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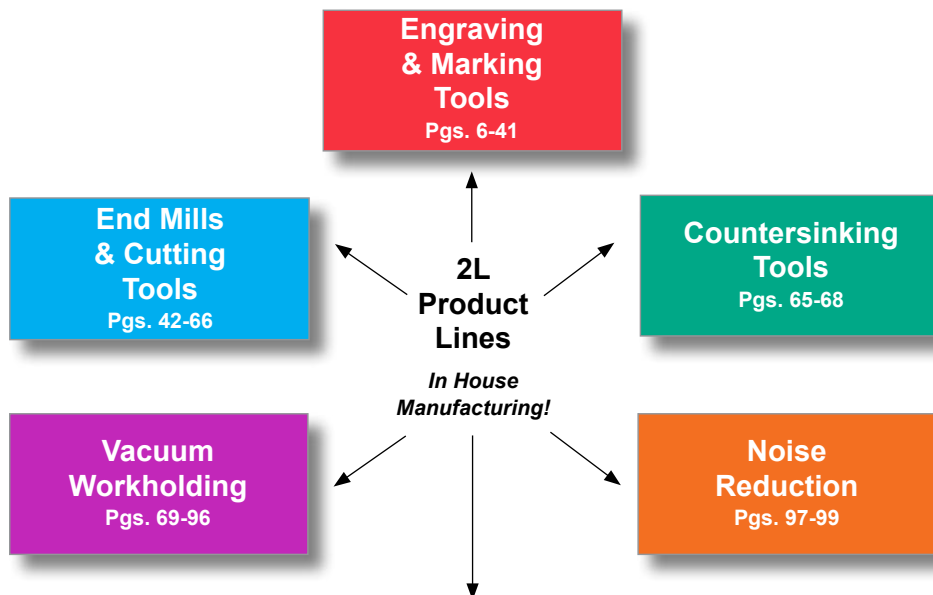
2L inc. is a manufacturer in Hudson, Massachusetts, USA that has been designing, developing, testing and manufacturing superior quality products in house since 1998.

2L inc. has several product lines: Engraving & Marking Tools, Solid Carbide End Mills & Cutting Tools, Countersinking Tools, Vacuum Workholding Systems, and Noise Reduction Solutions.

Many of our products are unique to 2L inc. and have been awarded design patents. The Spring Loaded Engraving Tools, Tough Tip Engraving Tools, CNC Countersink Depth Stop Tool, and other products are only available from 2L inc.

We maintain stock on thousands of sizes of our Solid Carbide Engraving Tools, End Mills, and Cutting Tools as well as the majority of our Engraving, Marking, Workholding, Silencing and Countersinking Products.

In addition to our standard carbide tools, we produce custom tools in house with quick turnaround times and can also re-sharpen quantities of carbide cutting tools upon request.



Custom Tools & Resharpenering

- Custom End Mills, Countersinks, Chamfering Tools, Engraving Tools, Spot Drills & more.
- Produced in house with **quick lead times**.
- Made with Ultra-Fine, Submicron, Nano Grade Solid Carbide.
- Visit our website at www.2linc.com/custom_tools.htm to download our custom tool forms.
- Send us your detailed drawings. Fax: (978)562-8972
Email: contact@2Linc.com

2L Products

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Our highly trained team members can assist you with your order and any technical questions you may have.

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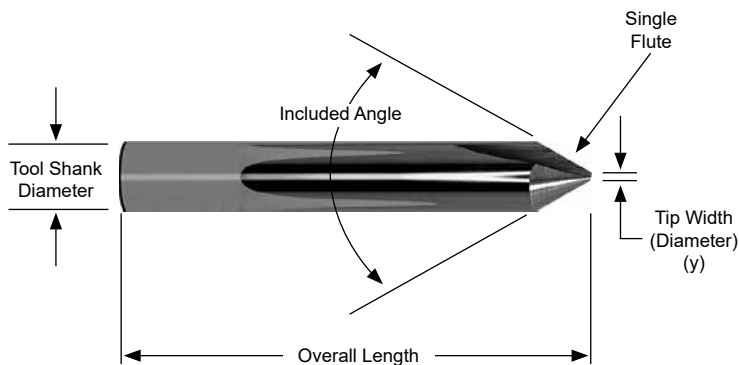
Tough Tip Engraving Tool For Steel (T)



Tough Tip Engraving Tool®. Maximum Tool Strength For Cutting Stainless Steel And Other Difficult To Machine Materials.

- Solid Carbide engraving tool designed to engrave tougher materials such as Steel and Stainless Steel.
- Unique V design maximizes the tip strength of the tool by removing the minimum amount of material from the tool end. This significantly strengthens the tool tip and increases tool life when engraving hard materials when compared with other engraving tool styles..
- Engrave and mark Stainless Steel, Tool Steels, Alloy and Mold Steels, Inconel, Hastelloy, Titanium and other hard materials.
- The most popular size is a 60 degree included angle with a .020" tip width and .1875" shank diameter (Part No. T-1875x2.0-60-.020).
- Produced from an Ultra-Fine, Submicron, Nano Grade Solid Carbide.
- Many sizes available with the latest generation of nano AlTiN+ extra nanocomposites.

Tough Tip Engraving Tool for Steels and Hard Materials. Hundreds of Tool Sizes Uncoated and nAlTiN+ Coated.



The Tough Tip Engraving Tool is covered by U.S. Patent 8,021,085.

Contact us for sizes not listed.
We manufacture in house.

Tough Tip Engraving Tool For Steel (T)

Tough Tip Engraving Tool for Steels (T) - Uncoated

Tool Shank Diameter	Overall Length	Included Angle	Tip Width (y)	Build Your Part No. (select y)	Uncoated Price (each)
.125" (1/8")	2.0"	30°	.010", .015", .020", .030", .040" (.005": 30° & 60° only)	T-125x2.0-30-y	\$21.44
		40°		T-125x2.0-40-y	
		45°		T-125x2.0-45-y	
		60°		T-125x2.0-60-y	
		90°		T-125x2.0-90-y	
.125" (1/8")	4.5"	30°	.010", .015", .020", .030", .040"	T-125x4.5-30-y	\$21.88
		45°		T-125x4.5-45-y	
		60°		T-125x4.5-60-y	
.1719" (11/64")	6.5"	30°	.010", .015", .020", .030", .040"	T-1719x6.5-30-y	\$28.13
		45°		T-1719x6.5-45-y	
		60°		T-1719x6.5-60-y	
.1875" (3/16")	2.0"	30°	.010", .015", .020", .030", .040" (.005": 60° only)	T-1875x2.0-30-y	\$24.98
		40°		T-1875x2.0-40-y	
		45°		T-1875x2.0-45-y	
		60°		T-1875x2.0-60-y	
		90°		T-1875x2.0-90-y	
.250" (1/4")	2.0"	30°	.010", .015", .020", .030", .040" (.005": 60° only)	T-250x2.0-30-y	\$27.48
		40°		T-250x2.0-40-y	
		45°		T-250x2.0-45-y	
		60°		T-250x2.0-60-y	
		90°		T-250x2.0-90-y	
.250" (1/4")	6.5"	30°	.010", .015", .020", .030", .040"	T-250x6.5-30-y	\$31.19
		45°		T-250x6.5-45-y	
		60°		T-250x6.5-60-y	
4 mm (.157")	50 mm (1.97")	30°	.25 mm (.010") .50 mm (.020") .76 mm (.030")	Tmet-4x50-30-y	\$24.98
		45°		Tmet-4x50-45-y	
		60°		Tmet-4x50-60-y	
6 mm (.236")	50 mm (1.97")	30°	.25 mm (.010") .50 mm (.020") .76 mm (.030") 1 mm (.040")	Tmet-6x50-30-y	\$27.48
		40°		Tmet-6x50-40-y	
		45°		Tmet-6x50-45-y	
		60°		Tmet-6x50-60-y	
		90°		Tmet-6x50-90-y	

Tough Tip Engraving Tool for Steels (T) - nAlTiN+ Coated

Tool Shank Diameter	Overall Length	Included Angle	Tip Width	Coating	Part No.	nAlTiN+ Coated Price (each)
.125" (1/8")	2.0"	30°	.005"	nAlTiN+	T-125x2.0-30-.005A	\$24.90
.125" (1/8")	2.0"	30°	.010"	nAlTiN+	T-125x2.0-30-.010A	\$24.90
.125" (1/8")	2.0"	60°	.005"	nAlTiN+	T-125x2.0-60-.005A	\$24.90
.125" (1/8")	2.0"	60°	.010"	nAlTiN+	T-125x2.0-60-.010A	\$24.90
.125" (1/8")	2.0"	60°	.015"	nAlTiN+	T-125x2.0-60-.015A	\$24.90
.125" (1/8")	2.0"	60°	.020"	nAlTiN+	T-125x2.0-60-.020A	\$24.90
.125" (1/8")	2.0"	60°	.030"	nAlTiN+	T-125x2.0-60-.030A	\$24.90
.125" (1/8")	2.0"	90°	.015"	nAlTiN+	T-125x2.0-60-.030A	\$24.90
.1875" (3/16")	2.0"	30°	.005"	nAlTiN+	T-1875x2.0-30-.005A	\$29.98
.1875" (3/16")	2.0"	30°	.010"	nAlTiN+	T-1875x2.0-30-.010A	\$29.98
.1875" (3/16")	2.0"	60°	.005"	nAlTiN+	T-1875x2.0-60-.005A	\$29.98
.1875" (3/16")	2.0"	60°	.010"	nAlTiN+	T-1875x2.0-60-.010A	\$29.98
.1875" (3/16")	2.0"	60°	.015"	nAlTiN+	T-1875x2.0-60-.015A	\$29.98
.1875" (3/16")	2.0"	60°	.020"	nAlTiN+	T-1875x2.0-60-.020A	\$29.98
.1875" (3/16")	2.0"	60°	.030"	nAlTiN+	T-1875x2.0-60-.030A	\$29.98
.250" (1/4")	2.0"	30°	.005"	nAlTiN+	T-250x2.0-30-.005A	\$32.48
.250" (1/4")	2.0"	30°	.010"	nAlTiN+	T-250x2.0-30-.010A	\$32.48
.250" (1/4")	2.0"	60°	.005"	nAlTiN+	T-250x2.0-60-.005A	\$32.48
.250" (1/4")	2.0"	60°	.010"	nAlTiN+	T-250x2.0-60-.010A	\$32.48
.250" (1/4")	2.0"	60°	.020"	nAlTiN+	T-250x2.0-60-.020A	\$32.48
6 mm (.236")	50 mm (1.97")	60°	.25 mm (.010")	nAlTiN+	Tmet-6x50-60-.25A	\$32.48
6 mm (.236")	50 mm (1.97")	60°	.50 mm (.020")	nAlTiN+	Tmet-6x50-60-.50A	\$32.48

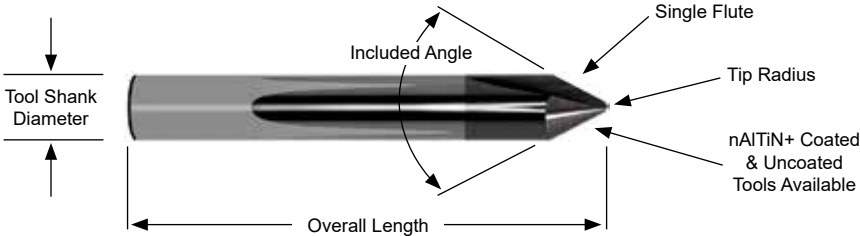
Part No. Examples: T-1875x2.0-60-.020 & T-125x2.0-60-.010A

Radius Tough Tip Engraving Tool For Steel (TR)

Tough Tip Engraving Tool[®] With Radius.

Maximum Tool Strength For Cutting Stainless Steel And Other Hard Materials.

- Single Flute Tough Tip Engraving Tool with a radius designed to engrave hard materials such as Steel, Stainless Steel, Alloy and Mold Steels, Inconel, Hastelloy, Titanium and other hard materials.
- Radius combined with the unique V design of the tool maximizes the tip strength of the tool by removing the minimum amount of material from the tool end. This significantly strengthens the tool tip and increases tool life.



- Produced from an Ultra-Fine, Submicron, Nano Grade Solid Carbide.
- Coated with latest generation of nano AlTiN+ extra nanocomposites for wear and heat resistance.
- Select sizes available without coating.

Radius Tough Tip Engraving Tool for Steels (TR) - nAlTiN+ Coated

Tool Shank Diameter	Overall Length	Included Angle	Tip Width	Coating	Part No.	nAlTiN+ Coated Price (each)
.125" (1/8")	2.0"	30°	.005"	nAlTiN+	TR-125x2.0-30-.005A	\$24.90
.125" (1/8")	2.0"	30°	.010"	nAlTiN+	TR-125x2.0-30-.010A	\$24.90
.125" (1/8")	2.0"	60°	.005"	nAlTiN+	TR-125x2.0-60-.005A	\$24.90
.125" (1/8")	2.0"	60°	.010"	nAlTiN+	TR-125x2.0-60-.010A	\$24.90
.125" (1/8")	2.0"	90°	.005"	nAlTiN+	TR-125x2.0-90-.005A	\$24.90
.125" (1/8")	2.0"	90°	.010"	nAlTiN+	TR-125x2.0-90-.010A	\$24.90
.1875" (3/16")	2.0"	30°	.005"	nAlTiN+	TR-1875x2.0-30-.005A	\$29.98
.1875" (3/16")	2.0"	30°	.010"	nAlTiN+	TR-1875x2.0-30-.010A	\$29.98
.1875" (3/16")	2.0"	60°	.005"	nAlTiN+	TR-1875x2.0-60-.005A	\$29.98
.1875" (3/16")	2.0"	60°	.010"	----	TR-1875x2.0-60-.010	\$24.98
.1875" (3/16")	2.0"	60°	.010"	nAlTiN+	TR-1875x2.0-60-.010A	\$29.98
.1875" (3/16")	2.0"	60°	.015"	----	TR-1875x2.0-60-.015	\$24.98
.1875" (3/16")	2.0"	60°	.020"	----	TR-1875x2.0-60-.020	\$24.98
.1875" (3/16")	2.0"	60°	.020"	nAlTiN+	TR-1875x2.0-60-.020A	\$29.98
.250" (1/4")	2.0"	60°	.010"	nAlTiN+	TR-250x2.0-60-.010A	\$32.48
6 mm (.236")	50 mm (1.97")	60°	.25 mm (.010")	nAlTiN+	TRmet-6x50-60-.25A	\$32.48

The Tough Tip Engraving Tool is covered by U.S. Patent 8,021,085.

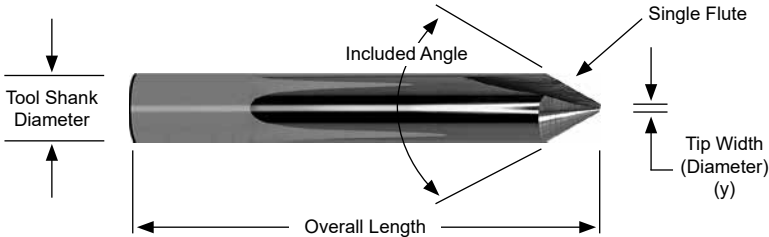
Contact us for sizes not listed.

Tough Tip Engraving Tool For Aluminum (T2)

Tough Tip Engraving Tool® for Aluminum.

Maximum Tool Strength For Cutting Aluminum And Other Soft Gummy Materials.

- Similar to the Tough Tip Engraving Tool for Steels, but designed with a sharper cutting edge which provides a cleaner cut and fewer burrs on softer materials such as Aluminum, Brass and Plastic.
- The unique V design maximizes the tip strength of the tool by removing the minimum amount of material from the tool end. This significantly strengthens the tool tip and increases tool life when compared with other engraving tool styles.
- Produced from an Ultra-Fine, Submicron, Nano Grade Solid Carbide.



Tough Tip Engraving Tool for Aluminum (T2)

Tool Shank Diameter	Overall Length	Included Angle	Tip Width (y)	Build Your Part No. (select y)	Price (each)
.125" (1/8")	2.0"	30°	.010", .015", .020", .030", .040"	T2-125x2.0-30-y	\$21.44
		40°		T2-125x2.0-40-y	
		45°		T2-125x2.0-45-y	
		60°		T2-125x2.0-60-y	
		90°		T2-125x2.0-90-y	
.125" (1/8")	4.5"	30°	.010", .020"	T2-125x4.5-30-y	\$21.88
		60°		T2-125x4.5-60-y	
.1719" (11/64")	6.5"	30°	.010", .015", .020"	T2-1719x6.5-30-y	\$28.13
		45°		T2-1719x6.5-45-y	
		60°		T2-1719x6.5-60-y	
.1875" (3/16")	2.0"	30°	.010", .015", .020", .030", .040"	T2-1875x2.0-30-y	\$24.98
		40°		T2-1875x2.0-40-y	
		45°		T2-1875x2.0-45-y	
		60°		T2-1875x2.0-60-y	
		90°		T2-1875x2.0-90-y	
.250" (1/4")	2.0"	30°	.010", .015", .020", .030", .040"	T2-250x2.0-30-y	\$27.48
		40°		T2-250x2.0-40-y	
		45°		T2-250x2.0-45-y	
		60°		T2-250x2.0-60-y	
		90°		T2-250x2.0-90-y	
.250" (1/4")	6.5"	30°	.010", .015", .020"	T2-250x6.5-30-y	\$31.19
		45°		T2-250x6.5-45-y	
		60°		T2-250x6.5-60-y	
4 mm (.157")	50 mm (1.97")	30°	.25 mm (.010"), .50 mm (.020"), .76 mm (.030")	T2met-4x50-30-y	\$24.98
		45°		T2met-4x50-45-y	
		60°		T2met-4x50-60-y	
6 mm (.236")	50 mm (1.97")	30°	.25 mm (.010"), .50 mm (.020"), .76 mm (.030"), 1 mm (.040")	T2met-6x50-30-y	\$27.48
		40°		T2met-6x50-40-y	
		45°		T2met-6x50-45-y	
		60°		T2met-6x50-60-y	
		90°		T2met-6x50-90-y	

Part No. Examples: T2-1875x2.0-60-.020 & T2met-6x50-60-.50

The Tough Tip Engraving Tool is covered by U.S. Patent 8,021,085.

We manufacture in house.

Standard Conical V-Bit (C)

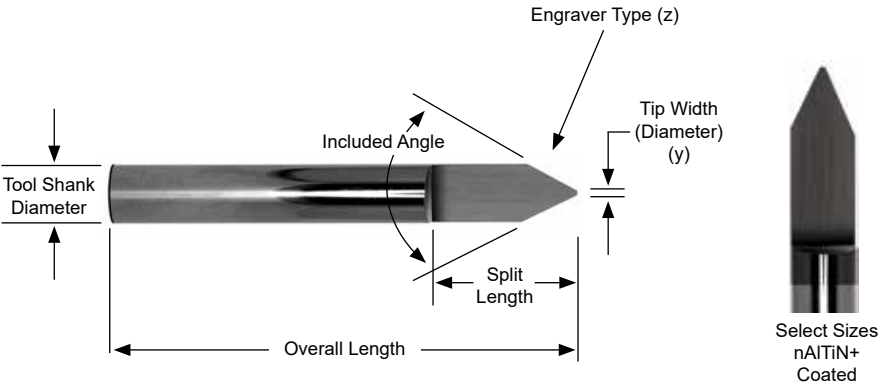
Standard Conical Engraving Tool.
For Use On The Widest Range Of Materials.

- Solid Carbide V-Shaped Engraving Tool for use with CNC Milling Machines, Top Loading Engraving Machines, the Spring Loaded Engraving Tool, and other Industrial Engraving/Marking Systems.
- Engraves and marks practically any material.
- May also be used for chamfering edges of workpieces.
- Produced from an Ultra-Fine, Submicron, Nano Grade Solid Carbide.
- Select sizes coated with latest generation of nano AlTiN+ extra nanocomposites.

Standard Conical Engraving Tool.
Most Commonly Used Engraving Tool Bit.

Available in Two “Engraver Types” Designed to Engrave a Wide Range of Materials:

- G (for harder materials) = Steels, Wood, Stainless Steel and more.
- S (for softer/gummy materials) = Aluminum, Plastic, Acrylic, Brass, Silver and more.



Standard Conical (C) - nAlTiN+ Coated

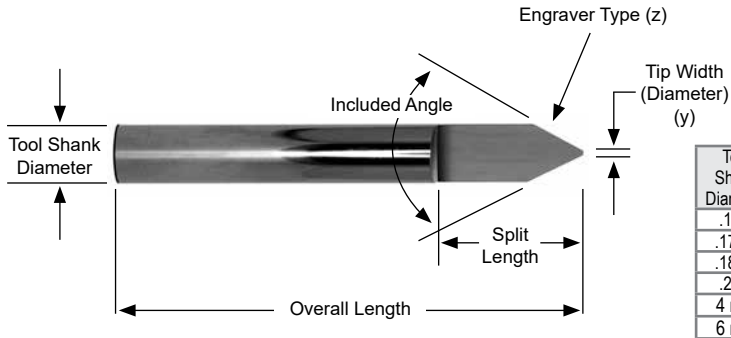
Tool Shank Diameter	Overall Length	Included Angle	Tip Width (y)	Engraver Type (z)	Coating	Build Your Part No. (select y)	Price (each)
.125" (1/8")	2.0"	40°	.010", .020"	GA (Hard)	nAlTiN+	C-125x2.0-40-y-GA	\$20.39
		60°	.005", .010", .020", .030"			C-125x2.0-60-y-GA	
.1875" (3/16")	2.0"	40°	.010", .015", .020"	GA (Hard)	nAlTiN+	C-1875x2.0-40-y-GA	\$24.33
		60°	.005", .010", .015", .020"			C-1875x2.0-60-y-GA	
.250" (1/4")	2.0"	40°	.010", .020"	GA (Hard)	nAlTiN+	C-250x2.0-40-y-GA	\$28.83
		60°	.005", .010", .020"			C-250x2.0-60-y-GA	

Part No. Examples: C-1875x2.0-60-.020-GA

Contact us for sizes not listed.

Standard Conical V-Bit (C)

Standard Conical Engraving Tool.
For Use On The Widest Range Of Materials.



Standard Conical (C) - Uncoated

Tool Shank Diameter	Overall Length	Included Angle	Tip Width (y)	Engraver Type (z)	Build Your Part No. (select y & z)	Price (each)
.125" (1/8")	2.0"	40°	.005", .010", .015", .020", .030" (.002": 60° only)	G (Hard) or S (Soft)	C-125x2.0-40-y-z	\$15.19
		45°			C-125x2.0-45-y-z	
		60°			C-125x2.0-60-y-z	
		90°			C-125x2.0-90-y-z	
.125" (1/8")	4.5"	45°	.010", .020" .005", .010", .015", .020", .030", .040", .050"	G (Hard) or S (Soft)	C-125x4.5-45-y-z	\$15.63
		60°			C-125x4.5-60-y-z	
		90°			C-125x4.5-90-y-z	
		45°			C-1719x6.5-45-y-z	
.1719" (11/64")	6.5"	45°	.010", .015", .020" .005", .010", .015", .020", .025", .030", .040", .050", .060", .075", .090", .125"	G (Hard) or S (Soft)	C-1719x6.5-60-y-z	\$21.88
		60°			C-1719x6.5-60-y-z	
		90°			C-1719x6.5-90-y-z	
		40°			C-1875x2.0-x-y-z	
.1875" (3/16")	2.0"	45°	.005", .010", .015", .020", .030" .005", .010", .015", .020", .025", .030", .040", .050"	G (Hard) or S (Soft)	C-1875x2.0-x-y-z	\$18.73
		60°			C-1875x2.0-x-y-z	
		90°			C-1875x2.0-x-y-z	
		45°			C-1875x2.0-x-y-z	
.250" (1/4")	2.0"	40°	.005", .010", .015", .020", .030" .005", .010", .015", .020", .025", .030", .040", .050"	G (Hard) or S (Soft)	C-250x2.0-x-y-z	\$21.23
		45°			C-250x2.0-x-y-z	
		60°			C-250x2.0-x-y-z	
		90°			C-250x2.0-x-y-z	
.250" (1/4")	6.5"	45°	.010", .015", .020", .030", .040", .050", .060", .075", .090", .125"	G (Hard) or S (Soft)	C-250x6.5-45-y-z	\$24.94
		60°			C-250x6.5-60-y-z	
		90°			C-250x6.5-90-y-z	
		45°			C-250x6.5-90-y-z	
.375" (3/8")	3.0"	60°	.005", .010", .015", .020"	G (Hard) or S (Soft)	C-375x3.0-60-y-z	\$36.14
		90°			C-375x3.0-90-y-z	
.500" (1/2")	3.0"	60°	.005", .010", .020"	G (Hard) or S (Soft)	C-500x3.0-60-y-z	\$53.58
4 mm (.157")	50 mm (1.97")	45°	.12 mm (.005"), .25 mm (.010"), .50 mm (.020"), .76 mm (.030")	G (Hard) or S (Soft)	Cmet-4x50-45-y-z	\$18.73
		60°			Cmet-4x50-60-y-z	
		90°			Cmet-4x50-90-y-z	
6 mm (.236")	50 mm (1.97")	40°	.12 mm (.005"), .25 mm (.010"), .38 mm (.015"), .50 mm (.020"), .76 mm (.030")	G (Hard) or S (Soft)	Cmet-6x50-40-y-z	\$21.23
		45°			Cmet-6x50-45-y-z	
		60°			Cmet-6x50-60-y-z	
		90°			Cmet-6x50-90-y-z	

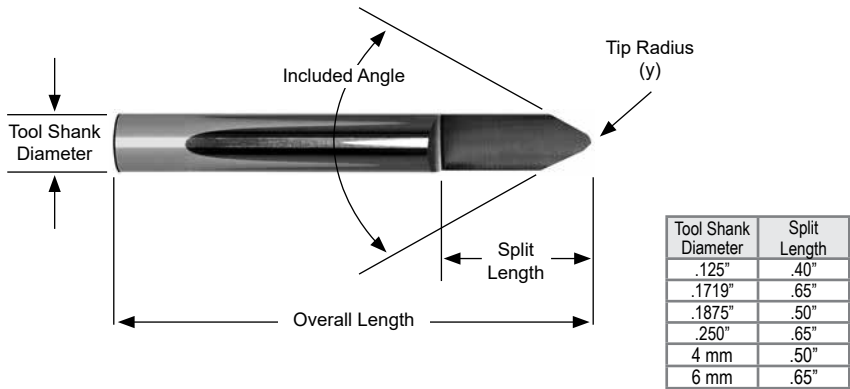
Part No. Examples: C-1875x2.0-60-.020-G & Cmet-6x50-60-.50-G

We manufacture in house.

Single Flute Conical Ballnose (B)

Single Flute Conical Ballnose Tool.
Radius Tip For Standard Engraving And 3D Engraving.

- Single Flute Solid Carbide half split tool with radius tip that produces a cut with a rounded bottom.
- Excellent results have been obtained when used for high speed engraving on Aluminum or Steel materials.
- Engraves wide range of materials from Acrylic to Steels.
- Use for engraving of letters, lines and logos, reverse engraving of Acrylic and 3D engraving applications.
- Produced from an Ultra-Fine, Submicron, Nano Grade Solid Carbide.



Single Flute Conical Ballnose (B)

Tool Shank Diameter	Overall Length	Included Angle	Tip Radius (y)	Build Your Part No. (select y)	Price (each)
.125" (1/8")	2.0"	30°	.003", .004"	B-125x2.0-30-y	\$23.85
.125" (1/8")	2.0"	30°	.005", .010", .015", .020", .030", .040", .050"	B-125x2.0-30-y	\$19.24
		60°		B-125x2.0-60-y	
.125" (1/8")	2.0"	60°	.003"	B-125x2.0-60-.003	\$23.85
.125" (1/8")	4.5"	30°	.005", .010", .015", .020", .030"	B-125x4.5-30-y	\$22.10
		60°		B-125x4.5-60-y	
.1719" (11/64")	6.5"	30°	.005", .010", .015", .020", .030"	B-1719x6.5-30-y	\$27.81
		60°		B-1719x6.5-60-y	
.1875" (3/16")	2.0"	30°	.005", .010", .015", .020", .030", .040", .050"	B-1875x2.0-30-y	\$20.28
		60°		B-1875x2.0-60-y	
.250" (1/4")	2.0"	30°	.005", .010", .015", .020", .030", .040", .050" (45°: .010" only)	B-250x2.0-30-y	\$27.10
		45°		B-250x2.0-60-y	
		60°			
.250" (1/4")	6.5"	30°	.005", .010", .015", .020", .030"	B-250x6.5-30-y	\$35.13
		60°		B-250x6.5-60-y	
4 mm (.157")	50 mm (1.97")	30°	.12 mm (.005"), .25 mm (.010"), .50 mm (.020")	Bmet-4x50-30-y	\$20.28
		60°		Bmet-4x50-60-y	
6 mm (.236")	50 mm (1.97")	30°	.12 mm (.005"), .25 mm (.010"), .50 mm (.020")	Bmet-6x50-30-y	\$27.10
		60°		Bmet-6x50-60-y	

Part No. Examples: B-1875x2.0-60-.010 & Bmet-6x50-60-.25

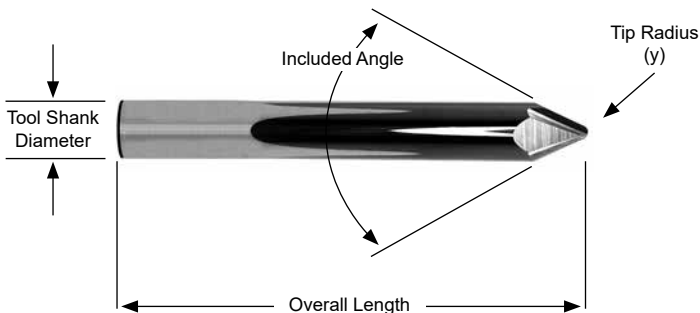
Contact us for sizes not listed.

2 Flute Conical Ballnose (B2)

2 Flute Conical Ballnose Tool.

Use For Engraving Or Surface Machining To Create 3D Surfaces.

- 2 Flute Solid Carbide Engraving Tool with radius allows for higher feedrates than single flute cutters.
- Commonly used for engraving or for surface machining where the tool makes small stepovers to create 3D surfaces.
- When used with a Spring Loaded Engraving Tool this tool will cut slightly deeper than a Single Flute Conical Ballnose Engraving Tool.
- Suitable for most materials including Plastic, Wood, Aluminum, Steel, Stainless Steel, and Titanium.
- Produced from an Ultra-Fine, Submicron, Nano Grade Solid Carbide.



2 Flute Conical Ballnose (B2)

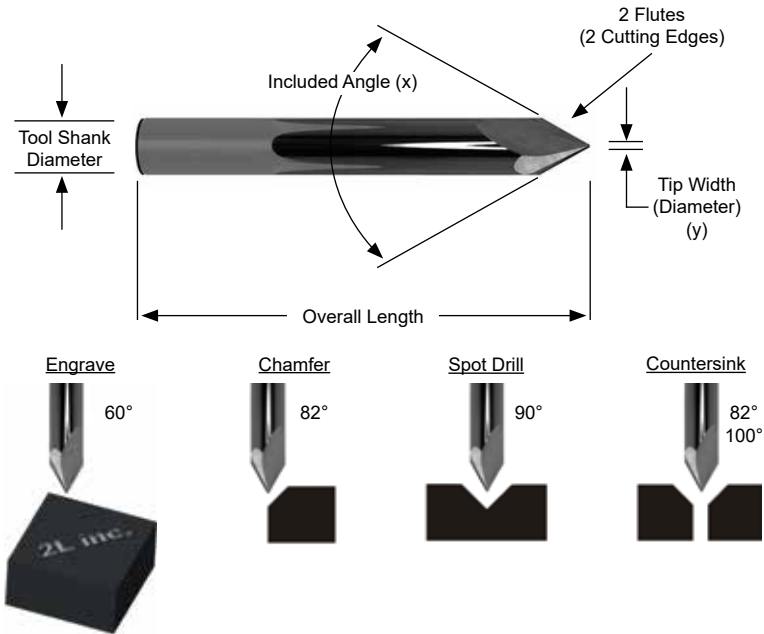
Tool Shank Diameter	Overall Length	Included Angle	Tip Radius (y)	Build Your Part No. (select y)	Price (each)
.125" (1/8")	2.0"	30°	.005", .010", .015", .020", .030", .040"	B2-125x2.0-30-y	\$19.24
		60°		B2-125x2.0-60-y	
.1875" (3/16")	2.0"	30°	.005", .010", .020", .030", .040"	B2-1875x2.0-30-y	\$20.28
		60°		B2-1875x2.0-60-y	
.250" (1/4")	2.0"	30°	.005", .010", .020", .030", .040" (45°: .010" only)	B2-250x2.0-30-y	\$27.10
		45°			
		60°		B2-250x2.0-60-y	
.250" (1/4")	6.5"	60°	.005", .010", .020", .030"	B2-250x6.5-60-y	\$35.13
6 mm (.236")	50 mm (1.97")	30°	.12 mm (.005"), .25 mm (.010"), .50 mm (.020"), .76 mm (.030"), 1 mm (.040")	B2met-6x50-30-y	\$27.10
		60°		B2met-6x50-60-y	
Part No. Examples: B2-1875x2.0-60-.010 & B2met-6x50-60-.50					

We manufacture in house.

Engraving-Chamfering (M)

2 Flute Multi Purpose Tool.
For Engraving, Chamfering, Spot Drilling And Countersinking.

- Solid Carbide multi-purpose tool with 2 flutes (2 cutting edges).
- Primarily used for engraving and chamfering, but also for countersinking and spot drilling.
- Reduce tool changes by using a single tool for different types of operations.
- Use on a wide range of materials from hard Steels to soft Plastics.
- Tough cutting edges allow for higher feedrates when chamfering.
- Produced from an Ultra-Fine, Submicron, Nano Grade Solid Carbide.



Engraving-Chamfering Tool (M)

Tool Shank Diameter	Overall Length	Included Angle (x)	Tip Width (y)	Build Your Part No. (select x & y)	Price (each)
.125" (1/8")	2.0"	60°, 82°, 90°, 100°	.005", .010", .015", .020"	M-125x2.0-x-y	\$18.94
.125" (1/8")	4.5"	60°, 82°, 90°, 100°	.005", .010", .015", .020"	M-125x4.5-x-y	\$19.38
.1719" (11/64")	6.5"	60°, 82°, 90°, 100°	.005", .010", .015", .020"	M-1719x6.5-x-y	\$25.63
.1875" (3/16")	2.0"	60°, 82°, 90°, 100°	.005", .010", .015", .020"	M-1875x2.0-x-y	\$22.48
.250" (1/4")	2.0"	60°, 82°, 90°, 100°	.005", .010", .015", .020"	M-250x2.0-x-y	\$24.98
.250" (1/4")	6.5"	60°, 82°, 90°, 100°	.005", .010", .015", .020"	M-250x6.5-x-y	\$30.75
.375" (3/8")	3.0"	60°, 82°, 90°, 100°	.005", .010", .015", .020"	M-375x3.0-x-y	\$36.14
.500" (1/2")	3.0"	60°, 82°, 90°, 100°	.005", .010", .015", .020"	M-500x3.0-x-y	\$56.58
.562" (9/16")	3.0"	60°, 82°, 90°, 100°	.005", .010", .015", .020"	M-562x3.0-x-y	\$66.84
4 mm (.157")	50 mm (1.97")	60°, 82°, 90°, 100°	.12 mm (.005"), .25 mm (.010"), .38 mm (.015"), .50 mm (.020")	Mmet-4x50-x-y	\$22.48
6 mm (.236")	50 mm (1.97")	60°, 82°, 90°, 100°	.12 mm (.005"), .25 mm (.010"), .38 mm (.015"), .50 mm (.020")	Mmet-6x50-x-y	\$24.98

Part No. Examples: M-1875x2.0-60-.010 & Mmet-6x50-60-.50

Contact us for sizes not listed.

Quarter Round (Q)

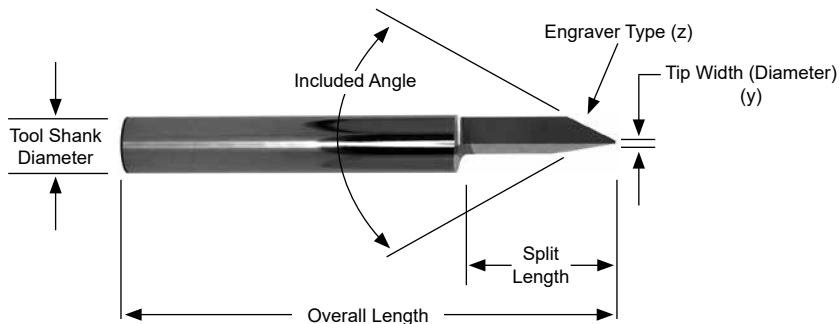
Quarter Round Tool.

Quarter Split Tool For Greater Chip Clearance On Many Materials.

- Solid Carbide Engraving Tool with a quarter split, which creates greater chip clearance.
- Engrave and cut many materials from soft Plastics to harder materials such as Stainless Steel.
- Produced from an Ultra-Fine, Submicron, Nano Grade Solid Carbide.

Available in Two "Engraver Types" Designed to Engrave a Wide Range of Materials:

- G (for harder materials) = Steels, Stainless Steel, Wood, and more.
- S (for softer/gummy materials) = Aluminum, Plastic, Acrylic, Brass, Silver and more.



Tool Shank Diameter	Split Length
.125"	.40"
.1719"	.65"
.1875"	.50"
.250"	.65"

Quarter Round (Q)

Tool Shank Diameter	Overall Length	Included Angle	Tip Width (y)	Engraver Type (z)	Build Your Part No. (select y & z)	Price (each)
.125" (1/8")	2.0"	30°	.005", .010", .015", .020", .030"	G (Hard) or S (Soft)	Q-125x2.0-30-y-z	\$15.19
		60°			Q-125x2.0-60-y-z	
.125" (1/8")	4.5"	30°	.005", .010", .015", .020", .030"	G (Hard) or S (Soft)	Q-125x4.5-30-y-z	\$16.75
		60°			Q-125x4.5-60-y-z	
.1719" (11/64")	6.5"	30°	.005", .010", .015", .020", .030"	G (Hard) or S (Soft)	Q-1719x6.5-30-y-z	\$22.81
		60°			Q-1719x6.5-60-y-z	
.1875" (3/16")	2.0"	30°	.005", .010", .015", .020", .030"	G (Hard) or S (Soft)	Q-1875x2.0-30-y-z	\$18.73
		60°			Q-1875x2.0-60-y-z	
.250" (1/4")	2.0"	30°	.005", .010", .015", .020", .030"	G (Hard) or S (Soft)	Q-250x2.0-30-y-z	\$21.23
		60°			Q-250x2.0-60-y-z	
.250" (1/4")	6.5"	30°	.005", .010", .015", .020", .030"	G (Hard) or S (Soft)	Q-250x6.5-30-y-z	\$27.19
		60°			Q-250x6.5-60-y-z	

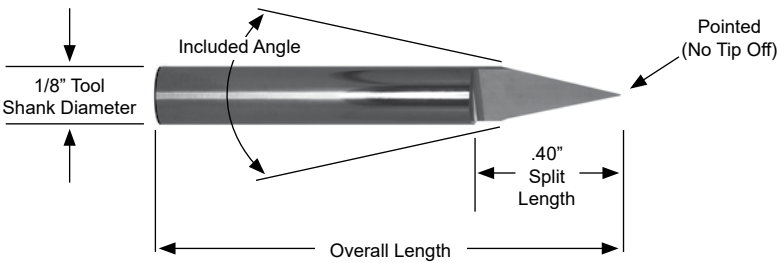
Part No. Example: Q-1875x2.0-60-.010-G

We manufacture in house.

Pointed V-Bit (P)

Pointed V-Bit Cutter.
Sharp Tip, No Tip Off.

- V-Shaped Engraving Tool sharpened to a point (no tip off).
- Used for extremely fine and shallow engraving and marking.
- Produced from an Ultra-Fine, Submicron, Nano Grade Solid Carbide.
- Available uncoated and select sizes coated with latest generation of nano AlTiN+ extra nanocomposites for wear and heat resistance.



Pointed V-Bit Cutters - Sharp Tip

Tool Shank Diameter	Overall Length	Included Angle	Coating	Part No.	Price (each)
.125" (1/8")	2.0"	15°	----	P-125x2.0-15-0-G	\$15.19
.125" (1/8")	2.0"	15°	nAlTiN+	P-125x2.0-15-0-GA	\$22.19
.125" (1/8")	2.0"	20°	----	P-125x2.0-20-0-G	\$15.19
.125" (1/8")	2.0"	20°	nAlTiN+	P-125x2.0-20-0-GA	\$22.19
.125" (1/8")	2.0"	30°	----	P-125x2.0-30-0-G	\$15.19
.125" (1/8")	2.0"	30°	nAlTiN+	P-125x2.0-30-0-GA	\$22.19
.125" (1/8")	2.0"	40°	----	P-125x2.0-40-0-G	\$15.19
.125" (1/8")	2.0"	45°	----	P-125x2.0-45-0-G	\$15.19
.125" (1/8")	2.0"	60°	----	P-125x2.0-60-0-G	\$15.19
.125" (1/8")	2.0"	90°	----	P-125x2.0-90-0-G	\$15.19

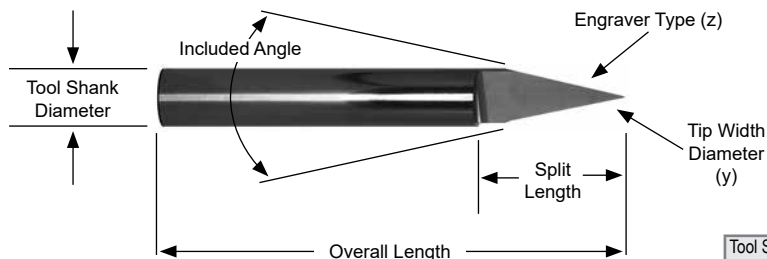
Contact us for sizes not listed.

Profiler V-Bit (P)

Profiler Engraving Tool. For Small, Fine, Delicate Engraving.



- Solid Carbide Engraving Tool similar to the Standard Conical Engraving Tool but designed with smaller included angles and tip widths.
- Use to produce narrow cuts and engrave small letters and lines that run close together. Profilers are also used to cut out shapes from solid sheets on a wide variety of materials.
- Produced from an Ultra-Fine, Submicron, Nano Grade Solid Carbide.
- Select sizes coated with latest generation of nano AlTiN+ extra nanocomposites.



Tool Shank Diameter	Split Length
.125"	.40"
.1719"	.65"
.1875"	.50"
.250"	.65"
4 mm	.50"
6 mm	.65"

Available in two "Engraver Types" Designed to Engrave a Wide Range of Materials:

- G (for harder materials) = Steels, Wood, Stainless Steel and more.
- S (for softer/gummy materials) = Aluminum, Plastic, Acrylic, Brass, Silver and more.

Profilers (P)							
Tool Shank Dia.	Overall Length	Included Angle	Tip Width (y)	Engraver Type (z)	Coating	Build Your Part No. (select y & z)	Price (each)
.125" (1/8")	2.0"	30°	.002", .005", .010", .015", .020", .060"	G (Hard) or S (Soft)	----	P-125x2.0-30-y-z	\$15.19
.125" (1/8")	2.0"	30°	.002", .005", .010"	GA (Hard)	nAlTiN+	P-125x2.0-30-y-z	\$22.19
.125" (1/8")	4.5"	30°	.002", .005", .010"	G (Hard) or S (Soft)	----	P-125x4.5-30-y-z	\$18.13
.1719" (11/64")	6.5"	30°	.002", .005", .010", .015", .020", .060"	G (Hard) or S (Soft)	----	P-1719x6.5-30-y-z	\$23.88
.1875" (3/16")	2.0"	30°	.002", .005", .015", .010", .020"	G (Hard) or S (Soft)	----	P-1875x2.0-30-y-z	\$18.73
.250" (1/4")	2.0"	30°	.002", .005", .010", .015", .020", .030", .040", .060"	G (Hard) or S (Soft)	----	P-250x2.0-30-y-z	\$21.23
.250" (1/4")	6.5"	30°	.002", .005", .010", .060"	G (Hard) or S (Soft)	----	P-250x6.5-30-y-z	\$24.94
4 mm (.157")	50 mm (1.97")	30°	.05 mm (.002"), .12 mm (.005"), .25 mm (.010")	G (Hard) or S (Soft)	----	Pmet-4x50-30-y-z	\$18.73
6 mm (.236")	50 mm (1.97")	30°	.05 mm (.002"), .12 mm (.005"), .25 mm (.010"), .50 MM (.020")	G (Hard) or S (Soft)	----	Pmet-6x50-30-y-z	\$21.23
Part No. Examples: P-125x2.0-30-.005-G & Pmet-6x50-30-.12-S							

We manufacture in house.

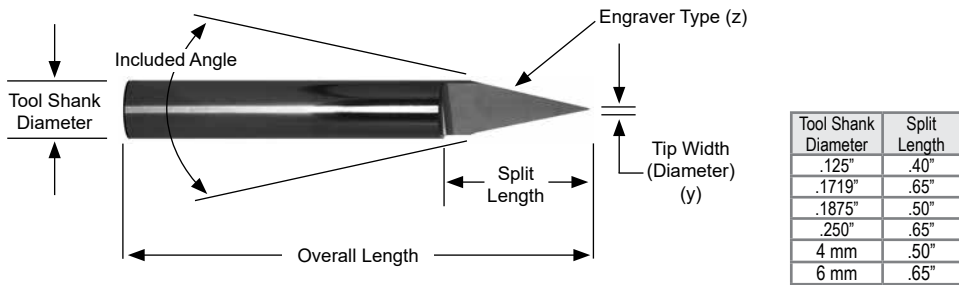
Micro Profiler V-Bit (P)

Micro Profiler V-Bit Engraving Tool.
For Extremely Small, Fine, Delicate Engraving.

- Solid Carbide Engraving Tool similar to the Profiler, but with smaller included angles and tip widths.
- Engrave extremely small letters and lines that may run close together on many materials.
- Produced from an Ultra-Fine, Submicron, Nano Grade Solid Carbide.
- Select sizes coated with latest generation of nano AlTiN+ extra nanocomposites.

Available in two “Engraver Types” Designed to Engrave a Wide Range of Materials:

- G (for harder materials) = Steels, Wood, Stainless Steel and more.
- S (for softer/gummy materials) = Aluminum, Plastic, Acrylic, Brass, Silver and more.



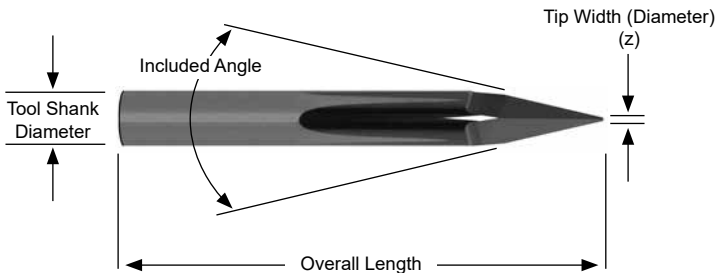
Micro Profilers (P)							
Tool Shank Diameter	Overall Length	Included Angle	Tip Width (y)	Engraver Type (z)	Coating	Build Your Part No. (select y & z)	Price (each)
.125" (1/8")	2.0"	15°	.005", .010", .015", .020"	G (Hard) or S (Soft)	----	P-125x2.0-15-y-z	\$19.00
.125" (1/8")	2.0"	15°	.005", .010"	GA-Hard	nAlTiN+	P-125x2.0-15-y-z	\$26.00
.125" (1/8")	2.0"	20°	.005", .010", .015", .020", .030"	G (Hard) or S (Soft)	----	P-125x2.0-20-y-z	\$19.00
.125" (1/8")	4.5"	15°	.005", .010"	G (Hard) or S (Soft)	----	P-125x4.5-15-y-z	\$21.69
.1719" (11/64")	6.5"	15°	.005", .010", .015"	G (Hard) or S (Soft)	----	P-1719x6.5-15-y-z	\$28.60
.1875" (3/16")	2.0"	15°	.005", .010", .015"	G (Hard) or S (Soft)	----	P-1875x2.0-15-y-z	\$23.41
.250" (1/4")	2.0"	15°	.005", .010", .015"	G (Hard) or S (Soft)	----	P-250x2.0-15-y-z	\$26.59
.250" (1/4")	6.5"	15°	.005", .010"	G (Hard) or S (Soft)	----	P-250x6.5-15-y-z	\$32.41
4 mm (.157")	50 mm (1.97")	15°	.12 mm (.005"), .25 mm (.010")	G (Hard) or S (Soft)	----	Pmet-4x50-15-y-z	\$23.41
6 mm (.236")	50 mm (1.97")	15°	.12 mm (.005"), .25 mm (.010")	G (Hard) or S (Soft)	----	Pmet-6x50-15-y-z	\$26.59
Part No. Examples: P-1875x2.0-15-.010-G & Pmet-6x50-15-.25-S							

Contact us for sizes not listed.

Pyramid (Y)

Pyramid Tool.
For Small Engraving, 3D Profiling.

- Solid Carbide cutter with 3 cutting edges in the shape of a pyramid, used for rotary engraving.
- Often used for 3D profiling, producing wax casting models, and engraving epoxy coated pens.
- Also used for small, fine engraving on many materials from soft Plastics to Steels.
- Produced from an Ultra-Fine, Submicron, Nano Grade Solid Carbide.



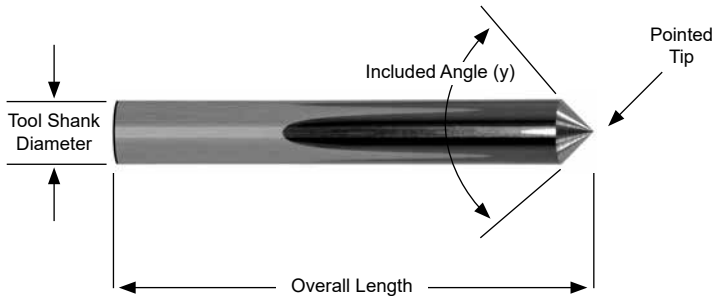
Pyramid (Y)					
Tool Shank Diameter	Overall Length	Included Angle	Tip Width (z)	Build Your Part No. (select z)	Price (each)
.125" (1/8")	2.0"	30°	.005", .010", .015", .020", .030"	Y-125x2.0-30-z	\$15.19
		60°		Y-125x2.0-60-z	
.125" (1/8")	4.5"	30°	.005", .010", .015", .020", .030"	Y-125x4.5-30-z	\$15.90
		60°		Y-125x4.5-60-z	
.1719" (11/64")	6.5"	30°	.005", .010", .015", .020", .030"	Y-1719x6.5-30-z	\$21.88
		60°		Y-1719x6.5-60-z	
.1875" (3/16")	2.0"	30°	.005", .010", .015", .020", .030"	Y-1875x2.0-30-z	\$18.73
		60°		Y-1875x2.0-60-z	
.250" (1/4")	2.0"	30°	.005", .010", .015", .020", .030"	Y-250x2.0-30-z	\$21.23
		60°		Y-250x2.0-60-z	
.250" (1/4")	6.5"	30°	.005", .010", .015", .020", .030"	Y-250x6.5-30-z	\$25.94
		60°		Y-250x6.5-60-z	
Part No. Example: Y-1875x2.0-60-.010					

We manufacture in house.

Carbide Pointed Scribe (CP)

Carbide Pointed Scribing Tools.
For Small, Fine, And Detailed Rotary Or Drag/Scratch Engraving.

- The Carbide Pointed Scribing Tool produces a very fine line on practically any material.
- Use for marking Glass, Stone, Ceramic, Granite, Steels and other hard materials as well as softer materials such as Aluminum and Brass.
- The tools are especially useful for extremely small letters where a very fine line is desired.
- Produced from an Ultra-Fine, Submicron, Nano Grade Solid Carbide.
- A Spring Loaded Engraving Tool is recommended when using a Carbide Point Engraving Tool.



- 2L has successfully engraved letters 0.020" (0.50 mm) tall using these tools in combination with a Spring Loaded Engraving Tool with a Heavy Spring on both Steel and Aluminum.
- The engraved lines shown are approximately 0.005" (0.127 mm) wide and 0.003" (0.076 mm) deep.
- The 120 degree tip angle is recommended for maximum tool life when used for general purpose engraving.



Carbide Pointed Scribe (CP)				
Tool Shank Diameter	Overall Length	Included Angle (y)	Build Your Part No. (select y)	Price (each)
.125" (1/8")	2.0"	30°, 45°, 60°, 90°, 120°	CP-125x2.0-y	\$16.81
.125" (1/8")	4.5"	30°, 45°, 60°, 90°, 120°	CP-125x4.5-y	\$22.63
.1719" (11/64")	6.5"	30°, 45°, 60°, 90°, 120°	CP-1719x6.5-y	\$26.88
.1875" (3/16")	2.0"	30°, 45°, 60°, 90°, 120°	CP-1875x2.0-y	\$21.88
.250" (1/4")	2.0"	30°, 45°, 60°, 90°, 120°	CP-250x2.0-y	\$26.23
.250" (1/4")	6.5"	30°, 45°, 60°, 90°, 120°	CP-250x6.5-y	\$29.13
4 mm (.157")	50 mm (1.97")	30°, 45°, 60°, 90°, 120°	CPmet-4x50-y	\$21.81
6 mm (.236")	50 mm (1.97")	30°, 45°, 60°, 90°, 120°	CPmet-6x50-y	\$26.23
Part No. Examples: CP-1875x2.0-90 & CPmet-6x50-90				

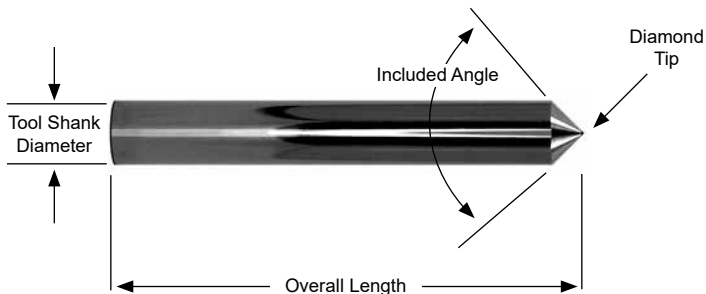
Contact us for sizes not listed.

Diamond Tip

Diamond Tip Engraving Tool.

For Small, Fine, Detailed Rotary Or Drag/Scratch Engraving.

- Use for fine engraving of many materials ranging from softer Alumimun or Brass, to harder materials such as Glass, Stone, Ceramic, Granite, Stainless Steel and other hard materials.
- It produces excellent results when used to show the base metal color beneath anodizing or epoxy coatings.
- For general purpose engraving the 120 degree tip angle is recommended.
- A Spring Loaded Engraving Tool is recommended when using a Diamond Tip Engraving Tool.
- Designed to be rotated in a machine spindle or held stationary for drag engraving when using a Spring Loaded Engraving Tool.



Diamond Tip

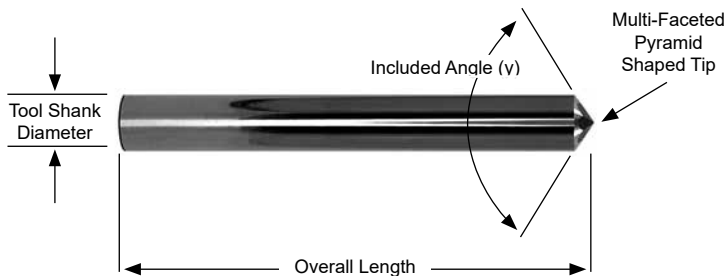
Tool Shank Diameter	Overall Length	Included Angle	Part No.	Price (each)
.125" (1/8")	1.125"	90°	10189	\$33.00
.125" (1/8")	1.125"	120°	10063	\$33.00
.125" (1/8")	4.5"	90°	10215	\$47.85
.125" (1/8")	4.5"	120°	10216	\$47.85
.1719" (11/64")	6.5"	90°	10217	\$49.50
.1719" (11/64")	6.5"	120°	10218	\$49.50
.1875" (3/16")	1.5"	90°	10392	\$49.50
.1875" (3/16")	1.5"	120°	10393	\$49.50
.250" (1/4")	6.5"	90°	10219	\$56.10
.250" (1/4")	6.5"	120°	10220	\$56.10

We manufacture in house.

2D Data Matrix (DM)

2D Data Matrix Tool Bit For Creating UID Barcodes, Human Readable Text, And For Cutting Through Difficult To Engrave Plating.

- Multi-faceted pyramid shaped tool designed to produce 2D Data Matrix Barcodes for creating UID (Unique Identification Marks) for government, aerospace, and high volume products.
- A 90 or 120 degree included angle is recommended for creating barcodes.
- This tool can also be used effectively for fine engraving and to engrave through plating that is prone to chipping.
- For a complete 2D Data Matrix Barcoding Engraving System use this tool bit with a 2L Spring Loaded Engraving Tool (pgs. 30-34) and the 2L PRO 3 2D Data Matrix Barcoding Software Program (pg. 37).
- A Spring Loaded Engraving Tool is recommended when using a Data Matrix Tool but it is not required.
- Produced from an Ultra-Fine, Submicron, Nano Grade Solid Carbide.



2D Data Matrix (DM)				
Tool Shank Diameter	Overall Length	Included Angle (y)	Build Your Part No. (select y)	Price (each)
.125" (1/8")	2.0"	60°, 90°, 120°	DM-125x2.0-y	\$18.06
.125" (1/8")	4.5"	60°, 90°, 120°	DM-125x4.5-y	\$22.63
.1719" (11/64")	6.5"	60°, 90°, 120°	DM-1719x6.5-y	\$26.88
.1875" (3/16")	2.0"	60°, 90°, 120°	DM-1875x2.0-y	\$27.48
.250" (1/4")	2.0"	60°, 90°, 120°	DM-250x2.0-y	\$27.56
.250" (1/4")	6.5"	60°, 90°, 120°	DM-250x6.5-y	\$28.13
6 mm (.236")	50 mm (1.97")	60°, 90°, 120°	DMmet-6x50-y	\$27.48
Part No. Examples: DM-1875x2.0-90 & DMmet-6x50-120				

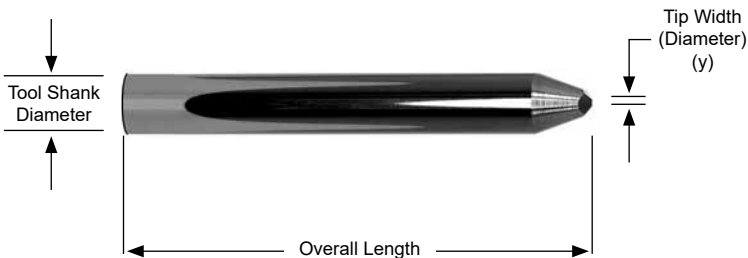
Contact us for sizes not listed.

Burnishing (BR)

Burnishing Tool.

For Burnishing, Exposing Metal Under Plated Surfaces, Shallow Engraving.

- Solid Carbide tool with a faceted style cut tip.
- Excellent for making shallow cuts, or to rub/burnish the surface of the workpiece.
- Use to remove plating or coating to expose the metal underneath the coating (such as engraving Black Oxide coated parts or hard or regular Anodized Aluminum).
- Ideal for marking hard materials such as hardened steel where deep engraving is not required.
- It can also be used to mark on cast steel parts or through scale to produce a clear and shallow engraved line.
- Burnishing Tools are most effective when marking depths no greater than .007".
- Produced from an Ultra-Fine, Submicron, Nano Grade Solid Carbide.
- A Spring Loaded Engraving Tool is recommended when using a Burnishing Tool.



Burnishing (BR)

Tool Shank Diameter	Overall Length	Tip Width (y)	Build Your Part No. (select y)	Price (each)
.125" (1/8")	2.0"	.005", .010", .020"	BR-125x2.0-y	\$15.19
.125" (1/8")	4.5"	.005", .010", .020"	BR-125x4.5-y	\$15.63
.1719" (11/64")	6.5"	.005", .010", .020"	BR-1719x6.5-y	\$21.88
.1875" (3/16")	2.0"	.005", .010", .020"	BR-1875x2.0-y	\$18.73
.250" (1/4")	2.0"	.005", .010", .020"	BR-250x2.0-y	\$21.23
.250" (1/4")	6.5"	.005", .010", .020"	BR-250x6.5-y	\$24.94

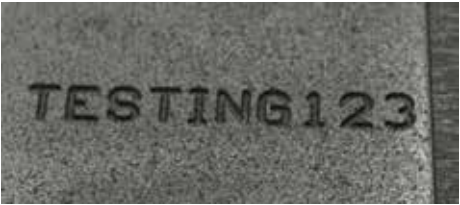
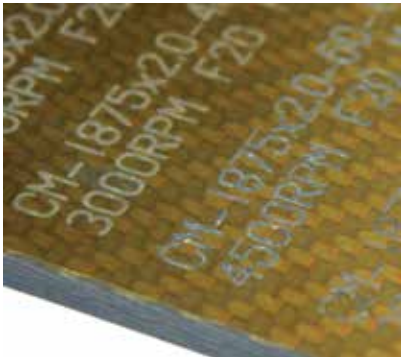
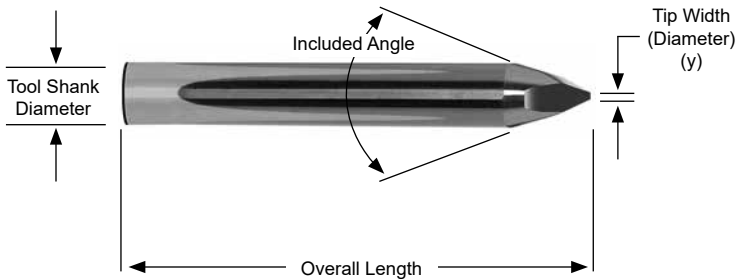
Part No. Example: BR-1875x2.0-.010

We manufacture in house.

Composite (CM)

Composite Engraving Tool Bit For Marking Modern Composite Or Honeycomb, Carbon Fiber, Glass Fiber, Graphite, Abrasive Materials, PCB Boards, Copper, Epoxy, And Wood Composites.

- The Composite Engraving Tool is a special multi-faceted pyramid shaped tool.
- Engrave difficult materials such as Modern Composite and Laminated Honeycomb materials.
- Also works well cutting through plating that is prone to chipping such as Hardcoat Anodized Aluminum and Electroless Nickel Plating on Aluminum or Steel. This creates a smooth burnished appearance when showing the base material underneath the plating.
- A Spring Loaded Engraving Tool is recommended when using a Composite Engraving Tool but it is not required.
- Produced from an Ultra-Fine, Submicron, Nano Grade Solid Carbide.



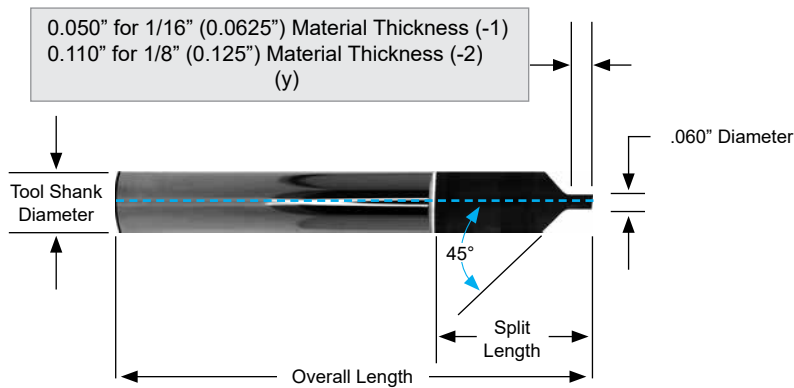
Composite Tool (CM)					
Tool Shank Diameter	Overall Length	Included Angle	Tip Width (y)	Build Your Part No. (select y)	Price (each)
.1875" (3/16")	2.0"	45°	.010", .020", .030", .040"	CM-1875x2.0-45-y	\$24.98
.1875" (3/16")	2.0"	60°	.010", .020", .030", .040"	CM-1875x2.0-60-y	\$24.98
.1875" (3/16")	2.0"	90°	.010", .020", .030", .040"	CM-1875x2.0-90-y	\$24.98
Part No. Example: CM-1875x2.0-60-.020					

Contact us for sizes not listed.

Cutter Beveler (CB)

Cutter Bevelers.
Parallel Edge With Bevel Angle.

- Simultaneously cut and bevel using one tool.
- 0.060" diameter parallel cutting edge cuts through materials and the side angle of 45° bevels or chamfers the edge of the material.
- Often used for cutting out badges, nametags, or other shapes from a sheet of material (typically plastic).
- Produced from an Ultra-Fine, Submicron, Nano Grade Solid Carbide.



Tool Shank Diameter	Split Length
.125"	.40"
.1719"	.65"
.1875"	.50"
.250"	.65"

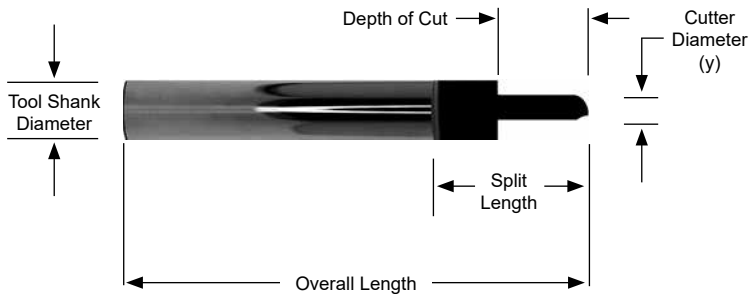
Cutter Beveler (CB)				
Tool Shank Diameter	Overall Length	Material Thickness (y)	Build Your Part No. (select y)	Price (each)
.125" (1/8")	2.0"	-1 or -2	CB-125x2.0-y	\$24.56
.125" (1/8")	4.5"	-1 or -2	CB-125x4.5-y	\$24.60
.1719" (11/64")	6.5"	-1 or -2	CB-1719x6.5-y	\$30.31
.1875" (3/16")	2.0"	-1 or -2	CB-1875x2.0-y	\$26.06
.250" (1/4")	2.0"	-1 or -2	CB-250x2.0-y	\$30.19
.250" (1/4")	6.5"	-1 or -2	CB-250x6.5-y	\$37.63
Part No. Example: CB-1875x2.0-1				

We manufacture in house.

Parallel Ballnose (PB)

Parallel Ballnose Cutter. Radius Tip With A Straight Edge.

- Straight edge tool with an included full radius on the end.
- Produces a cut with straight walls and a rounded bottom.
- Also effective for reverse engraving acrylic and 3D engraving applications.
- The standard cutter depth is 3X the diameter up to a maximum depth of 1/2".
- Produced from an Ultra-Fine, Submicron, Nano Grade Solid Carbide.



Cutter Diameter	Depth of Cut
0.050"	0.150"
0.060"	0.180"
0.075"	0.225"
0.090"	0.270"
0.125"	0.375"
0.1719"	0.500"
0.1875"	0.500"
0.250"	0.500"

Tool Shank Diameter	Split Length
.125"	.40"
.1719"	.65"
.1875"	.50"
.250"	.65"

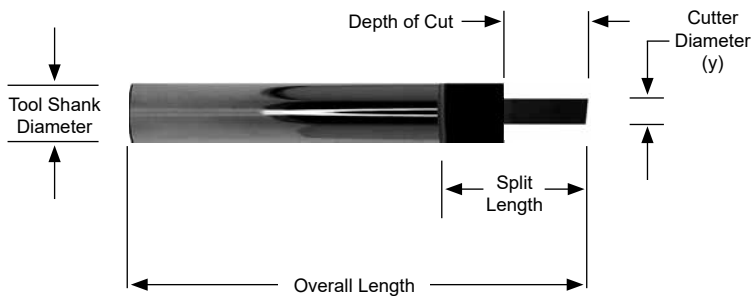
Parallel Ballnose (PB)				
Tool Shank Diameter	Overall Length	Cutter Diameter (y)	Build Your Part No. (select y)	Price (each)
.125" (1/8")	2.0"	.050", .060", .075", .090", .125"	PB-125x2.0-y	\$21.74
.125" (1/8")	4.5"	.050", .060", .075", .090", .125"	PB-125x4.5-y	\$24.60
.1719" (11/64")	6.5"	.050", .060", .075", .090", .125", .1719"	PB-1719x6.5-y	\$30.31
.1875" (3/16")	2.0"	.050", .060", .075", .090", .125", .1875"	PB-1875x2.0-y	\$22.78
.250" (1/4")	2.0"	.050", .060", .075", .090", .125", .1875", .250"	PB-250x2.0-y	\$29.60
.250" (1/4")	6.5"	.050", .060", .075", .090", .125", .1875", .250"	PB-250x6.5-y	\$37.63
Part No. Example: PB-125x2.0-.125				

Contact us for sizes not listed.

Parallel Cutter (PC)

Parallel Cutter.
Straight Edge Tool.

- Solid Carbide tool with parallel/straight edges.
- Produces a cut with straight walls and a flat bottom.
- The standard cutter depth is 3X the diameter up to a maximum depth of 1/2".
- Produced from an Ultra-Fine, Submicron, Nano Grade Solid Carbide.



Tool Shank Diameter	Split Length
.125"	.40"
.1719"	.65"
.1875"	.50"
.250"	.65"

Cutter Diameter	Depth of Cut
0.040"	0.120"
0.050"	0.150"
0.060"	0.180"
0.075"	0.225"
0.090"	0.270"
0.125"	0.375"
0.1719"	0.500"
0.1875"	0.500"
0.250"	0.500"

Parallel Cutters (PC)				
Tool Shank Diameter	Overall Length	Cutter Diameter (y)	Build Your Part No. (select y)	Price (each)
.125" (1/8")	2.0"	.040", .050", .060", .075", .090", .125", .1875", .250"	PC-125x2.0-y	\$17.70
.125" (1/8")	4.5"	.040", .050", .060", .075", .090", .125", .1875", .250"	PC-125x4.5-y	\$19.10
.1719" (11/64")	6.5"	.040", .050", .060", .075", .090", .125", .1875", .250"	PC-1719x6.5-y	\$25.90
.1875" (3/16")	2.0"	.040", .050", .060", .075", .090", .125", .1875", .250"	PC-1875x2.0-y	\$21.23
.250" (1/4")	2.0"	.040", .050", .060", .075", .090", .125", .1875", .250"	PC-250x2.0-y	\$23.73
.250" (1/4")	6.5"	.040", .050", .060", .075", .090", .125", .1875", .250"	PC-250x6.5-y	\$28.44
Part No. Example: PC-250x6.5-.090				

We manufacture in house.

Engraving Tool Starter Kits

Engraving Tool Starter Kits. A Selection Of Tools To Engrave A Wide Variety Of Materials.

- Each Engraving Tool Starter Kit includes six popular Engraving Tool Styles and/or Sizes.
- Tool Bits are suitable for use in CNC Mills, Routers, Spring Loaded Engraving Tools, Top Loading and Table Top Engraving Machines, and many other industrial engraving equipment and systems.
- Produced from an Ultra-Fine, Submicron, Nano Grade Solid Carbide.
- All tools are designed to be rotated while engraving and marking.

CNC Engraving Tool Starter Kits Include the Following Tools:

- (1) Tough Tip Engraving Tool for Steels: 60 degree included angle, .020" tip width (page 6).
 - (1) Tough Tip Engraving Tool for Aluminum: 60 degree included angle, .020" tip width (page 9).
 - (1) Standard Conical "General Purpose" Engraving Tool: 60 degree included angle, .020" tip width (page 10).
 - (1) Standard Conical "Softer Material" Engraving Tool: 60 degree included angle, .020" tip width (page 10).
 - (1) Single Flute Conical Ballnose Engraving Tool: 60 degree included angle, .010" tip radius (page 12).
 - (1) Engraving-Chamfering Tool: 60 degree included angle, .010" tip width (page 14).











Table Top Engraving Tool Starter Kits Include the Following Tools:

- (1) Tough Tip Engraving Tool for Steels: 60 degree included angle, .020" tip width (page 6).
 - (5) Standard Conical "Softer Material" Engraving Tool: 60 degree included angle, tip widths of .015", .030", .060", .090", .125" (page 10).


- (5 tip widths)

Engraving Tool Starter Kits				
Tool Shank Diameter & Description	Tools Overall Length	Tool Bits Included	Part No.	Price (each)
1/8" (.125") Dia. CNC Engraving Tool Starter Kit	2.0"	T-125x2.0-60-.020, T2-125x2.0-60-.020, C-125x2.0-60-.020-G, B-125x2.0-60-.010, C-125x2.0-60-.020-S, M-125x2.0-60-.010	10486	\$105.85
3/16" (.1875") Dia. CNC Engraving Tool Starter Kit	2.0"	T-1875x2.0-60-.020, T2-1875x2.0-60-.020, C-1875x2.0-60-.020-G, B-1875x2.0-60-.010, C-1875x2.0-60-.020-S, M-1875x2.0-60-.010	10489	\$123.64
1/4" (.250") Dia. CNC Engraving Tool Starter Kit	2.0"	T-250x2.0-60-.020, T2-250x2.0-60-.020, C-250x2.0-60-.020-G, B-250x2.0-60-.010, C-250x2.0-60-.020-S, M-250x2.0-60-.010,	10490	\$142.00
6 mm (.236") Dia. CNC Engraving Tool Starter Kit	50 mm (1.97")	Tmet-6x50-60-.50, T2met-6x50-60-.50, Cmet-6x50-60-.50-G, Bmet-6x50-60-.25, Cmet-6x50-60-.50-S, Mmet-6x50-60-.25	11030	\$142.00
11/64" (.1719") Dia. Table Top Engraving Tool Starter Kit	6.5"	T-1719x6.5-60-.020, C-1719x6.5-60-.015-S, C-1719x6.5-60-.030-S, C-1719x6.5-60-.060-S, C-1719x6.5-60-.090-S, C-1719x6.5-60-.125-S	10488	\$145.77
1/4" (.250") Dia. Table Top Engraving Tool Starter Kit	6.5"	T-250x6.5-60-.020, C-250x6.5-60-.015-S, C-250x6.5-60-.030-S, C-250x6.5-60-.060-S, C-250x6.5-60-.090-S, C-250x6.5-60-.125-S	10491	\$163.73

Engraving Tool Bit Accessories

Cutter Knobs and Accessories For Engraving Tools.



Engraving Accessories

Part No.	Description	Price (each)
10316	.125" (1/8") Brass Cutter Knob - Pkg. of 10 (includes 10 Set Screws)	\$30.00
10317	.1719" (11/64") Brass Cutter Knob - Pkg. of 10 (includes 10 Set Screws)	\$30.00
10318	.250" (1/4") Brass Cutter Knob - Pkg. of 10 (includes 10 Set Screws)	\$30.00
10323	Set Screws for Cutter Knobs - Pkg. of 5	\$6.25
10322	Hex Wrench for Cutter Knob Set Screws	\$6.50

Spring Loaded Engraving Tool™

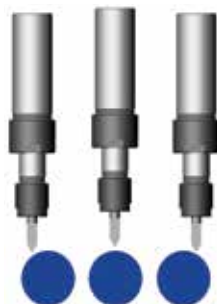
The Engraving Tool For CNC Milling Machines.

Engrave Flat, Curved And Uneven Surfaces When Engraving With A CNC Machine.



Engraving Made
Simple

Engrave Up To
84% Faster



Toolbit Floats With The
Workpiece Surface

Five Size Spring Loaded Engraving Toolholders Are Available To Fit Virtually Any CNC Machine.
Shank Diameters: 3/4", 20 mm, 1/2", 3/8" & 1/4".

Use Your CNC Milling Machine Or Multi-Axis Lathe To Engrave
No need for dedicated engraving machines or equipment.

Spring Loaded Design Compensates For Uneven Material Surfaces
The tool bit floats over the workpiece; slight surface variations no longer create illegible engraving.

Dramatically Reduce Cycle Times By Up To 84%
Plunge the tool rapidly into the part (G0) instead of feeding slow (G1).

Engrave Or Mark Most Materials (Plastic To Hardened Steel)
Use with 2L engraving tool bits that have been designed and tested for maximum performance on the material you are engraving or use with virtually any tool bit style. Different tension springs can be used to vary the force against the tool bit.

Engrave Text, Numbers, And Symbols
Use for Rotating or Drag/Scratch Engraving. For simple part numbers or detailed artistic engraving.

Tool Provides .40" Of Travel To The Tool Bit
Compensates for changing tolerances in the material surface.

Polish, Buff And Deburr
Use brushes and polishing wheels for polishing, buffing and deburring of workpieces.

Engrave Glass, Stone, Granite And Ceramic
Use a Diamond Tip Engraving Tool or Carbide Point Engraving Tool for fine engraving.

Get Started Engraving Fast
Each Spring Loaded Engraving Tool is sold in a kit containing everything needed to begin engraving using your cnc mill.

Free Engraving Software
2L Engraving Software (PRO Light Version) and a Single Line Engraving Font is free with the purchase of a Spring Loaded Engraving Tool Kit!

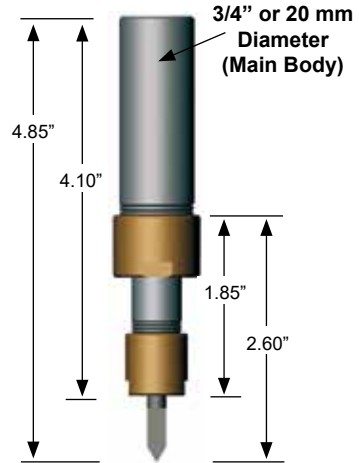
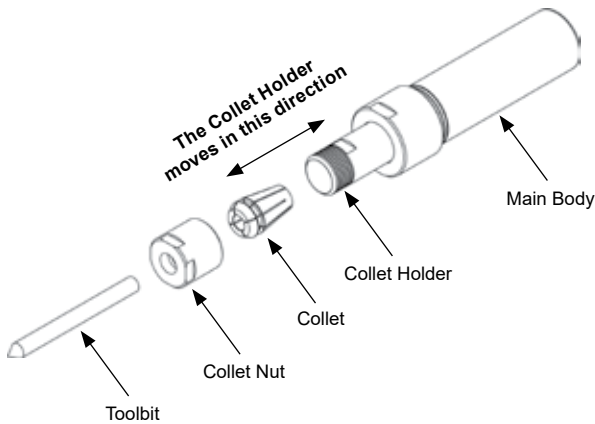


Standard Spring Loaded
Engraving Tool shown in
a Toolholder

* The Spring Loaded Engraving Tools are covered by U.S. Patents 6,834,434, 7,093,368, 7,607,871.

Spring Loaded Engraving Tool™: Standard Sizes

Spring Loaded Engraving Tool Standard Sizes:
3/4" & 20 mm Shaft Diameters.



3/4" (0.75") Shaft - Most Popular Size
10,000 Max. RPM

Included Collet holds 3/16" dia. tool bits
Part No. 10870

20 mm (0.78") Shaft
10,000 Max. RPM

Included Collet holds 3/16" dia. tool bits
Part No. 10871

- Designed for high volume, high speed production engraving.
- Main body fits in a standard Collet or End Mill Holder.
- The Integrated Collet allows quick tool bit changes without removing from the machine. Collets are easily interchanged to hold different diameter toolbits. A 3/16" Collet is included in each Kit. Additional Collets Available: 1/8", 1/4", 4 mm and 6 mm.
- Each Spring Loaded Engraving Toolholder is sold in a Kit containing everything needed to begin engraving using your CNC Mill.

Each Standard Spring Loaded Engraving Tool Kit Includes:

- > Spring Loaded Engraving Tool with 3/4" (0.75") or 20 mm (.78") diameter shaft.
- > Light Force Spring: Part No. 10045.
- > 3/16" Collet: Part No. 10874.
- > Collet Nut Wrenches: Part No. 10049.
- > Hex Wrench for the Spring Retaining Screw: Part No. 10051.
- > Solid Carbide Standard Conical V-Bit Engraving Tool, 3/16" diameter, 60 deg. angle, .020" tip width: Part No. C-1875x2.0-60-.020-G.
- > Complete instructions.
- > Sturdy reusable storage case.
- > 2L Engraving Software - PRO Light Version/Download - Free with each Kit purchase!

Standard Spring Loaded Engraving Tool Kits.
Choose Either 3/4" or 20 mm dia.



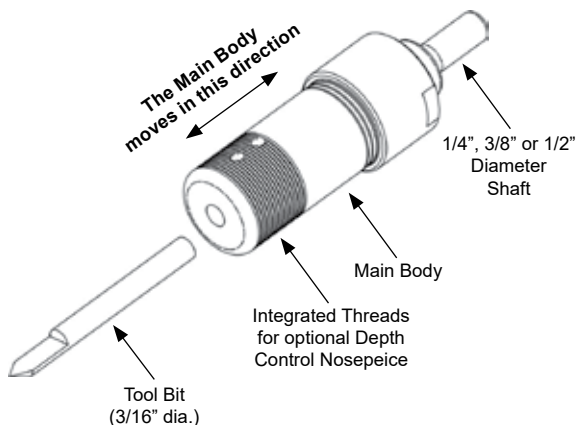
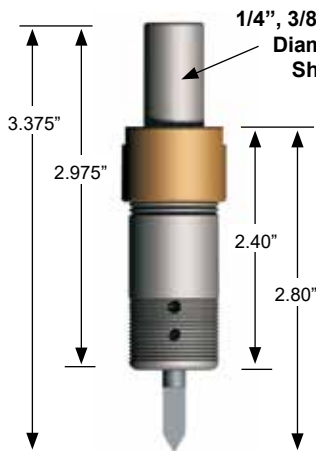
Standard Spring Loaded Engraving Tool Kits:

- 3/4" (0.75") Dia. Shaft Tool Kit: Part No. 10870, \$414.00 each.
- 20 mm (0.78") Dia. Shaft Tool Kit: Part No. 10871, \$414.00 each.

Spring Loaded Engraving Tool™: Mini Sizes

The Engraving Tool For CNC Milling Machines.

Spring Loaded Engraving Tool: Mini Sizes 1/2", 3/8" & 1/4" Shaft Diameters.



1/4" (0.25") Dia. Shaft

3,000 Max. RPM.
Holds 3/16" dia. tool bits.
Part No. 10381

3/8" (0.375") Dia. Shaft

6,000 Max. RPM.
Holds 3/16" dia. tool bits.
Part No. 10506

1/2" (0.50") Dia. Shaft

7,500 Max. RPM.
Holds 3/16" dia. tool bits.
Part No. 10382

- Fits in a standard Collet or End Mill holder.
- Holds 3/16" diameter tools.
- Each Spring Loaded Engraving Toolholder is sold in a complete Kit containing everything needed to begin engraving using your CNC Mill.

Each Mini Spring Loaded Engraving Tool Kit includes:

- > Spring Loaded Engraving Tool with 1/4" (0.25"), 3/8" (0.375"), or 1/2" (0.50") diameter shaft.
- > Light Force Spring: Part No. 10383.
- > 13/16" End Cap Wrench: Part No. 10389.
- > Hex Wrench: Part No. 10322.
- > Solid Carbide Standard Conical V-Bit Engraving Tool, 3/16" diameter, 60 degree angle, .020" tip width: Part No. C-1875x2.0-60-.020-G.
- > Set Screw: Part No. 10196.
- > Complete Instructions for Use.
- > Sturdy reusable plastic storage case.
- > 2L Engraving Software - PRO Light Version/Download Free with each Kit purchase!

Mini Spring Loaded Engraving Tool Kits.

Choose From Three Sizes:



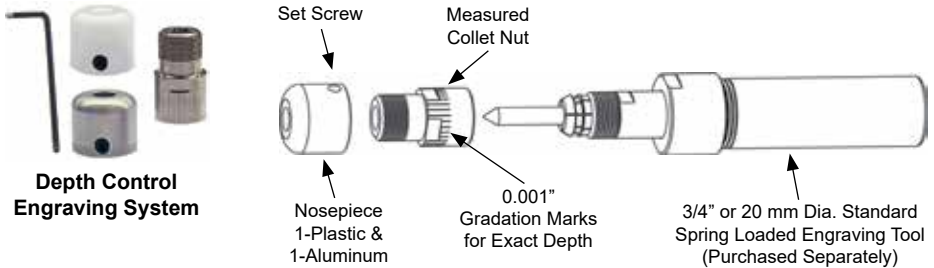
Mini Spring Loaded Engraving Tool Kits:

- 1/4" (0.25") Dia. Shaft Tool Kit: Part No. 10381, \$414.00 each.
- 3/8" (0.375") Dia. Shaft Tool Kit: Part No. 10506, \$414.00 each.
- 1/2" (0.50") Dia. Shaft Tool Kit: Part No. 10382, \$414.00 each.

Depth Control Engraving Systems

Provides Precise Engraving Depth With A Spring Loaded Tool.
Use When Precision Engraving Depth Is Your Only Option.

For Use With The Spring Loaded Engraving Tool - Standard Sizes.



- Use with the Spring Loaded Engraving Tool when precise engraving depth is required.
- System controls the exposure of the cutting tool to the engraved part.
- Graduations of 0.001" allow the depth to be easily modified.
- Engrave on softer materials such as Plastic, Brass or Copper with the Aluminum and Plastic Nosepieces.
- The Plastic Nosepiece is suggested for very soft plastic where scratching may be a concern.

Depth Control Engraving System Includes:

- | | |
|------------------------|-------------------|
| > Measured Collet Nut. | > Set Screws (2). |
| > Plastic Nosepiece. | > Hex Wrench. |
| > Aluminum Nosepiece. | > Instructions. |

**Standard Spring Loaded
Engraving Tool and Optional Depth
Control Engraving System**



Depth Control System for use with the Spring Loaded Engraving Tool - Standard Sizes:

- Depth Control Engraving System: Part No. 10872, \$135.50 each.

For Use With The Spring Loaded Engraving Tool - Mini Sizes.

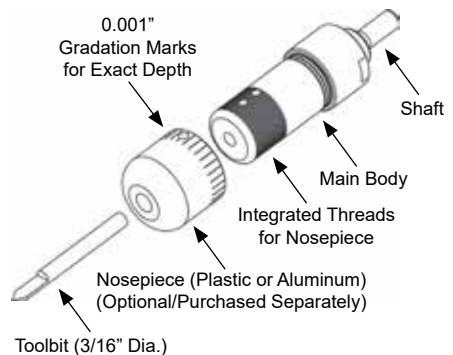


**Plastic
Nosepiece**



**Aluminum
Nosepiece**

**Mini Spring Loaded Engraving
Tool Shown with Optional Depth
Control Nosepiece**



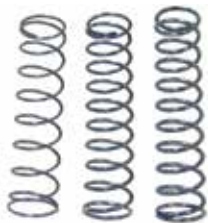
Depth Control Nosepieces for use with the Spring Loaded Engraving Tools - Mini Sizes:

- Plastic Nosepiece: Part No. 10387, \$56.25 each.
- Aluminum Nosepiece: Part No. 10388, \$56.25 each.

Accessories For Spring Loaded Engraving Tools

Accessories For The Spring Loaded Engraving Tools.

Springs:



Standard Spring Loaded Engraving Tool:

- Extra Light Spring: Part No. 10325, \$5.75 each.
- Light Spring: Part No. 10045, \$5.75 each.
- Medium Spring: Part No. 10046, \$5.75 each.
- Heavy Spring: Part No. 10047, \$5.75 each.
- Extra Heavy Spring: Part No. 10048, \$5.75 each.
- Extra-Extra Heavy Spring: Part No. 11044, \$5.75 each.

Mini Spring Loaded Engraving Tool:

- Light Spring: Part No. 10383, \$5.75 each.
- Medium Spring: Part No. 10384, \$5.75 each.
- Heavy Spring: Part No. 10385, \$5.75 each.
- Extra Heavy Spring: Part No. 10386, \$5.75 each.

Collets:



Standard Spring Loaded Engraving Tool:

- 1/8" (.125") Collet: Part No. 10873, \$18.50 each.
- 3/16" (.1875") Collet: Part No. 10874, \$18.50 each.
- 1/4" (.250") Collet: Part No. 10875, \$18.50 each.
- 4 mm (.157") Collet: Part No. 10876, \$18.50 each.
- 6 mm (.236") Collet: Part No. 10877, \$18.50 each.

Depth Control System Replacement Items:



Standard Spring Loaded Engraving Tool:

- Aluminum Nosepiece: Part No. 10193, \$43.75 each.
- Plastic Nosepiece: Part No. 10194, \$43.75 each.
- Set Screws (pkg. of 5): Part No. 10196, \$6.25 each.
- Hex Wrench: Part No. 10197, \$6.50 each.

Mini Spring Loaded Engraving Tool:

- Aluminum Nosepiece: Part No. 10388, \$56.25 each.
- Plastic Nosepiece: Part No. 10387, \$56.25 each.
- Set Screws (pkg. of 5): Part No. 10196, \$6.25 each.
- Hex Wrench: Part No. 10322, \$6.50 each.

Additional Spring Loaded Engraving Tool Items:



Standard Spring Loaded Engraving Tool:

- Balls (pkg. of 10): Part No. 10053, \$9.50 each.
- Spring Retaining Screw: Part No. 10052, \$10.00 each.
- Spring Ret. Screw Hex Wrench: Part No. 10051, \$6.50 each.
- Collet Nut: Part No. 10878, \$43.75 each.
- Collet Nut Wrenches (pkg. of 2): Part No. 10049, \$21.25 each.
- Endcap Wrench (not shown): Part No. 10389, \$10.75 each.

Mini Spring Loaded Engraving Tool:

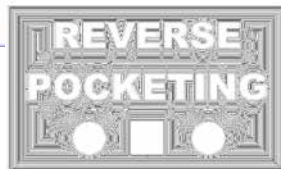
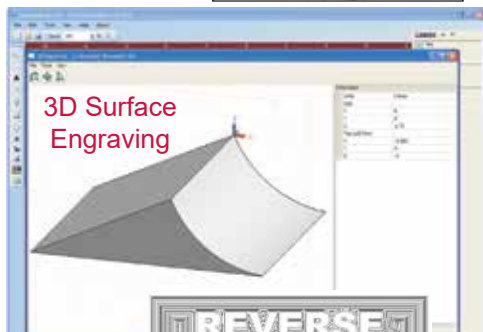
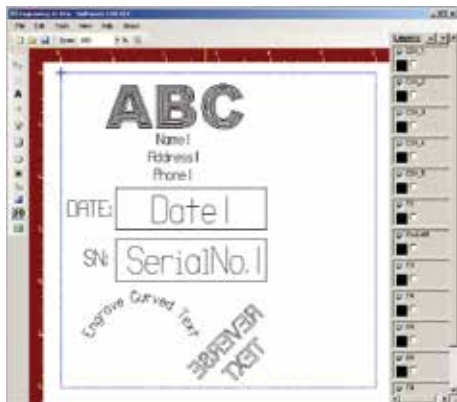
- Balls (pkg. of 10): Part No. 10053, \$9.50 each.
- Endcap Wrench (not shown): Part No. 10389, \$10.75 each.
- Hex Wrench: Part No. 10322, \$6.50 each.

PRO 1: 3 Axis Engraving Software Program

3 Axis Milling Engraving Software For 3 Axis CNC Machines.

PRO 1 Version.

Engraves Text, Incrementing Serial Numbers, Lines And Shapes.
Imports And Edits Photos, Images And Logos.



PRO 1 Engraving Software Program Features.

- Produces standard G0 & G1 codes to ensure cnc control compatibility.
- Simple to use interface allows any cnc operator to create G-code programs.
- Engrave at a constant depth on an imported 3D surface.
- Create incrementing serial numbers for use on any CNC control.
- Engrave text, numbers, images, drawn shapes, and sequential part numbers in one output nc program (.nc file), or save as .PLT or .DXF files.
- Import and edit photo images (JPG, BMP, and GIF formats) and DXF files.
- Perform pocketing of fonts, or reverse pocket text for raised lettering.
- Engrave layouts using a Database (.csv file) created with Microsoft Excel or other programs.
- Create precise layouts using guidelines & reference geometry.
- Control font styles, orientation, and character spacing.
- Use 2L Single Line Fonts to reduce cycle times or engrave any Windows fonts.
- Cycle Time Monitor improves job cost estimating and job optimization.
- Operates on Microsoft Windows® 7, 8, 10, 11, XP, and Vista.
- The 2L PRO Engraving Software Programs are provided via download. Installation requires your PC to have Internet access and either e-mail or print capabilities.

For All PRO 1 Features
Visit Our Website:

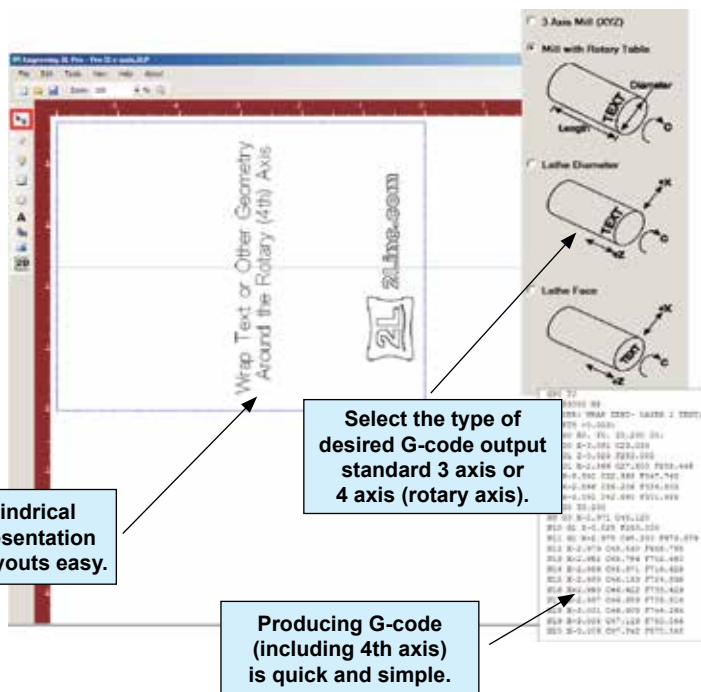
www.2Linc.com/software/

PRO 1 Engraving Software Program:

- For 3 Axis CNC Milling Machines: Part No. 10676, Visit: www.2linc.com for Pricing.

PRO 2 Version.

Wrap Engraving Text, Serial Numbers, And Other Geometry Around A Cylinder.



PRO 2 Engraving Software Program Features.

- The PRO 2 Version includes all the features of the 3 Axis PRO 1 Software Program [PLUS 4 axis Engraving capabilities](#).
 - Wrap the engraving geometry around a cylinder and create G-code for 4th axis rotary engraving (for a 4 axis cnc milling machine or a multi-axis lathe).
 - Creates G-code on the face of a part on a rotary axis lathe with polar interpolation.
 - Use with rotating live spindles or for drag engraving with a 2L Spring Loaded Engraving Tool.
 - Modify the rotary axis letter (A,B,C,H,U,V,W...) for your cnc machine.
 - The program automatically displays the cylinder size unrolled so it is easy to create layouts to visualize how the engraving will fit on your workpiece.
 - Creates generic G-code programs which use only G0 and G1 moves to ensure CNC control compatibility.
 - Operates on Microsoft Windows® 7, 8, 10, 11, XP, and Vista.
 - The 2L PRO Engraving Software Programs are provided via download. Installation requires your PC to have Internet access and either e-mail or print capabilities.
- For All PRO 2 Features
Visit Our Website:
www.2Linc.com/software/

For All PRO 2 Features
Visit Our Website:
www.2Linc.com/software/

PRO 2 Engraving Software Program:

- For 3 & 4 Axis and Multi Axis Lathes: Part No. 10677, Visit www.2Linc.com for Pricing.

PRO 3: 2D Data Matrix Engraving Software Program

2D Data Matrix Barcoding For 3 & 4 Axis Milling And Multi Axis Lathes.

PRO 3 Version.

Perform 2D Data Matrix Barcoding (UID) And Direct Part Marking (DPM).



PRO 3 Engraving Software Program Features.

- The PRO 3 Version **includes all the features of the PRO 1 and PRO 2 Engraving Software Programs PLUS 2D Data Matrix Barcoding.**
- Create G-code programs for producing 2D Data Matrix Barcodes (UID - Unique Identification Marks) with 3 or 4 axis CNC milling machines or multi-axis lathes.
- Place incrementing serial numbers within the barcode and engrave the human readable text.
- Use 2L engraving tools to create the 2D Data Matrix Barcodes with either a rigid toolholder or using a 2L Spring Loaded Engraving Tool.
- Produces Standard G0 & G1 Codes to ensure CNC control compatibility.
- Control barcode data cell spacing for different size marks.
- Add Ascii codes to the barcodes for macros or pad characters.
- Operates on Microsoft Windows® 7, 8, 10, 11, XP, and Vista.
- The 2L PRO Engraving Software Programs are provided via download. Installation requires your PC to have Internet access and either e-mail or print capabilities.

For All PRO 3 Features
Visit Our Website:
www.2Linc.com/software/

PRO 3 Engraving Software Program:

- For 2D Data Matrix Barcoding: Part No. 10678, Visit www.2Linc.com for Pricing.

CNC Dot Peen Marking Tool

The Dot Peen Marking Tool For CNC Milling Machines.

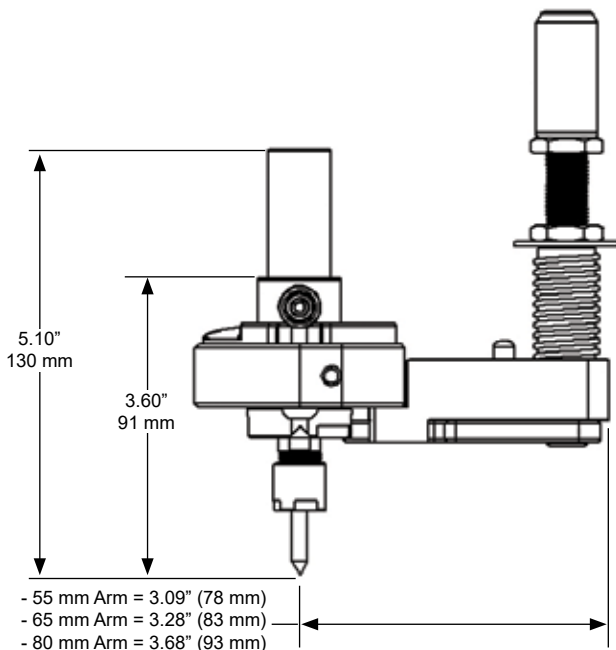
Produce Permanent Dots or Pin Marks on Uneven Work Surfaces
Using The Rotating Spindle of a CNC Machine.



CNC Dot Peen Marking Tool

The Dot Peen Marking Tool For CNC Milling Machines.

Mark Practically Any Material With Height Variations
Up To Approximately 0.100" (2.5 mm).



- The CNC Dot Peen Tool Marker produces permanent dots or pin marks using the rotating spindle of a CNC machine.
- Operation generates a succession of dots that appear as a line.
- 3/4" diameter shank fits into a standard 3/4" Collet or End Mill Holder.
- Compensates for tolerance variations in the surface height of approximately 0.100" (2.5 mm).
- The integrated Collet allows quick tool bit changes without removing the tool from the machine.
- Perform high speed marking as fast as the CNC Machine can move.
- Mark practically any material using inexpensive, easily replaceable dot peen tool bits.
- Produce marks on a wide range of material hardness, from soft plastics and aluminum to hardened steels, using different strength springs.
- Program using standard engraving software or use the included 2L Engraving Software Program.
- FREE 2L PRO Light Engraving Software Download Program with eleven Single Line Engraving Font is included at no additional charge with the purchase of the CNC Dot Peen Marking Tool.

Operating Notes:

- Spindle speed operation range: 500-1,000 RPM.
- Maximum recommended spindle speed: 1,000 RPM.

CNC Dot Peen Marking Tool

A Complete CNC Dot Peen Marker Consists Of
Three Components Which Are Purchased Separately.

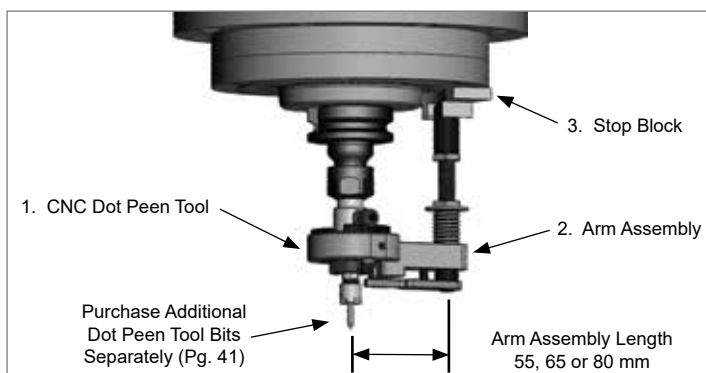
1. CNC Dot Peen Tool



2. Arm Assembly



3. Stop Block



1. CNC Dot Peen Tool

- 3/4" Shank Diameter: Part No. 11405, \$778.75 each.

Includes: Light Spring (Part No. 10045), Medium Spring (Part No. 10046),
Collet Nut Wrenches (Part No. 11505),
Dot Peen Toolbit (Part No. DP-1875x2.0-90-.005), 3/16" Collet (Part No. 10874).

2. Arm Assembly

See the above picture for Arm Assembly Length Measurement.

- 55 mm: Part No. 11406, \$215.00 each.
- 65 mm: Part No. 11407, \$215.00 each.
- 80 mm: Part No. 11408, \$215.00 each.

3. Stop Block

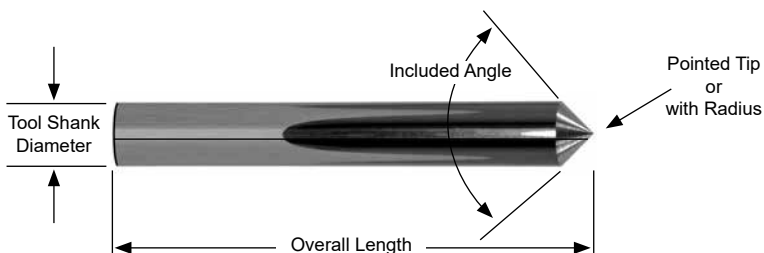
To determine which size Stop Block will best fit your CNC Machine
visit: www.2linc.com/dot-peen-template.pdf

- Small Stop Block: Part No. 11409, \$122.50 each.
- Large Stop Block: Part No. 11410, \$128.75 each.

CNC Dot Peen Marking Tool Accessories & Tool Bit

Dot Peen Marking Tool Bit.

- Solid Carbide tool bit used to produce permanent dots or pin marks.
- For use with the 2L CNC Dot Peen Marking Tool.
- Marks a wide range of materials from soft plastics to hard steels.
- Produced from an Ultra-Fine, Submicron, Nano Grade Solid Carbide.



Dot Peen Marking Tool Bit (DP)

Tool Shank Diameter	Overall Length	Included Angle	Tip Radius	Part No.	Price (each)
.1875" (3/16")	2.0"	60°	.000"	DP-1875x2.0-60-0	\$21.81
.1875" (3/16")	2.0"	60°	.005"	DP-1875x2.0-60-.005	\$21.81
.1875" (3/16")	2.0"	60°	.010"	DP-1875x2.0-60-.010	\$21.81
.1875" (3/16")	2.0"	60°	.020"	DP-1875x2.0-60-.020	\$21.81
.1875" (3/16")	2.0"	90°	.000"	DP-1875x2.0-90-0	\$21.81
.1875" (3/16")	2.0"	90°	.005"	DP-1875x2.0-90-.005	\$21.81
.1875" (3/16")	2.0"	90°	.010"	DP-1875x2.0-90-.010	\$21.81
.1875" (3/16")	2.0"	90°	.020"	DP-1875x2.0-90-.020	\$21.81
.1875" (3/16")	2.0"	120°	.000"	DP-1875x2.0-120-0	\$21.81
.1875" (3/16")	2.0"	120°	.005"	DP-1875x2.0-120-.005	\$21.81
.1875" (3/16")	2.0"	120°	.010"	DP-1875x2.0-120-.010	\$21.81
.1875" (3/16")	2.0"	120°	.020"	DP-1875x2.0-120-.020	\$21.81

A Dot Peen Marking Tool Bit (Part No. DP-1875x2.0-90-.005) is included with the CNC Dot Peen Marker (Part No. 11405).

Accessories For The CNC Dot Peen Marking Tool.

Springs:



- Light Spring: Part No. 10045, \$5.75 each.
- Medium Spring (included w/tool): Part No. 10046, \$5.75 each.
- Heavy Spring: Part No. 10047, \$5.75 each.
- Extra Heavy Spring: Part No. 10048, \$5.75 each.
- Extra- Extra Heavy Spring: Part No. 11044, \$5.75 each.

Collet, Nut, Wrenches:



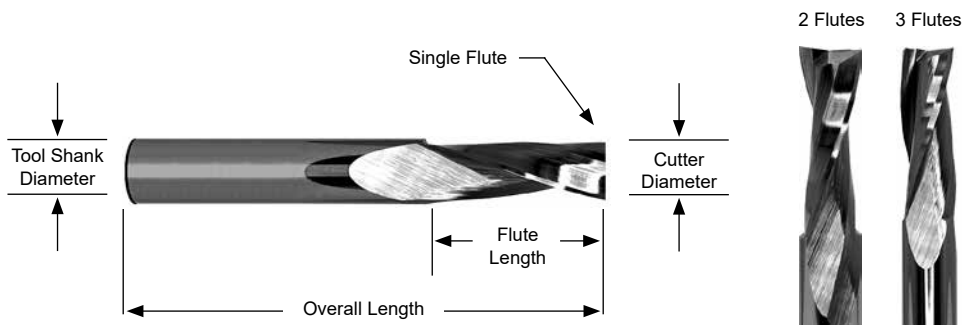
- 3/16" (.1875") Collet (included w/tool): Part No. 10874, \$18.50 each.
- Collet Nut: Part No. 10878, \$43.75 each.
- Collet Nut Wrenches (pkg. of 2): Part No. 11505, \$33.75 each.

Square End Mills: Plastic and Wood Cutting (PWE)

Standard/Square End Mills For Cutting Plastic And Wood.



- Slow 20° Helix reduces workpiece lifting and creates a fine finish.
- Extremely sharp cutting edge allows high feedrates while producing an excellent surface finish when cutting Plastic and Wood.
- CNC qualified.
- Center cutting for straight plunging or ramping down into workpieces.
- Single Flute - maximum chip clearance for chip evacuation.
- 2 Flutes - higher feedrates than Single Flute End Mills but still provide for a large amount of chip clearance to prevent chips from sticking or packing in the flutes.
- 3 Flutes - highest feedrate but have less chip clearance space than Single or 2 Flute End Mills.
- Produced from an Ultra-Fine, Submicron, Nano Grade Solid Carbide.



Standard/Square End Mills: Plastic and Wood Cutting (PWE)

Cutter Diameter	Flute Length	Tool Shank Diameter	Overall Length	Single Flute Part No.	2 Flutes Part No.	3 Flutes Part No.	Price (each)
.031" (1/32")	.094" (3x)	.125" (1/8")	2.0"	PWE1-031-1A094	PWE2-031-1A094	PWE3-031-1A094	\$19.81
.031" (1/32")	.094" (3x)	.250" (1/4")	2.0"	PWE1-031-2A094	PWE2-031-2A094	PWE3-031-2A094	\$22.75
.031" (1/32")	.160" (5x)	.125" (1/8")	2.0"	PWE1-031-1A160	PWE2-031-1A160	PWE3-031-1A160	\$19.81
.031" (1/32")	.160" (5x)	.250" (1/4")	2.0"	PWE1-031-2A160	PWE2-031-2A160	PWE3-031-2A160	\$22.75
.050"	.150" (3x)	.125" (1/8")	2.0"	PWE1-050-1	PWE2-050-1	PWE3-050-1	\$19.81
.050"	.150" (3x)	.250" (1/4")	2.0"	PWE1-050-2	PWE2-050-2	PWE3-050-2	\$22.75
.050"	.250" (5x)	.125" (1/8")	2.0"	PWE1-050-1A250	PWE2-050-1A250	PWE3-050-1A250	\$19.81
.050"	.250" (5x)	.250" (1/4")	2.0"	PWE1-050-2A250	PWE2-050-2A250	PWE3-050-2A250	\$22.75
.0625" (1/16")	.25" (4x)	.125" (1/8")	2.0"	PWE1-0625-1	PWE2-0625-1	PWE3-0625-1	\$19.81
.0625" (1/16")	.25" (4x)	.250" (1/4")	2.0"	PWE1-0625-2	PWE2-0625-2	PWE3-0625-2	\$22.75
.0625" (1/16")	.313" (5x)	.125" (1/8")	2.0"	PWE1-0625-1A313	PWE2-0625-1A313	PWE3-0625-1A313	\$19.81
.0625" (1/16")	.313" (5x)	.250" (1/4")	2.0"	PWE1-0625-2A313	PWE2-0625-2A313	PWE3-0625-2A313	\$22.75
.078" (5/64")	.25" (3x)	.125" (1/8")	2.0"	PWE1-078-1	PWE2-078-1	PWE3-078-1	\$19.81
.078" (5/64")	.25" (3x)	.250" (1/4")	2.0"	PWE1-078-2	PWE2-078-2	PWE3-078-2	\$22.75
.078" (5/64")	.390" (5x)	.125" (1/8")	2.0"	PWE1-078-1A390	PWE2-078-1A390	PWE3-078-1A390	\$19.81
.078" (5/64")	.390" (5x)	.250" (1/4")	2.0"	PWE1-078-2A390	PWE2-078-2A390	PWE3-078-2A390	\$22.75
.0938" (3/32")	.38" (3x)	.125" (1/8")	2.0"	PWE1-0938-1	PWE2-0938-1	PWE3-0938-1	\$19.81
.0938" (3/32")	.38" (3x)	.250" (1/4")	2.0"	PWE1-0938-2	PWE2-0938-2	PWE3-0938-2	\$22.75
.0938" (3/32")	.470" (5x)	.125" (1/8")	2.0"	PWE1-0938-1A470	PWE2-0938-1A470	PWE3-0938-1A470	\$19.81
.0938" (3/32")	.470" (5x)	.250" (1/4")	2.0"	PWE1-0938-2A470	PWE2-0938-2A470	PWE3-0938-2A470	\$22.75

Continued on next page.

Contact us for sizes not listed.

Square End Mills: Plastic and Wood Cutting (PWE)

Standard/Square End Mills
For Cutting Plastic And Wood.



Standard/Square End Mills: Plastic and Wood Cutting (PWE)

Cutter Diameter	Flute Length	Tool Shank Diameter	Overall Length	Single Flute Part No.	2 Flutes Part No.	3 Flutes Part No.	Price (each)
.1094" (7/64")	.330" (3x)	.125" (1/8")	2.0"	PWE1-109-1A330	PWE2-109-1A330	PWE3-109-1A330	\$19.81
.1094" (7/64")	.330" (3x)	.250" (1/4")	2.0"	PWE1-109-2A330	PWE2-109-2A330	PWE3-109-2A330	\$22.75
.1094" (7/64")	.550" (5x)	.125" (1/8")	2.0"	PWE1-109-1A550	PWE2-109-1A550	PWE3-109-1A550	\$19.81
.1094" (7/64")	.550" (5x)	.250" (1/4")	2.0"	PWE1-109-2A550	PWE2-109-2A550	PWE3-109-2A550	\$22.75
.125" (1/8")	.50" (4x)	.125" (1/8")	2.0"	PWE1-125-1	PWE2-125-1	PWE3-125-1	\$19.81
.125" (1/8")	.50" (4x)	.250" (1/4")	2.0"	PWE1-125-2	PWE2-125-2	PWE3-125-2	\$22.75
.125" (1/8")	.625" (5x)	.125" (1/8")	2.0"	PWE1-125-1A625	PWE2-125-1A625	PWE3-125-1A625	\$19.81
.125" (1/8")	.625" (5x)	.250" (1/4")	2.0"	PWE1-125-2A625	PWE2-125-2A625	PWE3-125-2A625	\$22.75
.156" (5/32")	.470" (3x)	.250" (1/4")	2.0"	PWE1-156-2A470	PWE2-156-2A470	PWE3-156-2A470	\$22.75
.156" (5/32")	.780" (5x)	.250" (1/4")	3.0"	PWE1-156-2C780	PWE2-156-2C780	PWE3-156-2C780	\$24.00
.1875" (3/16")	.50" (3x)	.1875" (3/16")	2.0"	PWE1-1875-1	PWE2-1875-1	PWE3-1875-1	\$21.63
.1875" (3/16")	.50" (3x)	.250" (1/4")	2.0"	PWE1-1875-2	PWE2-1875-2	PWE3-1875-2	\$22.75
.1875" (3/16")	1.0" (5x)	.1875" (3/16")	3.0"	PWE1-187-1C1.0	PWE2-187-1C1.0	PWE3-187-1C1.0	\$24.00
.1875" (3/16")	1.0" (5x)	.250" (1/4")	3.0"	PWE1-187-2C1.0	PWE2-187-2C1.0	PWE3-187-2C1.0	\$24.75
.250" (1/4")	.75" (3x)	.250" (1/4")	2.0"	PWE1-250-1	PWE2-250-1	PWE3-250-1	\$22.75
.250" (1/4")	.75" (3x)	.250" (1/4")	2.5"	PWE1-250-1A750	PWE2-250-1A750	PWE3-250-1A750	\$24.75
.250" (1/4")	1.25" (5x)	.250" (1/4")	3.0"	PWE1-250-1C1.25	PWE2-250-1C1.25	PWE3-250-1C1.25	\$25.25
.3125" (5/16")	1.0" (3x)	.3125" (5/16")	3.0"	PWE1-312-1C1.0	PWE2-312-1C1.0	PWE3-312-1C1.0	\$27.88
.375" (3/8")	1.125" (3x)	.375" (3/8")	3.0"	PWE1-375-1	PWE2-375-1	PWE3-375-1	\$39.00
.500" (1/2")	1.125" (2.3x)	.500" (1/2")	3.0"	PWE1-500-1	PWE2-500-1	PWE3-500-1	\$61.45
1.0 mm (.039")	3.0 mm (3x)	6 mm	50 mm	PWE1-1-1A3.0	PWE2-1-1A3.0	PWE3-1-1A3.0	\$22.75
1.0 mm (.039")	5.0 mm (5x)	6 mm	50 mm	PWE1-1-1A5.0	PWE2-1-1A5.0	PWE3-1-1A5.0	\$22.75
1.5 mm (.059")	6.35 mm (4x)	6 mm	50 mm	PWE1-1.5-1	PWE2-1.5-1	PWE3-1.5-1	\$22.75
1.5 mm (.059")	7.5 mm (5x)	6 mm	50 mm	PWE1-1.5-1A7.5	PWE2-1.5-1A7.5	PWE3-1.5-1A7.5	\$22.75
2 mm (.079")	6.35 mm (3x)	6 mm	50 mm	PWE1-2-1	PWE2-2-1	PWE3-2-1	\$22.75
2 mm (.079")	10 mm (5x)	6 mm	50 mm	PWE1-2-1A10	PWE2-2-1A10	PWE3-2-1A10	\$22.75
2.5 mm (.098")	7.5 mm (3x)	6 mm	50 mm	PWE1-2.5-1A7.5	PWE2-2.5-1A7.5	PWE3-2.5-1A7.5	\$22.75
2.5 mm (.098")	12.5 mm (5x)	6 mm	50 mm	PWE1-2.5-1A12.5	PWE2-2.5-1A12.5	PWE3-2.5-1A12.5	\$22.75
3 mm (.118")	12.7 mm (4x)	6 mm	50 mm	PWE1-3-1	PWE2-3-1	PWE3-3-1	\$22.75
3 mm (.118")	15 mm (5x)	6 mm	50 mm	PWE1-3-1A15	PWE2-3-1A15	PWE3-3-1A15	\$22.75
3.5 mm (.138")	10.5 mm (3x)	6 mm	50 mm	PWE1-3.5-1A10.5	PWE2-3.5-1A10.5	PWE3-3.5-1A10.5	\$22.75
3.5 mm (.138")	17.5 mm (5x)	6 mm	75 mm	PWE1-3.5-1B17.5	PWE2-3.5-1B17.5	PWE3-3.5-1B17.5	\$22.75
4 mm (.157")	12.7 mm (3x)	6 mm	50 mm	PWE1-4-1	PWE2-4-1	PWE3-4-1	\$22.75
4 mm (.157")	20 mm (5x)	6 mm	75 mm	PWE1-4-1B20	PWE2-4-1B20	PWE3-4-1B20	\$22.75
4.5 mm (.177")	13.5 mm (3x)	6 mm	50 mm	PWE1-4.5-1A13.5	PWE2-4.5-1A13.5	PWE3-4.5-1A13.5	\$22.75
4.5 mm (.177")	22.5 mm (5x)	6 mm	75 mm	PWE1-4.5-1B22.5	PWE2-4.5-1B22.5	PWE3-4.5-1B22.5	\$22.75
5 mm (.197")	12.7 mm (2.5x)	6 mm	50 mm	PWE1-5-1	PWE2-5-1	PWE3-5-1	\$22.75
5 mm (.197")	25 mm (5x)	6 mm	75 mm	PWE1-5-1B25	PWE2-5-1B25	PWE3-5-1B25	\$22.75
5.5 mm (.216")	16.5 mm (3x)	6 mm	50 mm	PWE1-5.5-1A16.5	PWE2-5.5-1A16.5	PWE3-5.5-1A16.5	\$22.75
5.5 mm (.216")	27.5 mm (5x)	6 mm	75 mm	PWE1-5.5-1B27.5	PWE2-5.5-1B27.5	PWE3-5.5-1B27.5	\$22.75
6 mm (.236")	19 mm (3x)	6 mm	50 mm	PWE1-6-1	PWE2-6-1	PWE3-6-1	\$22.75
6 mm (.236")	30 mm (5x)	6 mm	75 mm	PWE1-6-1B30	PWE2-6-1B30	PWE3-6-1B30	\$22.75

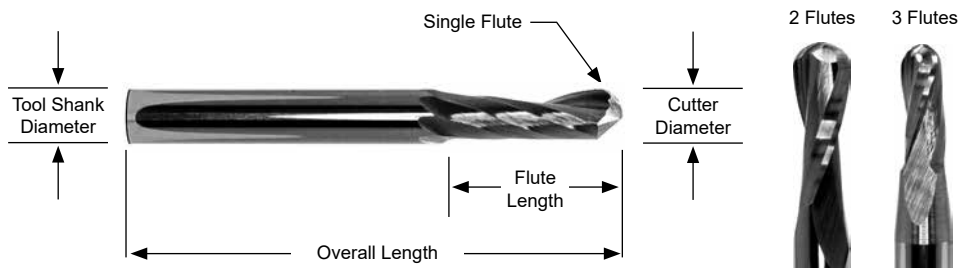
We manufacture in house.

Ballnose End Mills: Plastic And Wood Cutting (PWB)

Ballnose End Mills For Cutting Plastic And Wood.



- Slow 20° Helix reduces workpiece lifting and creates a fine finish.
- Extremely sharp cutting edge allows high feedrates while producing an excellent surface finish when cutting Plastic and Wood.
- CNC qualified.
- Center cutting for straight plunging or ramping down into workpieces.
- Single Flute - maximum chip clearance for chip evacuation.
- 2 Flutes - higher feedrates than Single Flute End Mills but still provide for a large amount of chip clearance to prevent chips from sticking or packing in the flutes.
- 3 Flutes - highest feedrate but have less chip clearance space than Single or 2 Flute End Mills.
- Produced from an Ultra-Fine, Submicron, Nano Grade Solid Carbide.



Ballnose End Mills: Plastic and Wood Cutting (PWB)

Cutter Diameter	Flute Length	Tool Shank Diameter	Overall Length	Single Flute Part No.	2 Flutes Part No.	3 Flutes Part No.	Price (each)
.050"	.15"	.125" (1/8")	2.0"	PWB1-050-1	PWB2-050-1	PWB3-050-1	\$19.81
.050"	.15"	.250" (1/4")	2.0"	PWB1-050-2	PWB2-050-2	PWB3-050-2	\$22.75
.0625" (1/16")	.25" (1/4")	.125" (1/8")	2.0"	PWB1-0625-1	PWB2-0625-1	PWB3-0625-1	\$19.81
.0625" (1/16")	.25" (1/4")	.250" (1/4")	2.0"	PWB1-0625-2	PWB2-0625-2	PWB3-0625-2	\$22.75
.078" (5/64")	.25" (1/4")	.125" (1/8")	2.0"	PWB1-078-1	PWB2-078-1	PWB3-078-1	\$19.81
.078" (5/64")	.25" (1/4")	.250" (1/4")	2.0"	PWB1-078-2	PWB2-078-2	PWB3-078-2	\$22.75
.0938" (3/32")	.38" (3/8")	.125" (1/8")	2.0"	PWB1-0938-1	PWB2-0938-1	PWB3-0938-1	\$19.81
.0938" (3/32")	.38" (3/8")	.250" (1/4")	2.0"	PWB1-0938-2	PWB2-0938-2	PWB3-0938-2	\$22.75
.125" (1/8")	.50" (1/2")	.125" (1/8")	2.0"	PWB1-125-1	PWB2-125-1	PWB3-125-1	\$19.81
.125" (1/8")	.50" (1/2")	.250" (1/4")	2.0"	PWB1-125-2	PWB2-125-2	PWB3-125-2	\$22.75
.1875" (3/16")	.50" (1/2")	.1875" (3/16")	2.0"	PWB1-1875-1	PWB2-1875-1	PWB3-1875-1	\$21.63
.1875" (3/16")	.50" (1/2")	.250" (1/4")	2.0"	PWB1-1875-2	PWB2-1875-2	PWB3-1875-2	\$22.75
.250" (1/4")	.75" (3/4")	.250" (1/4")	2.0"	PWB1-250-1	PWB2-250-1	PWB3-250-1	\$22.75
.250" (1/4")	1.0"	.250" (1/4")	2.5"	PWB1-250-1B1	PWB2-250-1B1	PWB3-250-1B1	\$23.95
.250" (1/4")	1.125" (1-1/8")	.250" (1/4")	3.0"	PWB1-250-1C1.125	PWB2-250-1C1.125	PWB3-250-1C1.125	\$24.75
.375" (3/8")	1.125" (1-1/8")	.375" (3/8")	3.0"	PWB1-375-1	PWB2-375-1	PWB3-375-1	\$39.00
.500" (1/2")	1.125" (1-1/8")	.500" (1/2")	3.0"	PWB1-500-1	PWB2-500-1	PWB3-500-1	\$61.45
1.5 mm (.059")	6.35 mm (.25")	6 mm (.236")	50 mm (1.97")	PWB1-1.5-1	PWB2-1.5-1	PWB3-1.5-1	\$22.75
2 mm (.079")	6.35 mm (.25")	6 mm (.236")	50 mm (1.97")	PWB1-2-1	PWB2-2-1	PWB3-2-1	\$22.75
3 mm (.118")	12.7 mm (.5")	6 mm (.236")	50 mm (1.97")	PWB1-3-1	PWB2-3-1	PWB3-3-1	\$22.75
4 mm (.157")	12.7 mm (.5")	6 mm (.236")	50 mm (1.97")	PWB1-4-1	PWB2-4-1	PWB3-4-1	\$22.75
5 mm (.197")	12.7 mm (.5")	6 mm (.236")	50 mm (1.97")	PWB1-5-1	PWB2-5-1	PWB3-5-1	\$22.75
6 mm (.236")	19 mm (.75")	6 mm (.236")	50 mm (1.97")	PWB1-6-1	PWB2-6-1	PWB3-6-1	\$22.75

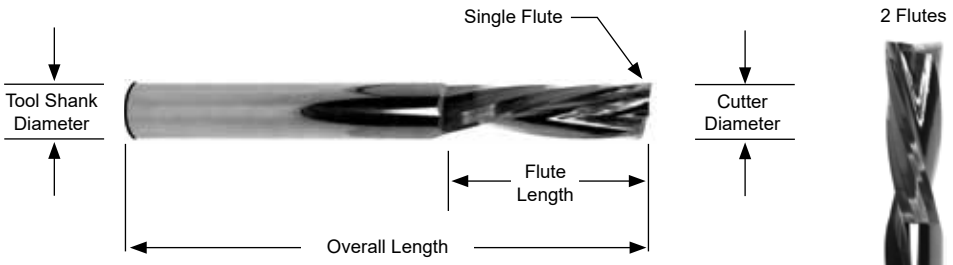
Contact us for sizes not listed.

Downcut End Mills: Plastic And Wood Cutting (PWD)

Downcut Router End Mills For Cutting Plastic And Wood.



- Downcut Helix pushes burrs downward to improve top edge appearance, and prevents workpiece lifting on Vacuum Chucks.
- Extremely sharp cutting edge allows high feedrates while producing an excellent surface finish when cutting Plastic and Wood.
- Right hand cut with a left hand spiral.
- 20° helix flute.
- CNC qualified.
- Center cutting for straight plunging or ramping down into workpieces.
- Produced from an Ultra-Fine, Submicron, Nano Grade Solid Carbide.



Downcut End Mills: Plastic and Wood Cutting (PWD)

Cutter Diameter	Flute Length	Tool Shank Diameter	Overall Length	Single Flute Part No.	2 Flutes Part No.	Price (each)
.031" (1/32")	.090"	.125" (1/8")	2.0"	PWD1-031-1	PWD2-031-1	\$23.38
.031" (1/32")	.090"	.250" (1/4")	2.0"	PWD1-031-2	PWD2-031-2	\$27.25
.050"	.15"	.125" (1/8")	2.0"	PWD1-050-1	PWD2-050-1	\$19.81
.050"	.15"	.250" (1/4")	2.0"	PWD1-050-2	PWD2-050-2	\$22.75
.0625" (1/16")	.25" (1/4")	.125" (1/8")	2.0"	PWD1-0625-1	PWD2-0625-1	\$19.81
.0625" (1/16")	.25" (1/4")	.250" (1/4")	2.0"	PWD1-0625-2	PWD2-0625-2	\$22.75
.078" (5/64")	.25" (1/4")	.125" (1/8")	2.0"	PWD1-078-1	PWD2-078-1	\$19.81
.078" (5/64")	.25" (1/4")	.250" (1/4")	2.0"	PWD1-078-2	PWD2-078-2	\$22.75
.0938" (3/32")	.38" (3/8")	.125" (1/8")	2.0"	PWD1-0938-1	PWD2-0938-1	\$19.81
.0938" (3/32")	.38" (3/8")	.250" (1/4")	2.0"	PWD1-0938-2	PWD2-0938-2	\$22.75
.125" (1/8")	.50" (1/2")	.125" (1/8")	2.0"	PWD1-125-1	PWD2-125-1	\$19.81
.125" (1/8")	.50" (1/2")	.250" (1/4")	2.0"	PWD1-125-2	PWD2-125-2	\$22.75
.1875" (3/16")	.50" (1/2")	.1875" (3/16")	2.0"	PWD1-1875-1	PWD2-1875-1	\$21.63
.1875" (3/16")	.50" (1/2")	.250" (1/4")	2.0"	PWD1-1875-2	PWD2-1875-2	\$22.75
.250" (1/4")	.50" (1/2")	.250" (1/4")	2.0"	PWD1-250-1	PWD2-250-1	\$22.75
.250" (1/4")	.75" (3/4")	.250" (1/4")	3.0"	PWD1-250-1C750	PWD2-250-1C750	\$25.25
.250" (1/4")	1.00"	.250" (1/4")	3.0"	PWD1-250-1C1.0	PWD2-250-1C1.0	\$25.25
.375" (3/8")	1.125" (1-1/8")	.375" (3/8")	3.0"	PWD1-375-1	PWD2-375-1	\$46.50
.500" (1/2")	1.125" (1-1/8")	.500" (1/2")	3.0"	PWD1-500-1	PWD2-500-1	\$85.95
1.5 mm (.059")	6.35 mm (.25")	6 mm (.236")	50 mm (1.97")	PWD1-1.5-1	PWD2-1.5-1	\$22.75
2 mm (.079")	6.35 mm (.25")	6 mm (.236")	50 mm (1.97")	PWD1-2-1	PWD2-2-1	\$22.75
3 mm (.118")	12.7 mm (.5")	6 mm (.236")	50 mm (1.97")	PWD1-3-1	PWD2-3-1	\$22.75
4 mm (.157")	12.7 mm (.5")	6 mm (.236")	50 mm (1.97")	PWD1-4-1	PWD2-4-1	\$22.75
5 mm (.197")	12.7 mm (.5")	6 mm (.236")	50 mm (1.97")	PWD1-5-1	PWD2-5-1	\$22.75
6 mm (.236")	12.7 mm (.5")	6 mm (.236")	50 mm (1.97")	PWD1-6-1	PWD2-6-1	\$22.75
6 mm (.236")	30 mm (1.18")	6 mm (.236")	75 mm (2.95")	PWD1-6-1B30	PWD2-6-1B30	\$27.98

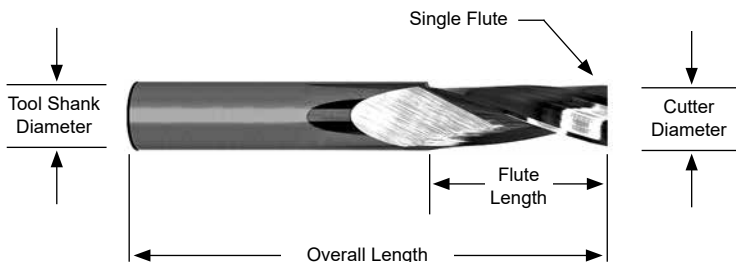
We manufacture in house.

Square End Mills: Aluminum Cutting (AE)

Standard/Square End Mills
For Cutting Aluminum, Brass, Bronze,
Magnesium And Zinc.



- Standard / Square Solid Carbide End Mills for cutting Aluminum.
- Slow 20° Helix reduces workpiece lifting and creates a fine finish.
- Sharp cutting edge allows higher feedrates and produces an excellent surface finish when cutting Aluminum and soft materials.
- CNC qualified.
- Center cutting for straight plunging or ramping down into workpieces.
- Single Flute - maximum chip clearance for chip evacuation.
- 2 Flutes - higher feedrates than Single Flute End Mills but still provide for a large amount of chip clearance to prevent chips from sticking or packing in the flutes.
- 3 Flutes - highest feedrate but have less chip clearance space than Single or 2 Flute End Mills.
- Produced from an Ultra-Fine, Submicron, Nano Grade Solid Carbide.
- Select sizes available with Diamond Coating.



Standard/Square End Mills: Aluminum Cutting (AE)

Cutter Diameter	Flute Length	Tool Shank Diameter	Overall Length	Single Flute Part No.	2 Flutes Part No.	3 Flutes Part No.	Price (each)
.031" (1/32")	.094" (3x)	.125" (1/8")	2.0"	AE1-031-1A094	AE2-031-1A094	AE3-031-1A094	\$19.81
.031" (1/32")	.094" (3x)	.250" (1/4")	2.0"	AE1-031-2A094	AE2-031-2A094	AE3-031-2A094	\$22.75
.031" (1/32")	.160" (5x)	.125" (1/8")	2.0"	AE1-031-1A160	AE2-031-1A160	AE3-031-1A160	\$19.81
.031" (1/32")	.160" (5x)	.250" (1/4")	2.0"	AE1-031-2A160	AE2-031-2A160	AE3-031-2A160	\$22.75
.050"	.150" (3x)	.125" (1/8")	2.0"	AE1-050-1	AE2-050-1	AE3-050-1	\$19.81
.050"	.150" (3x)	.250" (1/4")	2.0"	AE1-050-2	AE2-050-2	AE3-050-2	\$22.75
.050"	.250" (5x)	.125" (1/8")	2.0"	AE1-050-1A250	AE2-050-1A250	AE3-050-1A250	\$19.81
.050"	.250" (5x)	.250" (1/4")	2.0"	AE1-050-2A250	AE2-050-2A250	AE3-050-2A250	\$22.75
.0625" (1/16")	.25" (4x)	.125" (1/8")	2.0"	AE1-0625-1	AE2-0625-1	AE3-0625-1	\$19.81
.0625" (1/16")	.25" (4x)	.250" (1/4")	2.0"	AE1-0625-2	AE2-0625-2	AE3-0625-2	\$22.75
.0625" (1/16")	.313" (5x)	.125" (1/8")	2.0"	AE1-0625-1A313	AE2-0625-1A313	AE3-0625-1A313	\$19.81
.0625" (1/16")	.313" (5x)	.250" (1/4")	2.0"	AE1-0625-2A313	AE2-0625-2A313	AE3-0625-2A313	\$22.75
.078" (5/64")	.25" (3x)	.125" (1/8")	2.0"	AE1-078-1	AE2-078-1	AE3-078-1	\$19.81
.078" (5/64")	.25" (3x)	.250" (1/4")	2.0"	AE1-078-2	AE2-078-2	AE3-078-2	\$22.75
.078" (5/64")	.390" (5x)	.125" (1/8")	2.0"	AE1-078-1A390	AE2-078-1A390	AE3-078-1A390	\$19.81
.078" (5/64")	.390" (5x)	.250" (1/4")	2.0"	AE1-078-2A390	AE2-078-2A390	AE3-078-2A390	\$22.75
.0938" (3/32")	.38" (3x)	.125" (1/8")	2.0"	AE1-0938-1	AE2-0938-1	AE3-0938-1	\$19.81
.0938" (3/32")	.38" (3x)	.250" (1/4")	2.0"	AE1-0938-2	AE2-0938-2	AE3-0938-2	\$22.75
.0938" (3/32")	.470" (5x)	.125" (1/8")	2.0"	AE1-0938-1A470	AE2-0938-1A470	AE3-0938-1A470	\$19.81
.0938" (3/32")	.470" (5x)	.250" (1/4")	2.0"	AE1-0938-2A470	AE2-0938-2A470	AE3-0938-2A470	\$22.75

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Contact us for sizes not listed.

Square End Mills: Aluminum Cutting (AE)

Standard/Square End Mills
For Cutting Aluminum, Brass, Bronze,
Magnesium And Zinc.



Standard/Square End Mills: Aluminum Cutting (AE)

Cutter Diameter	Flute Length	Tool Shank Diameter	Overall Length	Single Flute Part No.	2 Flutes Part No.	3 Flutes Part No.	Price (each)
.1094" (7/64")	.330" (3x)	.125" (1/8")	2.0"	AE1-109-1A330	AE2-109-1A330	AE3-109-1A330	\$19.81
.1094" (7/64")	.330" (3x)	.250" (1/4")	2.0"	AE1-109-2A330	AE2-109-2A330	AE3-109-2A330	\$22.75
.1094" (7/64")	.550" (5x)	.125" (1/8")	2.0"	AE1-109-1A550	AE2-109-1A550	AE3-109-1A550	\$19.81
.1094" (7/64")	.550" (5x)	.250" (1/4")	2.0"	AE1-109-2A550	AE2-109-2A550	AE3-109-2A550	\$22.75
.125" (1/8")	.50" (4x)	.125" (1/8")	2.0"	AE1-125-1	AE2-125-1	AE3-125-1	\$19.81
.125" (1/8")	.50" (4x)	.250" (1/4")	2.0"	AE1-125-2	AE2-125-2	AE3-125-2	\$22.75
.125" (1/8")	.50" (4x)	.250" (1/4")	2.0"	AE1-125-2D (Diamond Coated)	----	----	\$32.25
.125" (1/8")	.625" (5x)	.125" (1/8")	2.0"	AE1-125-1A625	AE2-125-1A625	AE3-125-1A625	\$19.81
.125" (1/8")	.625" (5x)	.250" (1/4")	2.0"	AE1-125-2A625	AE2-125-2A625	AE3-125-2A625	\$22.75
.156" (5/32")	.470" (3x)	.250" (1/4")	2.0"	AE1-156-2A470	AE2-156-2A470	AE3-156-2A470	\$22.75
.156" (5/32")	.780" (5x)	.250" (1/4")	3.0"	AE1-156-2C780	AE2-156-2C780	AE3-156-2C780	\$24.00
.1875" (3/16")	.50" (3x)	.1875" (3/16")	2.0"	AE1-1875-1	AE2-1875-1	AE3-1875-1	\$21.63
.1875" (3/16")	.50" (3x)	.250" (1/4")	2.0"	AE1-1875-2	AE2-1875-2	AE3-1875-2	\$22.75
.1875" (3/16")	1.0" (5x)	.1875" (3/16")	3.0"	AE1-187-1C1.0	AE2-187-1C1.0	AE3-187-1C1.0	\$24.00
.1875" (3/16")	1.0" (5x)	.250" (1/4")	3.0"	AE1-187-2C1.0	AE2-187-2C1.0	AE3-187-2C1.0	\$24.75
.250" (1/4")	.75" (3x)	.250" (1/4")	2.0"	AE1-250-1	AE2-250-1	AE3-250-1	\$22.75
.250" (1/4")	.75" (3x)	.250" (1/4")	2.0"	AE1-250-1D (Diamond Coated)	----	----	\$32.25
.250" (1/4")	.75" (3x)	.250" (1/4")	2.5"	AE1-250-2.5	AE2-250-2.5	AE3-250-2.5	\$24.75
.250" (1/4")	1.25" (5x)	.250" (1/4")	3.0"	AE1-250-1C1.25	AE2-250-1C1.25	AE3-250-1C1.25	\$25.25
.3125" (5/16")	1.0" (3x)	.3125" (5/16")	3.0"	AE1-312-1C1.0	AE2-312-1C1.0	AE3-312-1C1.0	\$27.88
.375" (3/8")	1.125" (3x)	.375" (3/8")	3.0"	AE1-375-1	AE2-375-1	AE3-375-1	\$39.00
.500" (1/2")	1.125" (2.3x)	.500" (1/2")	3.0"	AE1-500-1	AE2-500-1	AE3-500-1	\$61.45
1.0 mm (.039")	3.0 mm (3x)	6 mm	50 mm	AE1-1-1A3.0	AE2-1-1A3.0	AE3-1-1A3.0	\$22.75
1.0 mm (.039")	5.0 mm (5x)	6 mm	50 mm	AE1-1-1A5.0	AE2-1-1A5.0	AE3-1-1A5.0	\$22.75
1.5 mm (.059")	6.35 mm (4x)	6 mm	50 mm	AE1-1.5-1	AE2-1.5-1	AE3-1.5-1	\$22.75
1.5 mm (.059")	7.5 mm (5x)	6 mm	50 mm	AE1-1.5-1A7.5	AE2-1.5-1A7.5	AE3-1.5-1A7.5	\$22.75
2 mm (.079")	6.35 mm (3x)	6 mm	50 mm	AE1-2-1	AE2-2-1	AE3-2-1	\$22.75
2 mm (.079")	10 mm (5x)	6 mm	50 mm	AE1-2-1A10	AE2-2-1A10	AE3-2-1A10	\$22.75
2.5 mm (.098")	7.5 mm (3x)	6 mm	50 mm	AE1-2.5-1A7.5	AE2-2.5-1A7.5	AE3-2.5-1A7.5	\$22.75
2.5 mm (.098")	12.5 mm (5x)	6 mm	50 mm	AE1-2.5-1A12.5	AE2-2.5-1A12.5	AE3-2.5-1A12.5	\$22.75
3 mm (.118")	5.0 mm (1.6x)	6 mm	50 mm	AE1-3-1A5.0	AE2-3-1A5.0	AE3-3-1A5.0	\$22.75
3 mm (.118")	7.5 mm (2.5x)	6 mm	50 mm	AE1-3-1A7.5	AE2-3-1A7.5	AE3-3-1A7.5	\$22.75
3 mm (.118")	12.7 mm (4x)	6 mm	50 mm	AE1-3-1	AE2-3-1	AE3-3-1	\$22.75
3 mm (.118")	15 mm (5x)	6 mm	50 mm	AE1-3-1A15	AE2-3-1A15	AE3-3-1A15	\$22.75
3.5 mm (.138")	10.5 mm (3x)	6 mm	50 mm	AE1-3.5-1A10.5	AE2-3.5-1A10.5	AE3-3.5-1A10.5	\$22.75
3.5 mm (.138")	17.5 mm (5x)	6 mm	75 mm	AE1-3.5-1B17.5	AE2-3.5-1B17.5	AE3-3.5-1B17.5	\$22.75
4 mm (.157")	12.7 mm (3x)	6 mm	50 mm	AE1-4-1	AE2-4-1	AE3-4-1	\$22.75
4 mm (.157")	20 mm (5x)	6 mm	75 mm	AE1-4-1B20	AE2-4-1B20	AE3-4-1B20	\$22.75
4.5 mm (.177")	13.5 mm (3x)	6 mm	50 mm	AE1-4.5-1A13.5	AE2-4.5-1A13.5	AE3-4.5-1A13.5	\$22.75
4.5 mm (.177")	22.5 mm (5x)	6 mm	75 mm	AE1-4.5-1B22.5	AE2-4.5-1B22.5	AE3-4.5-1B22.5	\$22.75
5 mm (.197")	12.7 mm (2.5x)	6 mm	50 mm	AE1-5-1	AE2-5-1	AE3-5-1	\$22.75
5 mm (.197")	25 mm (5x)	6 mm	75 mm	AE1-5-1B25	AE2-5-1B25	AE3-5-1B25	\$22.75
5.5 mm (.216")	16.5 mm (3x)	6 mm	50 mm	AE1-5.5-1A16.5	AE2-5.5-1A16.5	AE3-5.5-1A16.5	\$22.75
5.5 mm (.216")	27.5 mm (5x)	6 mm	75 mm	AE1-5.5-1B27.5	AE2-5.5-1B27.5	AE3-5.5-1B27.5	\$22.75
6 mm (.236")	19 mm (3x)	6 mm	50 mm	AE1-6-1	AE2-6-1	AE3-6-1	\$22.75
6 mm (.236")	30 mm (5x)	6 mm	75 mm	AE1-6-1B30	AE2-6-1B30	AE3-6-1B30	\$22.75

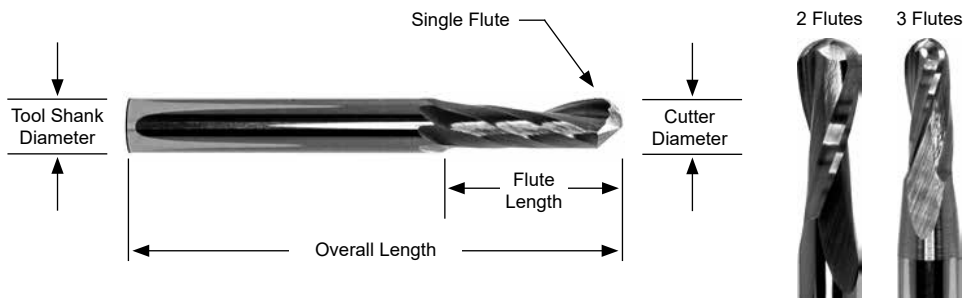
We manufacture in house.

Ballnose End Mills: Aluminum Cutting (AB)

Ballnose End Mills

For Cutting Aluminum, Brass, Bronze, Magnesium And Zinc.

- Ballnose Solid Carbide End Mills for cutting Aluminum.
- Slow 20° Helix reduces workpiece lifting and creates a fine finish.
- Sharp cutting edge allows higher feedrates and produces an excellent surface finish when cutting Aluminum and soft materials.
- CNC qualified.
- Center cutting for straight plunging or ramping down into workpieces.
- Single Flute - maximum chip clearance for chip evacuation.
- 2 Flutes - higher feedrates than Single Flute End Mills but still provide for a large amount of chip clearance to prevent chips from sticking or packing in the flutes.
- 3 Flutes - highest feedrate but have less chip clearance space than Single or 2 Flute End Mills.
- Produced from an Ultra-Fine, Submicron, Nano Grade Solid Carbide.



Ballnose End Mills: Aluminum Cutting (AB)

Cutter Diameter	Flute Length	Tool Shank Diameter	Overall Length	Single Flute Part No.	2 Flutes Part No.	3 Flutes Part No.	Price (each)
.050"	.15"	.125" (1/8")	2.0"	AB1-050-1	AB2-050-1	AB3-050-1	\$19.81
.050"	.15"	.250" (1/4")	2.0"	AB1-050-2	AB2-050-2	AB3-050-2	\$22.75
.0625" (1/16")	.25" (1/4")	.125" (1/8")	2.0"	AB1-0625-1	AB2-0625-1	AB3-0625-1	\$19.81
.0625" (1/16")	.25" (1/4")	.250" (1/4")	2.0"	AB1-0625-2	AB2-0625-2	AB3-0625-2	\$22.75
.078" (5/64")	.25" (1/4")	.125" (1/8")	2.0"	AB1-078-1	AB2-078-1	AB3-078-1	\$19.81
.078" (5/64")	.25" (1/4")	.250" (1/4")	2.0"	AB1-078-2	AB2-078-2	AB3-078-2	\$22.75
.0938" (3/32")	.38" (3/8")	.125" (1/8")	2.0"	AB1-0938-1	AB2-0938-1	AB3-0938-1	\$19.81
.0938" (3/32")	.38" (3/8")	.250" (1/4")	2.0"	AB1-0938-2	AB2-0938-2	AB3-0938-2	\$22.75
.125" (1/8")	.50" (1/2")	.125" (1/8")	2.0"	AB1-125-1	AB2-125-1	AB3-125-1	\$19.81
.125" (1/8")	.50" (1/2")	.250" (1/4")	2.0"	AB1-125-2	AB2-125-2	AB3-125-2	\$22.75
.1875" (3/16")	.50" (1/2")	.1875" (3/16")	2.0"	AB1-1875-1	AB2-1875-1	AB3-1875-1	\$21.63
.1875" (3/16")	.50" (1/2")	.250" (1/4")	2.0"	AB1-1875-2	AB2-1875-2	AB3-1875-2	\$22.75
.250" (1/4")	.75" (3/4")	.250" (1/4")	2.0"	AB1-250-1	AB2-250-1	AB3-250-1	\$22.75
.375" (3/8")	1.125" (1-1/8")	.375" (3/8")	3.0"	AB1-375-1	AB2-375-1	AB3-375-1	\$39.00
.500" (1/2")	1.125" (1-1/8")	.500" (1/2")	3.0"	AB1-500-1	AB2-500-1	AB3-500-1	\$61.45
1.5 mm (.059")	6.35 mm (.25")	6 mm (.236")	50 mm (1.97")	AB1-1.5-1	AB2-1.5-1	AB3-1.5-1	\$22.75
2 mm (.079")	6.35 mm (.25")	6 mm (.236")	50 mm (1.97")	AB1-2-1	AB2-2-1	AB3-2-1	\$22.75
3 mm (.118")	12.7 mm (.5")	6 mm (.236")	50 mm (1.97")	AB1-3-1	AB2-3-1	AB3-3-1	\$22.75
4 mm (.157")	12.7 mm (.5")	6 mm (.236")	50 mm (1.97")	AB1-4-1	AB2-4-1	AB3-4-1	\$22.75
5 mm (.197")	12.7 mm (.5")	6 mm (.236")	50 mm (1.97")	AB1-5-1	AB2-5-1	AB3-5-1	\$22.75
6 mm (.236")	19 mm (.75")	6 mm (.236")	50 mm (1.97")	AB1-6-1	AB2-6-1	AB3-6-1	\$22.75

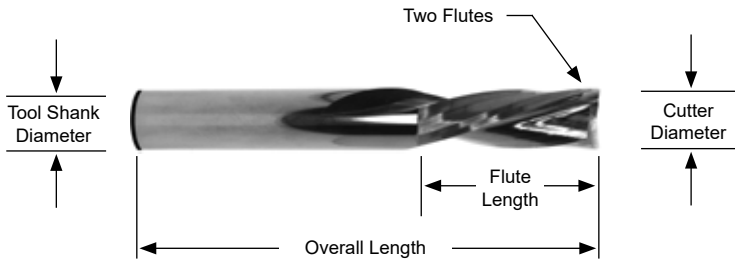
Contact us for sizes not listed.

Downcut End Mills: Aluminum Cutting (AD)

Downcut End Mills

For Cutting Aluminum, Brass, Bronze, Magnesium And Zinc.

- Downcut Helix pushes burrs downward to improve top edge appearance, and prevents workpiece lifting on Vacuum Chucks.
- Sharp cutting edge allows higher feedrates and produces an excellent surface finish when cutting Aluminum and soft materials.
- Right hand cut with a left hand spiral.
- 20° helix flute.
- CNC qualified.
- Center cutting for straight plunging or ramping down into workpieces.
- Produced from an Ultra-Fine, Submicron, Nano Grade Solid Carbide.



Downcut End Mills: Aluminum Cutting (AD)

Cutter Diameter	Flute Length	Tool Shank Diameter	Overall Length	2 Flutes Part No.	Price (each)
.031" (1/32")	.090"	.125" (1/8")	2.0"	AD2-031-1	\$23.38
.031" (1/32")	.090"	.250" (1/4")	2.0"	AD2-031-2	\$27.25
.050"	.15"	.125" (1/8")	2.0"	AD2-050-1	\$19.81
.050"	.15"	.250" (1/4")	2.0"	AD2-050-2	\$22.75
.0625" (1/16")	.25" (1/4")	.125" (1/8")	2.0"	AD2-0625-1	\$19.81
.0625" (1/16")	.25" (1/4")	.250" (1/4")	2.0"	AD2-0625-2	\$22.75
.078" (5/64")	.25" (1/4")	.125" (1/8")	2.0"	AD2-078-1	\$19.81
.078" (5/64")	.25" (1/4")	.250" (1/4")	2.0"	AD2-078-2	\$22.75
.0938" (3/32")	.38" (3/8")	.125" (1/8")	2.0"	AD2-0938-1	\$19.81
.0938" (3/32")	.38" (3/8")	.250" (1/4")	2.0"	AD2-0938-2	\$22.75
.125" (1/8")	.50" (1/2")	.125" (1/8")	2.0"	AD2-125-1	\$19.81
.125" (1/8")	.50" (1/2")	.250" (1/4")	2.0"	AD2-125-2	\$22.75
.1875" (3/16")	.50" (1/2")	.1875" (3/16")	2.0"	AD2-1875-1	\$21.63
.1875" (3/16")	.50" (1/2")	.250" (1/4")	2.0"	AD2-1875-2	\$22.75
.250" (1/4")	.50" (1/2")	.250" (1/4")	2.0"	AD2-250-1	\$22.75
.375" (3/8")	1.125" (1-1/8")	.375" (3/8")	3.0"	AD2-375-1	\$46.50
.500" (1/2")	1.125" (1-1/8")	.500" (1/2")	3.0"	AD2-500-1	\$85.95
1.5 mm (.059")	6.35 mm (.25")	6 mm (.236")	50 mm (1.97")	AD2-1.5-1	\$22.75
2 mm (.079")	6.35 mm (.25")	6 mm (.236")	50 mm (1.97")	AD2-2-1	\$22.75
3 mm (.118")	12.7 mm (.5")	6 mm (.236")	50 mm (1.97")	AD2-3-1	\$22.75
4 mm (.157")	12.7 mm (.5")	6 mm (.236")	50 mm (1.97")	AD2-4-1	\$22.75
5 mm (.197")	12.7 mm (.5")	6 mm (.236")	50 mm (1.97")	AD2-5-1	\$22.75
6 mm (.236")	12.7 mm (.5")	6 mm (.236")	50 mm (1.97")	AD2-6-1	\$22.75

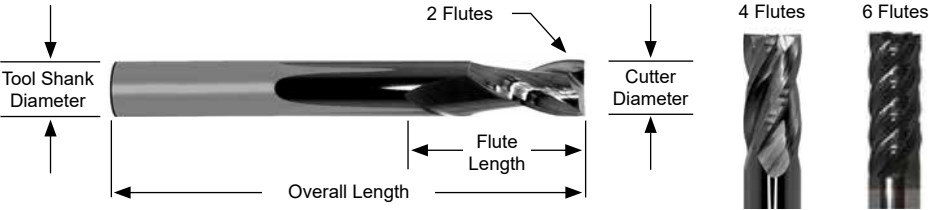
We manufacture in house.

Square End Mills: General Purpose (E)

Router End Mills - Helical High Performance.
Maximum Strength And Improved Surface Finish.



- High performance, CNC qualified Standard End Mills.
- 30° Helix.
- CNC qualified, and center cutting for straight plunging or ramping down into workpieces.
- Machines a wide variety of materials: Steels, Stainless Steel, Titanium, Inconel, Laminates, Aluminum, Brass, Plastic, and more.
- Produced from an Ultra-Fine, Submicron, Nano Grade Solid Carbide. Select sizes coated with latest generation of nano AlTiN+ extra nanocomposites for wear and heat resistance.



Standard/Square End Mills: Steels/General Purpose (E)

Cutter Dia.	Flute Length	Tool Shank Dia.	Overall Length	Coating	2 Flutes Part No.	4 Flutes Part No.	6 Flutes Part No.	Price (each)
.031"	.070" (2.2x)	.125"	2.0"	----	E2-125x2.0-.031-.07	E4-125x2.0-.031-.07	----	\$15.00
.031"	.094" (3x)	.125"	2.0"	----	E2-125x2.0-.031-.094	E4-125x2.0-.031-.094	----	\$15.00
.031"	.094" (3x)	.250"	2.0"	----	E2-250x2.0-.031-.094	E4-250x2.0-.031-.094	----	\$17.89
.031"	.160" (5x)	.125"	2.0"	----	E2-125x2.0-.031-.160	E4-125x2.0-.031-.160	----	\$15.00
.031"	.160" (5x)	.250"	2.0"	----	E2-250x2.0-.031-.160	E4-250x2.0-.031-.160	----	\$17.89
.050"	.15" (3x)	.125"	2.0"	----	E2-125x2.0-.050-.15	E4-125x2.0-.050-.15	----	\$15.00
.050"	.15" (3x)	.250"	2.0"	----	E2-250x2.0-.050-.15	E4-250x2.0-.050-.15	----	\$17.89
.050"	.25" (5x)	.125"	2.0"	----	E2-125x2.0-.050-.25	E4-125x2.0-.050-.25	----	\$15.00
.050"	.25" (5x)	.250"	2.0"	----	E2-250x2.0-.050-.25	E4-250x2.0-.050-.25	----	\$17.89
.0625"	.25" (4x)	.125"	2.0"	----	E2-125x2.0-.0625-.25	E4-125x2.0-.0625-.25	----	\$15.00
.0625"	.25" (4x)	.125"	4.5"	----	E2-125x4.5-.0625-.25	E4-125x4.5-.0625-.25	----	\$23.10
.0625"	.25" (4x)	.1875"	2.0"	----	E2-1875x2.0-.0625-.25	E4-1875x2.0-.0625-.25	----	\$15.69
.0625"	.25" (4x)	.1719"	6.5"	----	E2-171x6.5-.0625-.25	E4-171x6.5-.0625-.25	----	\$31.88
.0625"	.25" (4x)	.250"	2.0"	----	E2-250x2.0-.0625-.25	E4-250x2.0-.0625-.25	----	\$17.89
.0625"	.25" (4x)	.250"	6.5"	----	E2-250x6.5-.0625-.25	E4-250x6.5-.0625-.25	----	\$36.40
.0625"	.313" (5x)	.125"	2.0"	----	E2-125x2.0-.0625-.313	E4-125x2.0-.0625-.313	----	\$15.00
.0625"	.313" (5x)	.250"	2.0"	----	E2-250x2.0-.0625-.313	E4-250x2.0-.0625-.313	----	\$17.89
.078"	.25" (3x)	.125"	2.0"	----	E2-125x2.0-.078-.25	E4-125x2.0-.078-.25	----	\$15.00
.078"	.25" (3x)	.250"	2.0"	----	E2-250x2.0-.078-.25	E4-250x2.0-.078-.25	----	\$17.89
.078"	.39" (5x)	.125"	2.0"	----	E2-125x2.0-.078-.39	E4-125x2.0-.078-.39	----	\$15.00
.078"	.39" (5x)	.250"	2.0"	----	E2-250x2.0-.078-.39	E4-250x2.0-.078-.39	----	\$17.89
.0938"	.38" (3x)	.125"	2.0"	----	E2-125x2.0-.0938-.38	E4-125x2.0-.0938-.38	----	\$15.00
.0938"	.38" (3x)	.125"	4.5"	----	E2-125x4.5-.0938-.38	E4-125x4.5-.0938-.38	----	\$23.10
.0938"	.38" (3x)	.1719"	6.5"	----	E2-171x6.5-.0938-.38	E4-171x6.5-.0938-.38	----	\$31.88
.0938"	.38" (3x)	.250"	2.0"	----	E2-250x2.0-.0938-.38	E4-250x2.0-.0938-.38	----	\$17.89
.0938"	.38" (3x)	.250"	6.5"	----	E2-250x6.5-.0938-.38	E4-250x6.5-.0938-.38	----	\$36.40
.0938"	.47" (5x)	.125"	2.0"	----	E2-125x2.0-.0938-.47	E4-125x2.0-.0938-.47	----	\$15.00
.0938"	.47" (5x)	.250"	2.0"	----	E2-250x2.0-.0938-.47	E4-250x2.0-.0938-.47	----	\$17.89
.1094"	.33" (3x)	.125"	2.0"	----	E2-125x2.0-.109-.33	E4-125x2.0-.109-.33	----	\$15.00
.1094"	.33" (3x)	.250"	2.0"	----	E2-250x2.0-.109-.33	E4-250x2.0-.109-.33	----	\$17.89
.1094"	.55" (5x)	.125"	2.0"	----	E2-125x2.0-.109-.55	E4-125x2.0-.109-.55	----	\$15.00
.1094"	.55" (5x)	.250"	2.0"	----	E2-250x2.0-.109-.55	E4-250x2.0-.109-.55	----	\$17.89

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Contact us for sizes not listed. We manufacture in house.

Square End Mills: General Purpose (E)

Router End Mills - Helical High Performance.
Maximum Strength And Improved Surface Finish.

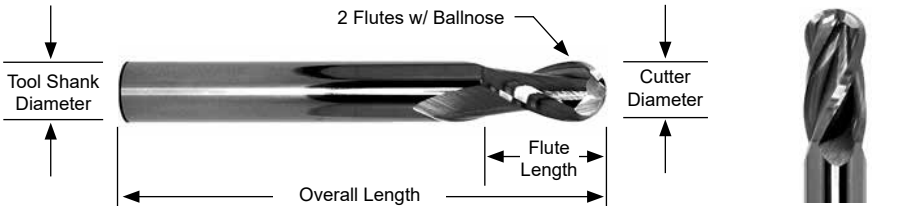
Standard/Square End Mills: Steels/General Purpose (E)

Cutter Dia.	Flute Length	Tool Shank Dia.	Overall Length	Coating	2 Flutes Part No.	4 Flutes Part No.	6 Flutes Part No.	Price (each)
.125"	.50" (4x)	.125"	2.0"	-----	E2-125x2.0-.125-.5	E4-125x2.0-.125-.5	-----	\$15.00
.125"	.50" (4x)	.125"	4.5"	-----	E2-125x4.5-.125-.5	E4-125x4.5-.125-.5	-----	\$23.10
.125"	.50" (4x)	.1719"	6.5"	-----	E2-171x6.5-.125-.5	E4-171x6.5-.125-.5	-----	\$31.88
.125"	.50" (4x)	.250"	2.0"	-----	E2-250x2.0-.125-.5	E4-250x2.0-.125-.5	-----	\$17.89
.125"	.50" (4x)	.250"	2.0"	nAlTiN+	E2-250x2.0-.125-.5A	-----	-----	\$24.86
.125"	.50" (4x)	.250"	2.5"	nAlTiN+	-----	-----	E6-250x2.5-.125-.5A	\$31.89
.125"	.50" (4x)	.250"	6.5"	-----	E2-250x6.5-.125-.5	E4-250x6.5-.125-.5	-----	\$36.40
.125"	.625" (5x)	.125"	2.0"	-----	E2-125x2.0-.125-.625	E4-125x2.0-.125-.625	-----	\$15.00
.125"	.625" (5x)	.250"	2.0"	-----	E2-250x2.0-.125-.625	E4-250x2.0-.125-.625	-----	\$17.89
.125"	1.0" (8x)	.125"	2.5"	-----	E2-125x2.5-.125-1	E4-125x2.5-.125-1	-----	\$17.85
.156"	.47" (3x)	.250"	2.0"	-----	E2-250x2.0-.156-.47	E4-250x2.0-.156-.47	-----	\$17.89
.156"	.78" (5x)	.250"	3.0"	-----	E2-250x3.0-.156-.78	E4-250x3.0-.156-.78	-----	\$23.61
.1719"	.50" (3x)	.1719"	6.5"	-----	E2-171x6.5-.1719-.5	E4-171x6.5-.1719-.5	-----	\$31.88
.1875"	.50" (3x)	.1875"	2.0"	-----	E2-187x2.0-.1875-.5	E4-187x2.0-.1875-.5	-----	\$15.69
.1875"	.75" (4x)	.250"	2.5"	nAlTiN+	-----	-----	E6-250x2.5-.187-.75A	\$31.89
.1875"	1.0" (5x)	.1875"	3.0"	-----	E2-187x3.0-.1875-1	E4-187x3.0-.1875-1	-----	\$18.09
.1875"	1.0" (5x)	.250"	3.0"	-----	E2-250x3.0-.1875-1	E4-250x3.0-.1875-1	-----	\$20.60
.250"	.50" (2x)	.250"	2.0"	-----	E2-250x2.0-.250-.5	E4-250x2.0-.250-.5	-----	\$17.89
.250"	.50" (2x)	.250"	2.0"	nAlTiN+	E2-250x2.0-.250-.5A	-----	-----	\$24.86
.250"	.50" (2x)	.250"	2.5"	nAlTiN+	-----	-----	E6-250x2.5-.250-.5A	\$31.89
.250"	.50" (2x)	.250"	6.5"	-----	E2-250x6.5-.250-.5	E4-250x6.5-.250-.5	-----	\$36.40
.250"	1.0" (4x)	.250"	3.0"	-----	E2-250x3.0-.250-1	E4-250x3.0-.250-1	-----	\$23.12
.250"	1.0" (4x)	.250"	2.5"	nAlTiN+	-----	-----	E6-250x2.5-.250-1A	\$31.89
.250"	1.25" (5x)	.250"	3.0"	-----	E2-250x3.0-.250-1.25	E4-250x3.0-.250-1.25	-----	\$23.61
.3125"	1.0" (3x)	.3125"	3.0"	-----	E2-312x3.0-.312-1	E4-312x3.0-.312-1	-----	\$24.40
.375"	1.0" (2.6x)	.375"	3.0"	-----	E2-375x3.0-.375-1	E4-375x3.0-.375-1	-----	\$31.56
.375"	1.125" (3x)	.375"	3.0"	nAlTiN+	-----	-----	E6-375x3.0-.375-1.1A	\$45.25
.500"	1.0" (2x)	.500"	3.0"	-----	E2-5x3.0-.500-1	E4-5x3.0-.500-1	-----	\$50.94
.500"	1.125" (2.2x)	.500"	3.0"	nAlTiN+	-----	-----	E6-5x3.0-.500-1.1A	\$72.81
.5625"	1.0" (1.7x)	.5625"	3.0"	-----	E2-562x3.0-.5625-1	E4-562x3.0-.5625-1	-----	\$62.80
1 mm	3.0 mm (3x)	6 mm	50 mm	-----	E2m-6x50-1-3	E4m-6x50-1-3	-----	\$17.89
1 mm	5.0 mm (5x)	6 mm	50 mm	-----	E2m-6x50-1-5	E4m-6x50-1-5	-----	\$17.89
1.5 mm	6.35 mm (4x)	6 mm	50 mm	-----	E2m-6x50-1.5-6.35	E4m-6x50-1.5-6.35	-----	\$17.89
1.5 mm	7.5 mm (5x)	6 mm	50 mm	-----	E2m-6x50-1.5-7.5	E4m-6x50-1.5-7.5	-----	\$17.89
2 mm	6.35 mm (3x)	6 mm	50 mm	-----	E2m-6x50-2-6.35	E4m-6x50-2-6.35	-----	\$17.89
2 mm	10 mm (5x)	6 mm	50 mm	-----	E2m-6x50-2-10	E4m-6x50-2-10	-----	\$17.89
2.5 mm	7.5 mm (3x)	6 mm	50 mm	-----	E2m-6x50-2.5-7.5	E4m-6x50-2.5-7.5	-----	\$17.89
2.5 mm	12.5 mm (5x)	6 mm	50 mm	-----	E2m-6x50-2.5-12.5	E4m-6x50-2.5-12.5	-----	\$17.89
3 mm	12.7 mm (3x)	6 mm	50 mm	-----	E2m-6x50-3-12.7	E4m-6x50-3-12.7	-----	\$17.89
3 mm	15 mm (5x)	6 mm	50 mm	-----	E2m-6x50-3-15	E4m-6x50-3-15	-----	\$17.89
3.5 mm	10.5 mm (3x)	6 mm	50 mm	-----	E2m-6x50-3.5-10.5	E4m-6x50-3.5-10.5	-----	\$17.89
3.5 mm	17.5 mm (5x)	6 mm	75 mm	-----	E2m-6x75-3.5-17.5	E4m-6x75-3.5-17.5	-----	\$19.89
4 mm	12.7 mm (3x)	6 mm	50 mm	-----	E2m-6x50-4-12.7	E4m-6x50-4-12.7	-----	\$17.89
4 mm	20 mm (5x)	6 mm	75 mm	-----	E2m-6x75-4-20	E4m-6x75-4-20	-----	\$19.89
4.5 mm	13.5 mm (3x)	6 mm	50 mm	-----	E2m-6x50-4.5-13.5	E4m-6x50-4.5-13.5	-----	\$17.89
4.5 mm	22.5 mm (5x)	6 mm	75 mm	-----	E2m-6x75-4.5-22.5	E4m-6x75-4.5-22.5	-----	\$19.89
5 mm	12.7 mm (2.5x)	6 mm	50 mm	-----	E2m-6x50-5-12.7	E4m-6x50-5-12.7	-----	\$17.89
5 mm	25mm (5x)	6 mm	75 mm	-----	E2m-6x75-5-25	E4m-6x75-5-25	-----	\$19.89
5.5 mm	16.5 mm (3x)	6 mm	50 mm	-----	E2m-6x50-5.5-16.5	E4m-6x50-5.5-16.5	-----	\$17.89
5.5 mm	27.5 mm (5x)	6 mm	75 mm	-----	E2m-6x75-5.5-27.5	E4m-6x75-5.5-27.5	-----	\$19.89
6 mm	19 mm (3x)	6 mm	50 mm	-----	E2m-6x50-6-19	E4m-6x50-6-19	-----	\$17.89
6 mm	26 mm (4x)	6 mm	75 mm	nAlTiN+	-----	-----	E6m-6x75-6-26A	\$31.89
6 mm	30 mm (5x)	6 mm	75 mm	-----	E2m-6x75-6-30	E4m-6x75-6-30	-----	\$19.89

Ballnose End Mills: General Purpose (H)

Ballnose Router End Mills - High Performance Helical. Maximum Strength And Improved Surface Finish.

- High performance, CNC qualified, center cutting Ballnose End Mills.
- 30° Helix.
- CNC qualified and center cutting for straight plunging or ramping down into workpieces.
- Machines a wide variety of materials: Steels, Stainless Steel, Titanium, Inconel, Laminates, Aluminum, Brass, Plastic, and more.
- Produced from an Ultra-Fine, Submicron, Nano Grade Solid Carbide.



Ballnose End Mills: Ferrous Cutting (H)

Cutter Diameter	Flute Length	Tool Shank Diameter	Overall Length	2 Flutes Part No.	4 Flutes Part No.	Price (each)
.031"	.094"	.125" (1/8")	2.0"	H2-125x2.0-.031-.094	H4-125x2.0-.031-.094	\$15.50
.031"	.25"	.125" (1/8")	2.0"	H2-125x2.0-.031-.25	H4-125x2.0-.031-.25	\$15.50
.050"	.07"	.125" (1/8")	2.0"	H2-125x2.0-.050-.07	H4-125x2.0-.050-.07	\$15.50
.050"	.15"	.125" (1/8")	2.0"	H2-125x2.0-.050-.15	H4-125x2.0-.050-.15	\$15.50
.050"	.15"	.250" (1/4")	2.0"	H2-250x2.0-.050-.15	H4-250x2.0-.050-.15	\$22.66
.0625" (1/16")	.25" (1/4")	.125" (1/8")	2.0"	H2-125x2.0-.0625-.25	H4-125x2.0-.0625-.25	\$15.50
.0625" (1/16")	.25" (1/4")	.125" (1/8")	4.5"	H2-125x4.5-.0625-.25	H4-125x4.5-.0625-.25	\$24.97
.0625" (1/16")	.25" (1/4")	.1719" (11/64")	6.5"	H2-171x6.5-.0625-.25	H4-171x6.5-.0625-.25	\$32.50
.0625" (1/16")	.25" (1/4")	.250" (1/4")	2.0"	H2-250x2.0-.0625-.25	H4-250x2.0-.0625-.25	\$22.66
.0625" (1/16")	.25" (1/4")	.250" (1/4")	6.5"	H2-250x6.5-.0625-.25	H4-250x6.5-.0625-.25	\$39.25
.0938" (3/32")	.38" (3/8")	.125" (1/8")	2.0"	H2-125x2.0-.0938-.38	H4-125x2.0-.0938-.38	\$15.50
.0938" (3/32")	.38" (3/8")	.125" (1/8")	4.5"	H2-125x4.5-.0938-.38	H4-125x4.5-.0938-.38	\$24.97
.0938" (3/32")	.38" (3/8")	.1719" (11/64")	6.5"	H2-171x6.5-.0938-.38	H4-171x6.5-.0938-.38	\$32.50
.0938" (3/32")	.38" (3/8")	.250" (1/4")	2.0"	H2-250x2.0-.0938-.38	H4-250x2.0-.0938-.38	\$22.66
.0938" (3/32")	.38" (3/8")	.250" (1/4")	6.5"	H2-250x6.5-.0938-.38	H4-250x6.5-.0938-.38	\$39.25
.125" (1/8")	.50" (1/2")	.125" (1/8")	2.0"	H2-125x2.0-.125-.5	H4-125x2.0-.125-.5	\$15.50
.125" (1/8")	.50" (1/2")	.125" (1/8")	4.5"	H2-125x4.5-.125-.5	H4-125x4.5-.125-.5	\$24.97
.125" (1/8")	.50" (1/2")	.1719" (11/64")	6.5"	H2-171x6.5-.125-.5	H4-171x6.5-.125-.5	\$32.50
.125" (1/8")	.50" (1/2")	.250" (1/4")	2.0"	H2-250x2.0-.125-.5	H4-250x2.0-.125-.5	\$22.66
.125" (1/8")	.50" (1/2")	.250" (1/4")	6.5"	H2-250x6.5-.125-.5	H4-250x6.5-.125-.5	\$39.25
.1719" (11/64")	.50" (1/2")	.1719" (11/64")	6.5"	H2-171x6.5-.1719-.5	H4-171x6.5-.1719-.5	\$32.50
.1875" (3/16")	.50" (1/2")	.1875" (3/16")	2.0"	H2-187x2.0-.1875-.5	H4-187x2.0-.1875-.5	\$16.50
.250" (1/4")	.50" (1/2")	.250" (1/4")	2.0"	H2-250x2.0-.250-.5	H4-250x2.0-.250-.5	\$22.66
.250" (1/4")	.50" (1/2")	.250" (1/4")	6.5"	H2-250x6.5-.250-.5	H4-250x6.5-.250-.5	\$39.25
.375" (3/8")	.75" (3/4")	.375" (3/8")	3.0"	H2-375x3.0-.375-.75	H4-375x3.0-.375-.75	\$39.00
.375" (3/8")	1.0"	.375" (3/8")	3.0"	H2-375x3.0-.375-1	H4-375x3.0-.375-1	\$39.00
.500" (1/2")	.50" (1/2")	.500" (1/2")	3.0"	H2-5x3.0-.500-.5	H4-5x3.0-.500-.5	\$50.94
.500" (1/2")	1.0"	.500" (1/2")	3.0"	H2-5x3.0-.500-1	H4-5x3.0-.500-1	\$50.94
.5625" (9/16")	1.0"	.5625" (9/16")	3.0"	H2-562x3.0-.5625-1	H4-562x3.0-.5625-1	\$65.80
1.5 mm (.059")	6.35 mm (.25")	6 mm (.236")	50 mm (1.97")	H2m-6x50-1.5-6.35	H4m-6x50-1.5-6.35	\$18.89
2 mm (.079")	6.35 mm (.25")	6 mm (.236")	50 mm (1.97")	H2m-6x50-2-6.35	H4m-6x50-2-6.35	\$18.89
3 mm (.118")	12.7 mm (.5")	6 mm (.236")	50 mm (1.97")	H2m-6x50-3-12.7	H4m-6x50-3-12.7	\$18.89
4 mm (.157")	12.7 mm (.5")	6 mm (.236")	50 mm (1.97")	H2m-6x50-4-12.7	H4m-6x50-4-12.7	\$18.89
5 mm (.197")	12.7 mm (.5")	6 mm (.236")	50 mm (1.97")	H2m-6x50-5-12.7	H4m-6x50-5-12.7	\$18.89
6 mm (.236")	19 mm (.75")	6 mm (.236")	50 mm (1.97")	H2m-6x50-6-19	H4m-6x50-6-19	\$18.89

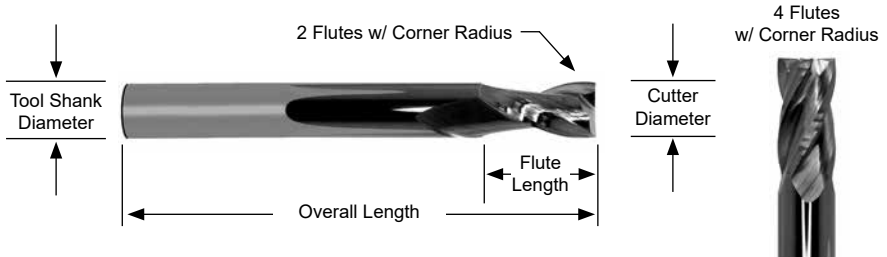
Contact us for sizes not listed.

Corner Radius End Mills: General Purpose (R)

Corner Radius End Mills - Helical High Performance.

Corner Radius For Maximum Performance.

- High performance End Mills with a corner radius that reduces edge chipping by strengthening the end of the tool.
- 30° Helix.
- CNC qualified and center cutting for straight plunging or ramping down into workpieces.
- Machines a wide variety of materials: Steels, Stainless Steel, Titanium, Inconel, Laminates, Aluminum, Brass, Plastic, and more.
- Produced from an Ultra-Fine, Submicron, Nano Grade Solid Carbide.



Corner Radius End Mills: Ferrous Cutting (R)

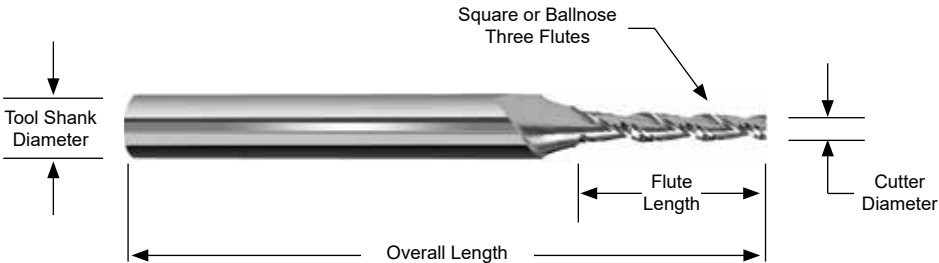
Cutter Diameter	Flute Length	Tool Shank Diameter	Corner Radius	Overall Length	2 Flutes Part No.	4 Flutes Part No.	Price (each)
.050"	.15"	.125" (1/8")	0.005"	2.0"	R2-125x2.0-.050-.15	R4-125x2.0-.050-.15	\$18.15
.050"	.15"	.250" (1/4")	0.005"	2.0"	R2-250x2.0-.050-.15	R4-250x2.0-.050-.15	\$25.94
.0625" (1/16")	.25" (1/4")	.125" (1/8")	0.006"	2.0"	R2-125x2.0-.0625-.25	R4-125x2.0-.0625-.25	\$18.15
.0625" (1/16")	.25" (1/4")	.125" (1/8")	0.006"	4.5"	R2-125x4.5-.0625-.25	R4-125x4.5-.0625-.25	\$32.46
.0625" (1/16")	.25" (1/4")	.1719" (11/64")	0.006"	6.5"	R2-171x6.5-.0625-.25	R4-171x6.5-.0625-.25	\$37.06
.0625" (1/16")	.25" (1/4")	.250" (1/4")	0.006"	2.0"	R2-250x2.0-.0625-.25	R4-250x2.0-.0625-.25	\$25.94
.0625" (1/16")	.25" (1/4")	.250" (1/4")	0.006"	6.5"	R2-250x6.5-.0625-.25	R4-250x6.5-.0625-.25	\$40.50
.0938" (3/32")	.38" (3/8")	.125" (1/8")	0.010"	2.0"	R2-125x2.0-.0938-.38	R4-125x2.0-.0938-.38	\$18.15
.0938" (3/32")	.38" (3/8")	.125" (1/8")	0.010"	4.5"	R2-125x4.5-.0938-.38	R4-125x4.5-.0938-.38	\$32.46
.0938" (3/32")	.38" (3/8")	.1719" (11/64")	0.010"	6.5"	R2-171x6.5-.0938-.38	R4-171x6.5-.0938-.38	\$37.06
.0938" (3/32")	.38" (3/8")	.250" (1/4")	0.010"	2.0"	R2-250x2.0-.0938-.38	R4-250x2.0-.0938-.38	\$25.94
.0938" (3/32")	.38" (3/8")	.250" (1/4")	0.010"	6.5"	R2-250x6.5-.0938-.38	R4-250x6.5-.0938-.38	\$40.50
.125" (1/8")	.50" (1/2")	.125" (1/8")	0.015"	2.0"	R2-125x2.0-.125-.5	R4-125x2.0-.125-.5	\$18.15
.125" (1/8")	.50" (1/2")	.125" (1/8")	0.015"	4.5"	R2-125x4.5-.125-.5	R4-125x4.5-.125-.5	\$32.46
.125" (1/8")	.50" (1/2")	.1719" (11/64")	0.015"	6.5"	R2-171x6.5-.125-.5	R4-171x6.5-.125-.5	\$37.06
.125" (1/8")	.50" (1/2")	.250" (1/4")	0.015"	2.0"	R2-250x2.0-.125-.5	R4-250x2.0-.125-.5	\$25.94
.125" (1/8")	.50" (1/2")	.250" (1/4")	0.015"	6.5"	R2-250x6.5-.125-.5	R4-250x6.5-.125-.5	\$40.50
.1719" (11/64")	.50" (1/2")	.1719" (11/64")	0.015"	6.5"	R2-171x6.5-.1719-.5	R4-171x6.5-.1719-.5	\$37.06
.1875" (3/16")	.50" (1/2")	.1875" (3/16")	0.015"	2.0"	R2-187x2.0-.1875-.5	R4-187x2.0-.1875-.5	\$21.15
.250" (1/4")	.50" (1/2")	.250" (1/4")	0.015"	2.0"	R2-250x2.0-.250-.5	R4-250x2.0-.250-.5	\$25.94
.250" (1/4")	.50" (1/2")	.250" (1/4")	0.015"	6.5"	R2-250x6.5-.250-.5	R4-250x6.5-.250-.5	\$40.50
.375" (3/8")	1.0"	.375" (3/8")	0.020"	3.0"	R2-375x3.0-.375-1	R4-375x3.0-.375-1	\$39.00
.500" (1/2")	1.0"	.500" (1/2")	0.020"	3.0"	R2-5x3.0-.500-1	R4-5x3.0-.500-1	\$71.80
.5625" (9/16")	1.0"	.5625" (9/16")	0.020"	3.0"	R2-562x3.0-.5625-1	R4-562x3.0-.5625-1	\$80.29
1.5 mm (.059")	6.35 mm (.25")	6 mm (.236")	0.15 mm (0.006")	50 mm (1.97")	R2m-6x50-1.5-6.35	R4m-6x50-1.5-6.35	\$25.94
2 mm (.079")	6.35 mm (.25")	6 mm (.236")	0.15 mm (0.006")	50 mm (1.97")	R2m-6x50-2-6.35	R4m-6x50-2-6.35	\$25.94
3 mm (.118")	12.7 mm (.5")	6 mm (.236")	0.25 mm (0.010")	50 mm (1.97")	R2m-6x50-3-12.7	R4m-6x50-3-12.7	\$25.94
4 mm (.157")	12.7 mm (.5")	6 mm (.236")	0.25 mm (0.010")	50 mm (1.97")	R2m-6x50-4-12.7	R4m-6x50-4-12.7	\$25.94
5 mm (.197")	12.7 mm (.5")	6 mm (.236")	0.25 mm (0.010")	50 mm (1.97")	R2m-6x50-5-12.7	R4m-6x50-5-12.7	\$25.94
6 mm (.236")	19 mm (.75")	6 mm (.236")	0.38 mm (0.015")	50 mm (1.97")	R2m-6x50-6-19	R4m-6x50-6-19	\$25.94

We manufacture in house.

Tapered End Mills - Square and Ballnose (TS & TB)

Tapered End Mills. Square and Ballnose.

- Solid Carbide End Mills produce tapered walls, grooves, and holes.
- 3 Flutes for machining a wide range of materials from soft Plastics and Aluminum to harder materials such as Steel, Stainless Steel, and Titanium.
- CNC qualified.
- Center cutting for straight plunging or ramping down into workpieces.
- Produced from an Ultra-Fine, Submicron, Nano Grade Solid Carbide.



Tapered End Mills - Square (TS)						
Angles per Side	Cutter Dia.	Flute Length	Tool Shank Diameter	Overall Length	3 Flutes Part No.	Price (each)
1	.030"	.300"	.125"	2.0"	TS3-1-030-125-.3	\$36.63
1	.060"	.600"	.1875"	3.0"	TS3-1-060-187-.6	\$38.38
1	.090"	.900"	.250"	3.0"	TS3-1-090-250-.9	\$39.85
1.5	.030"	.300"	.125"	2.0"	TS3-1.5-030-125-.3	\$36.63
1.5	.060"	.600"	.1875"	3.0"	TS3-1.5-060-187-.6	\$38.38
1.5	.090"	.900"	.250"	3.0"	TS3-1.5-090-250-.9	\$39.85
2	.030"	.300"	.125"	2.0"	TS3-2.0-030-125-.3	\$36.63
2	.060"	.600"	.1875"	3.0"	TS3-2.0-060-187-.6	\$38.38
2	.090"	.900"	.250"	3.0"	TS3-2.0-090-250-.9	\$39.85
1.8 (NPT)	.200"	.625"	.250"	2.0"	TS3-1.8-200-250-.62	\$39.85
1.8 (NPT)	.300"	.900"	.375"	3.0"	TS3-1.8-300-375-.9	\$47.08
1.8 (NPT)	.400"	1.250"	.500"	3.0"	TS3-1.8-400-500-1.2	\$63.30

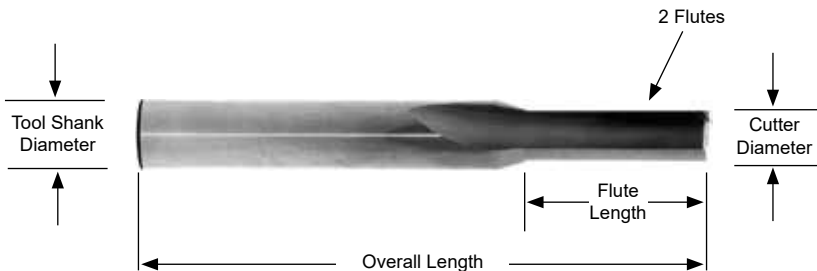
Tapered End Mills - Ballnose (TB)						
Angles per Side	Cutter Dia.	Flute Length	Tool Shank Diameter	Overall Length	3 Flutes Part No.	Price (each)
1	.030"	.300"	.125"	2.0"	TB3-1-030-125-.3	\$39.13
1	.060"	.600"	.1875"	3.0"	TB3-1-060-187-.6	\$40.88
1	.090"	.900"	.250"	3.0"	TB3-1-090-250-.9	\$42.35
1.5	.030"	.300"	.125"	2.0"	TB3-1.5-030-125-.3	\$39.13
1.5	.060"	.600"	.1875"	3.0"	TB3-1.5-060-187-.6	\$40.88
1.5	.090"	.900"	.250"	3.0"	TB3-1.5-090-250-.9	\$42.35
2	.030"	.300"	.125"	2.0"	TB3-2.0-030-125-.3	\$39.13
2	.060"	.600"	.1875"	3.0"	TB3-2.0-060-187-.6	\$40.88
2	.090"	.900"	.250"	3.0"	TB3-2.0-090-250-.9	\$42.35

Contact us for sizes not listed.

Composite End Mills (CE2)

Cut Composite Materials, Mill Abrasive And Reinforced Glass Filled Fiber Composite Materials.

- Mill abrasive and reinforced glass filled fiber composite materials.
- 2 straight flutes minimize the de-laminating of layers and the fraying of fibers that can occur when using a helical fluted tool that lifts the material.
- Off center Z flute design is used for milling and is not suitable for plunge cutting.
- CNC qualified.
- Center cutting for straight plunging or ramping down into workpieces.
- Produced from an Ultra-Fine, Submicron, Nano Grade Solid Carbide.



Composite End Mills (CE2)

Cutter Diameter	Flute Length	Tool Shank Diameter	Overall Length	Part No.	Price (each)
.125" (1/8")	.50"	.250" (1/4")	2.0"	CE2-250x2.0-.125-.5	\$25.11
.1875" (3/16")	.625"	.250" (1/4")	2.0"	CE2-250x2.0-.1875-.625	\$25.11
.250" (1/4")	.75"	.250" (1/4")	2.5"	CE2-250x2.5-.250-.75	\$25.73

We manufacture in house.

Extended Reach Toolholder

Straight Shank Tool Extension.
For Holding 0.125" (1/8") Diameter Tools.

0.375" (3/8") Overall Diameter.
6.0" Overall Length.



- Use this Extended Tool Holder for operations where an extra long tool is needed to reach into deep cavities or pockets and where larger diameter collet holding devices will not allow getting close enough to the cavity or pocket walls.
- 6 inches overall length. Holds 1/8" (0.125") diameter tools. Extremely small 3/8" (0.375") overall diameter.
- Change the cutting tools from the front without removing the toolholder from the spindle.
- Straight shank (0.375" diameter) allows you to control how far the toolholder protrudes from your collet.
- This tool is designed for light finishing cuts only.

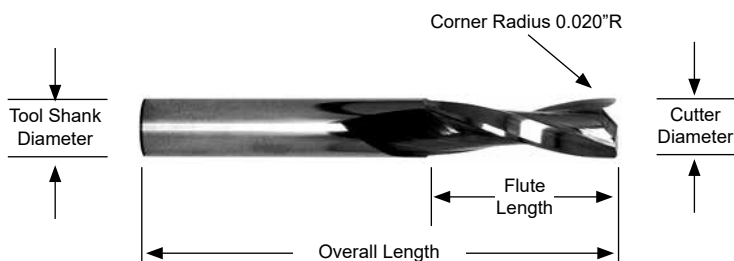
Operating Notes: Protrude the Extended Tool Holder from your collet the minimum amount necessary to reach into the pocket or cavity. The shaft may bend or whip if protruded too far from the collet or too much sideways cutting pressure is applied. The Extended Tool Holder is produced from high strength Tool Steel so it can be trammed in straight (straightened) in your spindle if necessary.

Extended Tool Holder:

- For .125" (1/8") Dia. Tools: Part No. 10782, \$128.75 each.

Armor Mills.**Mill Tough Materials: Granite, Armor Plate, And Hard Steels.**

- Machine, cut, and drill extremely tough and hard materials not possible with Standard End Mills.
- Use with Armorplate, Granite, High Speed Steel, Cobalt Steel, Taps, Drills, Marble and more.
- Rugged flat end mill style design allows drilling into rough and jagged shaped broken drills or taps where other tools might walk unless spot drilled with a larger drill.
- CNC qualified.
- Center cutting for straight plunging or ramping down into workpieces.
- Produced from an Ultra-Fine, Submicron, Nano Grade Solid Carbide.

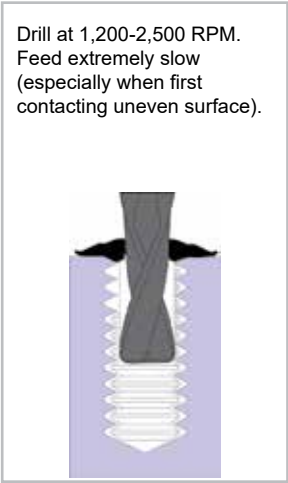


Armor Mills (A)



Armor Mills. Drill Out Broken Taps And Drills.

Use when the tap or drill is broken off below the surface of the workpiece or when the broken tap or drill has an uneven top surface that would cause the Tool tip to walk or deflect.



- It is recommended to use the Armor Mill in a rigid machine (machining centers, kneemills, lathes) with the parts held securely.
- Using the handwheel at the lowest speed, feed very slowly and keep a steady feedrate.
- Peck or stop frequently to remove chips from the hole.
- If the part needs to be drilled with a hand drill, operate the drill at faster rpms, use a strong, steady force, and keep the drill as straight as possible.
- It is important to prevent the tools from walking or deflecting, especially when first contacting the uneven part surface.

Contact us for sizes not listed.
We manufacture in house.

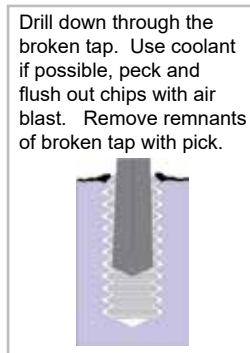
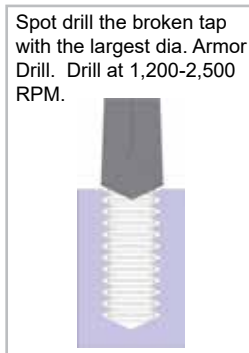
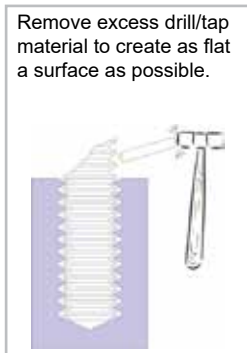
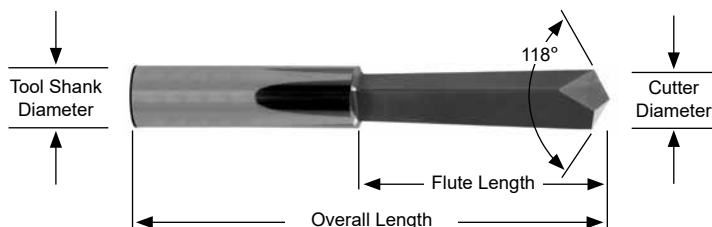
Armor Mills (A)					
Cutter Diameter	Flute Length	Tool Shank Diameter	Overall Length	Part No.	Price (each)
.060"	.250" (1/4")	.125" (1/8")	2.0"	A-125x2.0-.060-.250	\$22.12
.078" (5/64")	.375" (3/8")	.125" (1/8")	2.0"	A-125x2.0-.078-.375	\$22.12
.125" (1/8")	.50" (1/2")	.125" (1/8")	2.0"	A-125x2.0-.125-.5	\$22.12
.1875" (3/16")	.75" (3/4")	.1875" (3/16")	2.0"	A-1875x2.0-.1875-.75	\$26.50
.250" (1/4")	.8"	.250" (1/4")	2.0"	A-250x2.0-.250-.8	\$31.15
.250" (1/4")	1.0"	.250" (1/4")	2.5"	A-250x2.5-.250-1.0	\$38.45
.250" (1/4")	1.0"	.250" (1/4")	6.5"	A-250x6.5-.250-1.0	\$58.60
.3125" (5/16")	1.0"	.3125" (5/16")	2.5"	A-312x2.5-.312-1.0	\$40.79
.375" (3/8")	1.0"	.375" (3/8")	3.0"	A-375x3.0-.375-1.0	\$47.45
.375" (3/8")	1.5"	.375" (3/8")	3.0"	A-375x3.0-.375-1.5	\$55.35
.500" (1/2")	1.0"	.500" (1/2")	3.0"	A-500x3.0-.500-1.0	\$66.45
.500" (1/2")	1.5"	.500" (1/2")	3.0"	A-500x3.0-.500-1.5	\$75.51

Armor Drills (D)

Drill Out Broken Taps And Drills.

Drill Tough Materials: Granite, Armor Plate, And Hard Steels.

- Drill Hard materials not possible with standard drills.
- Drill out broken High Speed Steel and Cobalt Steel Drills and Taps.
- Drill Granite, Marble, Armorplate, High Speed Steel, and other very hard materials.
- CNC qualified.
- Center cutting for straight plunging or ramping down into workpieces.
- Produced from an Ultra-Fine, Submicron, Nano Grade Solid Carbide.



- Use when the tap or drill is broken off above the surface of the workpiece or when the broken tap or drill has a flat top surface that will not cause the drill tip to walk or deflect.
- Use in a rigid machine (machining centers, kneemills, lathes) with the parts held securely.
- Using the handwheel at the lowest speed, feed very slowly and keep a steady feedrate.
- Peck or stop frequently to remove chips from the hole.
- If the part needs to be drilled with a hand drill, operate the drill at faster rpms, use a strong, steady force, and keep the drill as straight as possible.
- It is important to prevent the tools from walking or deflecting, especially when first contacting the uneven part surface.

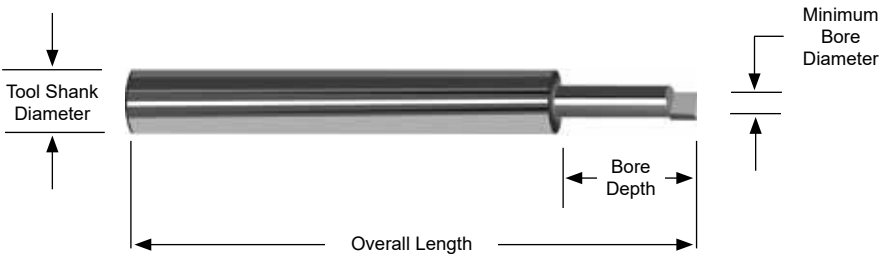
Armor Drills (D)

Cutter Diameter	Flute Length	Tool Shank Diameter	Overall Length	Part No.	Price (each)
.078" (5/64")	.375" (3/8")	.125" (1/8")	2.0"	D-125x2.0-.078-.375	\$22.12
.125" (1/8")	.50" (1/2")	.125" (1/8")	2.0"	D-125x2.0-.125-.5	\$22.12
.1875" (3/16")	.75" (3/4")	.1875" (3/16")	2.0"	D-1875x2.0-.1875-.75	\$26.50
.250" (1/4")	1.0"	.250" (1/4")	2.0"	D-250x2.0-.250-1	\$31.15
.3125" (5/16")	1.25"	.3125" (5/16")	2.5"	D-312x2.5-.312-1.25	\$40.79
.375" (3/8")	1.5"	.375" (3/8")	3.0"	D-375x3.0-.375-1.5	\$47.45
.500" (1/2")	1.5"	.500" (1/2")	3.0"	D-500x3.0-.500-1.5	\$66.45

Boring Bars (BB)

Bore, Enlarge Or Finish The Inside Diameter Of A Workpiece.

- Round neck for maximum rigidity and less deflection.
- The cutting tip is ground to a sharp corner which is effective for boring tough to machine, hard materials such as Cast Iron and Stainless Steel, as well as Plastic, Aluminum, Brass and Wood.
- Micro Size Bore Diameters from .040" up to .120".
- Produced from an Ultra-Fine, Submicron, Nano Grade Solid Carbide.



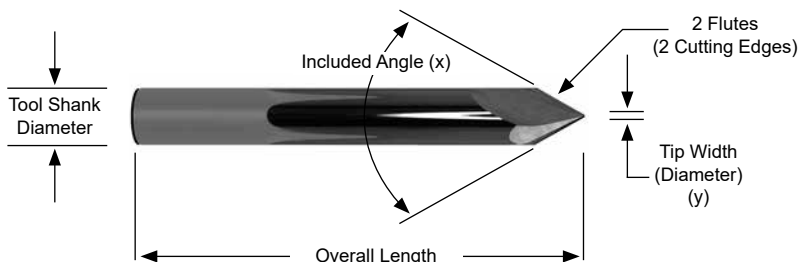
Boring Bars (BB)					
Minimum Bore Diameter	Bore Depth	Tool Shank Diameter	Overall Length	Part No.	Price (each)
.040"	.250"	.125" (1/8")	2.0"	BB-125x2.0-.040-.25	\$21.88
.040"	.500"	.125" (1/8")	2.0"	BB-125x2.0-.040-.50	\$21.88
.060"	.250"	.125" (1/8")	2.0"	BB-125x2.0-.060-.25	\$21.88
.060"	.500"	.125" (1/8")	2.0"	BB-125x2.0-.060-.50	\$21.88
.080"	.250"	.125" (1/8")	2.0"	BB-125x2.0-.080-.25	\$21.88
.080"	.500"	.125" (1/8")	2.0"	BB-125x2.0-.080-.50	\$21.88
.080"	.700"	.125" (1/8")	2.5"	BB-125x2.5-.080-.70	\$30.00
.100"	.250"	.125" (1/8")	2.0"	BB-125x2.0-.100-.25	\$21.88
.100"	.500"	.125" (1/8")	2.0"	BB-125x2.0-.100-.50	\$21.88
.120"	.250"	.125" (1/8")	2.0"	BB-125x2.0-.120-.25	\$21.88
.120"	.500"	.125" (1/8")	2.0"	BB-125x2.0-.120-.50	\$21.88

Contact us for sizes not listed.

Chamfering (M)

Chamfering Tool. 2 Flutes - 2 Cutting Edges.

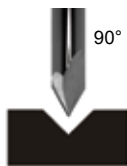
- Solid Carbide high performance tool with 2 flutes (2 cutting edges) for chamfering a wide range of materials from Hard Steels to Soft Plastics.
- Tough cutting edges allow for higher feedrates and long tool life. For example, feed rates of 100ipm or faster at only 8000rpm produces a very clean chamfered edge in 6061 Aluminum.
- This tool is also extremely effective for countersinking, spot drilling, beveling and deburring.
- Larger tool diameters such as 1/2" allow higher feed rates due to the rigidity of the tool, especially when creating larger chamfers.
- Produced from an Ultra-Fine, Submicron, Nano Grade Solid Carbide.



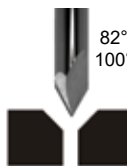
Chamfer



Spot Drill



Countersink



Chamfering Tool (M)

Tool Shank Diameter	Overall Length	Included Angle (x)	Tip Width (y)	Build Your Part No. (select x & y)	Price (each)
.125" (1/8")	2.0"	60°, 82°, 90°, 100°	.005", .010", .015", .020"	M-125x2.0-x-y	\$18.94
.125" (1/8")	4.5"	60°, 82°, 90°, 100°	.005", .010", .015", .020"	M-125x4.5-x-y	\$19.38
.1719" (11/64")	6.5"	60°, 82°, 90°, 100°	.005", .010", .015", .020"	M-1719x6.5-x-y	\$25.63
.1875" (3/16")	2.0"	60°, 82°, 90°, 100°	.005", .010", .015", .020"	M-1875x2.0-x-y	\$22.48
.250" (1/4")	2.0"	60°, 82°, 90°, 100°	.005", .010", .015", .020"	M-250x2.0-x-y	\$24.98
.250" (1/4")	6.5"	60°, 82°, 90°, 100°	.005", .010", .015", .020"	M-250x6.5-x-y	\$30.75
.375" (3/8")	3.0"	60°, 82°, 90°, 100°	.005", .010", .015", .020"	M-375x3.0-x-y	\$36.14
.500" (1/2")	3.0"	60°, 82°, 90°, 100°	.005", .010", .015", .020"	M-500x3.0-x-y	\$56.58
.562" (9/16")	3.0"	60°, 82°, 90°, 100°	.005", .010", .015", .020"	M-562x3.0-x-y	\$66.84
4 mm (.157")	50 mm (1.97")	60°, 82°, 90°, 100°	.12 mm (.005"), .25 mm (.010"), .38 mm (.015"), .50 mm (.020")	Mmet-4x50-x-y	\$22.48
6 mm (.236")	50 mm (1.97")	60°, 82°, 90°, 100°	.12 mm (.005"), .25 mm (.010"), .38 mm (.015"), .50 mm (.020")	Mmet-6x50-x-y	\$24.98

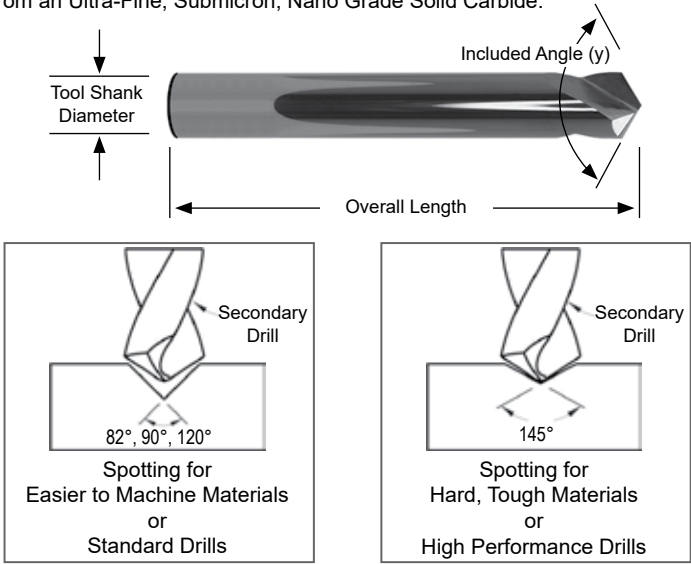
Part No. Examples: M-1875x2.0-60-.010 & Mmet-6x50-60-.50

We manufacture in house.

Spotting Drills (SD)

Spotting Drills / Centering Drills. For Pre-Drilling Holes On A Wide Variety of Materials.

- These NC Spotting Drills have short flutes and no land or body relief to maintain maximum rigidity.
- For use on numerous materials including Aluminum, Brass, Plastic, Wood as well as more difficult materials such as Steel, Stainless steel, Composites, Inconel, and Titanium.
- For softer materials 90° points are typically used to start drills up to 120°. 120° points are used to start drills above 120° (typically 135° drills). This allows the outer cutting edge of the secondary drill to start cutting before the point touches.
- For tougher and harder materials and for high performance secondary drills the 145° point is recommended. This allows the point of the secondary drill to touch before the outer cutting edge. This helps to reduce chatter and prevent chipping of the secondary drill's cutting edges.
- Produced from an Ultra-Fine, Submicron, Nano Grade Solid Carbide.



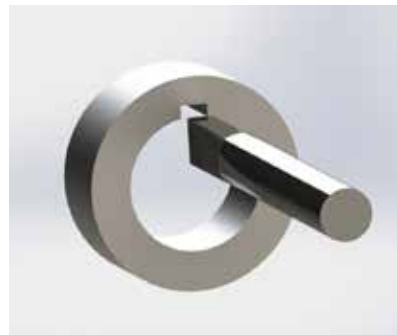
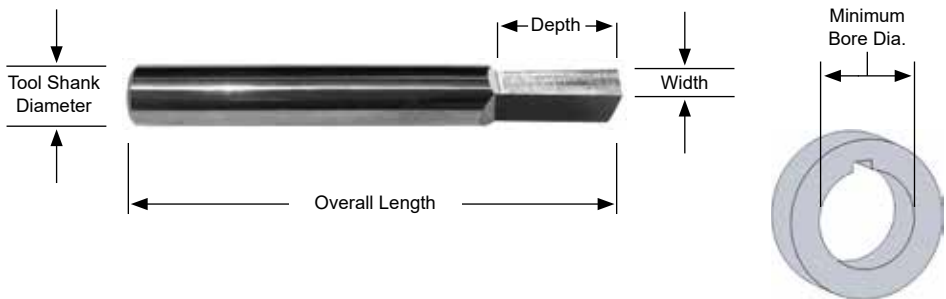
Spot Drills / 2 Flutes (SD)				
Tool Shank Diameter	Overall Length	Included Angle (y)	Build your Part No. (select y)	Price (each)
.125" (1/8")	2.0"	82°, 90°, 120°, 145°	SD-125x2.0-y	\$15.50
.125" (1/8")	4.5"	82°, 90°, 120°, 145°	SD-125x4.5-y	\$18.00
.1719" (11/64")	6.5"	82°, 90°, 120°, 145°	SD-1719x6.5-y	\$24.70
.1875" (3/16")	2.0"	82°, 90°, 120°, 145°	SD-1875x2.0-y	\$20.10
.250" (1/4")	2.0"	82°, 90°, 120°, 145°	SD-250x2.0-y	\$24.10
.250" (1/4")	6.5"	82°, 90°, 120°, 145°	SD-250x6.5-y	\$29.85
.3125" (5/16")	3.0"	82°, 90°, 120°, 145°	SD-3125x3.0-y	\$28.01
.375" (3/8")	3.0"	82°, 90°, 120°, 145°	SD-375x3.0-y	\$33.09
.500" (1/2")	3.0"	82°, 90°, 120°, 145°	SD-500x3.0-y	\$47.46
.5625" (9/16")	3.0"	82°, 90°, 120°, 145°	SD-562x3.0-y	\$58.66
.750" (3/4")	3.0"	82°, 90°, 120°, 145°	SD-750x3.0-y	\$123.08
4 mm (.157")	50 mm (1.97")	82°, 90°, 120°, 145°	SDmet-4x50-y	\$20.10
6 mm (.236")	50 mm (1.97")	82°, 90°, 120°, 145°	SDmet-6x50-y	\$24.10
Part No. Examples: SD-125x2.0-90 & SDmet-6x50-120				

Contact us for sizes not listed.

Square Key Broaches (SK)

Broach Tools. For Nibbling Square Key Slots.

- Square Key Broach Tools are used to produce keyway slots.
- Use for broaching or punching keyway slots on a lathe or machining center using small nibbles.
- Cuts soft and hard materials such as Plastic, Aluminum, Brass, Steel, Stainless Steel, hard Steel, Cast Iron, and Composites.
- Allowable depth per pass depends on material (0.001" - 0.003" depth per pass at 100ipm is typical).
- Produced from an Ultra-Fine, Submicron, Nano Grade Solid Carbide.



Square Key Broaches (SK)

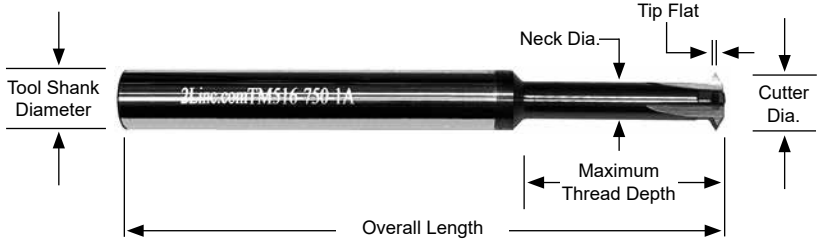
Width +.002" -.000"	Minimum Bore Diameter	Depth	Tool Shank Dia.	Overall Length	Part No.	Price (each)
.065"	0.250"	0.500"	0.250"	2.0"	SK-250-065-.5	\$24.03
.080"	0.250"	0.500"	0.250"	2.0"	SK-250-080-.5	\$24.03
.096"	0.250"	0.500"	0.250"	2.0"	SK-250-096-.5	\$24.03
.127"	0.250"	0.500"	0.250"	2.0"	SK-250-127-.5	\$24.03
.190"	0.250"	0.500"	0.250"	2.0"	SK-250-190-.5	\$24.03

We manufacture in house.

Thread Mills (TM)

Thread Milling Cutters. For Milling Multiple Thread Pitches.

- Use to cut internal and external threads. Create multiple thread pitches with one tool.
- Standard 60° thread form with a small flat on the tip of the thread cutter for increased wear resistance.
- Mill left and right handed threads.
- For milling both soft and hard materials such as Plastic, Aluminum, Brass, Steel, Stainless Steel, hard Steel, Cast Iron, and Composites.
- Coated with latest generation of nano AlTiN+ extra nanocomposites for wear and heat resistance.
- Produced from an Ultra-Fine, Submicron, Nano Grade Solid Carbide.



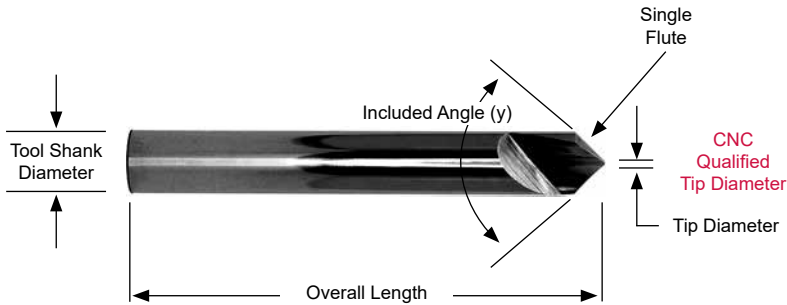
Thread Mills (TM)										
Thread Size	Pitch Range	Cutter Dia.	Maximum Thread Depth	Neck Dia.	Tip Flat	Flutes	Tool Shank Dia.	Overall Length	Part No.	nAlTiN+ Coated Price (each)
4	40-64	0.080"	0.250"	0.040"	0.0021"	2	0.125"	2.0"	TM4-250-1A	\$45.25
4	40-64	0.080"	0.500"	0.040"	0.0021"	2	0.125"	2.0"	TM4-500-1A	\$46.50
4	40-64	0.080"	0.625"	0.040"	0.0021"	2	0.125"	2.0"	TM4-625-1A	\$49.06
6	32-64	0.098"	0.375"	0.050"	0.0025"	4	0.125"	2.0"	TM6-375-1A	\$45.25
6	32-64	0.098"	0.625"	0.050"	0.0025"	4	0.125"	2.0"	TM6-625-1A	\$49.06
6	32-64	0.098"	0.750"	0.050"	0.0025"	4	0.125"	2.0"	TM6-750-1A	\$54.00
8	32-56	0.120"	0.500"	0.070"	0.0028"	4	0.1875"	2.0"	TM8-500-1A	\$46.50
8	32-56	0.120"	0.750"	0.070"	0.0028"	4	0.1875"	2.0"	TM8-750-1A	\$48.94
8	32-56	0.120"	0.875"	0.070"	0.0028"	4	0.1875"	2.0"	TM8-875-1A	\$54.00
10	24-56	0.135"	0.500"	0.070"	0.0028"	4	0.250"	2.5"	TM10-500-1A	\$47.75
10	24-56	0.135"	0.875"	0.070"	0.0028"	4	0.250"	2.5"	TM10-875-1A	\$48.94
10	24-56	0.135"	1.125"	0.070"	0.0028"	4	0.250"	2.5"	TM10-1125-1A	\$55.31
1/4	18-56	0.180"	0.750"	0.115"	0.0028"	4	0.250"	2.5"	TM14-750-1A	\$47.75
1/4	18-56	0.180"	1.250"	0.115"	0.0028"	4	0.250"	2.5"	TM14-1250-1A	\$55.13
5/16	16-48	0.240"	0.750"	0.160"	0.0028"	4	0.250"	2.5"	TM516-750-1A	\$47.75
5/16	16-48	0.240"	1.250"	0.160"	0.0028"	4	0.250"	2.5"	TM516-1250-1A	\$55.13
M2.5	.35-.50	1.9 mm (.075")	6.35 mm (.250")	1.14 mm (.044")	.05 mm (.002")	2	6 mm (.236")	50 mm (1.97")	TMM2.5-635-1A	\$45.25
M3	.40-.60	2.3 mm (.090")	6.8 mm (.268")	1.38 mm (.054")	.05 mm (.002")	4	6 mm (.236")	50 mm (1.97")	TMM3-68-1A	\$45.25
M4	.45-.80	3.0 mm (.118")	9 mm (.354")	1.8 mm (.071")	.07 mm (.0028")	4	6 mm (.236")	50 mm (1.97")	TMM4-9-1A	\$46.38
M5	.45-1.00	4.0 mm (.157")	12 mm (.472")	2.4 mm (.094")	.07 mm (.0028")	4	6 mm (.236")	50 mm (1.97")	TMM5-12-1A	\$46.38
M6	.50-1.25	4.8 mm (.189")	14 mm (.551")	2.88 mm (.113")	.076 mm (.003")	4	6 mm (.236")	50 mm (1.97")	TMM6-14-1A	\$46.38
M8-M14	.50-2.00	6.0 mm (.236")	21 mm (.827")	3.6 mm (.142")	.076 mm (.003")	4	6 mm (.236")	75 mm (3.00")	TMM814-21-1A	\$49.06

Contact us for sizes not listed.

Countersinks With Single Flute (CS)

Countersinks. Single Flute.

- Single Flute cutting tool designed for countersinking, chamfering or deburring.
- Each size may be used on a wide range of hole diameters.
- The Solid Carbide shank ensures maximum rigidity to reduce chatter.
- Produced from an Ultra-Fine, Submicron, Nano Grade Solid Carbide.



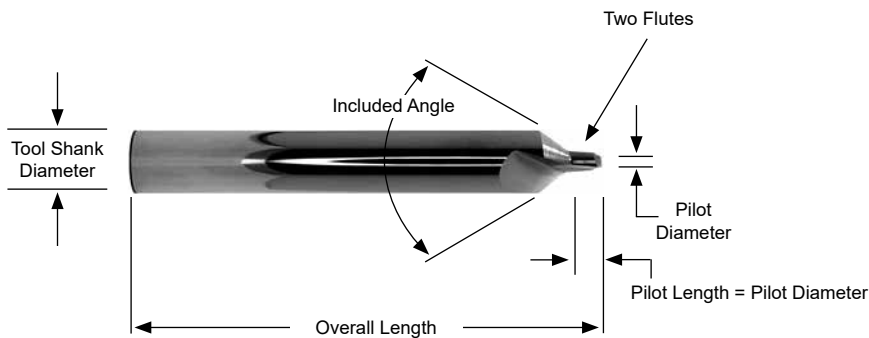
Countersinks (CS) - Single Flute					
Tool Shank Diameter	Overall Length	Tip Diameter	Included Angle (y)	Build Your Part No. (select y)	Price (each)
.125" (1/8")	2.0"	0.015"	82°,90°,100°	CS-125x2.0-y	\$16.23
.1875" (3/16")	2.0"	0.020"	82°,90°,100°	CS-1875x2.0-y	\$18.73
.250" (1/4")	2.0"	0.025"	82°,90°,100°	CS-250x2.0-y	\$21.23
.250" (1/4")	3.0"	0.025"	82°,90°,100°	CS-250x3.0-y	\$23.73
.375" (3/8")	3.0"	0.050"	82°,90°,100°	CS-375x3.0-y	\$39.56
.500" (1/2")	3.0"	0.050"	82°,90°,100°	CS-500x3.0-y	\$50.94
.5625" (9/16")	3.0"	0.050"	82°,90°,100°	CS-562x3.0-y	\$67.56
Part No. Example: CS-250x3.0-90					

We manufacture in house.

Countersinks With Pilot (CSP)

Countersinks With Pilot.
Reduce Chatter.

- Countersink with pilots are designed for countersinking, chamfering or deburring.
- Each size may be used on a wide range of hole diameters.
- The Countersinks with integrated pilot drills reduce chattering by allowing the pilot to closely fit into a predrilled hole.
- The solid carbide shank ensures maximum rigidity to reduce chatter.
- Produced from an Ultra-Fine, Submicron, Nano Grade Solid Carbide.
- Custom pilot sizes, number of flutes, or different included angles are available on any Countersink with short lead times.



Countersinks with Pilot Drills (CSP) - 2 Flutes
Standard Screw Sizes - Clearance Holes

Tool Shank Diameter	Overall Length	Included Angle	Pilot Drill Diameter	Part No.	Price (each)
.375" (3/8")	3.0"	82°	0.089" (#4 Screw or #43 Drill)	CSP-375x3.0-82-.089	\$53.56
.375" (3/8")	3.0"	82°	0.106" (#6 Screw or #36 Drill)	CSP-375x3.0-82-.106	\$53.56
.375" (3/8")	3.0"	82°	0.116" (#4 Screw or #32 Drill)	CSP-375x3.0-82-.116	\$53.56
.375" (3/8")	3.0"	82°	0.136" (#8 Screw or #29 Drill)	CSP-375x3.0-82-.136	\$53.56
.375" (3/8")	3.0"	82°	0.140" (#6 Screw or #28 Drill)	CSP-375x3.0-82-.140	\$53.56
.375" (3/8")	3.0"	82°	0.166" (#8 Screw or #19 Drill)	CSP-375x3.0-82-.166	\$53.56
.500" (1/2")	3.0"	82°	0.149" (#10 Screw or #25 Drill)	CSP-500x3.0-82-.149	\$60.94
.500" (1/2")	3.0"	82°	0.193" (#10 Screw or #10 Drill)	CSP-500x3.0-82-.193	\$60.94
.5625" (9/16")	3.0"	82°	0.201" (1/4" Screw or #7 Drill)	CSP-562x3.0-82-.201	\$77.31
.5625" (9/16")	3.0"	82°	0.257" (1/4" Screw or F Drill)	CSP-562x3.0-82-.257	\$77.31

Contact us for sizes not listed.
We manufacture in house.

CNC Countersink Depth Stop Tool

Precise Countersink Depth Control. Controls Countersink Depth On Uneven Materials.

The CNC Countersink Depth Stop maintains precise countersink depth control on materials with tolerance variations.

- Spring compresses up to 0.375" to compensate for material variations.
- Depth of cut can be adjusted in 0.001" increments.
- Tool shank fits into a standard 1/2" Collet or End Mill Holder.
- Holds 1/4", 5/16", 3/8", 1/2" and 9/16" Collets.
- Accommodates Countersink Tools with cutter diameters up to 7/8" (0.875") and lengths from 2.0" (50mm) to 3.0" (76mm). Other tool lengths may be used by changing the replaceable plastic nosepiece.

The replaceable Plastic Nosepiece uses a unique bearing design that reduces marring of the workpiece. As the tool touches the material, the Nosepiece stops spinning, which eliminates the potential for surface damage. The bearing system is shielded to protect against coolant, chips, graphite and composite material dust.



Operating Notes:

- Spindle speed operation range: 50-500 RPM.
- Maximum recommended spindle speed: 2,000 RPM.
- Use slower speeds and a Countersink Tool Bit with Pilot to minimize cutting tool chatter.

Each CNC Countersink Depth Stop Tool Includes:

- > Heavy Spring: Part No. 10707
- > Hex Wrench: Part No. 10197

Collets that hold the Countersink Tool Bits are purchased separately.

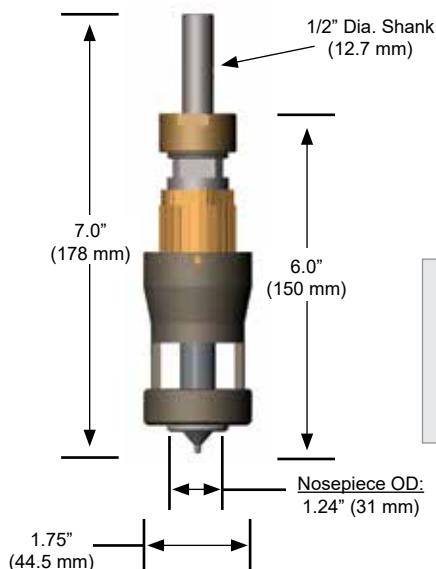
* The CNC Countersink Depth Stop is covered by U.S. Patent 7,607,871.

CNC Countersink Depth Stop Tool - .500" Diameter Shaft:

- Part No. 11244 holds Countersinks up to 7/8" (0.875"), \$665.00 each.

CNC Countersink Depth Stop Tool & Accessories

CNC Countersink Depth Stop Tool Holds A Wide Range Of Countersink Sizes.



CNC Countersink Depth Stop Tool, Part No. 11244:

- > Accommodates Countersinks with cutter diameters up to 7/8" (0.875" - 22 mm).
- > Hold Countersinks with lengths of 2.0" - 3.0" OL.
- > Uses 1/4", 5/16", 3/8", 1/2" & 9/16" Collets.
- > Nosepiece OD = 1.24" (31 mm).

Collets, Springs, And Accessories For The CNC Countersink Depth Stop Tool.

Collets:



- 1/4" (.250") Collet: Part No. 10701, \$98.00 each.
- 5/16" (.3125") Collet: Part No. 11557, \$98.00 each.
- 3/8" (.375") Collet: Part No. 10702, \$98.00 each.
- 1/2" (.500") Collet: Part No. 10703, \$98.00 each.
- 9/16" (.5625") Collet: Part No. 10704, \$98.00 each.

Springs:



- Light Spring: Part No. 10705, \$15.95 each.
- Medium Spring: Part No. 10706, \$15.95 each.
- Heavy Spring (included w/tool): Part No. 10707, \$15.95 each.
- Extra Heavy Spring: Part No. 10718, \$15.95 each.

Use the heaviest Spring possible. Use lighter Springs for fragile materials that may deform from force. The Extra Heavy Spring reduces the overall travel to approx. 0.250".

Other items:



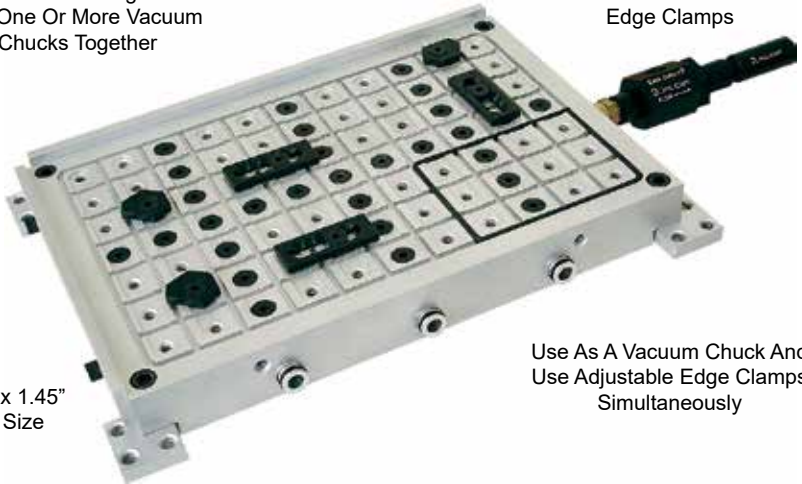
- Plastic Nosepiece (included w/tool): Part No. 11543, 0.320" (8.1 mm) height, \$45.00 each.
- Plastic Nosepiece: Part No. 11255, 0.170" (4.3 mm) height, \$45.00 each.
- Hex Wrench: Part No. 10197, \$6.50 each.
- Balls (pkg. of 10): Part No. 10053, \$9.50 pkg.

Modular Vacuum Chucks

8" x 12" Modular Vacuum Chucks For Workholding & Fixturing. Use As A Vacuum Chuck Or Pallet System.

Modular Design:
Use One Or More Vacuum
Chucks Together

Hold Parts With A Vacuum Or
Edge Clamps



8" x 12" x 1.45"
Pallet Size

Use As A Vacuum Chuck And
Use Adjustable Edge Clamps
Simultaneously

Modular System

Use one Modular Vacuum Chuck Pallet or combine several to increase the workholding area. Preconfigured Vacuum Chuck Kits are available for ease of ordering which include one Vacuum Chuck, or Multiple Pallets of two, three or four Modular Vacuum Chucks and accessories.

Prototype Parts Quickly

The 77 holes on the Vacuum Chuck top are threaded with accurate 1" spacing to allow placing low profile Adjustable Edge Clamps and Workstops anywhere on the Vacuum Pallet. This flexible design reduces set up times and eliminates the need for custom fixtures. There are 29 vacuum/clamp holes on the pallet top.

Fits In A Standard Milling Vise

Hold the Modular Vacuum Chuck in a standard milling vise or attach a Vise-Block for vise openings as small as 5".

Repeatable For High Production

Repeatable workpiece position between Pallets for high production. Load one Vacuum Chuck off-line while another is being machined. Vise Stop-Pin locates Pallet in the milling vise. Threaded Hole locations are labeled to allow documenting setups. Quick Vacuum Gasket Cord placement allows easy workpiece size changes.

Drill Through Workpieces

Replaceable Top Plates and the low slip Vacuum Gasket Sheets allow drilling through and machining around the outside of the workpieces without damage to the Vacuum Chuck.

Vacuum Source

Use an Air Powered Venturi Vacuum Generator or an Electric Vacuum Pump to create the vacuum.

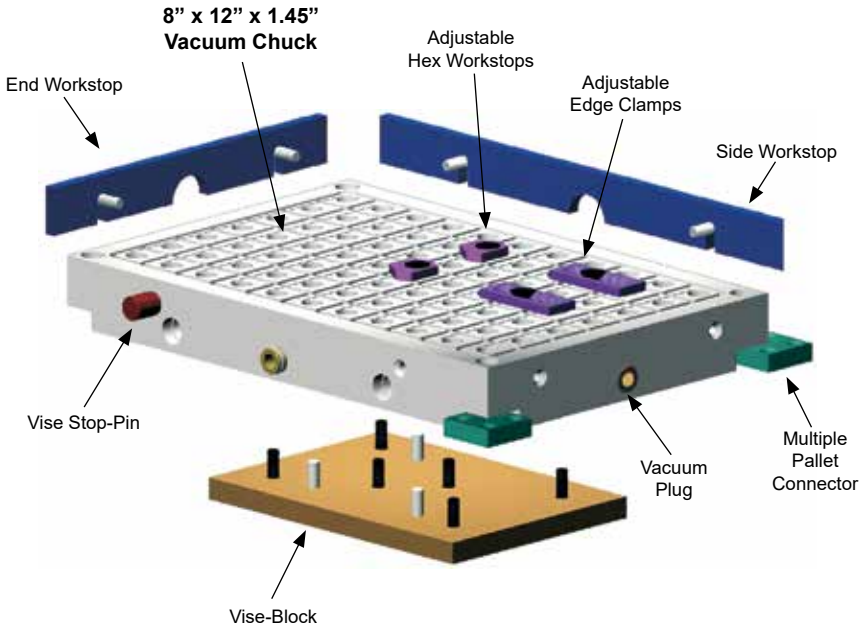
Hold Parts On A Magnetic Chuck

The steel Vise-Block allows holding aluminum, plastic, and thin workpieces on a magnetic chuck for surface grinders.

The 2L Modular Vacuum Chuck Workholding System has a U.S. utility patent pending.

Modular Vacuum Chucks

Single Pallet Modular Vacuum Chuck Kit.



Note: Not all items pictured above are included in the Modular Vacuum Chuck Kits/Systems. Many additional accessories are available separately.

Single Pallet Modular Vacuum Chuck Kit Includes:

- > 1 - 8" x 12" Modular Vacuum Chuck (Aluminum): Part No. 10275.
- > 2 - Adjustable Hex Workstop and Screws: Part No. 10247.
- > 2 - Adjustable Edge Clamps and Screws: Part No. 10248.
- > 10 feet - Gasket Cord.
- > 1 - 8" x 12" Gasket Sheet: Part No. 10253.
- > 1 - Vise Stop-Pin: Part No. 10252.
- > 30 - Vacuum Sealing Plug Screws with O-Rings: Part No. 10246 (3 pkgs./10 ea.).
- > 8 - Vacuum Plugs: Part No. 10254.



Single Pallet Modular Vacuum Chuck Kit:

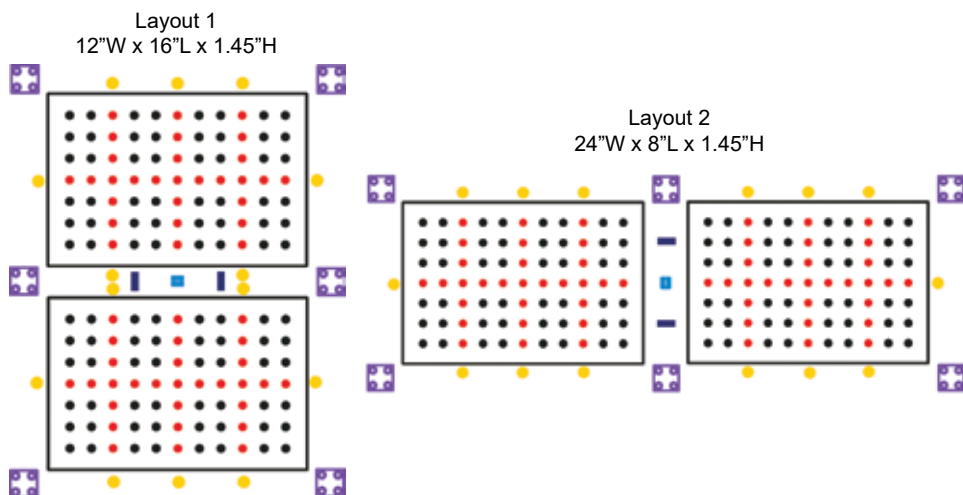
- Single Pallet Modular Vacuum Chuck Kit: Part No. 10245, \$917.75 each.

Two Pallet Modular Vacuum Chuck Kit

Two Pallet Modular Vacuum Chuck Kit.
Two 8" x 12" Vacuum Chucks - Part No. 10395.

Pre-Configured Multiple Pallet Kit.

Quickly Create And Modify The Workspace Layout.



Two Pallet Modular Vacuum Chuck Kit Includes:

- > 2 - 8" x 12" Modular Vacuum Chuck Pallets (Aluminum): Part No. 10275.
- > 2 - Adjustable Hex Workstop and Screws: Part No. 10247.
- > 2 - Adjustable Edge Clamps and Screws: Part No. 10248.
- > 10 feet - Gasket Cord.
- > 1 - 8" X 12" Gasket Sheet: Part No. 10253.
- > 1 - Vise Stop-Pin: Part No. 10252.
- > 60 - Vacuum Sealing Plug Screws with O-Rings: Part No. 10246 (6 pkgs./10 ea.).
- > 16 - Vacuum Plugs: Part No. 10254 (2 pkgs./8 ea.).
- > 1 - Vacuum Connector: Part No. 10271.
- > 2 - Alignment Pins: Part No. 10356.
- > 6 - Modular Vacuum Chuck Pallet Connectors: Part No. 10258.

Two Pallet Modular Vacuum Chuck Kit:

- Two Pallet Modular Vacuum Chuck Kit: Part No. 10395, \$1,893.44 each.

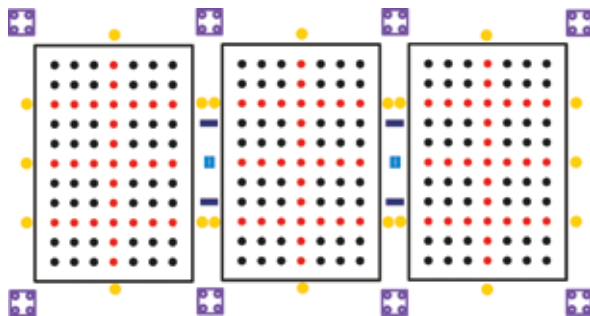
Three Pallet Modular Vacuum Chuck Kit

Three Pallet Modular Vacuum Chuck Kit.
Three 8" x 12" Vacuum Chucks - Part No. 10396.

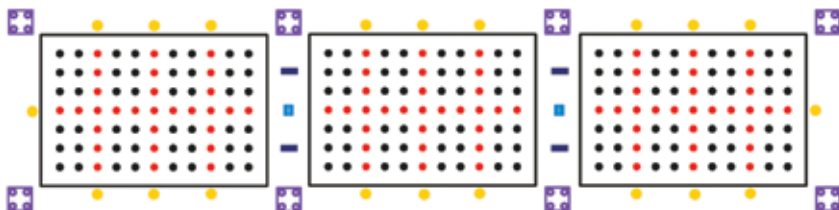
Pre-Configured Multiple Pallet Kit.

Quickly Create And Modify The Workspace Layout.

Layout 1
24"W x 12"L x 1.45"H



Layout 2
36"W x 8"L x 1.45"H



Three Pallet Modular Vacuum Chuck Kit Includes:

- > 3 - 8" x 12" Modular Vacuum Chuck Pallets (Aluminum): Part No. 10275.
- > 2 - Adjustable Hex Workstop and Screws: Part No. 10247.
- > 2 - Adjustable Edge Clamps and Screws: Part No. 10248.
- > 10 feet - Gasket Cord.
- > 1 - 8" x 12" Gasket Sheet: Part No. 10253.
- > 1 - Vise Stop-Pin: Part No. 10252.
- > 90 - Vacuum Sealing Plug Screws with O-Rings: Part No. 10246 (9 pkgs./10 ea.).
- > 24 - Vacuum Plugs: Part No. 10254 (3 pkgs./8 ea.).
- > 2 - Vacuum Connectors: Part No. 10271.
- > 4 - Alignment Pins: Part No. 10356 (2 pkgs./2 ea.).
- > 8 - Modular Vacuum Chuck Pallet Connectors: Part No. 10258.



Three Pallet Modular Vacuum Chuck Kit:

- Three Pallet Modular Vacuum Chuck Kit: Part No. 10396, \$2,741.46 each.

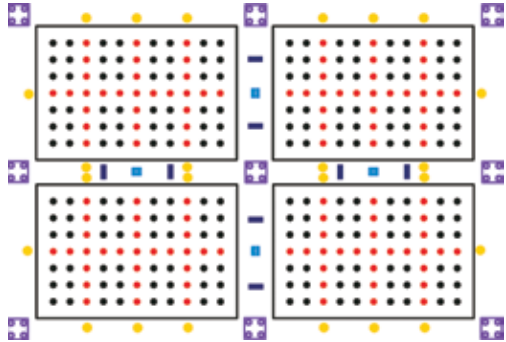
Four Pallet Modular Vacuum Chuck Kit

Four Pallet Modular Vacuum Chuck Kit.
Four 8" x 12" Vacuum Chucks - Part No. 10397.

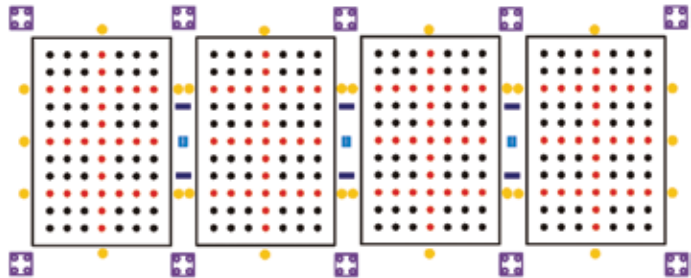
Pre-Configured Multiple Pallet Kit.

Quickly Create And Modify The Workspace Layout.












Layout 1
24"W x 16"L x 1.45"H



Layout 2
32"W x 12"L x 1.45"H



Four Pallet Modular Vacuum Chuck Kit Includes:

- > 4 - 8" x 12" Modular Vacuum Chuck Pallets (Aluminum): Part No. 10275. 
- > 2 - Adjustable Hex Work Stops and Screws: Part No. 10247. 
- > 2 - Adjustable Edge Clamps and Screws: Part No. 10248. 
- > 10 feet - Gasket Cord. 
- > 1 - 8" x 12" Gasket Sheet: Part No. 10253. 
- > 1 - Vise Stop-Pin: Part No. 10252. 
- > 120 - Vacuum Sealing Plug Screws with O-Rings: Part No. 10246 (12 pkgs./10 ea.). 
- > 32 - Vacuum Plugs: Part No. 10254 (4 pkgs./8 ea.). 
- > 4 - Vacuum Connectors: Part No. 10271. 
- > 8 - Alignment Pins: Part No. 10356 (4 pkgs./2 ea.). 
- > 10 - Modular Vacuum Chuck Pallet Connectors: Part No. 10258. 

Four Pallet Modular Vacuum Chuck Kit:

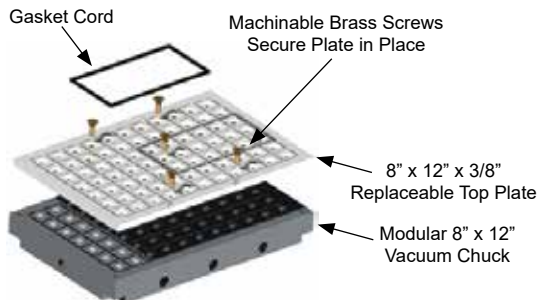
- Four Pallet Modular Vacuum Chuck Kit: Part No. 10397, \$3,625.86 each.

Replaceable Top Plates for Modular Vacuum Chucks

Protect The Vacuum Chuck Surface.

Standard Replaceable Top Plate.

Design Mirrors The Layout Of The 8" x 12" Modular Vacuum Chuck.



8" x 12" x 3/8" Aluminum Top Plate
1" Grid Spacing:

Part No. 10439
\$232.70 each.

- 8" x 12" x 3/8" Ground Flat Cast Aluminum Top Plate - Anodized.
- 77 through-holes to access the threaded holes in the Modular Vacuum Chuck.
- 1" Grid Spacing (center to center).
- Uses 1/8" Diameter Gasket Cord (Part No. 10250A).
- Includes 5 Brass Screws.
- This 8" x 12" Top Plate can be used with either the Modular Vacuum Chuck System or the Large Vacuum Chucks.

Close Spacing - Replaceable Top Plates.

Gasket Cord Grooves With Close Spacing For Holding Smaller Parts Or For Parts That Require Complex Or Detailed Gasket Cord Locations, Such As Going Around Holes Or Other Features.



8" x 12" x 1/2" Aluminum Top Plate
3/8" Grid Spacing:

Part No. 10956
\$247.50 each.

- 8" x 12" x 1/2" Ground Flat Cast Anodized Aluminum Top Plate.
- 3/8" grid spacing (center to center).
- Uses 1/8" diameter Gasket Cord (Part No. 10250A).
- Includes 8 Brass Screws.



12" x 12" x 3/4" Aluminum Top Plate
1/2" Grid Spacing:

Part No. 10958
\$311.25 each.

- 12" x 12" x 3/4" Ground Flat Cast Anodized Aluminum Top Plate.
- 1/2" grid spacing (center to center).
- Uses 1/8" diameter Gasket Cord (Part No. 10250A).
- Includes 8 Brass Screws.

Replaceable Top Plates For Modular Vacuum Chucks

Protect The Vacuum Chuck Surface.

Circular Grid Pattern Replaceable Top Plates.
Optimize Holding Round Parts.



8" x 12" x 3/8" Aluminum Top Plate

3/8" Gasket Cord Spacing:

Part No. 10957

\$247.50 each.

- 8" x 12" x 3/8" Ground Flat Cast Anodized Aluminum Top Plate.
- 3/8" Gasket Cord spacing (center to center).
- Center through-hole.
- Uses 1/8" diameter Gasket Cord (Part No. 10250A).
- Includes 4 Brass Screws.



12" x 12" x 3/4" Aluminum Top Plate

3/8" Gasket Cord Spacing:

Part No. 10959

\$311.25 each.

- 12" x 12" x 3/4" Ground Flat Cast Aluminum Top Plate - anodized.
- 3/8" Gasket Cord spacing (center to center).
- Center through-hole.
- Uses 1/8" diameter Gasket Cord (Part No. 10250A).
- Includes 4 Brass Screws.

Blank Top Plates.

No Gasket Cord Grooves Allows For Easy Customization.



12" x 12" x 3/4"

Ground Flat Cast Aluminum Top Plate:

Part No. 10973

\$218.75 each.

- 12" x 12" x 3/4" Ground Flat Cast Aluminum Top Plate.
- Top surface is roughened and anodized.
- Includes 4 Brass Screws.

Complete Modular Vacuum Chuck & Pump Systems

Single Pallet Modular Vacuum Chuck Kit & Automatic Vacuum Pump System. Complete System For Workholding And Fixturing.



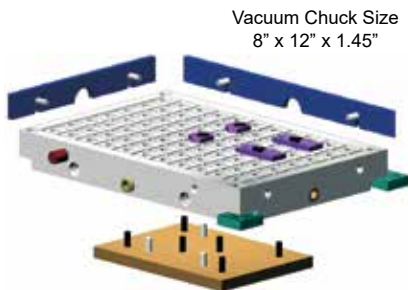
This Complete System includes everything you need to begin vacuum workholding using the Modular Vacuum Chuck with the Automatic Vacuum Pump as your vacuum source.

Automatic Vacuum Pump & Single Pallet Modular Vacuum Chuck Complete System Includes:

- > Automatic Vacuum Pump: Part No. 11729.
- > Single 8" x 12" Modular Vacuum Chuck Kit: Part No. 10245.
- > Vacuum Manifold: Part No. 10270.
- > Vacuum Hose Kit: Part No. 10262.
- > Gasket Cord (100 ft.): Part No. 10250A
- > Vise-Block: Part No. 10260 (optional).



Portable Automatic Air Venturi
Vacuum Pump



Vacuum Chuck Size
8" x 12" x 1.45"

Single Pallet Modular Vacuum Chuck Kit
shown with optional Vise-Block
(See catalog page 70 for Kit details)



Vacuum Manifold



Vacuum Hose Kit



Gasket Cord

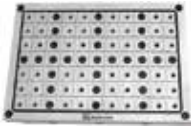
Single Pallet Modular Vacuum Chuck Kit & Automatic Vacuum Pump:

- Single Pallet Modular Vacuum Chuck & Automatic Vacuum Pump System (excludes Vise-Block):
Part No. 11745, \$3,036.60 each.
- Single Pallet Modular Vacuum Chuck & Automatic Vacuum Pump System (includes Vise-Block):
Part No. 11757, \$3,205.35 each.

Complete Modular Vacuum Chuck & Pump Systems

Multiple Pallet Modular Vacuum Chuck Kits & Automatic Vacuum Pump System.

Each Multiple Pallet Complete Vacuum Chuck System Includes the Following:



Multi-Chuck Kit
(options below)



Portable Automatic Air
Venturi Vacuum Pump



Vacuum
Manifold



Vacuum
Hose Kit

2 Pallet Modular Vacuum Chuck Kit & Automatic Vacuum Pump System.

Combined Vacuum Chuck Dimensions:

12" W x 16" L x 1.45" H or 24" W x 8" L x 1.45" H

System Includes:

- > Two Pallet Vacuum Chuck Kit: Part No. 10395
(See catalog page 71 for Kit details).
- > Automatic Vacuum Pump: Part No. 11729.
- > Vacuum Manifold: Part No. 10270.
- > Vacuum Hose Kit: Part No. 10262.
- > Gasket Cord (100 ft.): Part No. 10250A.

Two Pallet
Modular Vacuum Chuck Kit
& Automatic Vacuum Pump:

Part No. 11746
\$4,070.85 each.

3 Pallet Modular Vacuum Chuck Kit & Automatic Vacuum Pump System.

Combined Vacuum Chuck Dimensions:

24" W x 12" L x 1.45" H or 36" W x 8" L x 1.45" H

System Includes:

- > Three Pallet Vacuum Chuck Kit: Part No. 10396
(See catalog page 72 for Kit details).
- > Automatic Vacuum Pump: Part No. 11729.
- > Vacuum Manifold: Part No. 10270.
- > Vacuum Hose Kit: Part No. 10262.
- > Gasket Cord (100 ft.): Part No. 10250A.

Three Pallet
Modular Vacuum Chuck Kit
& Automatic Vacuum Pump:

Part No. 11758
\$4,945.10 each.

4 Pallet Modular Vacuum Chuck & Automatic Vacuum Pump System.

Combined Vacuum Chuck Dimensions:

24" W x 16" L x 1.45" H or 32" W x 12" " x 1.45" H

System Includes:

- > Four Pallet Vacuum Chuck Kit: Part No. 10397
(See catalog page 73 for Kit details).
- > Automatic Vacuum Pump: Part No. 11729.
- > Vacuum Manifold: Part No. 10270.
- > Vacuum Hose Kit: Part No. 10262.
- > Gasket Cord (100 ft.): Part No. 10250A.

Four Pallet
Modular Vacuum Chuck Kit
& Automatic Vacuum Pump:

Part No. 11759
\$5,856.85 each.

Complete Modular Vacuum Chuck & Pump Systems

Single Pallet Modular Vacuum Chuck Kit & Air Venturi Vacuum Pump. For Vacuum Workholding And Fixturing

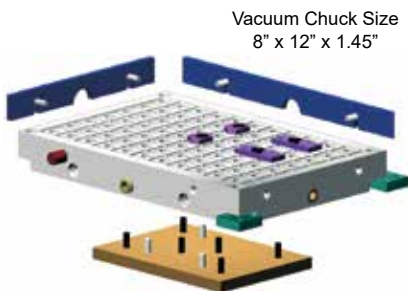
This Complete System includes everything you need to begin vacuum workholding using the Modular Vacuum Chuck with the Air Venturi Vacuum Generator Pump as your vacuum source.

Single Pallet Modular Vacuum Chuck Kit & Air Venturi Vacuum Pump Complete System Includes:

- > 1/4" NPT Air Venturi Vacuum: Part No. 10033.
- > Single Modular Vacuum Chuck Kit: Part No. 10245.
- > Vacuum Manifold: Part No. 10270.
- > No-Clog Air Exhaust Silencer: Part No. 10031.
- > Vise-Block: Part No. 10260 (optional).



1/4" NPT Air Venturi
Vacuum Generator



Vacuum Chuck Size
8" x 12" x 1.45"

Single Pallet Modular Vacuum Chuck Kit
shown with optional Vise Block
(See catalog page 70 for Kit details)



Vacuum Manifold



No-Clog Air Exhaust Silencer

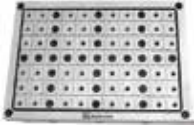
Single Pallet Modular Vacuum Chuck Kit & Air Venturi Vacuum Generator Pump:

- Single Pallet Modular Vacuum Chuck Kit & Air Venturi Vacuum Pump (excludes Vise-Block):
Part No. 10313, \$1,147.55 each.
- Single Pallet Modular Vacuum Chuck Kit & Air Venturi Vacuum Pump (includes Vise-Block):
Part No. 10312, \$1,316.30 each.

Complete Modular Vacuum Chuck & Pump Systems

Multiple Pallet Modular Vacuum Chuck Kits & Air Venturi Vacuum Pump.

Each Multiple Pallet Complete Vacuum Chuck System Includes the Following:



Multi-Chuck Kit
(options below)



1/4" NPT Air Venturi
Vacuum Generator Pump



Vacuum
Manifold



No-Clog Air
Exhaust Silencer

2 Pallet Modular Vacuum Chuck Kit & Air Venturi Vacuum Pump.

Combined Chuck Dimensions:

12" W x 16" L x 1.45" H or 24" W x 8" L x 1.45" H

System Includes:

- > Two Pallet Vacuum Chuck Kit: Part No. 10395
(See catalog page 71 for Kit details).
- > 1/4" NPT Air Venturi Vacuum: Part No. 10033.
- > Vacuum Manifold: Part No. 10270.
- > No-Clog Air Exhaust Silencer: Part No. 10031.

Two Pallet
Modular Vacuum Chuck Kit
& Air Venturi Vacuum Pump:

Part No. 10536
\$2,116.35 each.

3 Pallet Modular Vacuum Chuck Kit & Air Venturi Vacuum Pump.

Combined Chuck Dimensions:

24" W x 12" L x 1.45" H or 36" W x 8" L x 1.45" H

System Includes:

- > Three Pallet Vacuum Chuck Kit: Part No. 10396
(See catalog page 72 for Kit details).
- > 1/4" NPT Air Venturi Vacuum: Part No. 10033.
- > Vacuum Manifold: Part No. 10270.
- > No-Clog Air Exhaust Silencer: Part No. 10031.

Three Pallet
Modular Vacuum Chuck Kit
& Air Venturi Vacuum Pump:

Part No. 10537
\$2,964.37 each.

4 Pallet Modular Vacuum Chuck Kit & Air Venturi Vacuum Pump.

Combined Chuck Dimensions:

24" W x 16" L x 1.45" H or 32" W x 12" x 1.45" H

System Includes:

- > Four Pallet Vacuum Chuck Kit: Part No. 10397
(See catalog page 73 for Kit details).
- > 1/4" NPT Air Venturi Vacuum: Part No. 10033.
- > Vacuum Manifold: Part No. 10270.
- > No-Clog Air Exhaust Silencer: Part No. 10031.

Four Pallet
Modular Vacuum Chuck Kit
& Air Venturi Vacuum Pump:

Part No. 10538
\$3,848.77 each.

Workholding & Vacuum Chuck Accessories

Vacuum Gauge:

Part No. 10034, \$21.58 each.



- 2" diameter dial with steel case and plastic lens.
- 1/4" NPT Male brass fitting.

Gasket Cord:

Part No. 10250A, \$81.25 roll.



Fits into the slots of the Modular Vacuum Chucks and the Replaceable Top Plates to provide a vacuum seal.

- 1/8" Diameter.
- 100 ft.

Gasket Sheet:

Part No. 10253, \$20.50 each.



Provides vacuum seal and allows machining through parts. To use cut out the area beneath your part with a razor blade and place the Gasket Sheet and the part on the Vacuum Chuck.

- 8" width x 12" length x 1/8" height.

Multiple Pallet Connector:

Part No. 10258, \$40.00 each.



Use with the Modular Vacuum Chucks to lock two or more pallets together to increase the size of your workspace area. Includes four 5/16"-18 screws.

Alignment Pin:

Part No. 10356, \$7.50 pkg.



Heavy duty steel pins align and guide two or more pallets together. Pkg. of two.

Vacuum Connector:

Part No. 10271, \$30.00 each.



Connect two or more Modular Vacuum Chucks and increase the size of your workholding area while using only one vacuum source.

Workholding & Vacuum Chuck Accessories

Vise Stop-Pin:

Part No. 10252, \$30.00 each.



Locates the Modular 8" x 12" Vacuum Chuck in the milling vise.

Vise-Block:

Part No. 10260, \$168.75 each.



Attach to the Modular 8" x 12" Vacuum Chuck for use in smaller milling vises.

- 5" width x 7" length x .5" height.
- Steel construction.
- Six screws included.

Side and End Workstops:

Part No. 10255 & Part No. 10256, \$45.00 each.



Attach to the sides and ends of the Modular 8" x 12" Vacuum Chuck to locate the workpiece. The height of the workstops can be adjusted to allow for clearance of your tool. Includes two screws to attach to the pallet.

- Part No. 10255: 1" Side Workstop.
- Part No. 10256: 1" End Workstop.

Workholding & Vacuum Chuck Accessories

Vacuum Quick Disconnect Couplings:

Part No. 10373, \$38.50 each. Part No. 10374, \$44.10 each.



Straight through couplings allow quick hose disconnect. No internal valves in couplings. Contains 1 plug and 1 socket.

- Part No. 10373: 1/4" M - 1/4" M.
- Part No. 10374: 3/8" M - 3/8" M.

Vacuum Hose Kit:

Part No. 10262, \$96.45 each.



Allows vacuum source to be located away from your machine.

- 10 feet hose length, 5/8" ID-7/8" OD.
- 2 - 5/8" hose barbs.
- 2 - 3/8" F NPT-1/4 M NPT Hex Adaptors.
- Hose Clamp.

Vacuum Plug Screw:

Part No. 10246, \$8.50 pkg.



Screws into any of the tapped holes of the Modular Vacuum Chucks to seal and block escape of vacuum air to increase hold.
Pkg. of ten.

Vacuum Plug:

Part No. 10254, \$16.25 pkg.



Plugs the side vacuum connector holes of the Modular Vacuum Chucks. Pkg. of eight.

Vacuum Manifold:

Part No. 10270, \$91.15 each.



Use to connect the Vacuum Chuck to a vacuum source. Has 1/4" NPT threads.

- Vacuum Gauge.
- Brass Tee Fitting.
- 2 - 1/4" M NPT - 1/4" M NPT Fitting.
- 2 shut-off valves.

Adjustable Hex Workstops & Edge Clamps

No Dedicated Fixtures Needed.

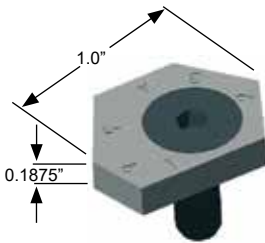
Fully Adjustable.

Use A Hex Workstop And An Edge Clamp To Securely Hold Various Size Parts.

- Tighten the standard flathead screw to move the Edge Clamp toward the workpiece.
- Numbered locations allow for repeatable setup.
- Low profile for maximum clearance.
- Black oxide steel construction.
- A 1/4"-20 screw is included with each Workstop and Edge Clamp.

Hex Workstop:

Part No. 10247, \$23.75 each.

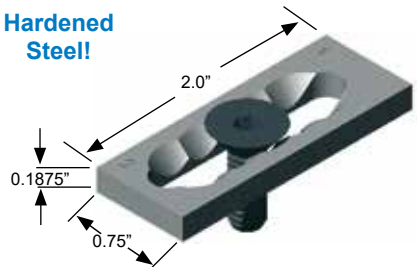


Varying distances from each edge to the central hole (0.050" each step) allows adjusting workpiece location.

Edge Clamp:

Part No. 10248, \$27.50 each.

Hardened Steel!

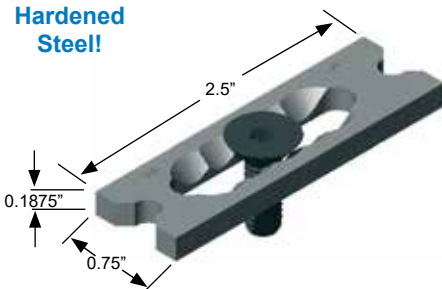


Provides 1.25" clamping travel range when used with an Adjustable Hex Workstop.

Corner Edge Clamp:

Part No. 10272, \$35.00 each.

Hardened Steel!

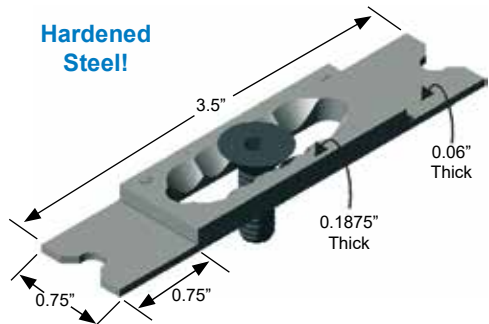


Cutout on ends allows holding corners of workpieces or circular workpieces. Provides 1.25" clamping travel range when used with an Adjustable Hex Workstop.

Thin Corner Edge Clamp:

Part No. 10273, \$40.00 each.

Hardened Steel!



Thin (0.06") cutout ends allows holding very thin workpieces, corners of workpieces, or circular workpieces. Provides 1.25" clamping travel range when used with an Adjustable Hex Workstop.

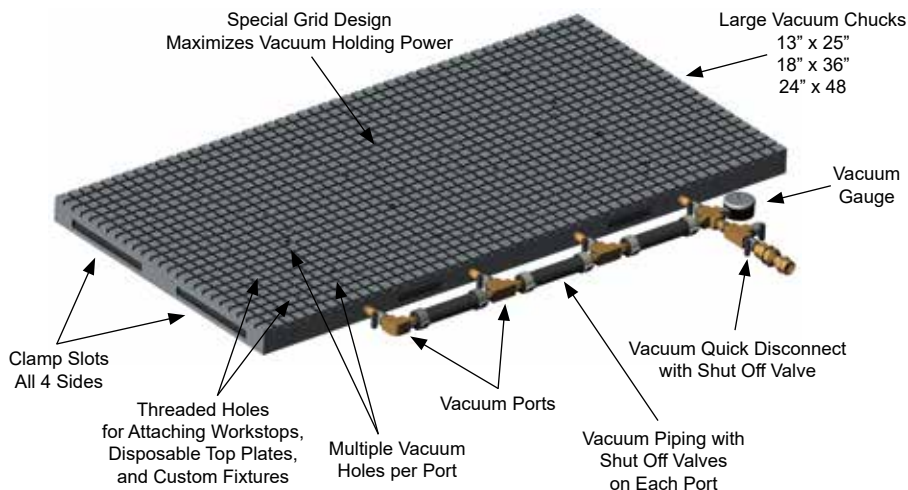
* The Adjustable Workstops and Edge Clamps are covered by U.S. Patent 8011648,

Large Vacuum Chucks

Precision Ground Vacuum Chucks with Gundrilled Side Holes.

Three Standard Vacuum Chuck Sizes Available:

13" x 25" • 18" x 36" • 24" x 48".



Produced from Flat Ground Hi-Tensile Cast Aluminum Plate.

Multiple Vacuum Ports With Multiple Vacuum Holes Per Port allow flexible use of the entire top surface. Each port can be shut off individually. The 18" x 36", and 24" x 48" Vacuum Chucks have four vacuum ports. The 13" x 25" Vacuum Chuck has three vacuum ports.

Special Grid Design Maximizes Vacuum Holding Power and allows for removing material from the top surface if the Vacuum Chuck is damaged during use or if the Vacuum Chuck needs to be re-machined flat. Either 3/16" x 5/16" (Part No. 10543) or 1/8" x 5/16" (Part No. 10544) Gasket Cords may be used.

1/2" Spacing Between The Gasket Cord Slots provides for flexible workpiece placement. This optimizes table space and maximizes the amount of the workpiece exposed to vacuum.

Threaded Holes In The Top Surface Of The Vacuum Chuck allow for easy attachment of Workstops for aligning workpieces, Replaceable Top Plates to prevent damage to the Vacuum Chuck when cutting through workpieces, and custom fixtures and top plates.

Multiple Vacuum Chucks Can Be Used In The Same CNC Machine to create extremely large vacuum workholding areas.

Vacuum Chucks And Top Plates Are Shipped Ground Flat. The design allows for skim cut removal of material to reflaten the surface if necessary.

Available As An Individual Vacuum Chuck Or Complete Vacuum Chuck And Vacuum Pump System.

Large Vacuum Chucks:

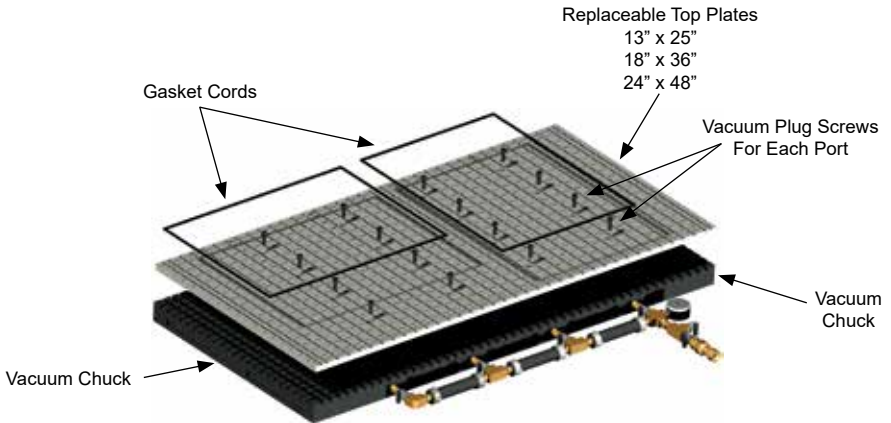
- 13" x 25" x 1.5" Vacuum Chuck: Part No. 10813, \$2,664.90 each.
- 18" x 36" x 1.5" Vacuum Chuck: Part No. 10546, \$3,836.25 each.
- 24" x 48" x 1.5" Vacuum Chuck: Part No. 10547, \$5,541.25 each.

Replaceable Top Plates For Large Vacuum Chucks

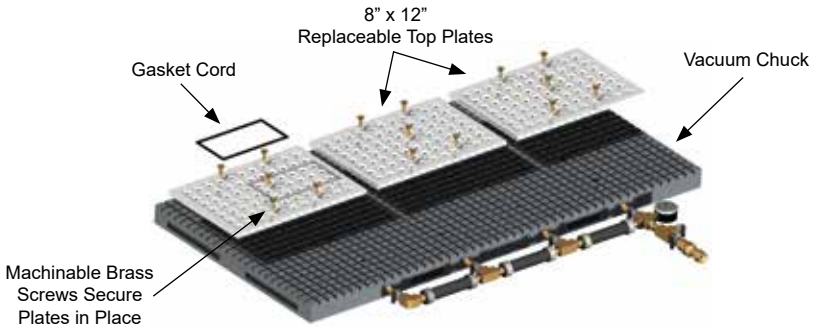
Replaceable Top Plates Protect The Surface Of The Vacuum Chuck.

Four Standard Replaceable Top Plate Sizes:

8" x 12" • 13" x 25" • 18" x 36" • 24" x 48".



- Large Replaceable Top Plate covers the entire Vacuum Chuck surface.
- 1/2" thick Ground Flat Cast Aluminum Plate.
- 1" grid spacing.
- Uses 1/8" diameter Gasket Cord (Part No. 10250A).



- 8" x 12" Replaceable Top Plates can be used with either the Large Vacuum Chucks or the Modular Vacuum Chucks.
- 3/8" thick Ground Flat Cast Aluminum Plate.
- 1" grid spacing.
- Uses 1/8" diameter Gasket Cord (Part No. 10250A).

Contact us for custom Top Plate designs.

Vacuum Chuck Replaceable Top Plates:

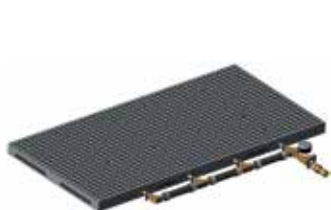
- 8" x 12" Top Plate: Part No. 10439, \$232.70 each.
- 13" x 25" Top Plate: Part No. 10823, \$998.75 each.
- 18" x 36" Top Plate: Part No. 10756, \$1,428.70 each.
- 24" x 48" Top Plate: Part No. 10757, \$1,948.70 each.

Complete Large Vacuum Chuck & Pump Systems

Large Vacuum Chuck & Automatic Vacuum Pump Systems.



Each Large Vacuum Chuck & Automatic Vacuum Pump System Includes:



Vacuum Chuck
& Port Fitting Assembly
(sizes below)



Portable Automatic
Air Venturi
Vacuum Pump



Vacuum
Hose Kit



Gasket
Cord

Select Your Complete System By Choosing The Size Vacuum Chuck Needed.

13" x 25" Vacuum Chuck & Automatic Vacuum Pump:

Part No. 11747, \$5,026.25 each.

- > 13" x 25" x 1.5" Vacuum Chuck: Part No. 10813.
- > 3 Port Fitting Assembly: Part No. 10816.
- > Automatic Vacuum Pump: Part No. 11729.
- > Vacuum Hose Kit: Part No. 10262.
- > Gasket Cord (50 ft.): Part No. 10543.
- > Gasket Cord (50 ft.): Part No. 10544.

18" x 36" Vacuum Chuck & Automatic Vacuum Pump:

Part No. 11748, \$6,247.95 each.

- > 18" x 36" x 1.5" Vacuum Chuck: Part No. 10546.
- > 4 Port Fitting Assembly: Part No. 10542.
- > Automatic Vacuum Pump: Part No. 11729.
- > Vacuum Hose Kit: Part No. 10262.
- > Gasket Cord (50 ft.): Part No. 10543.
- > Gasket Cord (50 ft.): Part No. 10544.

24" x 48" Vacuum Chuck & Automatic Vacuum Pump:

Part No. 11749, \$7,952.95 each.

- > 24" x 48" x 1.5" Vacuum Chuck: Part No. 10547.
- > 4 Port Fitting Assembly: Part No. 10550.
- > Automatic Vacuum Pump: Part No. 11729.
- > Vacuum Hose Kit: Part No. 10262.
- > Gasket Cord (50 ft.): Part No. 10543.
- > Gasket Cord (50 ft.): Part No. 10544.

Complete Large Vacuum Chuck & Pump Systems

Large Vacuum Chuck & Air Venturi Vacuum Systems.

Each Large Vacuum Chuck & Air Venturi Vacuum Pump System Includes:



Vacuum Chuck
& Port Fitting Assembly
(size options below)



Air Venturi
Vacuum Pump



No-Clog
Air Exhaust
Silencer



Vacuum
Hose Kit



Gasket
Cord

Select Your Complete System By Choosing The Size Vacuum Chuck Needed.

13" x 25" Vacuum Chuck & Air Venturi Vacuum Pump:

Part No. 10815, \$3,314.90 each.

- > 13" x 25" x 1.5" Vacuum Chuck: Part No. 10813.
- > 3 Port fitting Assembly: Part No. 10816.
- > Air Venturi Vacuum Pump: Part No. 10033.
- > No-Clog Air Exhaust Silencer: Part No. 10031.
- > Vacuum Hose Kit: Part No. 10262.
- > Gasket Cord (50 ft.): Part No. 10543.
- > Gasket Cord (50 ft.): Part No. 10544.

18" x 36" Vacuum Chuck & Air Venturi Vacuum Pump:

Part No. 10552, \$4,536.60 each.

- > 18" x 36" x 1.5" Vacuum Chuck: Part No. 10546.
- > 4 Port Assembly: Part No. 10542.
- > Air Venturi Vacuum Pump: Part No. 10033.
- > No-Clog Air Exhaust Silencer: Part No. 10031.
- > Vacuum Hose Kit: Part No. 10262.
- > Gasket Cord (50 ft.): Part No. 10543.
- > Gasket Cord (50 ft.): Part No. 10544.

24" x 48" Vacuum Chuck & Air Venturi Vacuum Pump:

Part No. 10554, \$6,241.60 each.

- > 24" x 48" x 1.5" Vacuum Chuck: Part No. 10547.
- > 4 Port Assembly: Part No. 10550.
- > Air Venturi Vacuum Pump: Part No. 10033.
- > No-Clog Air Exhaust Silencer: Part No. 10031.
- > Vacuum Hose Kit: Part No. 10262.
- > Gasket Cord (50 ft.): Part No. 10543.
- > Gasket Cord (50 ft.): Part No. 10544.

Large Vacuum Chuck Accessories

Accessories For Large Vacuum Chucks (13" x 25", 18" x 36", 24" x 48").

Gasket Cord:

Part No. 10543 & 10544, \$64.75 each.



Fits into the slots of the Large Vacuum Chucks to provide a vacuum seal.

- Part No. 10543: 1/8" x 5/16", 50 ft. typically used for smaller workpieces.
- Part No. 10544: 3/16" x 5/16", 50 ft. typically used for larger workpieces.

Vacuum Hose Kit:

Part No. 10262, \$96.45 each.



Allows vacuum source to be located away from your machine.

- 10 feet hose length, 5/8" ID-7/8" OD.
- 2 pcs: 5/8" hose barbs.
- 2 pcs: 3/8" F NPT-1/4 M NPT Hex Adaptors.
- Hose Clamp.

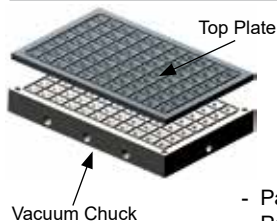
Replaceable Top Plates:

Part No. 10439, \$232.70 each.

Part No. 10823, \$988.75 each.

Part No. 10756, \$1,428.70 each.

Part No. 10757, \$1,948.70 each.



Precision ground Aluminum plate covers the Vacuum Chuck surface. Allows drilling through or machining around the outside of workpieces without damaging the Vacuum Chuck. Uses Gasket Cord Part No. 10250. The 8" x 12" Top Plate includes 5 machineable brass screws for securing in place. The Large Top Plates include vacuum plug screws.

- Part No. 10439: 8" x 12" x 3/8".
- Part No. 10756: 18" x 36" x 1/2".
- Part No. 10823: 13" x 25" x 1/2".
- Part No. 10757: 24" x 48" x 1/2".

Port Fitting Assemblies:

Part No. 10816, \$285.40 each.

Part No. 10542, \$335.75 each.

Part No. 10550, \$335.75 each.



1/4" NPT Port Vacuum Hose Connection. Includes Vacuum Gauge, Shut-Off Valves. Ships unassembled.

- Part No. 10816: for 13" x 25" Vacuum Chuck.
- Part No. 10542: for 18" x 36" Vacuum Chuck.
- Part No. 10550: for 24" x 48" Vacuum Chuck.

Gasket Cord:

Part No. 10250A, \$81.25 roll

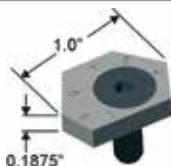


Fits into the slots of the Aluminum Top Plates to provide a vacuum seal.

- 1/8" Diameter.
- 100 ft.

Hex Workstop:

Part No. 10247, \$23.75 each.

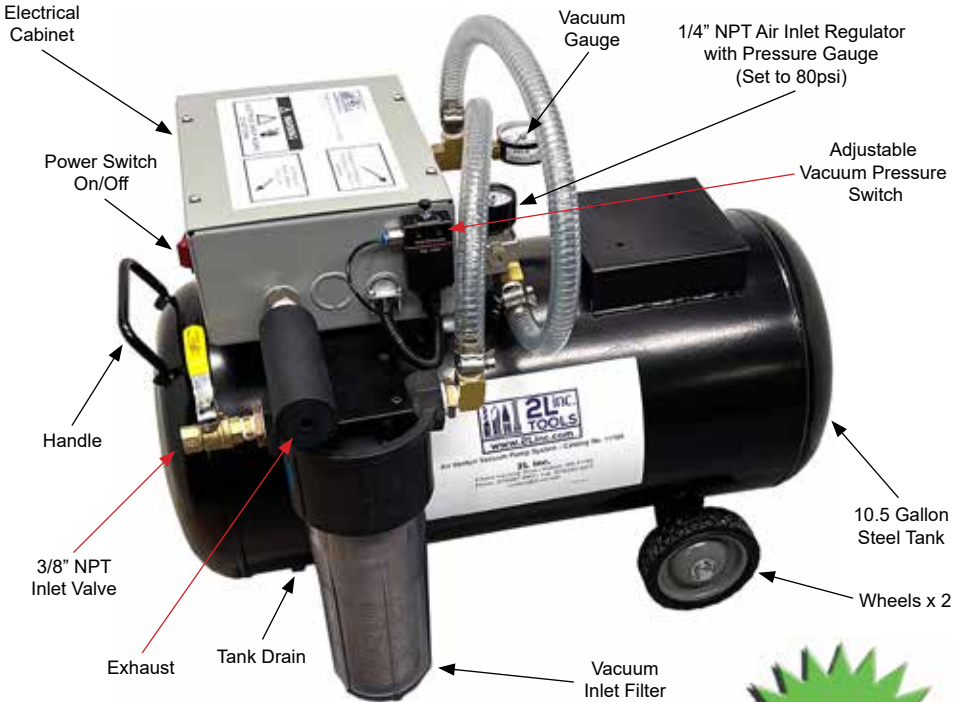


Use for locating workpieces on Vacuum Chucks. Low profile for maximum clearance. Numbered locations allow for repeatable setup. Varying distances from each edge to the central hole (0.050" each step) allows adjusting workpiece location.

- Black oxide steel construction.
- A 1/4"-20 screw is included.

Automatic Vacuum Pump

Automatic Air Venturi Vacuum Pump System - Automatic On/Off.
Maintenance Free 10.5 Gallon Tank, 4.5 SCFM Vacuum System.
For Vacuum Workholding, Fixturing, and Vacuum Forming.



Specifications:

- Max. vacuum 22" Hg - 26" Hg.
- 4.5 SCFM Vacuum Pump, uses 5 SCFM of Compressed Air.
- 10.5 Gallon Steel Tank with Bottom Drain.
- Only 70-80 psi air pressure is required to obtain the maximum vacuum.
- Automatic On/Off Adjustable Vacuum Switch reduces air usage and allows the the vacuum pump to be left unattended for periods of time.
- Vacuum Gauge with 2" diameter dial, Steel Case and Plastic Lens.
- Large visible inlet filter with washable metal vacuum filter to remove coolant and debris.
- Integrated air regulator with pressure gauge.
- Large No-Clog Silencer to produce a quiet 72db noise level.
- 3/8" NPT connection.
- 110 VAC / 0.5A power connection.
- Lighted on/off switch provides visual indication that pump is on.
- Portable: Wheels and Handle for easy relocation.

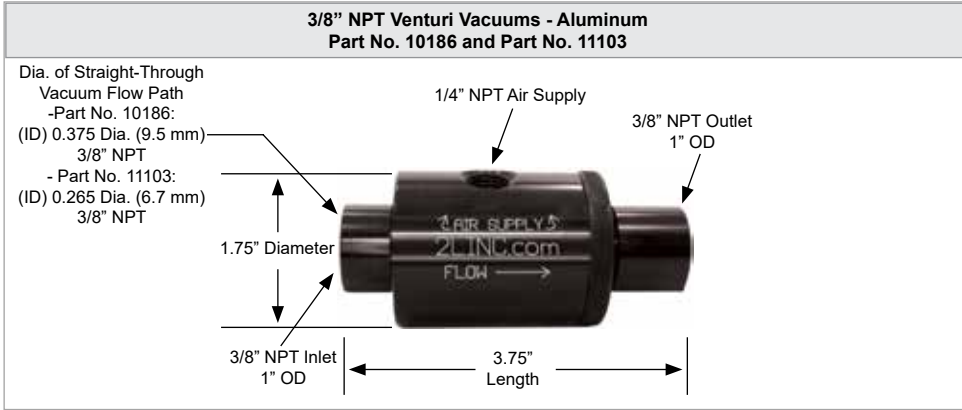
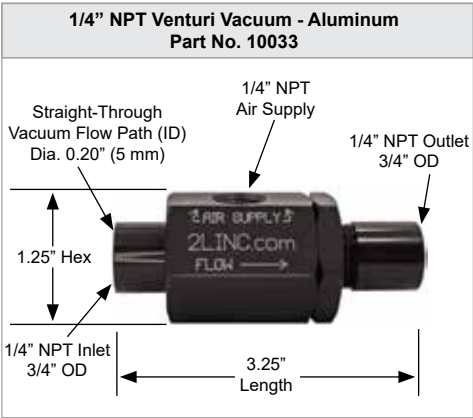
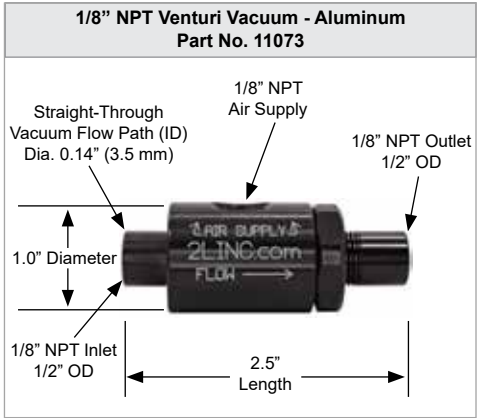
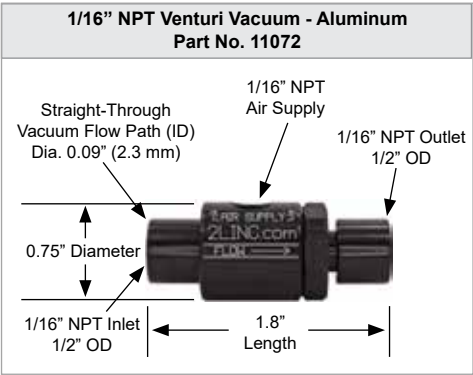
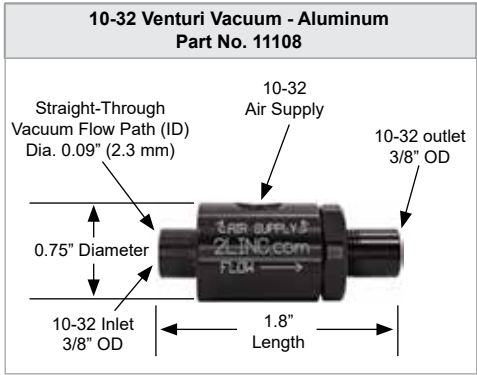


Automatic Air Venturi Vacuum Pump System:

Part No. 11729, \$1,850.00 each.

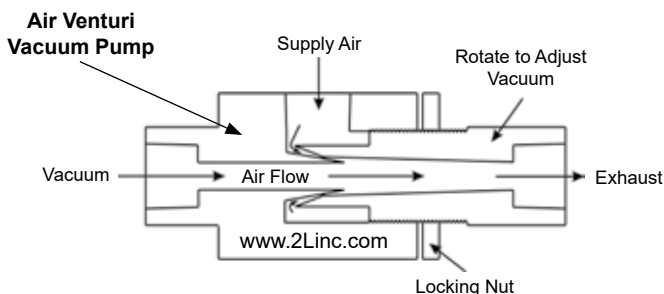
Air Venturi Vacuum Pumps: Aluminum

Create A Vacuum Using Ordinary Compressed Air.
Solid Anodized Aluminum Construction.
Excellent For Workholding.



Air Venturi Vacuum Pumps: Aluminum

Straight Through Design Passes Solid And Liquid Materials.
Solid Anodized Aluminum Construction.



- Excellent for workholding, fixturing, clamping applications (Vacuum Chucks, custom hold down fixturing, suction cups, etc.), and solid or liquid material transfer.
- Straight through design prevents clogging and passes materials, dirt, liquids, and contaminants.
- Solid Anodized Aluminum construction allows use in harsh, dirty environments or cleanrooms.
- Standard NPT or 10-32 UNF connections for easy installation.
- Maximum vacuum generated is 22"HG-26"HG (10.8psi-12.8psi).
- Vacuum may be adjusted from 0"HG to the maximum vacuum by loosening the locking nut and turning the exhaust end of the vacuum.
- Only 70-80PSI air pressure is required to obtain the maximum vacuum.



Aluminum - Air Venturi Vacuum Generator Pumps

Description	Vacuum Flow (SCFM) At Maximum Vacuum	Amount of Supply Air Used (SCFM) At Maximum Vacuum	Diameter of Straight Through Vacuum Flow Path (Bore Diameter)	Price (each)
10-32 Vacuum Part No. 11108	0.8	0.8	0.09" (2.3 mm)	\$108.75
1/16" NPT Vacuum Part No. 11072	0.8	0.8	0.09" (2.3 mm)	\$108.75
1/8" NPT Vacuum Part No. 11073	2.0	2.2	0.14" (3.5 mm)	\$113.75
1/4" NPT Vacuum Part No. 10033	4.5	5.0	0.20" (5 mm)	\$122.50
3/8" NPT Vacuum Part No. 11103	7.0	8.0	.265" (6.7 mm)	\$135.00
3/8" NPT Vacuum Part No. 10186	15.0	15.0	.375" (9.5 mm)	\$135.00

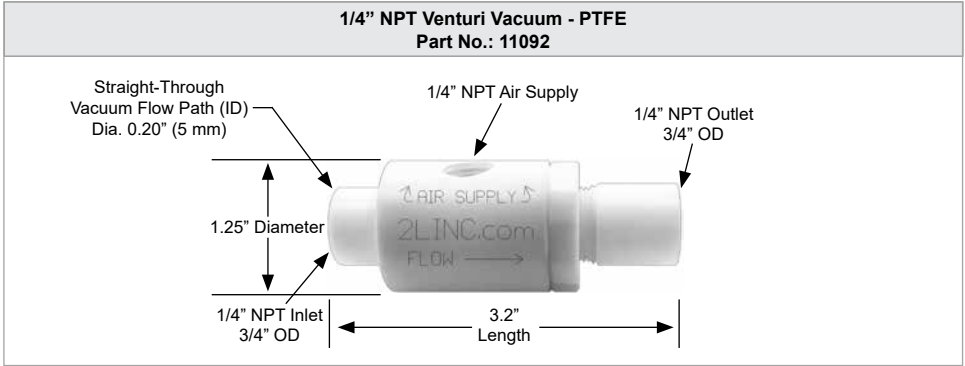
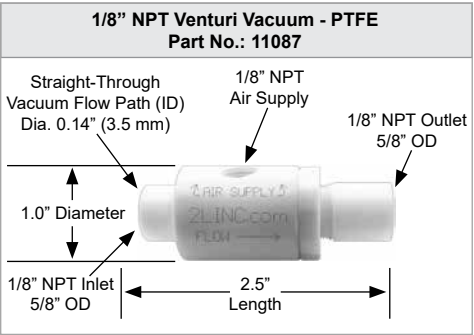
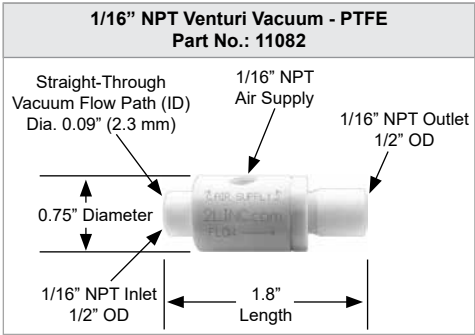
A No-Clog Air Exhaust Silencer/Muffler is recommended to reduce the noise level of the Air Venturi Vacuum.

See pg. 97-99 for No-Clog Air Silencers.



Air Venturi Vacuum Pumps: PTFE

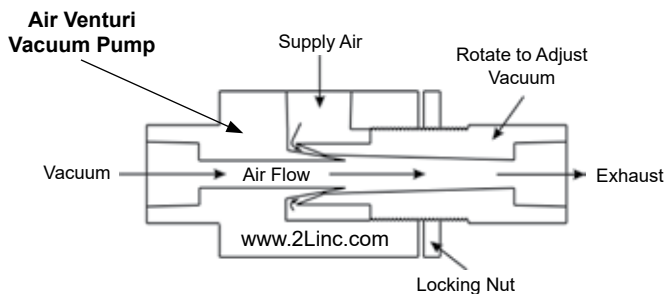
Create A Vacuum Using Ordinary Compressed Air.
Straight Through Design Passes Solid And Liquid Materials.
PTFE (Teflon®) Construction - Excellent For Workholding.



- Excellent for workholding, fixturing, clamping applications (Vacuum Chucks, custom hold down fixturing, suction cups, etc.), and solid or liquid material transfer.
- Straight through design prevents clogging and passes materials, dirt, liquids, and contaminants.
- Solid PTFE construction allows use in harsh, dirty environments or cleanrooms.
- Standard NPT connections for easy installation.
- Maximum vacuum generated is 22"HG-26"HG (10.8psi-12.8psi).
- Vacuum may be adjusted from 0"HG to the maximum vacuum by loosening the locking nut and turning the exhaust end of the vacuum.
- Only 70-80PSI air pressure is required to obtain the maximum vacuum.

PTFE - Air Venturi Vacuum Generator Pumps				
Description	Vacuum Flow (SCFM) At Maximum Vacuum	Amount of Supply Air Used (SCFM) At Maximum Vacuum	Diameter of Straight Through Vacuum Flow Path (Bore Diameter)	Price (each)
1/16" NPT Vacuum Part No. 11082	0.8	0.8	0.09" (2.3 mm)	\$108.75
1/8" NPT Vacuum Part No. 11087	1.8	2.0	0.14" (3.5 mm)	\$113.75
1/4" NPT Vacuum Part No. 11092	4.0	4.0	0.20" (5 mm)	\$122.50

Air Venturi Vacuum Pumps: Air Usage Specifications



Air Usage And Vacuum Flow Data.
Amount Of Air Used At Specific Vacuum Levels (HG).

Aluminum - Air Venturi Vacuum Generators

Air Usage and Vacuum Flow at 80psi for Reduced Vacuum Levels

Description	At 24" HG Vacuum		At 20" HG Vacuum		At 15" HG Vacuum		At 10" HG Vacuum	
	Vacuum Flow (SCFM)	Amount of Supply Air Used (SCFM)	Vacuum Flow (SCFM)	Amount of Supply Air Used (SCFM)	Vacuum Flow (SCFM)	Amount of Supply Air Used (SCFM)	Vacuum Flow (SCFM)	Amount of Supply Air Used (SCFM)
10-32 Vacuum Part No. 11108	0.8	0.8	0.8	0.6	0.8	0.4	0.6	0.2
1/16" NPT Vacuum Part No. 11072	0.8	0.8	0.8	0.6	0.8	0.4	0.6	0.2
1/8" NPT Vacuum Part No. 11073	1.9	2.2	2.05	1.5	2.0	1.0	1.8	0.7
1/4" NPT Vacuum Part No. 10033	4.5	5.0	4.5	3.0	4.5	2.0	4.0	2.0
3/8" NPT Vacuum Part No. 11103	7.0	8.0	7.0	6.0	7.0	4.0	5.0	3.0
3/8" NPT Vacuum Part No. 10186	15.0	15.0	18.0	12.0	18.0	7.0	16.0	4.0

PTFE - Air Venturi Vacuum Generators

Air Usage and Vacuum Flow at 80psi for Reduced Vacuum Levels

Description	At 24" HG Vacuum		At 20" HG Vacuum		At 15" HG Vacuum		At 10" HG Vacuum	
	Vacuum Flow (SCFM)	Amount of Supply Air Used (SCFM)	Vacuum Flow (SCFM)	Amount of Supply Air Used (SCFM)	Vacuum Flow (SCFM)	Amount of Supply Air Used (SCFM)	Vacuum Flow (SCFM)	Amount of Supply Air Used (SCFM)
1/16" NPT Vacuum Part No. 11082	0.8	0.8	0.8	0.6	0.8	0.4	0.6	0.3
1/8" NPT Vacuum Part No. 11087	1.8	2.0	1.7	1.7	1.7	1.3	1.5	1.1
1/4" NPT Vacuum Part No. 11092	4.0	4.0	4.0	3.0	3.5	2.5	3.0	2.0

A No-Clog Air Exhaust Silencer/Muffler is recommended to reduce the noise level of the Air Venturi Vacuum.
See pgs. 97-99 for No-Clog Air Silencers.



Adjustable Vacuum Pressure Switch

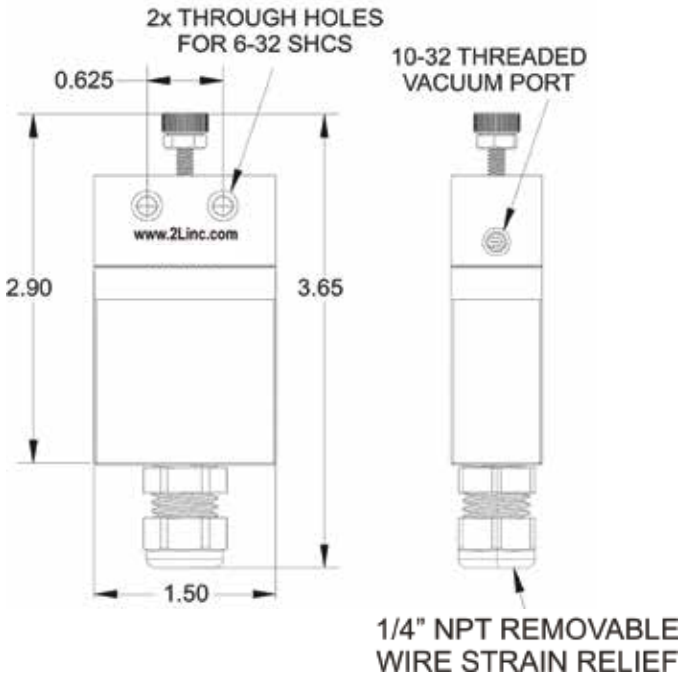
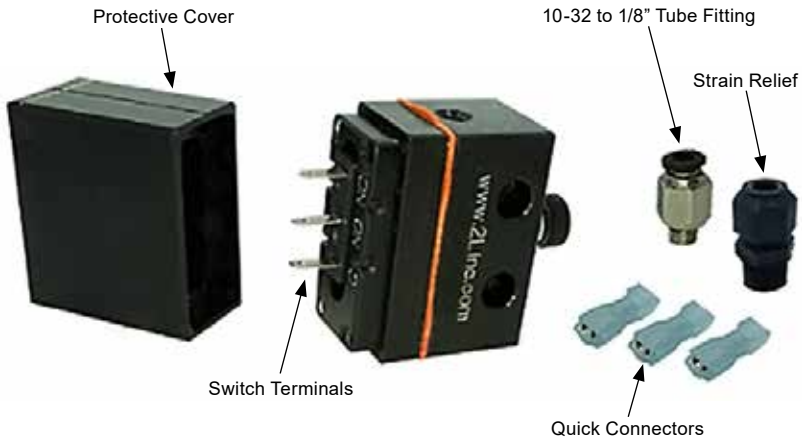
For Use With 2L Portable Automatic Air Venturi Vacuum Pump,
And Many Vacuum Workholding Applications.



- Adjustable Vacuum Pressure Switch has both Normally Open and Normally Closed Quick Connect Terminals.
- Simple to adjust with one thumbscrew.
- Tight repeatable deadband for consistent operation.
- 10-32 vacuum port.
- Two mounting holes for #6 SHCS.
 - Includes One Push to Connect 1/8" Tubing to 10-32 Connector.
 - Includes three fully insulated 14/16 Gauge Wire - 2.8 mm (0.110") Quick Disconnect Connectors.
- Vacuum Range: 5 - 30 in Hg.
 - Hysteresis / Deadband: 0.5 in Hg. - 3.0 in Hg (Average = 1.5 in Hg).
- Electrical Rating:
 - 10.1 A, 125/250 VAC, ¼ HP, 125 VAC.
 - Terminals: Quick Connect 2.8 x 0.5 mm (0.110').
 - Electrical Switch approved according to EN 61058 and UL 1054.
 - Ambient temperature -40 to max. +100° C.
- Replacement Vacuum Switch for the 2L Automatic Air Venturi Vacuum Pump (Part No. 11729)
- When using a vacuum chuck for workholding, the Vacuum Switch can be used to tie inline with the Feed-Hold Switch on the CNC Machine to stop the cnc movement if your vacuum is lost.

Adjustable Vacuum Pressure Switch

Simple To Adjust.
Tight Repeatable Deadband For Consistent Operation.



Adjustable Vacuum Pressure Switch:

Part No. 11547, \$95.00 each.

Automatic Air Venturi Vacuum Pump Accessories

Vacuum Pump Filter Housing:

Part No. 10690, \$97.50 each.



For use with the 2L Portable Vacuum Pump.

Includes complete Housing and one (1) O-Ring.

Mesh Filter for Filter Housing:

Part No. 10719, \$146.25 each.



For use with the Vacuum Pump Filter Housing.

Vacuum Pump Filter Wrench:

Part No. 10689, \$17.50 each.



For use with the Vacuum Pump Filter Housing.

O-Ring for Filter Housing:

Part No. 10733, \$12.50.



For use with the Vacuum Pump Filter Housing.

Vacuum Gauge:

Part No. 10034, \$21.58 each.



- 2" diameter dial with steel case and plastic lens.
- 1/4" NPT Male brass fitting.

Heavy Duty No-Clog Air Exhaust Silencers/Mufflers

Heavy Duty - Industrial Use, Air Exhaust Silencers/Mufflers.
Reduce Air Exhaust Noise Levels Up To 30db.

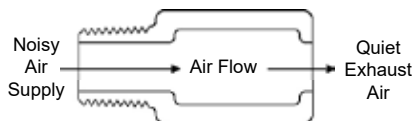


Straight-Through Wide Open Path Resists Clogging.

- Thick walled rugged design allows for use in the harshest environments, including the oil and gas industry marine applications.
- Reduce air exhaust noise levels up to 30db.
- Wide open straight through path resists clogging and produces no back pressure.
- Opening of 1/2" (12.7mm) or 3/8" (9.5mm) allows large particles (dirt, rust, contaminants) to pass straight through.
- Effectively reduces noise from both continuous flows and intermittent popping type noises.
- Removable foam insert increases the noise reduction. The foam insert may be removed for high temperature applications.
- Two piece design allows opening the muffler for inspection or replacing the foam insert. No tools are needed to open the muffler.
- Solid flat black Anodized Aluminum for harsh environments.

Typical Applications:

- Oil and Gas Industry gas blow off exhaust valves - marine environments.
- Air compressor intakes and exhausts.
- Furnace exhausts.
- Air knife and air dryer blowoff applications.
- Air tools and pneumatic air cylinder exhausts.
- Blow mold exhausts.
- Air guns.



Heavy Duty Industrial Silencers (Male NPT)

NPT / Male Pipe Thread	Approximate Noise Reduction Levels with Foam Insert	Approximate Noise Reduction Levels without Foam Insert	Length	O.D.	I.D. (thru-hole diameter, min.)	Part No.	Price (each)
1/2" M	30 db	20 db	5.5" (140 mm)	1.75" (44 mm)	3/8" (9.5 mm)	10786	\$78.50
3/4" M	30 db	20 db	5.5" (140 mm)	1.75" (44 mm)	1/2" (12.7 mm)	10787	\$78.50
Replacement Foam Insert - for use with the Heavy Duty Industrial Silencers						10800	\$9.75

Single & Stacked No-Clog Air Exhaust Silencers

Individual & Stacked Air Exhaust Silencers/Mufflers.
Quiets Air Exhausted From Pneumatic Tools, Industrial Air Guns, Blow Molds,
Air Cylinders And Other Air/Pneumatic Systems.

Reduce Air Exhaust Noise Levels Up To 27 db.

- Use an individual Male NPT No-Clog Air Exhaust Silencer, or use a Complete Stacked Silencer System for additional noise reduction.
- No-Clog, straight through open bore design inhibits clogging from exhaust contaminants such as mold release residue or plastic waste.
- Anodized Aluminum construction allows use in harsh, dirty environments or cleanrooms.
- Filter Free. No internal foam or felt limits potential clogging.
- Common thread sizes: 10-32 UN and NPT Male Pipe Threads 1/16", 1/8", 1/4" & 3/8".
- Can also be used to quiet an Air Venturi Vacuum or AC Vacuum Pump.

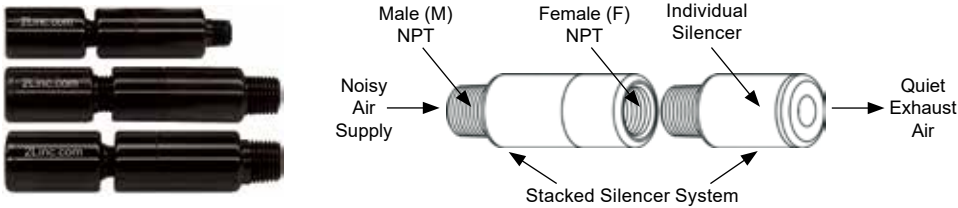
Individual No-Clog Silencers 10-32 UN, 1/16", 1/8" & 3/8" M NPT



Individual No-Clog Silencers (Male NPT)

Thread Size (Male)	Approximate Noise Reduction Levels	Length	O.D.	I.D. (thru-hole diameter, min.)	Part No.	Price (each)
10-32 UN	16 db	1.0"	.50"	0.1"	11113	\$16.15
1/16" NPT	24 db	1.5"	.75"	1/8"	11067	\$16.15
1/8" NPT	20 db	1.5"	.75"	3/16"	10030	\$16.15
1/4" NPT	17 db	1.6"	.75"	5/16"	10031	\$16.15
3/8" NPT	12-16 db	1.8"	1"	3/8"	10032	\$16.15

Stacked No-Clog Silencer Systems 1/8" & 1/4" M NPT



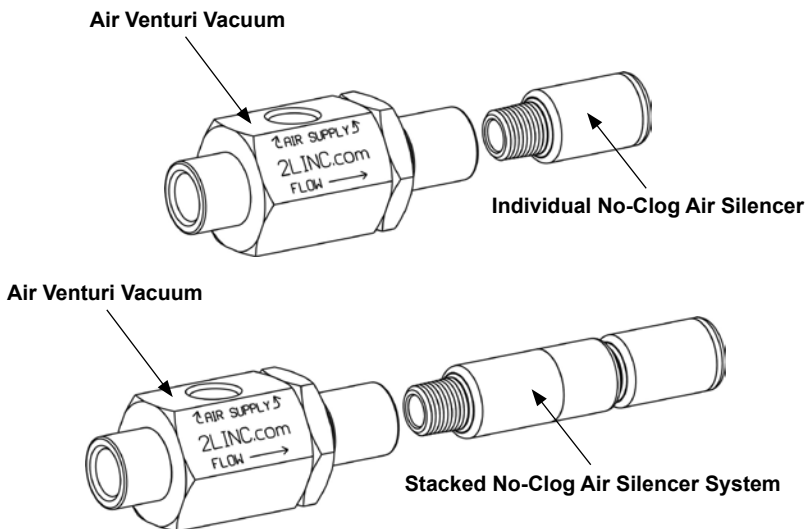
Stacked No-Clog Silencer Systems

NPT / Male-Female Pipe Thread + Male Pipe Thread	Approximate Noise Reduction Levels	Length	O.D.	I.D. (thru-hole diameter, min.)	Part No.	Price (each)
(1/8" M - 1/8" F) + (1/8" M)	19-24 db	3.3"	.75"	3/16"	10211	\$32.00
(1/4" M - 1/8" F) + (1/8" M)	24-27 db	3.35"	.75"	5/16"	10212	\$32.00
(1/4" M - 1/4" F) + (1/4" M)	20-23 db	3.65"	.75"	5/16"	10213	\$32.00

No-Clog Silencers For Air Venturi Vacuum Pumps

A No-Clog Air Exhaust Silencer Can Reduce The Noise Levels
Of An Air Venturi Vacuum.

Connect Tubing Or Hose To The Outlet Port To Redirect The Exhaust Air.



See pgs. 90 - 93 for corresponding Air Venturi Vacuum Generator Pumps.

Recommended No-Clog Air Exhaust Silencers/Mufflers for use with Air Venturi Vacuums

Air Venturi Vacuum Generator Pump	Recommended No-Clog Silencer Individual	Recommended No-Clog Silencer Stacked System
10-32 Vacuum (Aluminum) Part No. 11108	10-32 - Part No. 11113	N/A - Use Part No. 11113
1/16" NPT Vacuum (Aluminum) Part No. 11072	1/16" NPT - Part No. 11067	N/A - Use Part No. 11067
1/8" NPT Vacuum (Aluminum) Part No. 11073	1/8" NPT - Part No. 10030	1/8" NPT - Part No. 10211
1/4" NPT Vacuum (Aluminum) Part No. 10033	1/4" NPT - Part No. 10031	1/4" NPT - Part No. 10213
3/8" NPT Vacuum (Aluminum) Part No. 11103	3/8" NPT - Part No. 10032	N/A - Use Part No. 10032
3/8" NPT Vacuum (Aluminum) Part No. 10186	3/8" NPT - Part No. 10032	N/A - Use Part No. 10032
1/16" NPT Vacuum (PTFE) Part No. 11082	1/16" NPT - Part No. 11067	N/A - Use Part No. 11067
1/8" NPT Vacuum (PTFE) Part No. 11087	1/8" NPT - Part No. 10030	1/8" NPT - Part No. 10211
1/4" NPT Vacuum (PTFE) Part No. 11092	1/4" NPT - Part No. 10031	1/4" NPT - Part No. 10213

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