

# CUTTING TOOLS

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We have all your Cutting Tools in stock and ready for shipment

We have the right cutting tools such as solid carbide end mills, hand reamers, carbide reamers and ejector pin counterbores to assist in the final machining of your mold. To properly machine a mold, you need the right tools for the job.

- 80% core Ball nose
- 4 Flute Square end
- 3 Flute Corner Radius
- 2 Flute Square End
- Counterbores
- Reamers



## 80% Core 2 Flute Coated Solid Carbide End Mills - Ball Nose

- AlTiN Coated for longer tool life
- Premium micro grain carbide
- H6 Shank tolerance for heat shrink applications
- Cutting diameter tolerance +.0000 - .0015
- Eliminates rough finish commonly left by typical 4 flute tools

80% core geometry offers added strength and excellent rigidity for profile milling and contouring applications. The result is less push, reduced chatter, and improved chip extraction which produces excellent finishes in valleys and pockets. Designed for hard metal milling up to 58 HRC.



| SPECIFICATIONS           |               |
|--------------------------|---------------|
| End Style                | Ball Nose     |
| Material Type            | Solid Carbide |
| Shank Diameter Tolerance | H6            |
| Coating                  | AlTiN         |
| Unit of Measure          | Inch          |
| No. of Flutes            | 2             |

| CATALOG NO.        | FLUTE DIAMETER | FLUTE LENGTH | SHANK DIAMETER |
|--------------------|----------------|--------------|----------------|
| Overall Length: 4  |                |              |                |
| 80-2125P           | 1/8            | 1/2          | 1/8            |
| 80-2187P           | 3/16           | 3/4          | 3/16           |
| 80-2250P           | 1/4            | 3/4          | 1/4            |
| 80-2312P           | 5/16           | 3/4          | 5/16           |
| 80-2375P           | 3/8            | 7/8          | 3/8            |
| 80-2500P           | 1/2            | 1            | 1/2            |
| Overall Length: 6  |                |              |                |
| 80-2126P           | 1/8            | 1/2          | 1/8            |
| 80-2188P           | 3/16           | 3/4          | 3/16           |
| 80-2251P           | 1/4            | 3/4          | 1/4            |
| 80-2313P           | 5/16           | 3/4          | 5/16           |
| 80-2376P           | 3/8            | 7/8          | 3/8            |
| 80-2501P           | 1/2            | 1            | 1/2            |
| Overall Length: 8  |                |              |                |
| 80-2377P           | 3/8            | 7/8          | 3/8            |
| 80-2502P           | 1/2            | 1            | 1/2            |
| Overall Length: 12 |                |              |                |
| 80-2503P           | 1/2            | 1            | 1/2            |

## 80% Core Metric 2 Flute Coated Solid Carbide End Mills - Ball Nose



- Metric Sizes from 6mm - 12mm
- AlTiN Coated for longer tool life
- Premium micro grain carbide
- H6 Shank tolerance for heat shrink applications
- Cutting diameter tolerance +.000 - .038 mm
- Eliminates rough finish commonly left by typical 4 flute tools

80% core geometry offers added strength and excellent rigidity for profile milling and contouring applications. The result is less push, reduced chatter, and improved chip extraction which produces excellent finishes in valleys and pockets. Designed for hard metal milling up to 58 HRc.

| SPECIFICATIONS           |               |
|--------------------------|---------------|
| End Style                | Ball Nose     |
| Material Type            | Solid Carbide |
| Shank Diameter Tolerance | H6            |
| Coating                  | AlTiN         |
| Unit of Measure          | Metric        |
| No. of Flutes            | 2             |

| CATALOG NO.            | FLUTE DIAMETER | FLUTE LENGTH | SHANK DIAMETER |
|------------------------|----------------|--------------|----------------|
| Overall Length: 100 mm |                |              |                |
| 80-2236P               | 6 mm           | 18 mm        | 6 mm           |
| 80-2315P               | 8 mm           | 20 mm        | 8 mm           |
| 80-2393P               | 10 mm          | 22 mm        | 10 mm          |
| 80-2472P               | 12 mm          | 25 mm        | 12 mm          |
| Overall Length: 150 mm |                |              |                |
| 80-2237P               | 6 mm           | 18 mm        | 6 mm           |
| 80-2316P               | 8 mm           | 20 mm        | 8 mm           |
| 80-2394P               | 10 mm          | 22 mm        | 10 mm          |
| 80-2473P               | 12 mm          | 25 mm        | 12 mm          |

## 80% Core 2 Flute Coated Solid Carbide End Mills - Ball Nose Profile



- AlTiN Coated for longer tool life
- Premium micro grain carbide
- H6 Shank tolerance for heat shrink applications
- Cutting diameter tolerance +.0000 - .0015
- Eliminates rough finish commonly left by typical 4 flute tools
- Larger shank with 3° draft angles, gives extra reach with added strength

80% core geometry offers added strength and excellent rigidity for profile milling and contouring applications. The result is less push, reduced chatter, and improved chip extraction which produces excellent finishes in valleys and pockets. Designed for hard metal milling up to 58 HRc.

| SPECIFICATIONS           |               |
|--------------------------|---------------|
| End Style                | Ball Nose     |
| Material Type            | Solid Carbide |
| Shank Diameter Tolerance | H6            |
| Coating                  | AlTiN         |
| Unit of Measure          | Inch          |
| No. of Flutes            | 2             |
| Overall Length           | 4             |

| CATALOG NO. | FLUTE DIAMETER | FLUTE LENGTH | SHANK DIAMETER |
|-------------|----------------|--------------|----------------|
| 82-2032P    | 1/32           | 1/16         | 1/4            |
| 82-2062P    | 1/16           | 1/8          | 1/4            |
| 82-2093P    | 3/32           | 3/16         | 1/4            |
| 82-2125P    | 1/8            | 1/4          | 1/4            |
| 82-2126P    | 1/8            | 1/4          | 3/8            |
| 82-2187P    | 3/16           | 3/8          | 3/8            |
| 82-2250P    | 1/4            | 1/2          | 3/8            |
| 82-2312P    | 5/16           | 5/8          | 3/8            |
| 82-2375P    | 3/8            | 3/4          | 1/2            |
| 82-2437P    | 7/16           | 7/8          | 1/2            |

## 80% Core 2 Flute Coated Solid Carbide End Mills - Corner Radius



- AlTiN Coated for longer tool life
- Premium micro grain carbide
- H6 Shank tolerance for heat shrink applications
- Cutting diameter tolerance +.0000 - .0015
- Eliminates rough finish commonly left by typical 4 flute tools

80% core geometry offers added strength and excellent rigidity for profile milling and contouring applications. The result is less push, reduced chatter, and improved chip extraction which produces excellent finishes in valleys and pockets. Designed for hard metal milling up to 58 HRc.

| SPECIFICATIONS           |               |
|--------------------------|---------------|
| End Style                | Corner Radius |
| Material Type            | Solid Carbide |
| Shank Diameter Tolerance | H6            |
| Coating                  | AlTiN         |
| Unit of Measure          | Inch          |
| No. of Flutes            | 2             |

| CATALOG NO.        | FLUTE DIAMETER | FLUTE LENGTH | SHANK DIAMETER | CORNER RADIUS |
|--------------------|----------------|--------------|----------------|---------------|
| Overall Length: 4  |                |              |                |               |
| 81-2187P           | 3/16           | 3/4          | 3/16           | 0.020         |
| 81-2250P           | 1/4            | 3/4          | 1/4            | 0.030         |
| 81-2375P           | 3/8            | 7/8          | 3/8            | 0.030         |
| 81-2500P           | 1/2            | 1            | 1/2            | 0.030         |
| Overall Length: 6  |                |              |                |               |
| 81-2188P           | 3/16           | 3/4          | 3/16           | 0.020         |
| 81-2251P           | 1/4            | 3/4          | 1/4            | 0.030         |
| 81-2376P           | 3/8            | 7/8          | 3/8            | 0.030         |
| 81-2501P           | 1/2            | 1            | 1/2            | 0.030         |
| Overall Length: 8  |                |              |                |               |
| 81-2502P           | 1/2            | 1            | 1/2            | 0.030         |
| Overall Length: 12 |                |              |                |               |
| 81-2503P           | 1/2            | 1            | 1/2            | 0.030         |

## Variable 4 Flute Coated Solid Carbide End Mills - Square End

- AlTiN Coated for longer tool life
- Premium micro grain carbide
- H6 Shank tolerance for heat shrink applications
- Cutting diameter tolerance +.0000 - .0015
- Designed for rough cut and finish milling
- Ideal for hard to machine materials such as P-20, Stainless Steel and pre-heat treated metals up to 45 HRc

The unique high performance variable helix flute geometry reduces harmonics and diminishes chatter so higher feed rates can be obtained. The versatility of this tool helps you to save time by reducing tool changes. Use this tool to replace the typical old fashioned 4 flute end mills.



| SPECIFICATIONS           |               |
|--------------------------|---------------|
| End Style                | Square End    |
| Material Type            | Solid Carbide |
| Shank Diameter Tolerance | H6            |
| Coating                  | AlTiN         |
| Unit of Measure          | Inch          |
| No. of Flutes            | 4             |

| CATALOG NO.           | FLUTE DIAMETER | FLUTE LENGTH | SHANK DIAMETER |
|-----------------------|----------------|--------------|----------------|
| Overall Length: 1-1/2 |                |              |                |
| 90-4125SCP            | 1/8            | 1/2          | 1/8            |
| Overall Length: 2     |                |              |                |
| 90-4093SCP            | 3/32           | 1/2          | 3/32           |
| 90-4156SCP            | 5/32           | 5/8          | 5/32           |
| 90-4187SCP            | 3/16           | 5/8          | 3/16           |
| Overall Length: 2-1/2 |                |              |                |
| 90-4250SCP            | 1/4            | 3/4          | 1/4            |

## Variable 4 Flute Coated Solid Carbide End Mills - Corner Radius



- AlTiN Coated for longer tool life
- Premium micro grain carbide
- H6 Shank tolerance for heat shrink applications
- Cutting diameter tolerance +.0000 - .0015
- Designed for rough cut and finish milling
- Ideal for hard to machine materials such as P-20, Stainless Steel and pre-heat treated metals up to 45 HRc

The unique high performance variable helix flute geometry reduces harmonics and diminishes chatter so higher feed rates can be obtained. The versatility of this tool helps you to save time by reducing tool changes. Use this tool to replace the typical old fashioned 4 flute end mills.

| SPECIFICATIONS           |               |
|--------------------------|---------------|
| End Style                | Corner Radius |
| Material Type            | Solid Carbide |
| Shank Diameter Tolerance | H6            |
| Coating                  | AlTiN         |
| Unit of Measure          | Inch          |
| No. of Flutes            | 4             |

| CATALOG NO.           | FLUTE DIAMETER | FLUTE LENGTH | SHANK DIAMETER | CORNER RADIUS |
|-----------------------|----------------|--------------|----------------|---------------|
| Overall Length: 1-1/2 |                |              |                |               |
| 90-4125P              | 1/8            | 1/2          | 1/8            | 0.015         |
| Overall Length: 2     |                |              |                |               |
| 90-4126P              | 1/8            | 3/4          | 1/8            | 0.015         |
| 90-4187P              | 3/16           | 5/8          | 3/16           | 0.020         |
| Overall Length: 2-1/2 |                |              |                |               |
| 90-4188P              | 3/16           | 3/4          | 3/16           | 0.020         |
| 90-4250P              | 1/4            | 3/4          | 1/4            | 0.020         |
| 90-4312P              | 5/16           | 7/8          | 5/16           | 0.020         |
| 90-4375P              | 3/8            | 7/8          | 3/8            | 0.030         |
| Overall Length: 2-3/4 |                |              |                |               |
| 90-4437P              | 7/16           | 1            | 7/16           | 0.030         |
| Overall Length: 3     |                |              |                |               |
| 90-4251P              | 1/4            | 1 1/8        | 1/4            | 0.020         |
| 90-4313P              | 5/16           | 1 1/8        | 5/16           | 0.020         |
| 90-4376P              | 3/8            | 1 1/8        | 3/8            | 0.030         |
| 90-4500P              | 1/2            | 1            | 1/2            | 0.030         |

Continued on next page

## Variable 4 Flute Coated Solid Carbide End Mills - Corner Radius



- AlTiN Coated for longer tool life
- Premium micro grain carbide
- H6 Shank tolerance for heat shrink applications
- Cutting diameter tolerance +.0000 - .0015
- Designed for rough cut and finish milling
- Ideal for hard to machine materials such as P-20, Stainless Steel and pre-heat treated metals up to 45 HRc

The unique high performance variable helix flute geometry reduces harmonics and diminishes chatter so higher feed rates can be obtained. The versatility of this tool helps you to save time by reducing tool changes. Use this tool to replace the typical old fashioned 4 flute end mills.

| SPECIFICATIONS           |               |
|--------------------------|---------------|
| End Style                | Corner Radius |
| Material Type            | Solid Carbide |
| Shank Diameter Tolerance | H6            |
| Coating                  | AlTiN         |
| Unit of Measure          | Inch          |
| No. of Flutes            | 4             |

| CATALOG NO.           | FLUTE DIAMETER | FLUTE LENGTH | SHANK DIAMETER | CORNER RADIUS |
|-----------------------|----------------|--------------|----------------|---------------|
| Overall Length: 3-1/2 |                |              |                |               |
| 90-4625P              | 5/8            | 1-1/4        | 5/8            | 0.030         |
| Overall Length: 4     |                |              |                |               |
| 90-4438P              | 7/16           | 2            | 7/16           | 0.030         |
| 90-4501P              | 1/2            | 2            | 1/2            | 0.030         |
| 90-4750P              | 3/4            | 1-1/2        | 3/4            | 0.030         |
| 90-4100P              | 1              | 1-1/2        | 1              | 0.030         |
| Overall Length: 5     |                |              |                |               |
| 90-4626P              | 5/8            | 2-1/4        | 5/8            | 0.030         |
| 90-4751P              | 3/4            | 2-1/4        | 3/4            | 0.030         |
| 90-4101P              | 1              | 2-1/4        | 1              | 0.030         |
| Overall Length: 6     |                |              |                |               |
| 90-4752P              | 3/4            | 3            | 3/4            | 0.030         |
| 90-4102P              | 1              | 3            | 1              | 0.030         |
| Overall Length: 7     |                |              |                |               |
| 90-4103P              | 1              | 4            | 1              | 0.030         |

## Variable 4 Flute Coated Solid Carbide End Mills - Corner Radius Extended Reach



- Extra long shanks for hard to reach machining
- AlTiN Coated for longer tool life
- Premium micro grain carbide
- H6 Shank tolerance for heat shrink applications
- Cutting diameter tolerance +.0000 - .0015
- Designed for rough cut and finish milling
- Ideal for hard to machine materials such as P-20, Stainless Steel and pre-heat treated metals up to 45 HRc

The unique high performance variable helix flute geometry reduces harmonics and diminishes chatter so higher feed rates can be obtained. The versatility of this tool helps you to save time by reducing tool changes. Use this tool to replace the typical old fashioned 4 flute end mills.

| SPECIFICATIONS           |               |
|--------------------------|---------------|
| End Style                | Corner Radius |
| Fractional Size          | 1/8 OS        |
| Material Type            | Solid Carbide |
| Shank Diameter Tolerance | H6            |
| Coating                  | AlTiN         |
| Unit of Measure          | Inch          |
| No. of Flutes            | 4             |

| CATALOG NO.       | FLUTE DIAMETER | FLUTE LENGTH | SHANK DIAMETER | CORNER RADIUS |
|-------------------|----------------|--------------|----------------|---------------|
| Overall Length: 4 |                |              |                |               |
| 90-4125-4P        | 1/8            | 1/2          | 1/8            | 0.020         |
| 90-4187-4P        | 3/16           | 5/8          | 3/16           | 0.020         |
| 90-4250-4P        | 1/4            | 3/4          | 1/4            | 0.020         |
| 90-4312-4P        | 5/16           | 7/8          | 5/16           | 0.020         |
| 90-4375-4P        | 3/8            | 7/8          | 3/8            | 0.020         |
| Overall Length: 5 |                |              |                |               |
| 90-4500-4P        | 5/32           | 1-1/2        | 1/4            | 0.007         |
| Overall Length: 6 |                |              |                |               |
| 90-4507-060P      | 1/2            | 1            | 1/2            | 0.060         |

## Extended Reach 4 Flute Coated Solid Carbide End Mills - Ball Nose



- Extra long shanks for hard to reach machining
- TiAlN Coated for extended tool life
- Premium micro grain carbide
- H6 Shank tolerance for heat shrink applications
- Cutting diameter tolerance +.0000 - .0015
- Shorter flute length for maximum strength
- 30° helix general purpose ball nose

These extended reach tools add extra length to normal diameters for deeper cuts.

| SPECIFICATIONS           |               |
|--------------------------|---------------|
| End Style                | Ball Nose     |
| Material Type            | Solid Carbide |
| Shank Diameter Tolerance | H6            |
| Coating                  | TiAlN         |
| Unit of Measure          | Inch          |
| No. of Flutes            | 4             |

| CATALOG NO.       | FLUTE DIAMETER | FLUTE LENGTH | SHANK DIAMETER |
|-------------------|----------------|--------------|----------------|
| Overall Length: 4 |                |              |                |
| 51-4125P          | 1/8            | 1/2          | 1/8            |
| 51-4187P          | 3/16           | 5/8          | 3/16           |
| 51-4250P          | 1/4            | 3/4          | 1/4            |
| 51-4312P          | 5/16           | 7/8          | 5/16           |
| 51-4375P          | 3/8            | 7/8          | 3/8            |
| 51-4500P          | 1/2            | 1            | 1/2            |
| Overall Length: 6 |                |              |                |
| 51-4126P          | 1/8            | 1/2          | 1/8            |
| 51-4188P          | 3/16           | 5/8          | 3/16           |
| 51-4251P          | 1/4            | 3/4          | 1/4            |
| 51-4313P          | 5/16           | 7/8          | 5/16           |
| 51-4376P          | 3/8            | 7/8          | 3/8            |
| 51-4501P          | 1/2            | 1            | 1/2            |
| 51-4626P          | 5/8            | 1-1/4        | 5/8            |
| 51-4751P          | 3/4            | 1-1/2        | 3/4            |

## Extended Reach 4 Flute Coated Solid Carbide End Mills - Square End



- Extra long shanks for hard to reach machining
- TiAlN Coated for extended tool life
- Premium micro grain carbide
- H6 Shank tolerance for heat shrink applications
- Cutting diameter tolerance +.0000 - .0015
- Shorter flute length for maximum strength
- 30° helix general purpose Square End

These extended reach tools add extra length to normal diameters for deeper cuts.

| SPECIFICATIONS           |               |
|--------------------------|---------------|
| End Style                | Square End    |
| Material Type            | Solid Carbide |
| Shank Diameter Tolerance | H6            |
| Coating                  | TiAlN         |
| Unit of Measure          | Inch          |
| No. of Flutes            | 4             |

| CATALOG NO.       | FLUTE DIAMETER | FLUTE LENGTH | SHANK DIAMETER |
|-------------------|----------------|--------------|----------------|
| Overall Length: 4 |                |              |                |
| 41-4125P          | 1/8            | 1/2          | 1/8            |
| 41-4187P          | 3/16           | 5/8          | 3/16           |
| 41-4250P          | 1/4            | 3/4          | 1/4            |
| 41-4312P          | 5/16           | 7/8          | 5/16           |
| 41-4375P          | 3/8            | 7/8          | 3/8            |
| 41-4500P          | 1/2            | 1            | 1/2            |
| Overall Length: 6 |                |              |                |
| 41-4126P          | 1/8            | 1/2          | 1/8            |
| 41-4188P          | 3/16           | 5/8          | 3/16           |
| 41-4251P          | 1/4            | 3/4          | 1/4            |
| 41-4313P          | 5/16           | 7/8          | 5/16           |
| 41-4376P          | 3/8            | 7/8          | 3/8            |
| 41-4501P          | 1/2            | 1            | 1/2            |
| 41-4626P          | 5/8            | 1-1/4        | 5/8            |
| 41-4751P          | 3/4            | 1-1/2        | 3/4            |

## Variable 3 Flute Coated Solid Carbide End Mills - Corner Radius (For Machining Aluminum)



- Hard Carbon Coating out performs TiN, TiCN and ZrN in aluminum and nonferrous applications
- Premium micro grain carbide
- H6 Shank tolerance for heat shrink applications
- Cutting diameter tolerance +.0000 - .0015
- Designed for rough cut and finish milling
- Small corner radius for added strength
- Ideal for spindle speeds above 5000 rpm

Have the need for Speed? Take this Variable 3 flute tool and run through aluminum like a hot knife through butter. These high performance tools have a new hydrogen free coating that out performs TiN, TiCN and ZrN in aluminum and nonferrous applications. This tool will not adhere to aluminum.

| SPECIFICATIONS           |               |
|--------------------------|---------------|
| End Style                | Corner Radius |
| Material Type            | Solid Carbide |
| Shank Diameter Tolerance | H6            |
| Coating                  | Hard Carbon   |
| Unit of Measure          | Inch          |
| No. of Flutes            | 3             |

| CATALOG NO.           | FLUTE DIAMETER | FLUTE LENGTH | SHANK DIAMETER | CORNER RADIUS |
|-----------------------|----------------|--------------|----------------|---------------|
| Overall Length: 1-1/2 |                |              |                |               |
| 42-3125P              | 1/8            | 1/2          | 1/8            | 0.007         |
| Overall Length: 2     |                |              |                |               |
| 42-3126P              | 1/8            | 3/4          | 1/8            | 0.007         |
| 42-3187P              | 3/16           | 5/8          | 3/16           | 0.010         |
| Overall Length: 2-1/2 |                |              |                |               |
| 42-3188P              | 3/16           | 3/4          | 3/16           | 0.010         |
| 42-3250P              | 1/4            | 3/4          | 1/4            | 0.010         |
| 42-3312P              | 5/16           | 7/8          | 5/16           | 0.010         |
| 42-3375P              | 3/8            | 7/8          | 3/8            | 0.010         |
| Overall Length: 3     |                |              |                |               |
| 42-3127P              | 1/8            | 1            | 1/8            | 0.007         |
| 42-3189P              | 3/16           | 1-1/8        | 3/16           | 0.010         |
| 42-3251P              | 1/4            | 1-1/8        | 1/4            | 0.010         |
| 42-3313P              | 5/16           | 1-1/8        | 5/16           | 0.010         |
| 42-3376P              | 3/8            | 1-1/8        | 3/8            | 0.010         |
| 42-3500P              | 1/2            | 1-1/4        | 1/2            | 0.010         |

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## Variable 3 Flute Coated Solid Carbide End Mills - Corner Radius (For Machining Aluminum)



- Hard Carbon Coating out performs TIN, TICN and ZRN in aluminum and nonferrous applications
- Premium micro grain carbide
- H6 Shank tolerance for heat shrink applications
- Cutting diameter tolerance +.0000 - .0015
- Designed for rough cut and finish milling
- Small corner radius for added strength
- Ideal for spindle speeds above 5000 rpm

Have the need for Speed? Take this Variable 3 flute tool and run through aluminum like a hot knife through butter. These high performance tools have a new hydrogen free coating that out performs TIN, TICN and ZRN in aluminum and nonferrous applications. This tool will not adhere to aluminum.

| SPECIFICATIONS           |               |
|--------------------------|---------------|
| End Style                | Corner Radius |
| Material Type            | Solid Carbide |
| Shank Diameter Tolerance | H6            |
| Coating                  | Hard Carbon   |
| Unit of Measure          | Inch          |
| No. of Flutes            | 3             |

| CATALOG NO.           | FLUTE DIAMETER | FLUTE LENGTH | SHANK DIAMETER | CORNER RADIUS |
|-----------------------|----------------|--------------|----------------|---------------|
| Overall Length: 3-1/2 |                |              |                |               |
| 42-3625P              | 5/8            | 1-1/4        | 5/8            | 0.010         |
| Overall Length: 4     |                |              |                |               |
| 42-3252P              | 1/4            | 1 1/2        | 1/4            | 0.010         |
| 42-3314P              | 5/16           | 1 3/4        | 5/16           | 0.010         |
| 42-3377P              | 3/8            | 1 3/4        | 3/8            | 0.010         |
| 42-3501P              | 1/2            | 2            | 1/2            | 0.010         |
| 42-3750P              | 3/4            | 1 1/2        | 3/4            | 0.010         |
| 42-3100P              | 1              | 1 1/2        | 1              | 0.010         |
| Overall Length: 5     |                |              |                |               |
| 42-3626P              | 5/8            | 2 1/4        | 5/8            | 0.010         |
| 42-3751P              | 3/4            | 2 1/4        | 3/4            | 0.010         |
| 42-3101P              | 1              | 2 1/4        | 1              | 0.010         |
| Overall Length: 6     |                |              |                |               |
| 42-3502P              | 1/2            | 3            | 1/2            | 0.010         |
| 42-3627P              | 5/8            | 3            | 5/8            | 0.010         |
| 42-3752P              | 3/4            | 3            | 3/4            | 0.010         |
| 42-3102P              | 1              | 3            | 1              | 0.010         |

## Extended Reach 2 Flute Solid Carbide End Mills - Ball Nose (For Machining Aluminum)

- Extra long shanks for hard to reach machining
- Premium micro grain carbide
- H6 Shank tolerance for heat shrink applications
- Cutting diameter tolerance +.0000 - .0015
- Shorter flute length for maximum strength
- 30° helix general purpose ball nose

Great for cutting Aluminum, these extended reach tools add extra length to normal diameters for deeper cuts.



| SPECIFICATIONS           |               |
|--------------------------|---------------|
| End Style                | Ball Nose     |
| Material Type            | Solid Carbide |
| Shank Diameter Tolerance | H6            |
| Unit of Measure          | Inch          |
| No. of Flutes            | 2             |

| CATALOG NO.        | FLUTE DIAMETER | FLUTE LENGTH | SHANK DIAMETER |
|--------------------|----------------|--------------|----------------|
| Overall Length: 4  |                |              |                |
| 50-2125P           | 1/8            | 1/2          | 1/8            |
| 50-2187P           | 3/16           | 5/8          | 3/16           |
| 50-2250P           | 1/4            | 3/4          | 1/4            |
| 50-2312P           | 5/16           | 7/8          | 5/16           |
| 50-2375P           | 3/8            | 7/8          | 3/8            |
| 50-2500P           | 1/2            | 1            | 1/2            |
| Overall Length: 6  |                |              |                |
| 50-2126P           | 1/8            | 1/2          | 1/8            |
| 50-2188P           | 3/16           | 5/8          | 3/16           |
| 50-2251P           | 1/4            | 3/4          | 1/4            |
| 50-2313P           | 5/16           | 7/8          | 5/16           |
| 50-2376P           | 3/8            | 7/8          | 3/8            |
| 50-2501P           | 1/2            | 1            | 1/2            |
| 50-2626P           | 5/8            | 1 1/4        | 5/8            |
| 50-2751P           | 3/4            | 1 1/2        | 3/4            |
| Overall Length: 8  |                |              |                |
| 50-2377P           | 3/8            | 7/8          | 3/8            |
| 50-2502P           | 1/2            | 1            | 1/2            |
| Overall Length: 10 |                |              |                |
| 50-2503P           | 1/2            | 1            | 1/2            |
| Overall Length: 12 |                |              |                |
| 50-2504P           | 1/2            | 1            | 1/2            |



## Extended Reach 2 Flute Solid Carbide End Mills - Square End (For Machining Aluminum)



- Extra long shanks for hard to reach machining
- Premium micro grain carbide
- H6 Shank tolerance for heat shrink applications
- Cutting diameter tolerance +.0000 - .0015
- Shorter flute length for maximum strength
- 30° helix general purpose square end

Great for cutting Aluminum, these extended reach tools add extra length to normal diameters for deeper cuts.

| SPECIFICATIONS           |               |
|--------------------------|---------------|
| End Style                | Square End    |
| Material Type            | Solid Carbide |
| Shank Diameter Tolerance | H6            |
| Unit of Measure          | Inch          |
| No. of Flutes            | 2             |

| CATALOG NO.        | FLUTE DIAMETER | FLUTE LENGTH | SHANK DIAMETER |
|--------------------|----------------|--------------|----------------|
| Overall Length: 4  |                |              |                |
| 40-2125P           | 1/8            | 1/2          | 1/8            |
| 40-2187P           | 3/16           | 5/8          | 3/16           |
| 40-2250P           | 1/4            | 3/4          | 1/4            |
| 40-2312P           | 5/16           | 7/8          | 5/16           |
| 40-2375P           | 3/8            | 7/8          | 3/8            |
| 40-2500P           | 1/2            | 1            | 1/2            |
| Overall Length: 6  |                |              |                |
| 40-2126P           | 1/8            | 1/2          | 1/8            |
| 40-2188P           | 3/16           | 5/8          | 3/16           |
| 40-2251P           | 1/4            | 3/4          | 1/4            |
| 40-2313P           | 5/16           | 7/8          | 5/16           |
| 40-2376P           | 3/8            | 7/8          | 3/8            |
| 40-2501P           | 1/2            | 1            | 1/2            |
| 40-2626P           | 5/8            | 1 1/4        | 5/8            |
| 40-2751P           | 3/4            | 1 1/2        | 3/4            |
| Overall Length: 8  |                |              |                |
| 40-2377P           | 3/8            | 7/8          | 3/8            |
| 40-2502P           | 1/2            | 1            | 1/2            |
| Overall Length: 10 |                |              |                |
| 40-2503P           | 1/2            | 1            | 1/2            |
| Overall Length: 12 |                |              |                |
| 40-2504P           | 1/2            | 1            | 1/2            |

## Ejector Pin Counterbores

- Angled Pilot for easy pickup of holes
- Built in 45° Chamfer provides clearance for radius under Ejector Pin head
- Manufactured from high speed steel with precision ground cutting edges for even chip load and fast smooth chip clearance
- Pilot diameter on counterbore tool is .002" - .004" under the corresponding ejector pin body diameter.

Ejector Pin Counterbores are manufactured from high speed steel and allow for the drilling of ejector pin holes in the ejector retainer plate. The built in chamfer provides clearance for the radius under the ejector pin head. Holes are easily picked up due to the angled pilot design of each counterbore.



| SPECIFICATIONS  |                  |
|-----------------|------------------|
| Material Type   | High Speed Steel |
| Unit of Measure | Inch             |

| CATALOG NO. | EJECTOR PIN BODY DIAMETER | OVERALL LENGTH | COUNTERBORE BODY DIAMETER | SHANK DIAMETER | PILOT LENGTH |
|-------------|---------------------------|----------------|---------------------------|----------------|--------------|
| ECB-9       | 1/8                       | 2-5/8          | 9/32                      | 1/4            | 3/16         |
| ECB-11      | 5/32                      | 2-3/4          | 5/16                      | 1/4            | 3/16         |
| ECB-13      | 3/16                      | 3-1/4          | 13/32                     | 3/8            | 3/16         |
| ECB-15      | 7/32                      | 3-3/8          | 7/16                      | 3/8            | 1/4          |
| ECB-17      | 1/4                       | 3-9/16         | 15/32                     | 7/16           | 1/4          |
| ECB-19      | 9/32                      | 3-9/16         | 15/32                     | 7/16           | 1/4          |
| ECB-21      | 5/16                      | 3-7/8          | 17/32                     | 1/2            | 5/16         |
| ECB-23      | 11/32                     | 4-1/4          | 19/32                     | 1/2            | 5/16         |
| ECB-25      | 3/8                       | 4-1/2          | 21/32                     | 5/8            | 5/16         |
| ECB-29      | 7/16                      | 4-3/4          | 23/32                     | 5/8            | 5/16         |
| ECB-33      | 1/2                       | 5-1/8          | 25/32                     | 5/8            | 5/16         |
| ECB-37      | 5/8                       | 5-5/8          | 29/32                     | 5/8            | 5/16         |
| ECB-41      | 3/4                       | 6-1/4          | 1-1/32                    | 5/8            | 5/16         |
| ECB-47      | 1                         | 6-1/4          | 1-9/32                    | 3/4            | 5/16         |

## Carbide Reamers



- Designed to work with PCS Oversized Ejector Pins
- Straight flute
- Extra long shank for easy access to holes within a deep cavity
- Four or six flutes to check size precisely
- Extra long flute lengths for greater hole straightness
- Shank diameters smaller than reamer diameter to avoid seizing

PCS Carbide Reamers are manufactured from micro-grain carbide. These reamers are available on-size or .005 oversize. Extra long shanks and flute lengths come standard, providing a more precise hole.

| SPECIFICATIONS  |                     |
|-----------------|---------------------|
| Material Type   | Micro-Grain Carbide |
| Corner Radius   | 0.007               |
| Unit of Measure | Inch                |

| CATALOG NO.               | FRACTIONAL SIZE | DECIMAL SIZE<br>+.0002 -.0000 | NO. OF FLUTES | FLUTE LENGTH | OVERALL LENGTH | SHANK DIAMETER<br>+.0000 -.0005 |
|---------------------------|-----------------|-------------------------------|---------------|--------------|----------------|---------------------------------|
| Standard Oversize .005: 0 |                 |                               |               |              |                |                                 |
| RC-5                      | 1/16            | 0.0625                        | 4             | 1/2          | 4              | 0.0570                          |
| RC-7                      | 3/32            | 0.0938                        | 4             | 3/4          | 4              | 0.0880                          |
| RC-9                      | 1/8             | 0.1250                        | 4             | 7/8          | 4              | 0.1200                          |
| RC-11                     | 5/32            | 0.1562                        | 6             | 1            | 4              | 0.1510                          |
| RC-13                     | 3/16            | 0.1875                        | 6             | 1            | 4-1/2          | 0.1820                          |
| RC-15                     | 7/32            | 0.2188                        | 6             | 1-1/8        | 5              | 0.2130                          |
| RC-17                     | 1/4             | 0.2500                        | 6             | 1-1/8        | 5              | 0.2450                          |
| RC-21                     | 5/16            | 0.3125                        | 6             | 1-3/8        | 5              | 0.3070                          |
| RC-25                     | 3/8             | 0.3750                        | 4             | 1-1/2        | 5              | 0.1250                          |
| RC-33                     | 1/2             | 0.5000                        | 3             | 1 3/4        | 10             | 0.1560                          |
| Standard Oversize .005: 1 |                 |                               |               |              |                |                                 |
| ROS-4                     | 3/64 OS         | 0.0517                        | 4             | 1/2          | 4              | 0.0460                          |
| ROS-5                     | 1/16 OS         | 0.0673                        | 4             | 1/2          | 4              | 0.0620                          |
| ROS-6                     | 5-64 OS         | 0.0829                        | 4             | 1/2          | 4              | 0.0770                          |
| ROS-7                     | 3/32 OS         | 0.0986                        | 4             | 3/4          | 4              | 0.0930                          |
| ROS-9                     | 1/8 OS          | 0.1298                        | 4             | 7/8          | 4              | 0.1250                          |
| ROS-10                    | 9/64 OS         | 0.1454                        | 6             | 1            | 4              | 0.1400                          |
| ROS-11                    | 5/32 OS         | 0.1610                        | 6             | 1            | 4              | 0.1550                          |
| ROS-13                    | 3/16 OS         | 0.1923                        | 6             | 1            | 4-1/2          | 0.1870                          |
| ROS-15                    | 7/32 OS         | 0.2236                        | 6             | 1-1/8        | 5              | 0.2180                          |
| ROS-16                    | 15/64 OS        | 0.2394                        | 4             | 1-1/2        | 5              | 0.1250                          |
| ROS-17                    | 1/4 OS          | 0.2548                        | 6             | 1-1/8        | 5              | 0.2490                          |
| ROS-21                    | 5/16 OS         | 0.3173                        | 6             | 1-3/8        | 5              | 0.3120                          |
| ROS-25                    | 3/8 OS          | 0.3798                        | 6             | 1-1/2        | 5              | 0.3740                          |
| ROS-33                    | 1/2 OS          | 0.5050                        | 4             | 1-1/2        | 5              | 0.1250                          |

## Sprue Bushing Reamers (Hand & Machine)

- High speed steel
- Left hand spiral, right hand cut
- 2° 23' 13" included angle
- 1/2" taper per foot
- Hand reamer for finishing (HR-1 & HR-2)
- Machine reamer for roughing (MR-1 & MR-2)

PCS Sprue Bushing Reamers are manufactured from high-speed steel. Both Machine and Hand Reamers are available with a left hand spiral, right hand cut. Machine reamers should be used for rough work while finish work should be done using a hand reamer.

| SPECIFICATIONS  |                  |
|-----------------|------------------|
| Material Type   | High Speed Steel |
| Taper per Ft.   | 1/2              |
| Unit of Measure | Inch             |



| CATALOG NO.                 | NO. OF FLUTES | SMALL END DIAMETER | LARGE END DIAMETER | SHANK DIAMETER | FLUTE LENGTH | OVERALL LENGTH |
|-----------------------------|---------------|--------------------|--------------------|----------------|--------------|----------------|
| Description: Hand Reamer    |               |                    |                    |                |              |                |
| HR-1                        | 4             | 7/64               | 3/8                | 5/16           | 6            | 8              |
| HR-2                        | 6             | 13/64              | 5/8                | 1/2            | 10-1/2       | 12-5/8         |
| Description: Machine Reamer |               |                    |                    |                |              |                |
| MR-1                        | 3             | 7/64               | 3/8                | 5/16           | 6            | 8              |
| MR-2                        | 3             | 13/64              | 5/8                | 1/2            | 10-1/2       | 12-5/8         |

## Conversion Chart

| FRACTION | DECIMAL | MM      |
|----------|---------|---------|
| 1/64     | 0.0156  | 0.3968  |
| 1/32     | 0.0312  | 0.7937  |
| 3/64     | 0.0468  | 1.1906  |
| 1/16     | 0.0625  | 1.5875  |
| 5/64     | 0.0781  | 1.9843  |
| 3/32     | 0.0937  | 2.3812  |
| 7/64     | 0.1093  | 2.7781  |
| 1/8      | 0.1250  | 3.1750  |
| 9/64     | 0.1406  | 3.5718  |
| 5/32     | 0.1562  | 3.9687  |
| 11/64    | 0.1718  | 4.3656  |
| 3/16     | 0.1875  | 4.7625  |
| 13/64    | 0.2031  | 5.1593  |
| 7/32     | 0.2187  | 5.5562  |
| 15/64    | 0.2343  | 5.9531  |
| 1/4      | 0.2500  | 6.3500  |
| 17/64    | 0.2656  | 6.7468  |
| 9/32     | 0.2812  | 7.1437  |
| 19/64    | 0.2968  | 7.5406  |
| 5/16     | 0.3125  | 7.9375  |
| 21/64    | 0.3281  | 8.3343  |
| 11/32    | 0.3437  | 8.7312  |
| 23/64    | 0.3593  | 9.1281  |
| 3/8      | 0.3750  | 9.5250  |
| 25/64    | 0.3906  | 9.9218  |
| 13/32    | 0.4062  | 10.3187 |
| 27/64    | 0.4218  | 10.7156 |
| 7/16     | 0.4375  | 11.1250 |
| 29/64    | 0.4531  | 11.5093 |
| 15/32    | 0.4687  | 11.9062 |
| 31/64    | 0.4843  | 12.3031 |
| 1/2      | 0.5000  | 12.7000 |
| 33/64    | 0.5156  | 13.0968 |
| 17/32    | 0.5312  | 13.4937 |
| 35/64    | 0.5468  | 13.8906 |
| 9/16     | 0.5625  | 14.2875 |
| 37/64    | 0.5781  | 14.6843 |
| 19/32    | 0.5937  | 15.0812 |
| 39/64    | 0.6093  | 15.4781 |
| 5/8      | 0.6250  | 15.8750 |
| 41/64    | 0.6406  | 16.2718 |
| 21/32    | 0.6562  | 16.6687 |
| 43/64    | 0.6718  | 17.0656 |
| 11/16    | 0.6875  | 17.4625 |
| 45/64    | 0.7031  | 17.8593 |
| 23/32    | 0.7187  | 18.2562 |
| 47/64    | 0.7343  | 18.6531 |
| 3/4      | 0.7500  | 19.0500 |
| 49/64    | 0.7656  | 19.4468 |
| 25/32    | 0.7812  | 19.8437 |
| 51/64    | 0.7968  | 20.2406 |
| 13/16    | 0.8125  | 20.6375 |
| 53/64    | 0.8281  | 21.0343 |
| 27/32    | 0.8437  | 21.4312 |
| 55/64    | 0.8593  | 21.8281 |
| 7/8      | 0.8750  | 22.2250 |
| 57/64    | 0.8906  | 22.6218 |
| 29/32    | 0.9062  | 23.0187 |
| 59/64    | 0.9218  | 23.4156 |
| 15/16    | 0.9375  | 23.8125 |
| 61/64    | 0.9531  | 24.2093 |
| 31/32    | 0.9687  | 24.6062 |
| 63/64    | 0.9843  | 25.0031 |
| 1        | 1.0000  | 25.4000 |