                                                | .0695                                                  | .1469                 | 6  | 3/16           | 2-1/2          | 57130  | 59.50  | 57130-C3  | 65.10  |
| .187                                                 | .0191          | .143           | .563                                                 | .0695                                                  | .1679                 | 6  | 3/16           | 2              | 846435 | 58.60  | 846435-C3 | 64.20  |
| .210                                                 | .0191          | .166           | .625                                                 | .0695                                                  | .1919                 | 6  | 1/4            | 2-1/2          | 846440 | 62.60  | 846440-C3 | 70.20  |
| .210                                                 | .0191          | .166           | 1.000                                                | .0695                                                  | .1919                 | 6  | 1/4            | 3              | 65840  | 63.90  | 65840-C3  | 71.50  |
| .210                                                 | .0191          | .166           | 1.750                                                | .0695                                                  | .1919                 | 6  | 1/4            | 3              | 57140  | 63.90  | 57140-C3  | 71.50  |
| .262                                                 | .0251          | .206           | 1.375                                                | .0925                                                  | .2379                 | 8  | 5/16           | 3              | 65850  | 64.90  | 65850-C3  | 73.80  |
| .262                                                 | .0251          | .206           | 2.125                                                | .0925                                                  | .2379                 | 8  | 5/16           | 4              | 57150  | 74.80  | 57150-C3  | 85.50  |
| .315                                                 | .0251          | .259           | 1.625                                                | .0925                                                  | .2909                 | 8  | 3/8            | 3              | 65860  | 80.20  | 65860-C3  | 90.30  |
| .315                                                 | .0251          | .259           | 2.500                                                | .0925                                                  | .2909                 | 8  | 3/8            | 4              | 57160  | 90.30  | 57160-C3  | 104.10 |
| .420                                                 | .0321          | .350           | 2.125                                                | .1160                                                  | .3889                 | 10 | 7/16           | 4              | 65870  | 101.60 | 65870-C3  | 116.70 |
| .420                                                 | .0321          | .350           | 3.375                                                | .1160                                                  | .3889                 | 10 | 7/16           | 6              | 57170  | 117.90 | 57170-C3  | 134.80 |

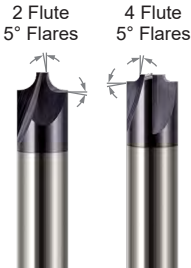
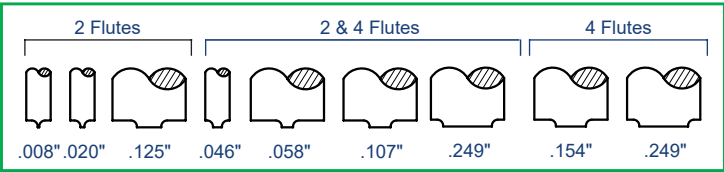
BACK DEBURRING MILLS

CORNER ROUNDING END MILLS

2 & 4 Flute – Flared



- Flares are tangent to radius (flare is blended to radius to ensure smooth form)
- Double-ended
- Axial depth of cut ≈ radius plus .005"
- End cutting
- Solid carbide • CNC ground in the USA



| RADIUS                                  | PILOT DIAMETER | FLUTES | SHANK DIAMETER | OVERALL LENGTH | UNCOATED |       | AItIN COATED |       |
|-----------------------------------------|----------------|--------|----------------|----------------|----------|-------|--------------|-------|
|                                         |                |        |                |                | TOOL #   | PRICE | TOOL #       | PRICE |
| R <sup>+.0005"</sup> <sub>-.0005"</sub> | D <sub>1</sub> |        | D <sub>2</sub> | L <sub>1</sub> |          |       |              |       |
| .003                                    | .046           | 2      | 1/8            | 1-1/2          | 17003    | 44.10 | 17003-C3     | 50.50 |
| .004                                    | .046           | 2      | 1/8            | 1-1/2          | 17004    | 44.10 | 17004-C3     | 50.50 |
| .005                                    | .008           | 2      | 1/8            | 1-1/2          | 67405    | 55.40 | 67405-C3     | 61.80 |
| .005                                    | .020           | 2      | 1/8            | 1-1/2          | 45305    | 47.60 | 45305-C3     | 54.00 |
| .005                                    | .046           | 2      | 1/8            | 1-1/2          | 17005    | 44.10 | 17005-C3     | 50.50 |
| .005                                    | .046           | 2      | 3/16           | 4 LONG!        | 31605    | 78.20 | 31605-C3     | 87.10 |
| .005                                    | .046           | 4      | 1/8            | 1-1/2          | 806105   | 59.90 | 806105-C3    | 66.30 |
| .005                                    | .058           | 4      | 1/8            | 1-1/2          | 67605    | 59.90 | 67605-C3     | 66.30 |
| .005                                    | .107           | 4      | 1/8            | 1-1/2          | 68005    | 59.90 | 68005-C3     | 66.30 |
| .005                                    | .249           | 4      | 3/8            | 2-1/2          | 21005    | 69.90 | 21005-C3     | 85.00 |
| .006                                    | .020           | 2      | 1/8            | 1-1/2          | 45306    | 47.60 | 45306-C3     | 54.00 |
| .006                                    | .046           | 2      | 1/8            | 1-1/2          | 17006    | 44.10 | 17006-C3     | 50.50 |
| .006                                    | .058           | 4      | 1/8            | 1-1/2          | 67606    | 60.50 | 67606-C3     | 66.90 |
| .006                                    | .107           | 4      | 1/8            | 1-1/2          | 68006    | 60.50 | 68006-C3     | 66.90 |
| .007                                    | .020           | 2      | 1/8            | 1-1/2          | 45307    | 47.60 | 45307-C3     | 54.00 |
| .007                                    | .046           | 2      | 1/8            | 1-1/2          | 17007    | 44.10 | 17007-C3     | 50.50 |
| .007                                    | .058           | 4      | 1/8            | 1-1/2          | 67607    | 59.90 | 67607-C3     | 66.30 |
| .007                                    | .107           | 4      | 1/8            | 1-1/2          | 68007    | 59.90 | 68007-C3     | 66.30 |
| .008                                    | .008           | 2      | 1/8            | 1-1/2          | 67408    | 55.40 | 67408-C3     | 61.80 |
| .008                                    | .020           | 2      | 1/8            | 1-1/2          | 45308    | 47.60 | 45308-C3     | 54.00 |
| .008                                    | .046           | 2      | 1/8            | 1-1/2          | 17008    | 44.10 | 17008-C3     | 50.50 |
| .008                                    | .046           | 2      | 3/16           | 4 LONG!        | 31608    | 78.20 | 31608-C3     | 87.10 |
| .008                                    | .058           | 4      | 1/8            | 1-1/2          | 67608    | 59.90 | 67608-C3     | 66.30 |
| .008                                    | .249           | 4      | 3/8            | 2-1/2          | 21008    | 69.90 | 21008-C3     | 85.00 |
| .009                                    | .020           | 2      | 1/8            | 1-1/2          | 45309    | 48.10 | 45309-C3     | 54.50 |
| .009                                    | .046           | 2      | 1/8            | 1-1/2          | 17009    | 44.10 | 17009-C3     | 50.50 |
| .010                                    | .008           | 2      | 1/8            | 1-1/2          | 67410    | 55.40 | 67410-C3     | 61.80 |
| .010                                    | .020           | 2      | 1/8            | 1-1/2          | 45310    | 47.60 | 45310-C3     | 54.00 |
| .010                                    | .046           | 2      | 1/8            | 1-1/2          | 17010    | 44.10 | 17010-C3     | 50.50 |
| .010                                    | .046           | 2      | 3/16           | 4 LONG!        | 31610    | 78.20 | 31610-C3     | 87.10 |

continued on next page

CORNER ROUNDING END MILLS

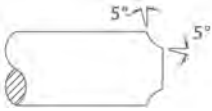
CORNER ROUNDING END MILLS

2 & 4 Flute – Flared (cont.)

continued from previous page

| RADIUS                                   | PILOT DIAMETER | FLUTES | SHANK DIAMETER | OVERALL LENGTH | UNCOATED |       | AITIN COATED |       |
|------------------------------------------|----------------|--------|----------------|----------------|----------|-------|--------------|-------|
|                                          |                |        |                |                | TOOL #   | PRICE | TOOL #       | PRICE |
| R <sup>+ .0005"</sup> <sub>-.0005"</sub> | D <sub>1</sub> |        | D <sub>2</sub> | L <sub>1</sub> |          |       |              |       |
| .010                                     | .046           | 4      | 1/8            | 1-1/2          | 806110   | 60.00 | 806110-C3    | 66.40 |
| .010                                     | .058           | 4      | 1/8            | 1-1/2          | 67610    | 59.90 | 67610-C3     | 66.30 |
| .010                                     | .107           | 4      | 3/16           | 2              | 68010    | 64.90 | 68010-C3     | 72.50 |
| .010                                     | .125           | 2      | 3/16           | 2              | 941510   | 64.90 | 941510-C3    | 72.50 |
| .010                                     | .249           | 4      | 3/8            | 2-1/2          | 21010    | 69.90 | 21010-C3     | 85.00 |
| .011                                     | .020           | 2      | 1/8            | 1-1/2          | 45311    | 48.10 | 45311-C3     | 54.50 |
| .011                                     | .046           | 2      | 1/8            | 1-1/2          | 17011    | 44.10 | 17011-C3     | 50.50 |
| .012                                     | .020           | 2      | 1/8            | 1-1/2          | 45312    | 47.60 | 45312-C3     | 54.00 |
| .012                                     | .046           | 2      | 1/8            | 1-1/2          | 17012    | 44.10 | 17012-C3     | 50.50 |
| .012                                     | .107           | 4      | 3/16           | 2              | 68012    | 64.90 | 68012-C3     | 72.50 |
| .013                                     | .020           | 2      | 1/8            | 1-1/2          | 45313    | 47.60 | 45313-C3     | 54.00 |
| .013                                     | .046           | 2      | 1/8            | 1-1/2          | 17013    | 44.10 | 17013-C3     | 50.50 |
| .014                                     | .020           | 2      | 1/8            | 1-1/2          | 45314    | 47.60 | 45314-C3     | 54.00 |
| .014                                     | .046           | 2      | 1/8            | 1-1/2          | 17014    | 44.10 | 17014-C3     | 50.50 |
| .015 (1/64)                              | .008           | 2      | 1/8            | 1-1/2          | 67415    | 55.40 | 67415-C3     | 61.80 |
| .015 (1/64)                              | .020           | 2      | 1/8            | 1-1/2          | 45315    | 47.60 | 45315-C3     | 54.00 |
| .015 (1/64)                              | .046           | 2      | 1/8            | 1-1/2          | 17015    | 44.10 | 17015-C3     | 50.50 |
| .015 (1/64)                              | .046           | 2      | 3/16           | 4 LONG!        | 31615    | 78.20 | 31615-C3     | 87.10 |
| .015 (1/64)                              | .046           | 4      | 1/8            | 1-1/2          | 806115   | 59.90 | 806115-C3    | 66.30 |
| .015 (1/64)                              | .058           | 2      | 1/8            | 1-1/2          | 770515   | 44.10 | 770515-C3    | 50.50 |
| .015 (1/64)                              | .058           | 4      | 1/8            | 1-1/2          | 67615    | 59.90 | 67615-C3     | 66.30 |
| .015 (1/64)                              | .107           | 4      | 3/16           | 2              | 68015    | 64.90 | 68015-C3     | 72.50 |
| .015 (1/64)                              | .125           | 2      | 3/16           | 2              | 941515   | 64.90 | 941515-C3    | 72.50 |
| .015 (1/64)                              | .249           | 2      | 3/8            | 2              | 749015   | 66.90 | 749015-C3    | 80.20 |
| .015 (1/64)                              | .249           | 4      | 3/8            | 2-1/2          | 21015    | 69.90 | 21015-C3     | 85.00 |
| .018                                     | .020           | 2      | 1/8            | 1-1/2          | 45318    | 47.60 | 45318-C3     | 54.00 |
| .018                                     | .046           | 2      | 1/8            | 1-1/2          | 17018    | 44.10 | 17018-C3     | 50.50 |
| .018                                     | .107           | 4      | 3/16           | 2              | 68018    | 64.90 | 68018-C3     | 72.50 |
| .020                                     | .008           | 2      | 1/8            | 1-1/2          | 67420    | 55.40 | 67420-C3     | 61.80 |
| .020                                     | .020           | 2      | 1/8            | 1-1/2          | 45320    | 47.60 | 45320-C3     | 54.00 |
| .020                                     | .046           | 2      | 1/8            | 1-1/2          | 17020    | 44.10 | 17020-C3     | 50.50 |
| .020                                     | .046           | 2      | 3/16           | 4 LONG!        | 31620    | 78.20 | 31620-C3     | 87.10 |
| .020                                     | .046           | 4      | 1/8            | 1-1/2          | 806120   | 59.90 | 806120-C3    | 66.30 |
| .020                                     | .058           | 2      | 1/8            | 1-1/2          | 770520   | 44.10 | 770520-C3    | 50.50 |
| .020                                     | .058           | 4      | 1/8            | 1-1/2          | 67620    | 59.90 | 67620-C3     | 66.30 |
| .020                                     | .107           | 2      | 3/16           | 2              | 748620   | 65.60 | 748620-C3    | 73.20 |
| .020                                     | .107           | 4      | 3/16           | 2              | 68020    | 64.90 | 68020-C3     | 71.30 |
| .020                                     | .125           | 2      | 3/16           | 2              | 941520   | 64.90 | 941520-C3    | 72.50 |
| .020                                     | .249           | 4      | 3/8            | 2-1/2          | 21020    | 69.90 | 21020-C3     | 85.00 |

continued on next page



5° Flares at Shoulder and Pilot to Avoid Steps in Workpiece



Large Pilots for Profiling, Increasing Strength and Requiring Less Speed



Small Pilots for Narrow Slots and Holes



Small Pilots Allow Milling of Tight Inside Corners

CORNER ROUNDING END MILLS

CORNER ROUNDING END MILLS

2 & 4 Flute – Flared (cont.)

continued from previous page

| RADIUS                                                       | PILOT<br>DIAMETER | FLUTES | SHANK<br>DIAMETER | OVERALL<br>LENGTH | UNCOATED |        | AItIN COATED |           |       |
|--------------------------------------------------------------|-------------------|--------|-------------------|-------------------|----------|--------|--------------|-----------|-------|
| R $\begin{smallmatrix} +.0005" \\ -.0005" \end{smallmatrix}$ | D <sub>1</sub>    |        | D <sub>2</sub>    | L <sub>1</sub>    | TOOL #   | PRICE  | TOOL #       | PRICE     |       |
| .022                                                         | .020              | 2      | 1/8               | 1-1/2             | 45322    | 47.60  | 45322-C3     | 54.00     |       |
| .022                                                         | .046              | 2      | 1/8               | 1-1/2             | 17022    | 44.10  | 17022-C3     | 50.50     |       |
| .022                                                         | .107              | 4      | 3/16              | 2                 | 68022    | 64.90  | 68022-C3     | 72.50     |       |
| .025                                                         | .008              | 2      | 1/8               | 1-1/2             | 67425    | 55.90  | 67425-C3     | 62.30     |       |
| .025                                                         | .020              | 2      | 1/8               | 1-1/2             | 45325    | 47.60  | 45325-C3     | 54.00     |       |
| .025                                                         | .046              | 2      | 1/8               | 1-1/2             | 17025    | 44.10  | 17025-C3     | 50.50     |       |
| .025                                                         | .046              | 2      | 3/16              | 4                 | LONG!    | 31625  | 78.20        | 31625-C3  | 87.10 |
| .025                                                         | .058              | 4      | 1/8               | 1-1/2             |          | 67625  | 59.90        | 67625-C3  | 66.30 |
| .025                                                         | .107              | 4      | 3/16              | 2                 | 68025    | 64.90  | 68025-C3     | 71.30     |       |
| .025                                                         | .125              | 2      | 3/16              | 2                 | 941525   | 64.90  | 941525-C3    | 72.50     |       |
| .025                                                         | .249              | 4      | 3/8               | 2-1/2             | 21025    | 69.90  | 21025-C3     | 85.00     |       |
| .027                                                         | .046              | 2      | 1/8               | 1-1/2             | 17027    | 44.10  | 17027-C3     | 50.50     |       |
| .027                                                         | .107              | 4      | 3/16              | 2                 | 68027    | 64.90  | 68027-C3     | 72.50     |       |
| .030                                                         | .008              | 2      | 1/8               | 1-1/2             | 67430    | 55.40  | 67430-C3     | 61.80     |       |
| .030                                                         | .020              | 2      | 1/8               | 1-1/2             | 45330    | 47.60  | 45330-C3     | 54.00     |       |
| .030                                                         | .046              | 2      | 1/8               | 1-1/2             | 17030    | 44.10  | 17030-C3     | 50.50     |       |
| .030                                                         | .046              | 2      | 3/16              | 4                 | LONG!    | 31630  | 78.20        | 31630-C3  | 87.10 |
| .030                                                         | .046              | 4      | 1/8               | 1-1/2             |          | 806130 | 59.90        | 806130-C3 | 66.30 |
| .030                                                         | .058              | 2      | 1/8               | 1-1/2             | 756930   | 60.50  | 756930-C3    | 66.90     |       |
| .030                                                         | .058              | 4      | 1/8               | 1-1/2             | 67630    | 59.90  | 67630-C3     | 66.30     |       |
| .030                                                         | .107              | 2      | 3/16              | 2                 | 748630   | 65.60  | 748630-C3    | 73.20     |       |
| .030                                                         | .107              | 4      | 3/16              | 2                 | 68030    | 64.90  | 68030-C3     | 71.30     |       |
| .030                                                         | .125              | 2      | 3/16              | 2                 | 941530   | 64.90  | 941530-C3    | 72.50     |       |
| .030                                                         | .249              | 2      | 3/8               | 2                 | 749030   | 73.70  | 749030-C3    | 87.00     |       |
| .030                                                         | .249              | 4      | 3/8               | 2-1/2             | 21030    | 76.90  | 21030-C3     | 92.00     |       |
| .031 (1/32)                                                  | .008              | 2      | 1/8               | 1-1/2             | 67431    | 55.40  | 67431-C3     | 61.80     |       |
| .031 (1/32)                                                  | .020              | 2      | 1/8               | 1-1/2             | 45331    | 47.60  | 45331-C3     | 54.00     |       |
| .031 (1/32)                                                  | .046              | 2      | 1/8               | 1-1/2             | 17031    | 44.10  | 17031-C3     | 50.50     |       |
| .031 (1/32)                                                  | .046              | 2      | 3/16              | 4                 | LONG!    | 31631  | 78.20        | 31631-C3  | 87.10 |
| .031 (1/32)                                                  | .046              | 4      | 1/8               | 1-1/2             |          | 806131 | 59.90        | 806131-C3 | 66.30 |
| .031 (1/32)                                                  | .058              | 4      | 1/8               | 1-1/2             | 67631    | 59.90  | 67631-C3     | 66.30     |       |
| .031 (1/32)                                                  | .107              | 4      | 3/16              | 2                 | 68031    | 64.90  | 68031-C3     | 72.50     |       |
| .031 (1/32)                                                  | .125              | 2      | 3/16              | 2                 | 941531   | 72.50  | 941531-C3    | 80.10     |       |
| .031 (1/32)                                                  | .154              | 4      | 1/4               | 2                 | 946631   | 85.10  | 946631-C3    | 95.50     |       |
| .031 (1/32)                                                  | .249              | 4      | 3/8               | 2-1/2             | 21031    | 76.90  | 21031-C3     | 92.00     |       |
| .032                                                         | .046              | 2      | 1/8               | 1-1/2             | 17032    | 44.10  | 17032-C3     | 50.50     |       |
| .032                                                         | .249              | 4      | 3/8               | 2-1/2             | 21032    | 76.90  | 21032-C3     | 92.00     |       |
| .035                                                         | .020              | 2      | 1/8               | 1-1/2             | 67835    | 47.60  | 67835-C3     | 54.00     |       |
| .035                                                         | .046              | 2      | 1/8               | 1-1/2             | 17035    | 44.10  | 17035-C3     | 50.50     |       |
| .035                                                         | .046              | 2      | 3/16              | 4                 | LONG!    | 31635  | 78.20        | 31635-C3  | 87.10 |
| .035                                                         | .058              | 4      | 3/16              | 2                 |          | 67635  | 67.20        | 67635-C3  | 74.80 |
| .035                                                         | .125              | 2      | 1/4               | 2                 | 941535   | 66.60  | 941535-C3    | 74.20     |       |
| .035                                                         | .249              | 4      | 3/8               | 2-1/2             | 21035    | 76.90  | 21035-C3     | 92.00     |       |
| .037                                                         | .107              | 4      | 3/16              | 2                 | 68037    | 65.60  | 68037-C3     | 73.20     |       |

continued on next page

CORNER ROUNDING END MILLS

CORNER ROUNDING END MILLS

2 & 4 Flute – Flared (cont.)

continued from previous page

| RADIUS                            | PILOT DIAMETER | FLUTES | SHANK DIAMETER | OVERALL LENGTH | UNCOATED |        | AItIN COATED |        |
|-----------------------------------|----------------|--------|----------------|----------------|----------|--------|--------------|--------|
|                                   |                |        |                |                | TOOL #   | PRICE  | TOOL #       | PRICE  |
| R <sup>+ .0005"</sup><br>- .0005" | D <sub>1</sub> |        | D <sub>2</sub> | L <sub>1</sub> |          |        |              |        |
| .039 (1 mm)                       | .020           | 2      | 1/8            | 1-1/2          | 67839    | 47.60  | 67839-C3     | 54.00  |
| .039 (1 mm)                       | .046           | 2      | 1/8            | 1-1/2          | 17039    | 44.10  | 17039-C3     | 50.50  |
| .039 (1 mm)                       | .046           | 2      | 3/16           | 4              | 31639    | 78.20  | 31639-C3     | 87.10  |
| .039 (1 mm)                       | .046           | 4      | 1/8            | 1-1/2          | 806139   | 59.90  | 806139-C3    | 66.30  |
| .039 (1 mm)                       | .058           | 4      | 3/16           | 2              | 67639    | 67.20  | 67639-C3     | 74.80  |
| .039 (1 mm)                       | .100           | 2      | 3/16           | 2              | 45339    | 57.90  | 45339-C3     | 65.50  |
| .039 (1 mm)                       | .107           | 4      | 3/16           | 2              | 68039    | 57.90  | 68039-C3     | 65.50  |
| .039 (1 mm)                       | .154           | 4      | 1/4            | 2              | 946639   | 85.10  | 946639-C3    | 95.50  |
| .039 (1 mm)                       | .249           | 4      | 3/8            | 2-1/2          | 21039    | 76.90  | 21039-C3     | 92.00  |
| .040                              | .020           | 2      | 1/8            | 1-1/2          | 45340    | 47.60  | 45340-C3     | 54.00  |
| .040                              | .046           | 2      | 3/16           | 2              | 17040    | 56.20  | 17040-C3     | 63.80  |
| .040                              | .107           | 4      | 1/4            | 2              | 68040    | 85.10  | 68040-C3     | 95.50  |
| .040                              | .249           | 4      | 3/8            | 2-1/2          | 21040    | 93.20  | 21040-C3     | 108.30 |
| .043                              | .046           | 2      | 3/16           | 2              | 17043    | 56.20  | 17043-C3     | 63.80  |
| .043                              | .058           | 4      | 3/16           | 2              | 67643    | 67.20  | 67643-C3     | 74.80  |
| .043                              | .249           | 4      | 3/8            | 2-1/2          | 21043    | 94.10  | 21043-C3     | 109.20 |
| .045                              | .046           | 2      | 3/16           | 2              | 17045    | 56.20  | 17045-C3     | 63.80  |
| .045                              | .058           | 4      | 3/16           | 2              | 67645    | 67.20  | 67645-C3     | 74.80  |
| .047 (3/64)                       | .020           | 2      | 1/8            | 1-1/2          | 67847    | 47.60  | 67847-C3     | 54.00  |
| .047 (3/64)                       | .046           | 2      | 3/16           | 2              | 17047    | 56.20  | 17047-C3     | 63.80  |
| .047 (3/64)                       | .046           | 2      | 3/16           | 4              | 31647    | 78.20  | 31647-C3     | 87.10  |
| .047 (3/64)                       | .058           | 4      | 3/16           | 2              | 67647    | 67.20  | 67647-C3     | 74.80  |
| .047 (3/64)                       | .107           | 4      | 1/4            | 2              | 68047    | 85.10  | 68047-C3     | 95.50  |
| .047 (3/64)                       | .125           | 2      | 1/4            | 2              | 45347    | 66.60  | 45347-C3     | 77.00  |
| .047 (3/64)                       | .249           | 4      | 3/8            | 2-1/2          | 21047    | 93.20  | 21047-C3     | 108.30 |
| .050                              | .020           | 2      | 1/8            | 1-1/2          | 67850    | 47.60  | 67850-C3     | 54.00  |
| .050                              | .046           | 2      | 3/16           | 2              | 17050    | 56.20  | 17050-C3     | 63.80  |
| .050                              | .046           | 2      | 1/4            | 4              | 31650    | 92.90  | 31650-C3     | 101.70 |
| .050                              | .058           | 4      | 3/16           | 2              | 67650    | 67.20  | 67650-C3     | 74.80  |
| .050                              | .107           | 4      | 1/4            | 2              | 68050    | 85.10  | 68050-C3     | 95.50  |
| .050                              | .125           | 2      | 1/4            | 2              | 45350    | 66.60  | 45350-C3     | 77.00  |
| .050                              | .249           | 4      | 3/8            | 2-1/2          | 21050    | 93.20  | 21050-C3     | 108.30 |
| .052                              | .107           | 4      | 1/4            | 2              | 68052    | 85.90  | 68052-C3     | 96.30  |
| .055                              | .046           | 2      | 3/16           | 2              | 17055    | 56.20  | 17055-C3     | 63.80  |
| .055                              | .058           | 4      | 3/16           | 2              | 67655    | 67.20  | 67655-C3     | 74.80  |
| .055                              | .107           | 4      | 1/4            | 2              | 68055    | 85.10  | 68055-C3     | 95.50  |
| .058                              | .107           | 4      | 1/4            | 2              | 68058    | 85.10  | 68058-C3     | 95.50  |
| .060                              | .020           | 2      | 3/16           | 2              | 67860    | 58.40  | 67860-C3     | 66.00  |
| .060                              | .046           | 2      | 3/16           | 2              | 17060    | 56.20  | 17060-C3     | 63.80  |
| .060                              | .046           | 2      | 1/4            | 4              | 31660    | 92.90  | 31660-C3     | 101.70 |
| .060                              | .046           | 4      | 3/16           | 2              | 806060   | 64.10  | 806060-C3    | 71.70  |
| .060                              | .058           | 2      | 3/16           | 2              | 756960   | 56.80  | 756960-C3    | 64.40  |
| .060                              | .058           | 4      | 3/16           | 2              | 67660    | 67.20  | 67660-C3     | 74.80  |
| .060                              | .107           | 2      | 1/4            | 2              | 748660   | 67.30  | 748660-C3    | 77.70  |
| .060                              | .107           | 4      | 1/4            | 2              | 68060    | 85.10  | 68060-C3     | 95.50  |
| .060                              | .125           | 2      | 1/4            | 2              | 45360    | 66.60  | 45360-C3     | 77.00  |
| .060                              | .154           | 4      | 5/16           | 2-1/2          | 946660   | 98.20  | 946660-C3    | 110.80 |
| .060                              | .249           | 4      | 1/2            | 3              | 21060    | 103.90 | 21060-C3     | 119.50 |

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CORNER ROUNDING END MILLS

CORNER ROUNDING END MILLS

2 & 4 Flute – Flared (cont.)

continued from previous page

| RADIUS<br>R <sup>+ .0005"</sup><br>- .0005" | PILOT<br>DIAMETER<br>D <sub>1</sub> | FLUTES | SHANK<br>DIAMETER<br>D <sub>2</sub> | OVERALL<br>LENGTH<br>L <sub>1</sub> | UNCOATED |        | AITIN COATED |        |
|---------------------------------------------|-------------------------------------|--------|-------------------------------------|-------------------------------------|----------|--------|--------------|--------|
|                                             |                                     |        |                                     |                                     | TOOL #   | PRICE  | TOOL #       | PRICE  |
| .062 (1/16)                                 | .020                                | 2      | 3/16                                | 2                                   | 67862    | 58.40  | 67862-C3     | 66.00  |
| .062 (1/16)                                 | .046                                | 2      | 3/16                                | 2                                   | 17062    | 56.20  | 17062-C3     | 63.80  |
| .062 (1/16)                                 | .046                                | 2      | 1/4                                 | 4 LONG!                             | 31662    | 92.90  | 31662-C3     | 101.70 |
| .062 (1/16)                                 | .046                                | 4      | 3/16                                | 2                                   | 806062   | 67.20  | 806062-C3    | 72.80  |
| .062 (1/16)                                 | .058                                | 2      | 3/16                                | 2                                   | 770562   | 56.20  | 770562-C3    | 63.80  |
| .062 (1/16)                                 | .058                                | 4      | 3/16                                | 2                                   | 67662    | 67.20  | 67662-C3     | 74.80  |
| .062 (1/16)                                 | .107                                | 2      | 1/4                                 | 2                                   | 748662   | 67.30  | 748662-C3    | 77.70  |
| .062 (1/16)                                 | .107                                | 4      | 1/4                                 | 2                                   | 68062    | 85.10  | 68062-C3     | 95.50  |
| .062 (1/16)                                 | .125                                | 2      | 1/4                                 | 2                                   | 45362    | 66.60  | 45362-C3     | 77.00  |
| .062 (1/16)                                 | .154                                | 4      | 5/16                                | 2-1/2                               | 946662   | 98.20  | 946662-C3    | 110.80 |
| .062 (1/16)                                 | .249                                | 4      | 1/2                                 | 3                                   | 21062    | 103.90 | 21062-C3     | 124.60 |
| .065                                        | .046                                | 2      | 3/16                                | 2                                   | 17065    | 56.20  | 17065-C3     | 63.80  |
| .070                                        | .046                                | 2      | 3/16                                | 2                                   | 17070    | 56.20  | 17070-C3     | 63.80  |
| .070                                        | .058                                | 4      | 1/4                                 | 2                                   | 67670    | 85.10  | 67670-C3     | 95.50  |
| .070                                        | .107                                | 4      | 1/4                                 | 2                                   | 68070    | 85.10  | 68070-C3     | 95.50  |
| .072                                        | .046                                | 2      | 1/4                                 | 2                                   | 17072    | 64.50  | 17072-C3     | 74.90  |
| .072                                        | .249                                | 4      | 1/2                                 | 3                                   | 21072    | 108.80 | 21072-C3     | 129.50 |
| .075                                        | .046                                | 2      | 1/4                                 | 2                                   | 17075    | 64.50  | 17075-C3     | 74.90  |
| .078 (5/64)                                 | .020                                | 2      | 3/16                                | 2                                   | 67878    | 64.90  | 67878-C3     | 72.50  |
| .078 (5/64)                                 | .046                                | 2      | 1/4                                 | 2                                   | 17078    | 64.50  | 17078-C3     | 74.90  |
| .078 (5/64)                                 | .046                                | 2      | 1/4                                 | 4 LONG!                             | 31678    | 92.90  | 31678-C3     | 101.70 |
| .078 (5/64)                                 | .046                                | 4      | 1/4                                 | 2                                   | 806078   | 85.10  | 806078-C3    | 95.50  |
| .078 (5/64)                                 | .058                                | 4      | 1/4                                 | 2                                   | 67678    | 85.10  | 67678-C3     | 95.50  |
| .078 (5/64)                                 | .107                                | 4      | 5/16                                | 2-1/2                               | 68078    | 98.20  | 68078-C3     | 110.80 |
| .078 (5/64)                                 | .125                                | 2      | 5/16                                | 2-1/2                               | 941578   | 98.20  | 941578-C3    | 110.80 |
| .078 (5/64)                                 | .154                                | 4      | 5/16                                | 2-1/2                               | 946678   | 98.20  | 946678-C3    | 110.80 |
| .078 (5/64)                                 | .249                                | 4      | 1/2                                 | 3                                   | 21078    | 108.80 | 21078-C3     | 129.50 |
| .080                                        | .046                                | 2      | 1/4                                 | 2                                   | 17080    | 64.50  | 17080-C3     | 74.90  |
| .080                                        | .058                                | 4      | 1/4                                 | 2                                   | 67680    | 85.10  | 67680-C3     | 95.50  |
| .080                                        | .107                                | 4      | 5/16                                | 2-1/2                               | 68080    | 98.20  | 68080-C3     | 110.80 |
| .085                                        | .046                                | 2      | 1/4                                 | 2                                   | 17085    | 64.50  | 17085-C3     | 74.90  |
| .089                                        | .045                                | 2      | 1/4                                 | 2                                   | 17089    | 64.50  | 17089-C3     | 74.90  |
| .089                                        | .107                                | 4      | 5/16                                | 2-1/2                               | 68089    | 99.20  | 68089-C3     | 111.80 |
| .089                                        | .248                                | 4      | 1/2                                 | 3                                   | 21089    | 109.90 | 21089-C3     | 130.60 |
| .090                                        | .045                                | 2      | 1/4                                 | 2                                   | 17090    | 64.50  | 17090-C3     | 74.90  |
| .090                                        | .058                                | 4      | 1/4                                 | 2                                   | 67690    | 85.10  | 67690-C3     | 95.50  |
| .090                                        | .107                                | 4      | 5/16                                | 2-1/2                               | 68090    | 98.20  | 68090-C3     | 110.80 |
| .093 (3/32)                                 | .045                                | 2      | 1/4                                 | 2                                   | 17093    | 64.50  | 17093-C3     | 74.90  |
| .093 (3/32)                                 | .045                                | 2      | 5/16                                | 4 LONG!                             | 31693    | 122.40 | 31693-C3     | 136.50 |
| .093 (3/32)                                 | .046                                | 4      | 1/4                                 | 2                                   | 806093   | 85.10  | 806093-C3    | 95.50  |
| .093 (3/32)                                 | .058                                | 4      | 1/4                                 | 2                                   | 67693    | 85.10  | 67693-C3     | 95.50  |
| .093 (3/32)                                 | .107                                | 4      | 5/16                                | 2-1/2                               | 68093    | 98.20  | 68093-C3     | 110.80 |
| .093 (3/32)                                 | .125                                | 2      | 5/16                                | 2-1/2                               | 941593   | 99.20  | 941593-C3    | 111.80 |
| .093 (3/32)                                 | .154                                | 4      | 3/8                                 | 2-1/2                               | 946693   | 120.40 | 946693-C3    | 135.50 |
| .093 (3/32)                                 | .248                                | 4      | 1/2                                 | 3                                   | 21093    | 110.80 | 21093-C3     | 131.50 |
| .095                                        | .045                                | 2      | 1/4                                 | 2                                   | 17095    | 64.50  | 17095-C3     | 74.90  |

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CORNER ROUNDING END MILLS

CORNER ROUNDING END MILLS

2 & 4 Flute – Flared (cont.)

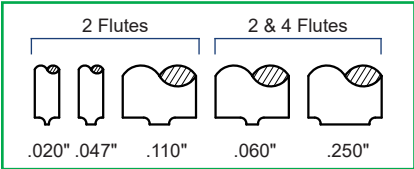
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| RADIUS                                   | PILOT DIAMETER | FLUTES | SHANK DIAMETER | OVERALL LENGTH | UNCOATED |        | AItIN COATED |        |
|------------------------------------------|----------------|--------|----------------|----------------|----------|--------|--------------|--------|
|                                          |                |        |                |                | TOOL #   | PRICE  | TOOL #       | PRICE  |
| R <sup>+0.0005"</sup> <sub>-.0005"</sub> | D <sub>1</sub> |        | D <sub>2</sub> | L <sub>1</sub> |          |        |              |        |
| .100                                     | .045           | 2      | 1/4            | 2              | 17100    | 64.50  | 17100-C3     | 74.90  |
| .100                                     | .045           | 2      | 5/16           | 4              | 31700    | 122.40 | 31700-C3     | 136.50 |
| .100                                     | .058           | 4      | 5/16           | 2-1/2          | 77800    | 98.70  | 77800-C3     | 111.30 |
| .100                                     | .107           | 4      | 5/16           | 2-1/2          | 68100    | 98.70  | 68100-C3     | 111.30 |
| .100                                     | .125           | 2      | 3/8            | 2-1/2          | 941600   | 118.40 | 941600-C3    | 128.50 |
| .100                                     | .248           | 4      | 1/2            | 3              | 21100    | 110.80 | 21100-C3     | 131.50 |
| .109 (7/64)                              | .058           | 2      | 5/16           | 2-1/2          | 17109    | 98.70  | 17109-C3     | 111.30 |
| .109 (7/64)                              | .107           | 4      | 3/8            | 2-1/2          | 68109    | 120.40 | 68109-C3     | 135.50 |
| .118 (3 mm)                              | .058           | 2      | 5/16           | 2-1/2          | 17118    | 98.70  | 17118-C3     | 111.30 |
| .118 (3 mm)                              | .107           | 4      | 3/8            | 2-1/2          | 68118    | 120.40 | 68118-C3     | 135.50 |
| .118 (3 mm)                              | .125           | 2      | 3/8            | 2-1/2          | 941618   | 118.40 | 941618-C3    | 128.50 |
| .118 (3 mm)                              | .248           | 4      | 1/2            | 3              | 21118    | 140.50 | 21118-C3     | 161.20 |
| .125 (1/8)                               | .046           | 2      | 5/16           | 2-1/2          | 948425   | 95.80  | 948425-C3    | 108.40 |
| .125 (1/8)                               | .046           | 4      | 5/16           | 2-1/2          | 805908   | 99.60  | 805908-C3    | 108.50 |
| .125 (1/8)                               | .058           | 2      | 5/16           | 2-1/2          | 17125    | 98.70  | 17125-C3     | 111.30 |
| .125 (1/8)                               | .058           | 2      | 3/8            | 4              | 31725    | 146.20 | 31725-C3     | 154.20 |
| .125 (1/8)                               | .058           | 4      | 5/16           | 2-1/2          | 67708    | 98.70  | 67708-C3     | 111.30 |
| .125 (1/8)                               | .107           | 4      | 3/8            | 2-1/2          | 68125    | 120.40 | 68125-C3     | 135.50 |
| .125 (1/8)                               | .125           | 2      | 7/16           | 2-1/2          | 941608   | 160.50 | 941608-C3    | 179.60 |
| .125 (1/8)                               | .154           | 4      | 7/16           | 2-1/2          | 946725   | 160.50 | 946725-C3    | 179.60 |
| .125 (1/8)                               | .248           | 4      | 5/8            | 3-1/2          | 21125    | 178.60 | 21125-C3     | 201.10 |
| .140 (9/64)                              | .058           | 2      | 3/8            | 2-1/2          | 17140    | 118.40 | 17140-C3     | 133.50 |
| .140 (9/64)                              | .107           | 4      | 7/16           | 2-1/2          | 68140    | 160.50 | 68140-C3     | 179.60 |
| .156 (5/32)                              | .058           | 2      | 3/8            | 2-1/2          | 17156    | 118.40 | 17156-C3     | 133.50 |
| .156 (5/32)                              | .107           | 4      | 7/16           | 2-1/2          | 68156    | 160.50 | 68156-C3     | 179.60 |
| .156 (5/32)                              | .248           | 4      | 5/8            | 3-1/2          | 21156    | 196.60 | 21156-C3     | 219.10 |
| .172 (11/64)                             | .058           | 2      | 7/16           | 2-1/2          | 17172    | 178.60 | 17172-C3     | 197.70 |
| .187 (3/16)                              | .058           | 2      | 7/16           | 2-1/2          | 17187    | 178.60 | 17187-C3     | 197.70 |
| .187 (3/16)                              | .107           | 4      | 1/2            | 3              | 68187    | 187.40 | 68187-C3     | 208.10 |
| .187 (3/16)                              | .125           | 2      | 5/8            | 3-1/2          | 941612   | 215.60 | 941612-C3    | 230.70 |
| .187 (3/16)                              | .248           | 4      | 5/8            | 3-1/2          | 21187    | 210.70 | 21187-C3     | 233.20 |
| .197 (5 mm)                              | .058           | 2      | 1/2            | 3              | 17197    | 187.40 | 17197-C3     | 208.10 |
| .197 (5 mm)                              | .107           | 4      | 5/8            | 3-1/2          | 68197    | 281.20 | 68197-C3     | 303.70 |
| .219 (7/32)                              | .058           | 2      | 1/2            | 3              | 17219    | 189.10 | 17219-C3     | 209.80 |
| .219 (7/32)                              | .107           | 4      | 5/8            | 3-1/2          | 68219    | 281.20 | 68219-C3     | 303.70 |
| .236 (6 mm)                              | .107           | 2      | 5/8            | 3-1/2          | 17236    | 284.10 | 17236-C3     | 306.60 |
| .236 (6 mm)                              | .107           | 4      | 5/8            | 3-1/2          | 68236    | 281.20 | 68236-C3     | 303.70 |
| .250 (1/4)                               | .058           | 2      | 5/8            | 3-1/2          | 17199    | 284.10 | 17199-C3     | 306.60 |
| .250 (1/4)                               | .107           | 2      | 5/8            | 3-1/2          | 17250    | 281.20 | 17250-C3     | 303.70 |
| .250 (1/4)                               | .107           | 4      | 5/8            | 3-1/2          | 68250    | 281.20 | 68250-C3     | 303.70 |
| .250 (1/4)                               | .154           | 4      | 3/4            | 4              | 946750   | 313.10 | 946750-C3    | 339.10 |
| .250 (1/4)                               | .247           | 4      | 3/4            | 4              | 21250    | 313.10 | 21250-C3     | 339.10 |
| .312 (5/16)                              | .247           | 4      | 1              | 4              | 21312    | 442.20 | 21312-C3     | 479.40 |
| .375 (3/8)                               | .246           | 4      | 1              | 4              | 21375    | 482.80 | 21375-C3     | 520.00 |

CORNER ROUNDING END MILLS

CORNER ROUNDING END MILLS

2 & 4 Flute – Unflared



- Unflared shoulder and pilot for full radius form
- Double-ended
- Axial depth of cut = radius plus .005"
- End cutting
- Solid carbide
- CNC ground in the USA

2 Flute 4 Flute



| RADIUS                                  | PILOT DIA.     | FLUTES | SHANK DIA.     | OAL            | UNCOATED |       | TiN COATED |       | AiTiN COATED |       | AMORPHOUS DIAMOND |       |
|-----------------------------------------|----------------|--------|----------------|----------------|----------|-------|------------|-------|--------------|-------|-------------------|-------|
|                                         |                |        |                |                | TOOL #   | PRICE | TOOL #     | PRICE | TOOL #       | PRICE | TOOL #            | PRICE |
| R <sup>+.0005"</sup> <sub>-.0005"</sub> | D <sub>1</sub> |        | D <sub>2</sub> | L <sub>1</sub> |          |       |            |       |              |       |                   |       |
| .005                                    | .020           | 2      | 1/8            | 1-1/2          | 932205   | 45.40 |            |       | 932205-C3    | 51.80 |                   |       |
| .005                                    | .047           | 2      | 1/8            | 1-1/2          | 46005    | 35.00 | 46005-C1   | 41.40 | 46005-C3     | 41.40 | 46005-C4          | 54.30 |
| .008                                    | .047           | 2      | 1/8            | 1-1/2          | 46008    | 35.00 | 46008-C1   | 41.40 | 46008-C3     | 41.40 |                   |       |
| .010                                    | .020           | 2      | 1/8            | 1-1/2          | 932210   | 45.40 |            |       | 932210-C3    | 51.80 |                   |       |
| .010                                    | .047           | 2      | 1/8            | 1-1/2          | 46010    | 34.40 | 46010-C1   | 40.80 | 46010-C3     | 40.80 | 46010-C4          | 53.70 |
| .010                                    | .060           | 4      | 1/8            | 1-1/2          | 929910   | 54.90 |            |       | 929910-C3    | 61.30 |                   |       |
| .010                                    | .250           | 4      | 3/8            | 2-1/2          | 44010    | 60.30 |            |       | 44010-C3     | 75.40 |                   |       |
| .012                                    | .047           | 2      | 1/8            | 1-1/2          | 46012    | 35.00 | 46012-C1   | 41.40 | 46012-C3     | 41.40 |                   |       |
| .015 (1/64)                             | .020           | 2      | 1/8            | 1-1/2          | 932215   | 45.40 |            |       | 932215-C3    | 51.80 |                   |       |
| .015 (1/64)                             | .047           | 2      | 1/8            | 1-1/2          | 46015    | 34.40 | 46015-C1   | 40.80 | 46015-C3     | 40.80 | 46015-C4          | 53.70 |
| .015 (1/64)                             | .047           | 2      | 3/16           | 4 LONG!        | 928015   | 71.20 |            |       | 928015-C3    | 80.10 |                   |       |
| .015 (1/64)                             | .060           | 4      | 1/8            | 1-1/2          | 929915   | 54.90 |            |       | 929915-C3    | 61.30 |                   |       |
| .015 (1/64)                             | .250           | 4      | 3/8            | 2-1/2          | 44015    | 60.30 |            |       | 44015-C3     | 75.40 |                   |       |
| .018                                    | .047           | 2      | 1/8            | 1-1/2          | 46018    | 35.00 | 46018-C1   | 41.40 | 46018-C3     | 41.40 |                   |       |
| .020                                    | .020           | 2      | 1/8            | 1-1/2          | 932220   | 45.40 |            |       | 932220-C3    | 51.80 |                   |       |
| .020                                    | .047           | 2      | 1/8            | 1-1/2          | 46020    | 34.40 | 46020-C1   | 40.80 | 46020-C3     | 40.80 | 46020-C4          | 53.70 |
| .020                                    | .047           | 2      | 3/16           | 4 LONG!        | 928020   | 69.80 |            |       | 928020-C3    | 78.70 |                   |       |
| .020                                    | .060           | 4      | 1/8            | 1-1/2          | 929920   | 55.90 |            |       | 929920-C3    | 62.30 |                   |       |
| .020                                    | .250           | 4      | 3/8            | 2-1/2          | 44020    | 60.30 |            |       | 44020-C3     | 75.40 |                   |       |
| .022                                    | .047           | 2      | 1/8            | 1-1/2          | 46022    | 35.00 | 46022-C1   | 41.40 | 46022-C3     | 41.40 |                   |       |
| .025                                    | .020           | 2      | 1/8            | 1-1/2          | 932225   | 45.40 |            |       | 932225-C3    | 51.80 |                   |       |
| .025                                    | .047           | 2      | 1/8            | 1-1/2          | 46025    | 34.40 | 46025-C1   | 40.80 | 46025-C3     | 40.80 | 46025-C4          | 53.70 |
| .025                                    | .250           | 4      | 3/8            | 2-1/2          | 44025    | 60.30 |            |       | 44025-C3     | 75.40 |                   |       |
| .027                                    | .047           | 2      | 1/8            | 1-1/2          | 46027    | 35.00 | 46027-C1   | 41.40 | 46027-C3     | 41.40 |                   |       |
| .030                                    | .047           | 2      | 1/8            | 1-1/2          | 46030    | 35.00 | 46030-C1   | 41.40 | 46030-C3     | 41.40 | 46030-C4          | 54.30 |
| .030                                    | .250           | 4      | 3/8            | 2-1/2          | 44030    | 66.10 |            |       | 44030-C3     | 81.20 |                   |       |
| .031 (1/32)                             | .020           | 2      | 1/8            | 1-1/2          | 932231   | 45.40 |            |       | 932231-C3    | 51.80 |                   |       |
| .031 (1/32)                             | .047           | 2      | 1/8            | 1-1/2          | 46031    | 34.40 | 46031-C1   | 40.80 | 46031-C3     | 40.80 | 46031-C4          | 53.70 |
| .031 (1/32)                             | .047           | 2      | 3/16           | 4 LONG!        | 928031   | 69.80 |            |       | 928031-C3    | 78.70 |                   |       |
| .031 (1/32)                             | .060           | 4      | 1/8            | 1-1/2          | 929931   | 54.90 |            |       | 929931-C3    | 61.30 |                   |       |
| .031 (1/32)                             | .250           | 4      | 3/8            | 2-1/2          | 44031    | 66.10 |            |       | 44031-C3     | 81.20 |                   |       |
| .032                                    | .047           | 2      | 1/8            | 1-1/2          | 46032    | 38.80 | 46032-C1   | 45.20 | 46032-C3     | 45.20 |                   |       |
| .035                                    | .047           | 2      | 1/8            | 1-1/2          | 46035    | 38.80 | 46035-C1   | 45.20 | 46035-C3     | 45.20 |                   |       |
| .039 (1 mm)                             | .020           | 2      | 1/8            | 1-1/2          | 932239   | 39.60 |            |       | 932239-C3    | 46.00 |                   |       |
| .039 (1 mm)                             | .047           | 2      | 1/8            | 1-1/2          | 46039    | 38.80 | 46039-C1   | 45.20 | 46039-C3     | 45.20 | 46039-C4          | 58.10 |
| .039 (1 mm)                             | .060           | 4      | 3/16           | 2              | 929939   | 55.90 |            |       | 929939-C3    | 63.50 |                   |       |
| .039 (1 mm)                             | .250           | 4      | 3/8            | 2-1/2          | 44039    | 66.10 |            |       | 44039-C3     | 81.20 |                   |       |

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CORNER ROUNDING END MILLS

CORNER ROUNDING END MILLS

2 & 4 Flute – Unflared (cont.)

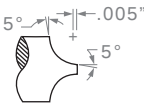
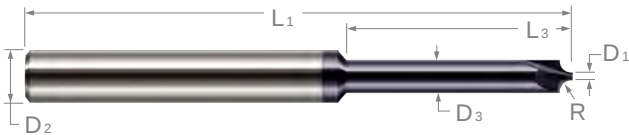
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|                                   |                |        |                |                | UNCOATED |        | TIN COATED |        | AITIN COATED |        | AMORPHOUS DIAMOND |        |
|-----------------------------------|----------------|--------|----------------|----------------|----------|--------|------------|--------|--------------|--------|-------------------|--------|
| RADIUS                            | PILOT DIA.     | FLUTES | SHANK DIA.     | OAL            | TOOL #   | PRICE  | TOOL #     | PRICE  | TOOL #       | PRICE  | TOOL #            | PRICE  |
| R <sup>+ .0005"</sup><br>- .0005" | D <sub>1</sub> |        | D <sub>2</sub> | L <sub>1</sub> |          |        |            |        |              |        |                   |        |
| .043                              | .047           | 2      | 3/16           | 2              | 46043    | 46.10  | 46043-C1   | 53.70  | 46043-C3     | 53.70  |                   |        |
| .047 (3/64)                       | .047           | 2      | 3/16           | 2              | 46047    | 45.40  | 46047-C1   | 53.00  | 46047-C3     | 53.00  | 46047-C4          | 72.10  |
| .047 (3/64)                       | .250           | 4      | 3/8            | 2-1/2          | 44047    | 67.40  |            |        | 44047-C3     | 82.50  |                   |        |
| .050                              | .047           | 2      | 3/16           | 2              | 46050    | 45.40  | 46050-C1   | 53.00  | 46050-C3     | 53.00  | 46050-C4          | 72.10  |
| .050                              | .250           | 4      | 3/8            | 2-1/2          | 44050    | 66.10  |            |        | 44050-C3     | 81.20  |                   |        |
| .055                              | .047           | 2      | 3/16           | 2              | 46055    | 45.40  | 46055-C1   | 53.00  | 46055-C3     | 53.00  |                   |        |
| .060                              | .047           | 2      | 3/16           | 2              | 46060    | 46.90  | 46060-C1   | 54.50  | 46060-C3     | 54.50  | 46060-C4          | 73.60  |
| .060                              | .250           | 4      | 1/2            | 3              | 44060    | 93.30  |            |        | 44060-C3     | 114.00 |                   |        |
| .062 (1/16)                       | .047           | 2      | 3/16           | 2              | 46062    | 46.10  | 46062-C1   | 53.70  | 46062-C3     | 53.70  | 46062-C4          | 72.80  |
| .062 (1/16)                       | .047           | 2      | 1/4            | 4              | 928062   | 83.40  |            |        | 928062-C3    | 93.60  |                   |        |
| .062 (1/16)                       | .060           | 4      | 3/16           | 2              | 929962   | 61.70  |            |        | 929962-C3    | 69.30  |                   |        |
| .062 (1/16)                       | .110           | 2      | 1/4            | 2              | 793462   | 53.10  |            |        | 793462-C3    | 63.50  |                   |        |
| .062 (1/16)                       | .250           | 4      | 1/2            | 3              | 44062    | 93.30  |            |        | 44062-C3     | 114.00 |                   |        |
| .067                              | .047           | 2      | 3/16           | 2              | 46067    | 46.90  | 46067-C1   | 54.50  | 46067-C3     | 54.50  |                   |        |
| .072                              | .047           | 2      | 1/4            | 2              | 46072    | 53.90  | 46072-C1   | 64.00  | 46072-C3     | 64.30  |                   |        |
| .078 (5/64)                       | .047           | 2      | 1/4            | 2              | 46078    | 53.10  | 46078-C1   | 63.20  | 46078-C3     | 63.50  | 46078-C4          | 83.50  |
| .078 (5/64)                       | .060           | 4      | 1/4            | 2              | 929978   | 76.60  |            |        | 929978-C3    | 87.00  |                   | NEW    |
| .078 (5/64)                       | .250           | 4      | 1/2            | 3              | 44078    | 93.30  |            |        | 44078-C3     | 114.00 |                   |        |
| .089                              | .047           | 2      | 1/4            | 2              | 46089    | 53.90  | 46089-C1   | 64.00  | 46089-C3     | 64.30  |                   |        |
| .093 (3/32)                       | .047           | 2      | 1/4            | 2              | 46093    | 53.90  | 46093-C1   | 64.00  | 46093-C3     | 64.30  | 46093-C4          | 84.30  |
| .093 (3/32)                       | .047           | 2      | 5/16           | 4              | 928093   | 99.60  |            |        | 928093-C3    | 113.70 |                   |        |
| .093 (3/32)                       | .060           | 4      | 1/4            | 2              | 929993   | 76.60  |            |        | 929993-C3    | 87.00  |                   |        |
| .093 (3/32)                       | .110           | 2      | 5/16           | 2-1/2          | 793493   | 82.40  |            |        | 793493-C3    | 95.00  |                   | NEW    |
| .093 (3/32)                       | .250           | 4      | 1/2            | 3              | 44093    | 105.10 |            |        | 44093-C3     | 125.80 |                   |        |
| .100                              | .047           | 2      | 1/4            | 2              | 46100    | 53.10  | 46100-C1   | 63.20  | 46100-C3     | 63.50  | 46100-C4          | 83.50  |
| .104                              | .060           | 2      | 5/16           | 2-1/2          | 46104    | 74.90  | 46104-C1   | 87.50  | 46104-C3     | 87.50  |                   |        |
| .109 (7/64)                       | .060           | 2      | 5/16           | 2-1/2          | 46109    | 73.70  | 46109-C1   | 86.30  | 46109-C3     | 86.30  |                   |        |
| .118 (3 mm)                       | .060           | 2      | 5/16           | 2-1/2          | 46118    | 74.90  | 46118-C1   | 87.50  | 46118-C3     | 87.50  | 46118-C4          | 105.30 |
| .118 (3 mm)                       | .250           | 4      | 1/2            | 3              | 44118    | 105.10 |            |        | 44118-C3     | 125.80 |                   |        |
| .125 (1/8)                        | .060           | 2      | 5/16           | 2-1/2          | 46125    | 74.90  | 46125-C1   | 87.50  | 46125-C3     | 87.50  | 46125-C4          | 105.30 |
| .125 (1/8)                        | .060           | 2      | 3/8            | 4              | 928125   | 148.60 |            |        | 928125-C3    | 164.90 |                   |        |
| .125 (1/8)                        | .110           | 2      | 3/8            | 3              | 793508   | 122.90 |            |        | 793508-C3    | 135.50 |                   |        |
| .125 (1/8)                        | .250           | 4      | 5/8            | 3-1/2          | 44125    | 154.10 |            |        | 44125-C3     | 176.60 |                   |        |
| .140 (9/64)                       | .060           | 2      | 3/8            | 2-1/2          | 46140    | 86.10  | 46140-C1   | 101.20 | 46140-C3     | 101.20 |                   |        |
| .156 (5/32)                       | .060           | 2      | 3/8            | 2-1/2          | 46156    | 93.00  | 46156-C1   | 108.10 | 46156-C3     | 108.10 |                   |        |
| .156 (5/32)                       | .250           | 4      | 5/8            | 3-1/2          | 44156    | 165.60 |            |        | 44156-C3     | 188.10 |                   |        |
| .172 (11/64)                      | .060           | 2      | 7/16           | 2-1/2          | 46172    | 152.90 | 46172-C1   | 171.70 | 46172-C3     | 172.00 |                   |        |
| .187 (3/16)                       | .060           | 2      | 7/16           | 2-1/2          | 46187    | 157.60 | 46187-C1   | 176.40 | 46187-C3     | 176.70 |                   |        |
| .187 (3/16)                       | .250           | 4      | 5/8            | 3-1/2          | 44187    | 181.20 |            |        | 44187-C3     | 203.70 |                   |        |
| .197 (5 mm)                       | .060           | 2      | 1/2            | 3              | 46197    | 218.80 | 46197-C1   | 238.80 | 46197-C3     | 239.50 |                   |        |
| .219 (7/32)                       | .060           | 2      | 1/2            | 3              | 46219    | 210.00 | 46219-C1   | 230.00 | 46219-C3     | 230.70 |                   |        |
| .236 (6 mm)                       | .110           | 2      | 5/8            | 3-1/2          | 46236    | 280.40 | 46236-C1   | 302.90 | 46236-C3     | 302.90 |                   |        |
| .250 (1/4)                        | .060           | 4      | 5/8            | 3-1/2          | 930016   | 295.50 |            |        | 930016-C3    | 318.00 |                   |        |
| .250 (1/4)                        | .110           | 2      | 5/8            | 3-1/2          | 46250    | 280.40 | 46250-C1   | 302.90 | 46250-C3     | 302.90 |                   |        |
| .250 (1/4)                        | .250           | 4      | 3/4            | 4              | 44250    | 294.10 |            |        | 44250-C3     | 320.10 |                   |        |
| .312 (5/16)                       | .250           | 2      | 1              | 4              | 46312    | 435.60 | 46312-C1   | 472.80 | 46312-C3     | 472.80 |                   |        |
| .375 (3/8)                        | .250           | 2      | 1              | 4              | 46375    | 474.70 | 46375-C1   | 511.90 | 46375-C3     | 511.90 |                   |        |

CORNER ROUNDING END MILLS

CORNER ROUNDING END MILLS

Long Reach – Flared



- **Reduced diameter for clearance along walls and in small features**
- Small pilot design for miniature holes, narrow slots and small inside corners
- Flares are tangent to radius (flare is blended to radius to ensure smooth form)
- Axial depth of cut = radius plus .005"    • 2 flutes    • Solid carbide
- CNC ground in the USA

| RADIUS                                                       | PILOT DIAMETER                                                          | NECK DIAMETER  | OVERALL REACH                                                           | SHANK DIAMETER | OVERALL LENGTH | UNCOATED |       | AItin COATED |       |
|--------------------------------------------------------------|-------------------------------------------------------------------------|----------------|-------------------------------------------------------------------------|----------------|----------------|----------|-------|--------------|-------|
|                                                              |                                                                         |                |                                                                         |                |                | 2 FL     | PRICE | 2 FL         | PRICE |
| R $\begin{smallmatrix} +.0005" \\ -.0005" \end{smallmatrix}$ | D <sub>1</sub> $\begin{smallmatrix} +.000" \\ -.001" \end{smallmatrix}$ | D <sub>3</sub> | L <sub>3</sub> $\begin{smallmatrix} +.010" \\ -.000" \end{smallmatrix}$ | D <sub>2</sub> | L <sub>1</sub> |          |       |              |       |
| .005                                                         | .010                                                                    | .031           | .156                                                                    | 1/8            | 1-1/2          | 994605   | 41.20 |              |       |
|                                                              | .010                                                                    | .031           | .250                                                                    | 1/8            | 1-1/2          | 56905    | 41.20 | 56905-C3     | 46.40 |
|                                                              | .010                                                                    | .031           | .375                                                                    | 1/8            | 1-1/2          | 57305    | 42.50 |              |       |
|                                                              | .020                                                                    | .031           | .156                                                                    | 1/8            | 1-1/2          | 992205   | 41.20 | 992205-C3    | 46.40 |
|                                                              | .020                                                                    | .031           | .250                                                                    | 1/8            | 1-1/2          | 55705    | 41.20 | 55705-C3     | 46.40 |
|                                                              | .020                                                                    | .031           | .375                                                                    | 1/8            | 1-1/2          | 56005    | 42.90 |              |       |
|                                                              | .020                                                                    | .062           | .312                                                                    | 1/8            | 1-1/2          | 990905   | 41.20 | 990905-C3    | 46.40 |
|                                                              | .020                                                                    | .062           | .500                                                                    | 1/8            | 1-1/2          | 57505    | 41.20 | 57505-C3     | 46.40 |
|                                                              | .020                                                                    | .062           | .750                                                                    | 1/8            | 2              | 55305    | 42.50 |              |       |
|                                                              | .020                                                                    | .093           | .750                                                                    | 1/8            | 2              | 57405    | 47.30 |              |       |
| .008                                                         | .010                                                                    | .031           | .156                                                                    | 1/8            | 1-1/2          | 994608   | 41.20 | 994608-C3    | 46.40 |
|                                                              | .010                                                                    | .031           | .250                                                                    | 1/8            | 1-1/2          | 56908    | 41.20 |              |       |
|                                                              | .010                                                                    | .031           | .375                                                                    | 1/8            | 1-1/2          | 57308    | 42.50 | 57308-C3     | 47.70 |
| .010                                                         | .010                                                                    | .031           | .156                                                                    | 1/8            | 1-1/2          | 994610   | 41.20 | 994610-C3    | 46.40 |
|                                                              | .010                                                                    | .031           | .250                                                                    | 1/8            | 1-1/2          | 56910    | 41.20 | 56910-C3     | 46.40 |
|                                                              | .010                                                                    | .031           | .375                                                                    | 1/8            | 1-1/2          | 57310    | 42.50 |              |       |
|                                                              | .020                                                                    | .062           | .312                                                                    | 1/8            | 1-1/2          | 990910   | 41.20 | 990910-C3    | 46.40 |
|                                                              | .020                                                                    | .062           | .500                                                                    | 1/8            | 1-1/2          | 57510    | 41.20 | 57510-C3     | 46.40 |
|                                                              | .020                                                                    | .062           | .750                                                                    | 1/8            | 2              | 55310    | 42.50 |              |       |
|                                                              | .020                                                                    | .093           | .750                                                                    | 1/8            | 2              | 57410    | 47.30 |              |       |
|                                                              | .020                                                                    | .093           | 1.125                                                                   | 1/8            | 2              | 54310    | 47.30 |              |       |
| .015                                                         | .020                                                                    | .062           | .312                                                                    | 1/8            | 1-1/2          | 990915   | 41.20 | 990915-C3    | 46.40 |
|                                                              | .020                                                                    | .062           | .500                                                                    | 1/8            | 1-1/2          | 57515    | 41.20 | 57515-C3     | 46.40 |
|                                                              | .020                                                                    | .062           | .750                                                                    | 1/8            | 2              | 55315    | 42.50 |              |       |
|                                                              | .020                                                                    | .093           | .750                                                                    | 1/8            | 2              | 57415    | 47.30 |              |       |
|                                                              | .020                                                                    | .093           | 1.125                                                                   | 1/8            | 2              | 54315    | 47.80 |              |       |
| .020                                                         | .020                                                                    | .062           | .312                                                                    | 1/8            | 1-1/2          | 990920   | 41.20 | 990920-C3    | 46.40 |
|                                                              | .020                                                                    | .062           | .500                                                                    | 1/8            | 1-1/2          | 57520    | 41.20 | 57520-C3     | 46.40 |
|                                                              | .020                                                                    | .062           | .750                                                                    | 1/8            | 2              | 55320    | 42.50 |              |       |
|                                                              | .020                                                                    | .093           | .750                                                                    | 1/8            | 2              | 57420    | 47.30 | 57420-C3     | 52.50 |
|                                                              | .020                                                                    | .093           | 1.125                                                                   | 1/8            | 2              | 54320    | 47.30 |              |       |
| .025                                                         | .020                                                                    | .093           | .750                                                                    | 1/8            | 2              | 57425    | 47.30 |              |       |
|                                                              | .020                                                                    | .093           | 1.125                                                                   | 1/8            | 2              | 54325    | 47.30 |              |       |
| .030                                                         | .020                                                                    | .093           | .750                                                                    | 1/8            | 2              | 57430    | 47.30 | 57430-C3     | 52.50 |
|                                                              | .020                                                                    | .093           | 1.125                                                                   | 1/8            | 2              | 54330    | 47.30 | 54330-C3     | 52.50 |
| .031                                                         | .020                                                                    | .093           | .750                                                                    | 1/8            | 2              | 57431    | 47.30 | 57431-C3     | 52.50 |
|                                                              | .020                                                                    | .093           | 1.125                                                                   | 1/8            | 2              | 54331    | 47.80 |              |       |

CORNER ROUNDING END MILLS

CORNER ROUNDING END MILLS

3 Flute – Flared

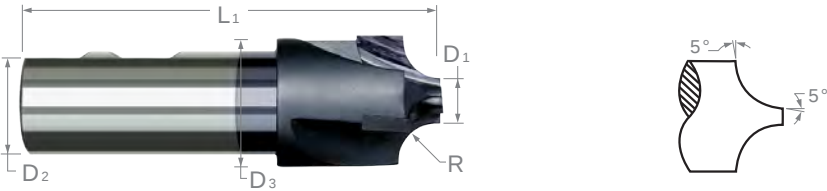


- Single end
- Cutting on radius, flares, and end only (not center cutting)
- 5° flares tangent at pilot and shoulder to avoid steps
- Axial depth of cut  $\approx$  radius plus .005"
- 3 flutes
- Solid carbide
- CNC ground in the USA

| RADIUS                                                       | PILOT DIAMETER | SHANK DIAMETER | OVERALL LENGTH | UNCOATED |        | AITiN COATED |        |
|--------------------------------------------------------------|----------------|----------------|----------------|----------|--------|--------------|--------|
|                                                              |                |                |                | 3 FL     | PRICE  | 3 FL         | PRICE  |
| R $\begin{smallmatrix} +.0005" \\ -.0005" \end{smallmatrix}$ | D <sub>1</sub> | D <sub>2</sub> | L <sub>1</sub> |          |        |              |        |
| .015 (1/64)                                                  | .046           | 1/8            | 1-1/2          | 760215   | 34.00  | 760215-C3    | 39.20  |
| .015 (1/64)                                                  | .058           | 1/8            | 1-1/2          | 933415   | 34.00  | 933415-C3    | 39.20  |
| .020                                                         | .046           | 1/8            | 1-1/2          | 760220   | 34.00  | 760220-C3    | 39.20  |
| .020                                                         | .058           | 1/8            | 1-1/2          | 933420   | 34.00  | 933420-C3    | 39.20  |
| .031 (1/32)                                                  | .046           | 1/8            | 1-1/2          | 760231   | 34.00  | 760231-C3    | 39.20  |
| .031 (1/32)                                                  | .058           | 1/8            | 1-1/2          | 933431   | 34.00  | 933431-C3    | 39.20  |
| .062 (1/16)                                                  | .058           | 3/16           | 2              | 933462   | 43.40  | 933462-C3    | 49.00  |
| .062 (1/16)                                                  | .154           | 5/16           | 2-1/2          | 928262   | 74.40  | 928262-C3    | 83.30  |
| .093 (3/32)                                                  | .058           | 1/4            | 2              | 933493   | 63.90  | 933493-C3    | 71.50  |
| .093 (3/32)                                                  | .154           | 3/8            | 2-1/2          | 928293   | 84.90  | 928293-C3    | 95.00  |
| .125 (1/8)                                                   | .058           | 5/16           | 2-1/2          | 933508   | 74.40  | 933508-C3    | 83.30  |
| .125 (1/8)                                                   | .248           | 5/8            | 3-1/2          | 973008   | 124.40 | 973008-C3    | 139.50 |
| .187 (3/16)                                                  | .058           | 7/16           | 2-1/2          | 933512   | 122.00 | 933512-C3    | 134.60 |
| .187 (3/16)                                                  | .248           | 5/8            | 3-1/2          | 973012   | 141.10 | 973012-C3    | 156.20 |

CORNER ROUNDING END MILLS

3 Flute – Flared – Carbide Tipped



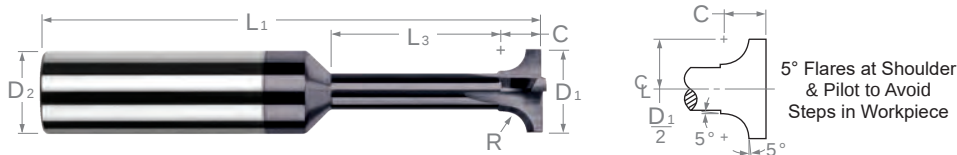
- Carbide tipped - cutting on radius and flares only
- 5° flares tangent to radius at pilot and shoulder to avoid steps
- 3 flutes
- Weldon flat
- CNC ground in the USA

| RADIUS | PILOT DIAMETER | HEAD DIAMETER  | SHANK DIAMETER | OVERALL LENGTH | UNCOATED |        | AITiN COATED |        |
|--------|----------------|----------------|----------------|----------------|----------|--------|--------------|--------|
|        |                |                |                |                | 3 FL     | PRICE  | 3 FL         | PRICE  |
| R      | D <sub>1</sub> | D <sub>3</sub> | D <sub>2</sub> | L <sub>1</sub> |          |        |              |        |
| 1/4    | 13/32          | 1              | 3/4            | 3-1/4          | 45016    | 230.70 | 45016-C3     | 255.50 |
| 5/16   | 13/32          | 1-1/8          | 7/8            | 3-1/2          | 45020    | 236.40 | 45020-C3     | 256.40 |
| 3/8    | 13/32          | 1-1/4          | 7/8            | 3-3/4          | 45024    | 244.80 | 45024-C3     | 265.80 |
| 7/16   | 13/32          | 1-3/8          | 1              | 4              | 45028    | 274.30 | 45028-C3     | 299.10 |
| 1/2    | 13/32          | 1-1/2          | 1              | 4              | 45032    | 303.40 | 45032-C3     | 328.30 |
| 5/8    | 21/32          | 2              | 1-1/4          | 4-1/4          | 45040    | 376.40 | 45040-C3     | 407.50 |

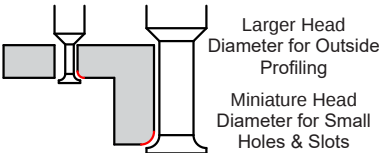
CORNER ROUNDING END MILLS

CORNER ROUNDING END MILLS

Back Corner Rounding End Mills – Flared



- Designed to mill radius on backside of workpiece
- 5° flares at neck and shoulder to avoid steps
- Flares are tangent to radius (flare is blended to radius to ensure smooth form)
- Cutting on radius and flares only
- Solid carbide
- CNC ground in the USA



| RADIUS                                                       | HEAD DIAMETER                                               | NECK DIAMETER | NECK LENGTH | RADIUS CENTER                                                | FLUTES | SHANK DIAMETER | OVERALL LENGTH | UNCOATED |       | AITIN COATED |       |
|--------------------------------------------------------------|-------------------------------------------------------------|---------------|-------------|--------------------------------------------------------------|--------|----------------|----------------|----------|-------|--------------|-------|
|                                                              |                                                             |               |             |                                                              |        |                |                | TOOL #   | PRICE | TOOL #       | PRICE |
| R $\begin{smallmatrix} +.0005" \\ -.0005" \end{smallmatrix}$ | D1 $\begin{smallmatrix} +.000" \\ -.002" \end{smallmatrix}$ |               | L3          | C $\begin{smallmatrix} +.003" \\ -.001" \end{smallmatrix}$ * |        | D2             | L1             |          |       |              |       |
| .005                                                         | .030                                                        | .017          | .062        | .025                                                         | 3      | 1/8            | 1-1/2          | 57705    | 66.60 | 57705-C3     | 71.80 |
| .005                                                         | .060                                                        | .047          | .250        | .025                                                         | 3      | 1/8            | 1-1/2          | 58005    | 66.60 | 58005-C3     | 71.80 |
| .005                                                         | .115                                                        | .102          | .875        | .025                                                         | 3      | 1/8            | 2              | 59805    | 69.40 | 59805-C3     | 74.60 |
| .008                                                         | .075                                                        | .056          | .312        | .028                                                         | 3      | 1/8            | 1-1/2          | 58708    | 66.60 | 58708-C3     | 71.80 |
| .008                                                         | .187                                                        | .144          | .500        | .070                                                         | 3      | 3/16           | 2              | 16008    | 70.70 | 16008-C3     | 76.30 |
| .010                                                         | .045                                                        | .022          | .078        | .030                                                         | 3      | 1/8            | 1-1/2          | 60910    | 66.60 | 60910-C3     | 71.80 |
| .010                                                         | .075                                                        | .052          | .281        | .030                                                         | 3      | 1/8            | 1-1/2          | 58710    | 66.60 | 58710-C3     | 71.80 |
| .010                                                         | .187                                                        | .140          | .500        | .072                                                         | 3      | 3/16           | 2              | 16010    | 70.70 | 16010-C3     | 76.30 |
| .012                                                         | .075                                                        | .048          | .250        | .032                                                         | 3      | 1/8            | 1-1/2          | 58712    | 66.60 | 58712-C3     | 71.80 |
| .015 (1/64)                                                  | .060                                                        | .027          | .093        | .035                                                         | 3      | 1/8            | 1-1/2          | 58515    | 66.60 | 58515-C3     | 71.80 |
| .015 (1/64)                                                  | .090                                                        | .057          | .312        | .035                                                         | 3      | 1/8            | 1-1/2          | 59715    | 66.60 | 59715-C3     | 71.80 |
| .015 (1/64)                                                  | .187                                                        | .130          | .500        | .077                                                         | 3      | 3/16           | 2              | 16015    | 70.70 | 16015-C3     | 76.30 |
| .015 (1/64)                                                  | .187                                                        | .130          | 1.000       | .077                                                         | 3      | 3/16           | 2-1/2          | 992815   | 71.80 | 992815-C3    | 77.40 |
| .020                                                         | .075                                                        | .032          | .109        | .040                                                         | 3      | 1/8            | 1-1/2          | 59220    | 66.60 | 59220-C3     | 71.80 |
| .020                                                         | .115                                                        | .072          | .375        | .040                                                         | 3      | 1/8            | 1-1/2          | 60420    | 66.60 | 60420-C3     | 71.80 |
| .020                                                         | .187                                                        | .120          | .500        | .082                                                         | 3      | 3/16           | 2              | 16020    | 70.70 | 16020-C3     | 76.30 |
| .022                                                         | .187                                                        | .116          | .500        | .084                                                         | 3      | 3/16           | 2              | 16022    | 70.70 | 16022-C3     | 76.30 |
| .025                                                         | .090                                                        | .037          | .125        | .055                                                         | 3      | 1/8            | 1-1/2          | 60125    | 66.60 | 60125-C3     | 71.80 |
| .025                                                         | .187                                                        | .110          | .500        | .087                                                         | 3      | 3/16           | 2              | 16025    | 70.70 | 16025-C3     | 76.30 |
| .027                                                         | .187                                                        | .106          | .500        | .089                                                         | 3      | 3/16           | 2              | 16027    | 70.70 | 16027-C3     | 76.30 |
| .030                                                         | .115                                                        | .052          | .187        | .060                                                         | 3      | 1/8            | 1-1/2          | 60630    | 66.60 | 60630-C3     | 71.80 |
| .030                                                         | .187                                                        | .100          | .500        | .092                                                         | 3      | 3/16           | 2              | 16030    | 70.70 | 16030-C3     | 76.30 |
| .030                                                         | .187                                                        | .100          | 1.000       | .092                                                         | 3      | 3/16           | 2-1/2          | 992830   | 71.80 | 992830-C3    | 77.40 |
| .031 (1/32)                                                  | .115                                                        | .050          | .156        | .061                                                         | 3      | 1/8            | 1-1/2          | 60631    | 66.60 | 60631-C3     | 71.80 |
| .031 (1/32)                                                  | .187                                                        | .098          | .500        | .093                                                         | 3      | 3/16           | 2              | 16031    | 70.70 | 16031-C3     | 76.30 |
| .031 (1/32)                                                  | .187                                                        | .098          | 1.000       | .093                                                         | 3      | 3/16           | 2-1/2          | 992831   | 71.80 | 992831-C3    | 77.40 |
| .035                                                         | .250                                                        | .153          | .500        | .097                                                         | 3      | 1/4            | 2-1/2          | 16035    | 76.90 | 16035-C3     | 84.50 |
| .039 (1 mm)                                                  | .250                                                        | .145          | .500        | .101                                                         | 3      | 1/4            | 2-1/2          | 16039    | 76.90 | 16039-C3     | 84.50 |
| .039 (1 mm)                                                  | .250                                                        | .145          | 1.000       | .101                                                         | 3      | 1/4            | 2-1/2          | 992839   | 76.90 | 992839-C3    | 84.50 |
| .040                                                         | .250                                                        | .143          | .500        | .102                                                         | 3      | 1/4            | 2-1/2          | 16040    | 76.90 | 16040-C3     | 84.50 |
| .045                                                         | .250                                                        | .133          | .500        | .107                                                         | 3      | 1/4            | 2-1/2          | 16045    | 76.90 | 16045-C3     | 84.50 |

\*Radius center is in the same plane as cutter OD (radial component of radius center = D1/2, see above drawing).

continued on next page

CORNER ROUNDING END MILLS

CORNER ROUNDING END MILLS

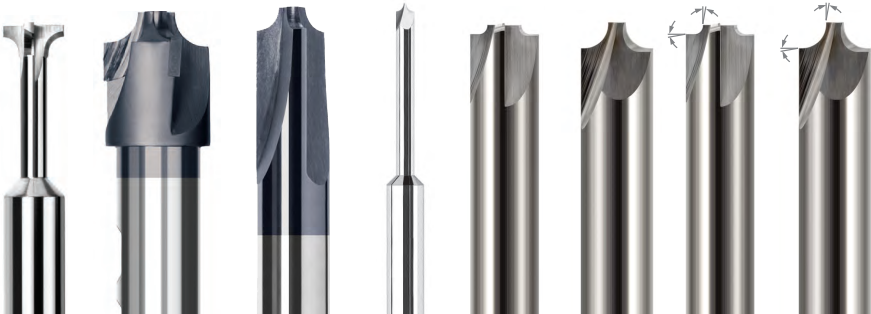
Back Corner Rounding End Mills – Flared (cont.)

continued from previous page

| RADIUS                                                       | HEAD DIAMETER                                                           | NECK DIAMETER | NECK LENGTH    | RADIUS CENTER                                                  | FLUTES | SHANK DIAMETER | OVERALL LENGTH | UNCOATED |        | AITIN COATED |        |
|--------------------------------------------------------------|-------------------------------------------------------------------------|---------------|----------------|----------------------------------------------------------------|--------|----------------|----------------|----------|--------|--------------|--------|
|                                                              |                                                                         |               |                |                                                                |        |                |                | TOOL #   | PRICE  | TOOL #       | PRICE  |
| R $\begin{smallmatrix} +.0005" \\ -.0005" \end{smallmatrix}$ | D <sub>1</sub> $\begin{smallmatrix} +.000" \\ -.002" \end{smallmatrix}$ |               | L <sub>3</sub> | C $\begin{smallmatrix} +.003" * \\ -.001" * \end{smallmatrix}$ |        | D <sub>2</sub> | L <sub>1</sub> |          |        |              |        |
| .047 (3/64)                                                  | .250                                                                    | .128          | .625           | .109                                                           | 3      | 1/4            | 2-1/2          | 16047    | 76.90  | 16047-C3     | 84.50  |
| .047 (3/64)                                                  | .250                                                                    | .128          | 1.250          | .109                                                           | 3      | 1/4            | 3              | 992847   | 84.90  | 992847-C3    | 92.50  |
| .050                                                         | .250                                                                    | .122          | .375           | .112                                                           | 3      | 1/4            | 2-1/2          | 985050   | 76.90  | 985050-C3    | 84.50  |
| .050                                                         | .250                                                                    | .122          | .625           | .112                                                           | 3      | 1/4            | 2-1/2          | 16050    | 76.90  | 16050-C3     | 84.50  |
| .050                                                         | .250                                                                    | .122          | 1.250          | .112                                                           | 3      | 1/4            | 3              | 992850   | 84.10  | 992850-C3    | 91.70  |
| .055                                                         | .250                                                                    | .113          | .625           | .117                                                           | 3      | 1/4            | 2-1/2          | 16055    | 76.90  | 16055-C3     | 84.50  |
| .060                                                         | .312                                                                    | .164          | .437           | .122                                                           | 3      | 5/16           | 2-1/2          | 985060   | 105.40 | 985060-C3    | 114.30 |
| .060                                                         | .312                                                                    | .165          | .875           | .122                                                           | 3      | 5/16           | 2-1/2          | 16060    | 105.40 | 16060-C3     | 114.30 |
| .062 (1/16)                                                  | .312                                                                    | .160          | .437           | .124                                                           | 3      | 5/16           | 2-1/2          | 985062   | 105.40 | 985062-C3    | 114.30 |
| .062 (1/16)                                                  | .312                                                                    | .161          | .875           | .124                                                           | 3      | 5/16           | 2-1/2          | 16062    | 105.40 | 16062-C3     | 114.30 |
| .062 (1/16)                                                  | .312                                                                    | .160          | 1.250          | .124                                                           | 3      | 5/16           | 3              | 992862   | 111.40 | 992862-C3    | 120.30 |
| .070                                                         | .375                                                                    | .207          | .875           | .132                                                           | 3      | 3/8            | 2-1/2          | 16070    | 120.70 | 16070-C3     | 130.80 |
| .078 (5/64)                                                  | .375                                                                    | .191          | .500           | .171                                                           | 3      | 3/8            | 2-1/2          | 985078   | 120.70 | 985078-C3    | 130.80 |
| .078 (5/64)                                                  | .375                                                                    | .191          | 1.000          | .171                                                           | 3      | 3/8            | 2-1/2          | 16078    | 120.70 | 16078-C3     | 130.80 |
| .078 (5/64)                                                  | .375                                                                    | .191          | 1.500          | .171                                                           | 3      | 3/8            | 3              | 992878   | 131.00 | 992878-C3    | 141.10 |
| .080                                                         | .375                                                                    | .187          | 1.000          | .173                                                           | 3      | 3/8            | 2-1/2          | 16080    | 120.70 | 16080-C3     | 130.80 |
| .090                                                         | .375                                                                    | .167          | 1.000          | .183                                                           | 3      | 3/8            | 2-1/2          | 16090    | 121.90 | 16090-C3     | 132.00 |
| .093 (3/32)                                                  | .375                                                                    | .161          | .500           | .186                                                           | 3      | 3/8            | 2-1/2          | 985093   | 120.70 | 985093-C3    | 130.80 |
| .093 (3/32)                                                  | .375                                                                    | .161          | 1.000          | .186                                                           | 3      | 3/8            | 2-1/2          | 16093    | 120.70 | 16093-C3     | 130.80 |
| .093 (3/32)                                                  | .375                                                                    | .161          | 1.500          | .186                                                           | 3      | 3/8            | 3              | 992893   | 131.00 | 992893-C3    | 141.10 |
| .100                                                         | .500                                                                    | .272          | .500           | .193                                                           | 4      | 1/2            | 3              | 985100   | 173.90 | 985100-C3    | 189.00 |
| .100                                                         | .500                                                                    | .272          | 1.000          | .193                                                           | 4      | 1/2            | 3              | 16100    | 173.90 | 16100-C3     | 189.00 |
| .118 (3 mm)                                                  | .500                                                                    | .236          | 1.000          | .211                                                           | 4      | 1/2            | 3              | 1613M    | 173.90 | 1613M-C3     | 189.00 |
| .125 (1/8)                                                   | .500                                                                    | .222          | .500           | .218                                                           | 4      | 1/2            | 3              | 985108   | 173.90 | 985108-C3    | 189.00 |
| .125 (1/8)                                                   | .500                                                                    | .222          | 1.000          | .218                                                           | 4      | 1/2            | 3              | 16108    | 173.90 | 16108-C3     | 189.00 |
| .125 (1/8)                                                   | .500                                                                    | .222          | 1.500          | .218                                                           | 4      | 1/2            | 3-1/2          | 992908   | 180.60 | 992908-C3    | 195.70 |
| .156 (5/32)                                                  | .625                                                                    | .284          | 1.000          | .250                                                           | 4      | 5/8            | 3-1/2          | 16110    | 235.70 | 16110-C3     | 250.80 |
| .187 (3/16)                                                  | .625                                                                    | .222          | 1.000          | .281                                                           | 4      | 5/8            | 3-1/2          | 16112    | 235.70 | 16112-C3     | 250.80 |
| .250 (1/4)                                                   | 1.000                                                                   | .471          | 1.500          | .376                                                           | 4      | 1              | 4              | 16116    | 353.90 | 16116-C3     | 378.70 |

\*Radius center is in the same plane as cutter OD (radial component of radius center = D1/2, see above drawing).

CORNER ROUNDING END MILLS



Check Out All of Our Corner Rounding Solutions!