



**ACME**  
INDUSTRIAL  
COMPANY

# PRECISION **BUSHINGS**

*DRILL BUSHINGS*



*GUN DRILL BUSHINGS*

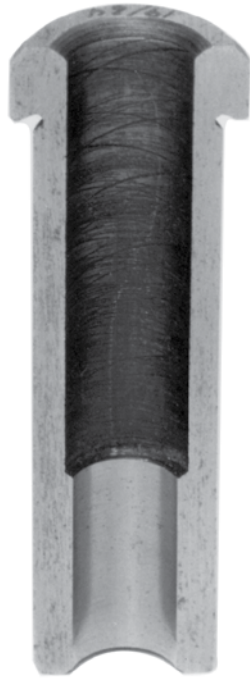


*TOOL HOLDER BUSHINGS*



**ISO 9001:2008**  
REGISTERED  
QUALITY SYSTEM

# How High Are Your Standards?



## **Theirs**

- Counterbored
- Case Hardened



## **Ours**

- **No Counterbore**

Full bearing surface supports the tool for the entire length of bushing. You'll drill more **precise** holes plus your Acme bushing will last **longer**.

- **Hardened**

61-65 R<sub>C</sub> means less machine downtime to change worn bushings.

*Acme maintains the highest standards for just about every kind of bushing you'd ever need, including tap holder and tool holder bushings, boring bar sleeves, gun drill bushings, liners, and more.*



***The Standard Components  
With the Highest Standards***

**ISO 9001:2008  
REGISTERED  
QUALITY SYSTEM**

**Acme Industrial Company**

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# CONTENTS

<b>Selection Tips</b> .....	2
<b>Installation Tips</b> .....	4
<b>Specifications</b> .....	5
<b>STANDARD DRILL BUSHINGS - INCH</b>	
Headless Press Fit - Type P .....	6
Head Press Fit - Type H .....	10
Slip-Fixed Renewable - Type SF .....	14
Headless Liners - Type L .....	17
Head Liners - Type HL .....	20
<b>SPECIAL PURPOSE BUSHINGS - INCH</b>	
Extended Range Bushings	
Headless Press Fit - Type P .....	21
Head Press Fit - Type H .....	22
Slip-Fixed Renewable - Type SF .....	23
Headless Liners - Type L .....	24
Head Liners - Type HL .....	25
Extra-Thinwall Bushings .....	26
Embedment Bushings .....	27
Tungsten Carbide Bushings	
Headless Press Fit - Type CP .....	28
Head Press Fit - Type CH .....	28
Slip-Fixed Renewable - Type CSF .....	29
Gun Drill Bushings	
Type GDB .....	30
Type GDX .....	30
Liners - Type GDL .....	31
Inserts - Type GDI .....	31
Oil Groove Bushings .....	32
Special/Custom Drill Bushings .....	34
<b>LOCKSCREWS &amp; CLAMPS - INCH</b> .....	33
<b>TOOL HOLDER BUSHINGS - INCH</b>	
CNC Style - Type Z .....	35
Split Style - Type B .....	36
Solid Style - Type J .....	37
Slotted Style - Type C .....	38
Boring Bar Sleeves .....	39
Tool Collars .....	39
Tap Holder - Type K .....	40
<b>STANDARD DRILL BUSHINGS - METRIC</b>	
Technical Information .....	41
Plain Press Fit - Type PM .....	42
Head Press Fit - Type HM .....	44
Slip-Fixed Renewable - Type SFM .....	46
Plain Liners - Type PM .....	48
Head Liners - Type HM .....	50
<b>LOCKSCREWS &amp; CLAMPS - METRIC</b> .....	52
<b>Decimal Conversion Chart</b> .....	BC

# SELECTION TIPS



## “The best bushing for the job – at the right price, right now.”

You can be sure with ACME that you're buying the best bushing for the job. Bushings and accessories have been the backbone of our business since 1914. Our nationwide network of industrial distributors further assures you of prompt personal service.

The following summaries of typical uses for bushings and liners prefaces our simplified, easy to use catalog – the most complete in the industry.

You may find it helpful first to define your specific needs, and then select a compatible bushing. Standard, off-the-shelf drill bushings are the least expensive. Sometimes, though you may require a special order. Acme will be glad to help you with your toughest requirements.

If you have any questions or need assistance, please call our customer service department at : (847) 428-3911 or (800) 323-5582. Our qualified staff of customer service representatives will be happy to assist you or provide you with the name of the ACME distributor nearest you.

## Things to consider in selecting the PROPER drill bushing.

- Use - To drill, tap or ream?
- Kind - Headless, Head, Slip-Fixed Renewable?
- Production Run - Tungsten Carbide or Titanium Nitride Coated bushings, even at a slightly higher cost than standard steel, will last longer during long production runs.
- Size - Hole size, O.D. size, and length.
- Special Requirements - Threaded O.D., angles, flats on head, other special dimensions.
- Standard or Special - Standard sizes are less expensive. Is a special bushing really necessary or will a standard fill your requirement?

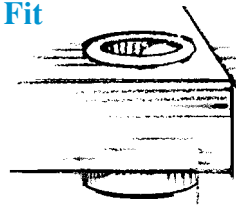
## No-Counterbore Bushings are Standard with ACME

Acme is committed to the concept of manufacturing our bushings without a counterbore. We believe this produces a better, longer lasting and more versatile bushing (especially if you require modified or special bushings). Even though No-Counterbore bushings are more difficult and costly to produce, because close tolerances are required the full length of the bushing, **No-Counterbore Bushings Are Standard With ACME!** Counterbored bushings will be supplied only upon special request.

## Headless Press Fit Bushings

### ANSI/ACME Designation Type P

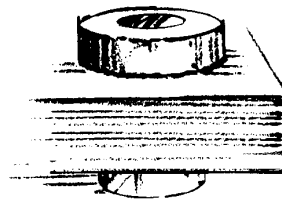
- Most popular, therefore, least expensive
- Typically for single stage drilling operations
- Permits close spacing
- Mounts flush with top of jig plate
- Available with finish ground O.D. or unground for custom grinding



## Head Press Fit Bushings

### ANSI/ACME Designation Type H

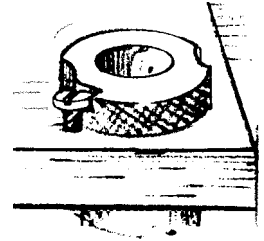
- Same as Headless Press Fit but with head (or shoulder) on the drill entry end
- Head prevents heavy axial loads from forcing bushing through jig hole
- Available with finish ground O.D. or unground for custom grinding
- Flush mounting is possible by counterboring jig hole to fit bushing head



## Slip-Fixed Renewable Bushings

### ANSI/ACME Designation Type SF

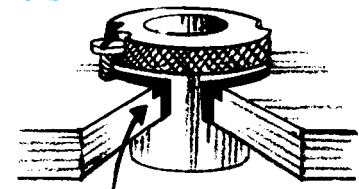
- The “Two-in-One” Bushing: Fixed mode and slip position options on one knurled head! – flexibility lowers your inventory costs
- Knurled head for easier handling – just turn and lift!
- Used with liner, permanently pressed into drill jig
- Fixed mode for runs longer than life of bushing. Held in place by lockscrew or clamp which fits a milled recess in the head.
- Slip mode for multiple operations on the same holes (such as drilling followed by reaming) – without disturbing the workpiece.
- O.D. has a slip fit tolerance for easy insertion or removal from the liner



## Headless Press Fit Liners

### ANSI/ACME Designation Type L

- Used with Slip-Fixed Renewable bushings to provide precise location point
- Permits interchange of Type SF bushings with varied I.D.'s – without affecting centerline accuracy
- Permanently pressed into jig plate – for life of the jig

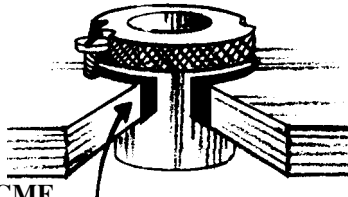




# SELECTION TIPS

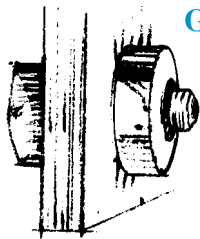
- Protects jig plate hole from wear caused by frequent bushing replacement
- Used where little impact will occur on the SF bushing's head

## Head Press Fit Liners



**ANSI/ACME Designation Type HL**

- Similar to Headless Press Fit Liners but with head or shoulder
- Use with Slip-Fixed Renewable bushings whenever excessive pounding will occur during operation
- Head prevents liner from being pushed through jig
- Flush mount by counterboring top of hole in jig plate
- Available with finish ground O.D. or unground for custom grinding



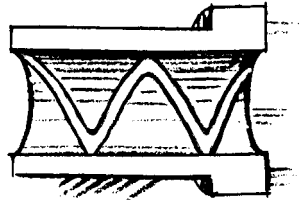
## Gun Drill Bushings

**ACME Designation Type GD**

Gun drills are used where maximum precision for long, deep holes is essential.

- Types GDB and GDX are single piece construction
- The other type of Gun Drill bushing is two piece construction. It consists of a Liner (GDL) and an Insert (GDI). The Insert can be removed from the Liner thus allowing for a range of I.D. sizes using the same Liner
- Acme can manufacture special Gun Drill bushings to fit your exact requirements

## Oil Groove Bushings



**ACME Designation Type OG**

- Used for drill lubrication or as a bearing
- Lubricant (or coolant) flows through grooves in bushing I.D. wall
- 25 Oil Groove styles available – headless or with heads
- Wiper designs available to help guard against dirt or chips
- NOTE: The oil groove should not break out the wiper end of the bushing

## Extended Range Bushings and Liners

- Sizes larger than ANSI or ACME standards
- Available in types P, H, SF, L and HL
- Unground O.D.'s available for custom grinding

## Extra-Thinwall Bushings

- Reduced wall thickness and head diameters save space
- As durable as regular wall thickness bushings
- For use where extremely close hole patterns must be accurately drilled
- Available in Type P, H, and SF
- Note: This type of bushing will not necessarily be round in the free state

## Embedment Bushings

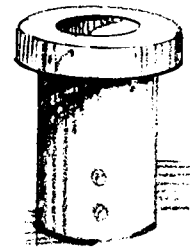
- Designed specifically for use in soft materials such as aluminum or magnesium
- Can also be used in jigs or fixtures made with laminated fiberglass or castable potting compounds
- Three types available: Diamond Groove, Ser-Groove, and Spline-Lock

## Tungsten Carbide Bushings

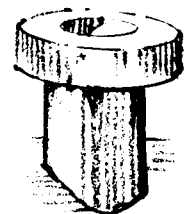
- Extremely Hard – hardness of 78-80 RC
- Can last up to 50 times longer than conventional steel bushings
- Available in Type CP, CH, and CSF

## Titanium Nitride (TiN) Coated Bushings

- Can last up to 40 times longer than conventional steel bushings
- Excellent results where long wearing capabilities are needed but carbide may be too brittle
- Much more cost effective than carbide bushings when larger quantities (can be as low as three pieces depending on size) are involved



## Special/Custom Bushings



## Special Bushings

- Modified Standard - an ANSI/ACME standard bushing is modified or altered in I.D., O.D. or length
- Custom Bushing - Those bushings that can not be easily modified. Requirements can include special diameters, shapes, angles, materials, threads, etc.

## Tool Holder Bushings

- Used to adapt various tools to tool holders or turret bores on many types of machine tools
- Available in six different styles and a complete range of sizes
- Special sizes and configurations can be manufactured to meet your exact requirements



## Bushing/Liner Installation Tips

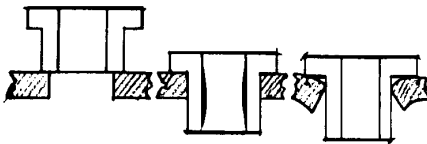
(cast iron or unhardened steel jig plates)

Production accuracy requires extra care when preparing mounting holes and installing bushings/liners. The following factors should be considered: diametral interference fits, alignment, chip clearance, and how close the bushing is to the workpiece.

Because of the many variables, no definite rules can substitute for the skill and judgment of the experienced toolmaker. The following suggestions should be helpful to others.

### Interference Fits

Interference holds press fit bushings in place on the jig plate. Too much interference may cause a number of problems: (1) jig plate distortion; (2) bellmouthing (bushing/liner walls bow inward); (3) tool seizure, or (4) trouble with slip-fixed renewable fitting into the liner.



Too little interference may allow slippage, thus causing inaccurately drilled holes. In most cases, interference of 0.0005 to 0.0008 inch is sufficient to properly install press fit bushings and liners.

### Mounting Hole Roundness

It is recommended that all mounting holes be jig bored or ground to assure roundness. Ordinary twist drills seldom produce an accurately sized or truly round hole!

### Bushing/Liner Installation

First, lubricate the inside diameter of the mounting hole and the outside diameter of the bushing/liner – before pressing into place! Lubrication prevents scoring of the hole wall. White lead is a typical lubricant.

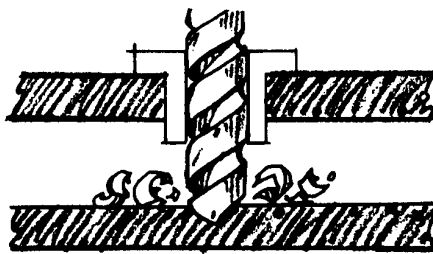
Second, use an arbor press to press the bushing/liner into place. If an arbor press is not available, draw the bushing/liner into place by tightening two steel plates connected by a nut and bolt. A bushing/liner should never be hammered into place! Why defeat the main purpose of the bushing? – Accuracy!

### Chip Clearance

One school of thought suggests a space between the workpiece and the drill bushing. The other suggests direct contact. In order to decide, you should consider the abrasiveness of the material being drilled, the drill size, and the type of bushing/liner being applied.

Chips produced from drilling will be ejected either through a space or through the bushing. If your drill clogs or heats up, try increasing the space between the end of the bushing and the workpiece. Normal spaces vary from one-half the drill diameter for small chips (as from cast iron) to one and one-half times the drill diameter for long stringy chips (as from cold-rolled steel).

Vary the length of Slip-Fixed Renewable bushings to achieve proper spacing for your operation (see number 4 below for a more detailed explanation). A rule of thumb is, the greater the space between the bushing and the workpiece, the greater the chance for error. Where possible, test your conditions and continue to check for accuracy throughout your production run.



### Hints for More Accurate Production and Longer Bushing Life

#### 1) Align Bushings Properly.

Carefully align the drill with the bushing axis to avoid poor alignment and excessive wear. The radius on the bushing will help center the drill point. ACME No-Counterbore bushings help the operator accomplish this with ease.

#### 2) Keep Tools Sharp.

Dull drill bits defeat the preciseness of bushings. Sharpen by first grinding each drill with the point in the exact center. This helps avoid “walking” by the drill when it first enters the workpiece.

#### 3) Use Proper Coolants.

Check the coolant label to be sure you are using the right coolant for your machining process.

#### 4) Use Slip-Fixed Renewable Bushings for Multiple Operations.

Slip-Fixed Renewable Bushings of different lengths provide for both accuracy and chip removal during multiple operations. For example, a short bushing during drilling will provide the proper clearance for chips to escape. A longer bushing during reaming will provide maximum guidance.

#### 5) Adapt Bushings To Irregular Work Surfaces.

The exit end of the bushing should conform to contours of the workpiece. For maximum guidance, hold to a minimum any space for chip clearance. A drill point that does not enter exactly perpendicular to the work surface will skip or wander. In such a case, side load exerted by the drill is concentrated near the exit end of the bushing. The bushing can wear prematurely. Slip-Fixed Renewable bushings could simplify replacement of worn bushings, and also aid alignment with the contoured work surface. For short production runs using press fit bushings, form the bushing end to the workpiece contour.

#### 6) For Long Production Runs, Use Tungsten Carbide or Titanium Nitride Coated Bushings.

ACME Carbide bushings last up to 50 times longer than hardened steel. ACME Titanium Nitride (TiN) coated bushings can last up to 40 times longer than conventional bushings. Both types of bushings could save valuable replacement downtime. The additional cost is small when you consider the extra long life possible. Call us for more details.



# SPECIFICATIONS

## Bushing Specifications

### ANSI/ACME Standard Drill Bushings:

I.D. Range (Std. Drill Size)	Standard I.D. Tolerance (add to nominal I.D.)
#80 to 1/4	+ .0001 to +.0004
Over 1/4 to 3/4	+ .0001 to +.0005
Over 3/4 to 1-1/2	+ .0002 to +.0006
Over 1-1/2 to 2-3/4	+ .0003 to +.0007

### Reamer Bushings:

I.D. Range (Std. Reamer Size)	I.D. Tolerance (add to nominal I.D.)
Up to 1/4	+ .0005 to +.0008
Over 1/4 to 1"	+ .0006 to +.0010
Over 1"	+ .0008 to +.0012

- Finish Ground bushings, 1/8" to 1" I.D., are held within .0003" concentricity T.I.R. (Total Indicator Reading). Other sizes are held within .0005" T.I.R.
- Unground bushings with .010/.020 grinding stock on the O.D. are concentric within .006". The letter "U" as a suffix to the ANSI symbol indicates an unground O.D. for custom grinding.
- Lengths longer than ANSI Standard or relieved bushings will meet the above tolerances at the drill exit end only.
- Standard and Special bushings will be manufactured from thru-hardened tool steel and heat treated to 61-65 RC unless instructed otherwise by the customer.
- No-Counterbore bushings will be supplied unless requested otherwise. No-Counterbore bushings allow for truer alignment, more accurate holes, less tool wear, and less problems with chips packing up in the I.D. of the bushing. Acme will, however, supply counterbored bushings when requested.
- Specifications for Metric Bushings are in the Standard Metric Bushing Section of this catalog.

## Ordering Information

26 pcs.	3/4	P	64	12
Quantity	Inside Diameter	Type	Outside Diameter	Length
	For standard drill sizes show: Fraction, Number, or Letter. For Special I.D.'s indicate decimal size to four places.	Type of Bushing: P = Headless Press Fit H = Head Press Fit SF = Slip-Fixed Renewable L = Headless Liners HL = Head Liners  "C" prefix = Tungsten Carbide	O.D. in 64ths of 1" (ie. "64" = 1")	Length in 16ths of 1" (ie. "12" = 3/4")  "U" suffix = Unground O.D. for custom grinding

### Specify in sequence for each order:

1. Quantity
2. Inside Diameter (Column A in catalog)
3. Type: See Chart above for ANSI/ACME designations
4. Outside Diameter (Column B in catalog)
5. Length (Column C in catalog)
6. Unground O.D.'s specify the Letter "U" after the ANSI Symbol

### • Gun Drill Bushings

Specify I.D., Description or Part number (when indicated) and quantity.

### • Oil Groove Bushings

Specify in sequence: ACME Oil Groove style, Type of Bushing, I.D., O.D., and length (or ANSI Symbol) and material (steel or bronze). Also indicate style of wiper if required.

### • Embedment Bushings

Specify Quantity, I.D. size and ordering symbol.

### • Carbide Bushings

Specify Quantity, I.D. and ANSI Symbol prefixed by the letter "C".

### • Tool Holder Bushings

Order by Acme Part Number and quantity.

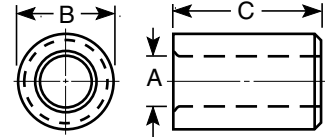
# ANSI and Acme Standard Bushings Headless Press Fit



## Type P



All press fit bushings are lapped, honed or ground in the I.D. Bushings with I.D.'s of 1/8" to 1" are concentric within .0003" T.I.R. to the O.D. Other I.D. sizes are held within .0005" T.I.R.  
No-Counterbore bushings are standard with Acme.



A STANDARD I.D. SIZES		B BODY O.D. Nominal (Actual)	C LENGTH (Overall)	ANSI SYMBOL TYPE P	** Price Code
Number, Letter, or Fraction Size	Range of Dec. Equiv.				
80, 79, 1/64, 78, 77, 76, 75, 74, 73, 72, 71, 70	.0135 to .0280	5/32 (.1578 / .1575)	1/4 5/16 3/8 1/2	P-10-4 P-10-5 P-10-6 P-10-8	230 237 240 244
69, 68, 1/32, 67, 66, 65, 64, 63, 62, 61, 60, 59, 58, 57, 56, 3/64	.0292 to .0469	5/32 (.1578 / .1575)	1/4 5/16 3/8 1/2 3/4	P-10-4 P-10-5 P-10-6 P-10-8 P-10-12	212 218 221 223 251
55, 54, 53, 1/16	.0520 to .0625	5/32 (.1578 / .1575)	1/4 5/16 3/8 1/2 3/4	P-10-4 P-10-5 P-10-6 P-10-8 P-10-12	194 199 203 204 228
1/16, 52, 51, 50, 49, 48, 5/64, 47, 46, 45, 44, 43, 42, 3/32, 41, 40, 39	.0625 to .0995	3/16 (.1891 / .1888)	1/4 5/16 3/8 1/2 5/8 3/4	P-12-4 P-12-5 P-12-6 P-12-8 P-12-10 P-12-12	133 140 143 145 157 161
60, 59, 58, 57, 56, 3/64, 55, 54, 53	.0400 to .0595	13/64 (.2046 / .2043)	1/4 5/16 3/8 1/2 3/4	P-13-4 P-13-5 P-13-6 P-13-8 P-13-12	203 209 213 216 244
1/16, 52, 51, 50, 49, 48, 5/64, 47, 46, 45, 44, 43, 42, 3/32, 41, 40, 39	.0625 to .0995	13/64 (.2046 / .2043)	1/4 5/16 3/8 1/2 3/4 1 1-3/8	P-13-4 P-13-5 P-13-6 P-13-8 P-13-12 P-13-16 P-13-22	133 140 143 145 161 168 210
40, 39, 38, 37, 36, 7/64, 35, 34, 33, 32, 31, 1/8, 30, 29, 28, 9/64	.0980 to .1406	1/4 (.2516 / .2513)	1/4 5/16 3/8 1/2 5/8 3/4 1 1-3/8	P-16-4 P-16-5 P-16-6 P-16-8 P-16-10 P-16-12 P-16-16 P-16-22	123 126 130 133 137 141 149 192

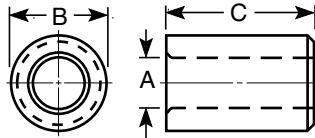
\*\* Price Code - See Separate Net Price Schedule

NOTE: Headless Press Fit Bushings with .010 / .020 rough grinding stock on the O.D. are available, please call for prices. Add the letter "U" to the end of the ANSI Symbol when ordering.





# ANSI and Acme Standard Bushings Headless Press Fit



I.D. Range (Drill Size)	Std. I.D. Tolerance (add to nom. I.D.)
#80 to 1/4	+ .0001 to + .0004
Over 1/4 to 3/4	+ .0001 to + .0005
Over 3/4 to 1-1/2	+ .0002 to + .0006
Over 1-1/2 to 2-3/4	+ .0003 to + .0007

Type P



A STANDARD I.D. SIZES		B BODY O.D. Nominal (Actual)	C LENGTH (Overall)	ANSI SYMBOL TYPE P	** Price Code
Number, Letter, or Fraction Size	Range of Dec. Equiv.				
1/8, 30, 29, 28, 9/64, 27, 26, 25, 24, 23, 5/32, 22, 21, 20, 19, 18, 11/64, 17, 16, 15, 14, 13, 3/16, 12, 11, 10	.1250 to .1935	5/16 (.3141 / .3138)	1/4 5/16 3/8 1/2 5/8 3/4 1 1-3/8	P-20-4 P-20-5 P-20-6 P-20-8 P-20-10 P-20-12 P-20-16 P-20-22	114 117 119 120 122 124 135 153
10, 9, 8, 7, 13/64, 6, 5, 4, 3, 7/32, 2, 1	.1935 to .2280	3/8 (.3766 / .3763)	1/4 3/8 1/2 3/4 1	P-24-4 P-24-6 P-24-8 P-24-12 P-24-16	109 113 114 118 126
3/16, 12, 11, 10, 9, 8, 7, 13/64, 6, 5, 4, 3, 7/32, 2, 1, A, 15/64, B, C, D, 1/4, F	.1875 to .2570	13/32 (.4078 / .4075)	1/4 5/16 3/8 1/2 3/4 1 1-3/8 1-3/4	P-26-4 P-26-5 P-26-6 P-26-8 P-26-12 P-26-16 P-26-22 P-26-28	115 115 113 114 118 126 133 149
15/64, 1/4, F, 17/64, 9/32	.2344 .2500 .2570 2656 .2812	7/16 (.4392 / .4389)	1/4 5/16 3/8 1/2 5/8 3/4 1	P-28-4 P-28-5 P-28-6 P-28-8 P-28-10 P-28-12 P-28-16	110 112 113 114 116 118 126
3/16, 12, 11, 10, 9, 8, 7, 13/64, 6, 5, 4, 3, 7/32, 2, 1, A, 15/64, B, C, D, 1/4, F, G, 17/64, H, I, J, K, 9/32, L, M, 19/64, N, 5/16, O	.1875 to .3160	1/2 (.5017 / .5014)	5/16 3/8 1/2 3/4 1 1-3/8 1-3/4	P-32-5 P-32-6 P-32-8 P-32-12 P-32-16 P-32-22 P-32-28	111 113 114 118 129 147 149
N, 5/16, O, P, 21/64, Q, R, 11/32	.3020 to .3438	9/16 (.5642 / .5639)	3/8 1/2 3/4 1	P-36-6 P-36-8 P-36-12 P-36-16	112 111 114 117

\*\* Price Code - See Separate Net Price Schedule

NOTE: Headless Press Fit Bushings with .010 / .020 rough grinding stock on the O.D. are available, please call for prices. Add the letter "U" to the end of the ANSI Symbol when ordering.

See Headless Liner section for additional lengths on some specific I.D. sizes of Type "P" Bushings.

**No-Counterbore (Full Bearing Surface) Bushings are Standard at ACME.**

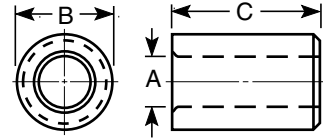
# ANSI and Acme Standard Bushings Headless Press Fit



## Type P



All press fit bushings are lapped, honed or ground in the I.D. Bushings with I.D.'s of 1/8" to 1" are concentric within .0003" T.I.R. to the O.D. Other I.D. sizes are held within .0005" T.I.R.  
No-Counterbore bushings are standard with Acme.



A STANDARD I.D. SIZES		B BODY O.D. Nominal (Actual)	C LENGTH (Overall)	ANSI SYMBOL TYPE P	** Price Code
Number, Letter, or Fraction Size	Range of Dec. Equiv.				
5/16, O, P, 21/64, Q, R, 11/32, S, T, 23/64, U, 3/8, V, W, 25/64, X, Y, 13/32, Z, 27/64, 7/16	.3125 to .4375	5/8 (.6267 / .6264)	5/16	P-40-5	110
			3/8	P-40-6	111
			1/2	P-40-8	111
			5/8	P-40-10	113
			3/4	P-40-12	114
			1	P-40-16	117
			1-1/4	P-40-20	132
			1-3/8	P-40-22	132
			1-3/4	P-40-28	141
			2-1/8	P-40-34	155
5/16, O, P, 21/64, Q, R, 11/32, S, T, 23/64, U, 3/8, V, W, 25/64, X, Y, 13/32, Z, 27/64, 7/16, 29/64, 15/32, 31/64, 1/2, 33/64, 17/32	.3125 to .5312	3/4 (.7518 / .7515)	3/8	P-48-6	114
			1/2	P-48-8	114
			5/8	P-48-10	116
			3/4	P-48-12	117
			1	P-48-16	123
			1-1/4	P-48-20	133
			1-3/8	P-48-22	133
			1-3/4	P-48-28	143
			2-1/8	P-48-34	160
			2-1/2	P-48-40	225
1/2, 33/64, 17/32, 35/64, 9/16, 37/64, 19/32, 39/64, 5/8, 41/64, 21/32	.5000 to .6562	7/8 (.8768 / .8765)	1/2	P-56-8	123
			5/8	P-56-10	124
			3/4	P-56-12	125
			1	P-56-16	128
			1-1/4	P-56-20	132
			1-3/8	P-56-22	132
			1-1/2	P-56-24	138
			1-3/4	P-56-28	144
			2-1/8	P-56-34	155
			2-1/2	P-56-40	167
1/2, 33/64, 17/32, 35/64, 9/16, 37/64, 19/32, 39/64, 5/8, 41/64, 21/32, 43/64, 11/16, 45/64, 23/32, 47/64, 3/4, 49/64	.5000 to .7656	1 (1.0018 / 1.0015)	1/2	P-64-8	124
			5/8	P-64-10	125
			3/4	P-64-12	125
			1	P-64-16	128
			1-1/4	P-64-20	132
			1-3/8	P-64-22	132
			1-1/2	P-64-24	139
			1-3/4	P-64-28	146
			2-1/8	P-64-34	156
			2-1/2	P-64-40	174
3	P-64-48	232			

\*\* Price Code - See Separate Net Price Schedule

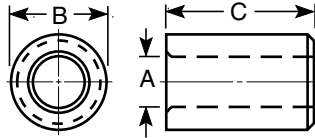
NOTE: Headless Press Fit Bushings with .010 / .020 rough grinding stock on the O.D. are available, please call for prices. Add the letter "U" to the end of the ANSI Symbol when ordering.

See Headless Liner section for additional lengths on some specific I.D. sizes of Type "P" Bushings.

**No-Counterbore (Full Bearing Surface) Bushings are Standard at ACME.**



# ANSI and Acme Standard Bushings Headless Press Fit



I.D. Range (Drill Size)	Std. I.D. Tolerance (add to nom. I.D.)
#80 to 1/4	+0.001 to +0.0004
Over 1/4 to 3/4	+0.001 to +0.0005
Over 3/4 to 1-1/2	+0.002 to +0.0006
Over 1-1/2 to 2-3/4	+0.003 to +0.0007

Type P



A STANDARD I.D. SIZES		B BODY O.D. Nominal (Actual)	C LENGTH (Overall)	ANSI SYMBOL TYPE P	** Price Code
Number, Letter, or Fraction Size	Range of Dec. Equiv.				
25/32, 13/16, 27/32	.7812 .8125 .8438	1-1/8 (1.1270 / 1.1267)	1/2 3/4 1	P-72-8 P-72-12 P-72-16	153 141 153
7/8 and 15/16	.8750 & .9375	1-1/4 (1.2520/ 1.2517)	5/8 3/4 1 1-1/4 1-1/2 1-3/4 2	P-80-10 P-80-12 P-80-16 P-80-20 P-80-24 P-80-28 P-80-32	147 141 153 162 170 178 194
3/4, 49/64, 25/32, 51/64, 13/16, 53/64, 27/32, 55/64, 7/8, 57/64, 29/32, 59/64, 15/16, 61/64, 31/32, 63/64, 1", 1-1/64, 1-1/32	.7500 to 1.0312	1-3/8 (1.3772 / 1.3768)	1/2 3/4 1 1-1/4 1-3/8 1-1/2 1-3/4 2 2-1/8 2-1/2 3	P-88-8 P-88-12 P-88-16 P-88-20 P-88-22 P-88-24 P-88-28 P-88-32 P-88-34 P-88-40 P-88-48	153 141 153 162 162 170 178 194 194 210 262
1-1/32, 1-1/16, 1-3/32, 1-1/8	1.0312 1.0625 1.0938 1.1250	1-1/2 (1.5022 / 1.5018)	3/4 1 1-1/4 1-1/2 1-3/4 2	P-96-12 P-96-16 P-96-20 P-96-24 P-96-28 P-96-32	173 162 173 180 186 205
1", 1-1/64, 1-1/32, 1-3/64, 1-1/16, 1-5/64, 1-3/32, 1-7/64, 1-1/8, 1-9/64, 1-5/32, 1-11/64, 1-3/16, 1-13/64, 1-7/32, 1-15/64, 1-1/4, 1-17/64, 1-9/32, 1-19/64, 1-5/16, 1-21/64, 1-11/32, 1-23/64, 1-3/8, 1-25/64	1.0000 to 1.3906	1-3/4 (1.7523 / 1.7519)	3/4 1 1-3/8 1-3/4 2-1/8 2-1/2 3	P-112-12 P-112-16 P-112-22 P-112-28 P-112-34 P-112-40 P-112-48	173 162 173 186 205 256 288
1-3/8, 1-25/64, 1-13/32, 1-27/64, 1-7/16, 1-29/64, 1-15/32, 1-31/64, 1-1/2, 1-33/64, 1-17/32, 1-35/64, 1-9/16, 1-37/64, 1-19/32, 1-39/64, 1-5/8, 1-41/64, 1-21/32, 1-43/64, 1-11/16, 1-45/64, 1-23/32, 1-47/64, 1-3/4	1.3750 to 1.7500	2-1/4 (2.2525 / 2.2521)	1 1-3/8 1-3/4 2-1/8 2-1/2 3	P-144-16 P-144-22 P-144-28 P-144-34 P-144-40 P-144-48	196 210 223 246 264 322

\*\* Price Code - See Separate Net Price Schedule

NOTE: Headless Press Fit Bushings with .010 / .020 rough grinding stock on the O.D. are available, please call for prices. Add the letter "U" to the end of the ANSI Symbol when ordering.

See Headless Liner section for additional lengths on some specific I.D. sizes of Type "P" Bushings.

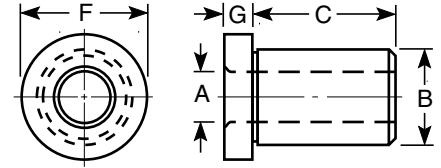
# ANSI and Acme Standard Bushings Head Press Fit



## Type H



All press fit bushings are lapped, honed or ground in the I.D. Bushings with I.D.'s of 1/8" to 1" are concentric within .0003" T.I.R. to the O.D. Other I.D. sizes are held within .0005" T.I.R.  
No-Counterbore bushings are standard with Acme.



A STANDARD I.D. SIZES		B BODY O.D. Nominal (Actual)	C LENGTH (Under Head)	ANSI SYMBOL TYPE H	** Price Code	F Head Dia.	G Head Thick.
Number, Letter, or Fraction Size	Range of Dec. Equiv.						
80, 79, 1/64, 78, 77, 76, 75, 74, 73, 72, 71, 70	.0135 to .0280	5/32 (.1578 / .1575)	1/4 5/16 3/8 1/2	H-10-4 H-10-5 H-10-6 H-10-8	238 240 245 246	1/4	3/32
69, 68, 1/32, 67, 66, 65, 64, 63, 62, 61, 60, 59, 58, 57, 56, 3/64	.0292 to .0469	5/32 (.1578 / .1575)	1/4 5/16 3/8 1/2	H-10-4 H-10-5 H-10-6 H-10-8	219 221 226 228	1/4	3/32
55, 54, 53, 1/16	.0520 to .0625	5/32 (.1578 / .1575)	1/4 5/16 3/8 1/2	H-10-4 H-10-5 H-10-6 H-10-8	200 201 204 207	1/4	3/32
1/16, 52, 51, 50, 49, 48, 5/64, 47, 46, 45, 44, 43, 42, 3/32, 41, 40, 39	.0625 to .0995	3/16 (.1891 / .1888)	1/4 5/16 3/8 1/2 3/4	H-12-4 H-12-5 H-12-6 H-12-8 H-12-12	145 148 151 153 173	5/16	3/32
60, 59, 58, 57, 56, 3/64, 55, 54, 53	.0400 to .0595	13/64 (.2046 / .2043)	1/4 5/16 3/8 1/2 3/4	H-13-4 H-13-5 H-13-6 H-13-8 H-13-12	210 212 218 221 253	19/64	3/32
1/16, 52, 51, 50, 49, 48, 5/64, 47, 46, 45, 44, 43, 42, 3/32, 41, 40, 39	.0625 to .0995	13/64 (.2046 / .2043)	1/4 5/16 3/8 1/2 3/4 1	H-13-4 H-13-5 H-13-6 H-13-8 H-13-12 H-13-16	145 148 151 153 173 203	19/64	3/32
40, 39, 38, 37, 36, 7/64, 35, 34, 33, 32, 31, 1/8, 30, 29, 28, 9/64	.0980 to .1406	1/4 (.2516 / .2513)	1/4 5/16 3/8 1/2 5/8 3/4 1 1-3/8	H-16-4 H-16-5 H-16-6 H-16-8 H-16-10 H-16-12 H-16-16 H-16-22	136 137 141 142 154 158 189 231	23/64	3/32

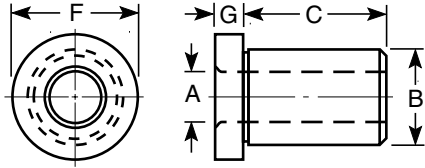
\*\* Price Code - See Separate Net Price Schedule

NOTE: Head Press Fit Bushings with .010 / .020 rough grinding stock on the O.D. are available, please call for prices. Add the letter "U" to the end of the ANSI Symbol when ordering.

**No-Counterbore (Full Bearing Surface) Bushings are Standard at ACME**



# ANSI and Acme Standard Bushings Head Press Fit



I.D. Range (Drill Size)	Standard I.D. Tolerance (add to nominal I.D.)
#80 to 1/4	+0.0001 to +0.0004
Over 1/4 to 3/4	+0.0001 to +0.0005
Over 3/4 to 1-1/2	+0.0002 to +0.0006
Over 1-1/2 to 2-3/4	+0.0003 to +0.0007

Type H



A STANDARD I.D. SIZES		B BODY O.D. Nominal (Actual)	C LENGTH (Under Head)	ANSI SYMBOL TYPE H	** Price Code	F Head Dia.	G Head Thick.
Number, Letter, or Fraction Size	Range of Dec. Equiv.						
1/8, 30, 29, 28, 9/64, 27, 26, 25, 24, 23, 5/32, 22, 21, 20, 19, 18, 11/64, 17, 16, 15, 14, 13, 3/16, 12, 11, 10	.1250 to .1935	5/16 (.3141 / .3138)	1/4 5/16 3/8 1/2 5/8 3/4 1 1-3/8 1-3/4	H-20-4 H-20-5 H-20-6 H-20-8 H-20-10 H-20-12 H-20-16 H-20-22 H-20-28	122 125 128 129 130 132 144 193 228	27/64	1/8
10, 9, 8, 7, 13/64, 6, 5, 4, 3, 7/32, 2, 1	.1935 to .2280	3/8 (.3766 / .3763)	1/4 3/8 1/2 3/4 1	H-24-4 H-24-6 H-24-8 H-24-12 H-24-16	118 124 126 129 139	1/2	3/32
3/16, 12, 11, 10, 9, 8, 7, 13/64, 6, 5, 4, 3, 7/32, 2, 1, A, 15/64, B, C, D, 1/4, F	.1875 to .2570	13/32 (.4078 / .4075)	1/4 5/16 3/8 1/2 3/4 1 1-3/8 1-3/4	H-26-4 H-26-5 H-26-6 H-26-8 H-26-12 H-26-16 H-26-22 H-26-28	119 120 124 126 128 129 148 166	1/2	5/32
15/64, 1/4, F, 17/64, 9/32	.2344 .2500 .2570 .2656 .2812	7/16 (.4392 / .4389)	1/4 3/8 1/2 5/8 3/4 1	H-28-4 H-28-6 H-28-8 H-28-10 H-28-12 H-28-16	119 124 126 128 129 139	9/16	3/32
3/16, 12, 11, 10, 9, 8, 7, 13/64, 6, 5, 4, 3, 7/32, 2, 1, A, 15/64, B, C, D, 1/4, F, G, 17/64, H, I, J, K, 9/32, L, M, 19/64, N, 5/16, O	.1875 to .3160	1/2 (.5017 / .5014)	1/4 5/16 3/8 1/2 3/4 1 1-3/8 1-3/4	H-32-4 H-32-5 H-32-6 H-32-8 H-32-12 H-32-16 H-32-22 H-32-28	118 120 124 126 128 138 148 166	39/64	7/32
N, 5/16, O, P, 21/64, Q, R, 11/32	.3020 to .3438	9/16 (.5642 / .5639)	3/8 1/2 5/8 3/4 1	H-36-6 H-36-8 H-36-10 H-36-12 H-36-16	122 122 123 124 128	11/16	3/32

\*\* Price Code - See Separate Net Price Schedule

NOTE: Head Press Fit Bushings with .010 / .020 rough grinding stock on the O.D. are available, please call for prices. Add the letter "U" to the end of the ANSI Symbol when ordering.

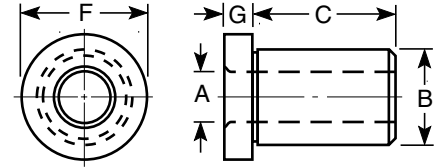
# ANSI and Acme Standard Bushings Head Press Fit



## Type H



All press fit bushings are lapped, honed or ground in the I.D. Bushings with I.D.'s of 1/8" to 1" are concentric within .0003" T.I.R. to the O.D. Other I.D. sizes are held within .0005" T.I.R.  
No-Counterbore bushings are standard with Acme.



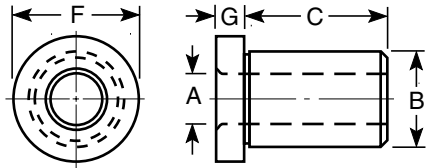
A STANDARD I.D. SIZES		B BODY O.D. Nominal (Actual)	C LENGTH (Under Head)	ANSI SYMBOL TYPE H	** Price Code	F Head Dia.	G Head Thick.
Number, Letter, or Fraction Size	Range of Dec. Equiv.						
5/16, O, P, 21/64, Q, R, 11/32, S, T, 23/64, U, 3/8, V, W, 25/64, X, Y, 13/32, Z, 27/64, 7/16	.3125 to .4375	5/8 (.6267 / .6264)	1/4 5/16 3/8 1/2 5/8 3/4 1 1-3/8 1-3/4 2-1/8	H-40-4 H-40-5 H-40-6 H-40-8 H-40-10 H-40-12 H-40-16 H-40-22 H-40-28 H-40-34	124 118 120 120 123 126 128 147 158 172	51/64	7/32
5/16, O, P, 21/64, Q, R, 11/32, S, T, 23/64, U, 3/8, V, W, 25/64, X, Y, 13/32, Z, 27/64, 7/16, 29/64, 15/32, 31/64, 1/2, 33/64, 17/32	.3125 to .5312	3/4 (.7518 / .7515)	1/4 3/8 1/2 5/8 3/4 1 1-1/4 1-3/8 1-3/4 2-1/8 2-1/2	H-48-4 H-48-6 H-48-8 H-48-10 H-48-12 H-48-16 H-48-20 H-48-22 H-48-28 H-48-34 H-48-40	128 124 124 126 128 132 148 148 159 173 270	59/64	7/32
1/2, 33/64, 17/32, 35/64, 9/16, 37/64, 19/32, 39/64, 5/8, 41/64, 21/32	.5000 to .6562	7/8 (.8768 / .8765)	3/8 1/2 5/8 3/4 1 1-1/4 1-3/8 1-1/2 1-3/4 2-1/8 2-1/2	H-56-6 H-56-8 H-56-10 H-56-12 H-56-16 H-56-20 H-56-22 H-56-24 H-56-28 H-56-34 H-56-40	133 133 134 134 140 145 146 155 159 174 270	1-7/64	1/4
1/2, 33/64, 17/32, 35/64, 9/16, 37/64, 19/32, 39/64, 5/8, 41/64, 21/32, 43/64, 11/16, 45/64, 23/32, 47/64, 3/4, 49/64	.5000 to .7656	1 (1.0018 / 1.0015)	1/2 3/4 1 1-3/8 1-1/2 1-3/4 2-1/8 2-1/2 3	H-64-8 H-64-12 H-64-16 H-64-22 H-64-24 H-64-28 H-64-34 H-64-40 H-64-48	136 137 141 147 165 170 188 205 277	1-15/64	5/16

\*\* Price Code - See Separate Net Price Schedule

NOTE: Head Press Fit Bushings with .010 / .020 rough grinding stock on the O.D. are available, please call for prices. Add the letter "U" to the end of the ANSI Symbol when ordering.



# ANSI and Acme Standard Bushings Head Press Fit



I.D. Range (Drill Size)	Standard I.D. Tolerance (add to nominal I.D.)
#80 to 1/4	+.0001 to +.0004
Over 1/4 to 3/4	+.0001 to +.0005
Over 3/4 to 1-1/2	+.0002 to +.0006
Over 1-1/2 to 2-3/4	+.0003 to +.0007

Type H



A STANDARD I.D. SIZES		B BODY O.D. Nominal (Actual)	C LENGTH (Under Head)	ANSI SYMBOL TYPE H	** Price Code	F Head Dia.	G Head Thick.
Number, Letter, or Fraction Size	Range of Dec. Equiv.						
7/8 and 15/16	.8750 & .9375	1-1/4 (1.2520 / 1.2517)	5/8 3/4 1 1-1/4 1-1/2 1-3/4 2	H-80-10 H-80-12 H-80-16 H-80-20 H-80-24 H-80-28 H-80-32	163 158 168 178 186 194 210	1-1/2	1/4
3/4, 49/64, 25/32, 51/64, 13/16, 53/64, 27/32, 55/64, 7/8, 57/64, 29/32, 59/64, 15/16, 61/64, 31/32, 63/64, 1", 1-1/64, 1-1/32	.7500 to 1.0312	1-3/8 (1.3772 / 1.3768)	1/2 3/4 1 1-3/8 1-1/2 1-3/4 2-1/8 2-1/2 3	H-88-8 H-88-12 H-88-16 H-88-22 H-88-24 H-88-28 H-88-34 H-88-40 H-88-48	165 166 176 188 205 205 223 241 304	1-39/64	3/8
1", 1-1/64, 1-1/32, 1-3/64, 1-1/16, 1-5/64, 1-3/32, 1-7/64, 1-1/8, 1-9/64, 1-5/32, 1-11/64, 1-3/16, 1-13/64, 1-7/32, 1-15/64, 1-1/4, 1-17/64, 1-9/32, 1-19/64, 1-5/16, 1-21/64, 1-11/32, 1-23/64, 1-3/8, 1-25/64	1.0000 to 1.3906	1-3/4 (1.7523 / 1.7519)	3/4 1 1-3/8 1-3/4 2-1/8 2-1/2 3	H-112-12 H-112-16 H-112-22 H-112-28 H-112-34 H-112-40 H-112-48	212 198 212 227 246 264 322	1-63/64	3/8
1-3/8, 1-25/64, 1-13/32, 1-27/64, 1-7/16, 1-29/64, 1-15/32, 1-31/64, 1-1/2, 1-33/64, 1-17/32, 1-35/64, 1-9/16, 1-37/64, 1-19/32, 1-39/64, 1-5/8, 1-41/64, 1-21/32, 1-43/64, 1-11/16, 1-45/64, 1-23/32, 1-47/64, 1-3/4	1.3750 to 1.7500	2-1/4 (2.2525 / 2.2521)	1 1-3/8 1-3/4 2-1/8 2-1/2 3	H-144-16 H-144-22 H-144-28 H-144-34 H-144-40 H-144-48	231 249 272 288 305 335	2-31/64	3/8

\*\* Price Code - See Separate Net Price Schedule

NOTE: Head Press Fit Bushings with .010 / .020 rough grinding stock on the O.D. are available, please call for prices. Add the letter "U" to the end of the ANSI Symbol when ordering.

**No-Counterbore (Full Bearing Surface) Bushings are Standard at ACME**

# ANSI and Acme Standard Bushings

## Slip-Fixed Renewable

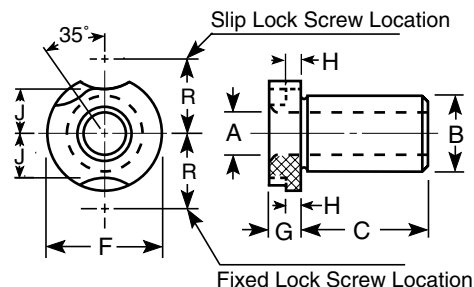


### Type SF



All type "SF" bushings are lapped, honed or ground in the I.D. Bushings with I.D.'s of 1/8" to 1" are concentric within .0003" T.I.R. to the O.D. Other I.D. sizes are held within .0005" T.I.R. A slip fit clearance is provided for proper alignment when inserted into a liner.

No-Counterbore bushings are standard with Acme.



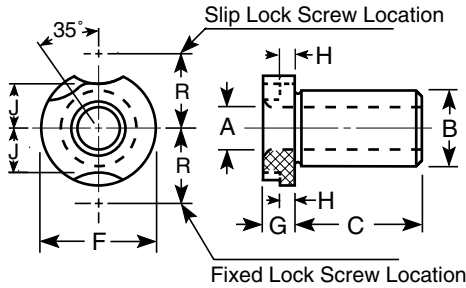
A STANDARD I.D. SIZES		B BODY O.D. Nominal (Actual)	C LENGTH (Under Head)	ANSI SYMBOL Type SF	** PRICE CODE	HEAD SIZE		LOCK SCREWS AND CLAMPS
Number, Letter, or Fraction Size	Range of Dec. Equiv.					Head Dim.	Lockscrew Location	
80, 79, 1/64, 78, 77, 76, 75, 74, 73, 72, 71, 70	.0135 to .0280	3/16 (.1875 / .1873)	1/4 5/16 3/8 1/2	SF-12-4 SF-12-5 SF-12-6 SF-12-8	271 274 278 280	F = 5/16 G = 3/16	H = 3/32 J = 3/32 R = 17/64	#1 - LS
69, 68, 1/32, 67, 66, 65, 64, 63, 62, 61, 60, 59, 58, 57, 56, 3/64	.0292 to .0469	3/16 (.1875 / .1873)	1/4 5/16 3/8 1/2	SF-12-4 SF-12-5 SF-12-6 SF-12-8	244 246 249 251	F = 5/16 G = 3/16	H = 3/32 J = 3/32 R = 17/64	#1 - LS
55, 54, 53	.0520 to .0595	3/16 (.1875 / .1873)	1/4 5/16 3/8 1/2	SF-12-4 SF-12-5 SF-12-6 SF-12-8	215 217 219 222	F = 5/16 G = 3/16	H = 3/32 J = 3/32 R = 17/64	#1-LS
1/16, 52, 51, 50, 49, 48, 5/64, 47, 46, 45, 44, 43, 42, 3/32, 41, 40	.0625 to .0980	3/16 (.1875 / .1873)	1/4 5/16 3/8 1/2 3/4	SF-12-4 SF-12-5 SF-12-6 SF-12-8 SF-12-12	154 156 158 161 172	F = 5/16 G = 3/16	H = 3/32 J = 3/32 R = 17/64	#1-LS
39, 38, 37, 36, 7/64, 35, 34, 33, 32, 31, 1/8, 30, 29, 28	.0995 to .1405	1/4 (.2500 / .2498)	1/4 3/8 1/2 5/8 3/4	SF-16-4 SF-16-6 SF-16-8 SF-16-10 SF-16-12	147 153 156 161 163	F = 7/16 G = 1/4	H = 1/8 J = 9/64 R = 23/64	#2 - LS
3/64, 55, 54, 53	.0469 to .0595	5/16 (.3125 / .3123)	5/16 3/8 1/2 3/4 1	SF-20-5 SF-20-6 SF-20-8 SF-20-12 SF-20-16	204 208 209 251 274	F = 35/64 G = 1/4	H = 1/8 J = 11/64 R = 1/2	1A - LS RC - 1A
1/16, 52, 51, 50, 49, 48, 5/64, 47, 46, 45, 44, 43	.0625 to .0890	5/16 (.3125 / .3123)	5/16 3/8 1/2 3/4 1	SF-20-5 SF-20-6 SF-20-8 SF-20-12 SF-20-16	158 160 164 182 206	F = 35/64 G = 1/4	H = 1/8 J = 11/64 R = 1/2	1A - LS RC - 1A
42, 3/32, 41, 40, 39, 38, 37, 36, 7/64, 35, 34, 33, 32, 31, 1/8, 30, 29, 28, 9/64, 27, 26, 25, 24, 23, 5/32, 22, 21, 20, 19, 18, 11/64, 17, 16, 15, 14, 13, 3/16, 12, 11, 10	.0935 to .1935	5/16 (.3125 / .3123)	5/16 3/8 1/2 3/4 1 1-3/8	SF-20-5 SF-20-6 SF-20-8 SF-20-12 SF-20-16 SF-20-22	150 153 156 164 178 205	F = 35/64 G = 1/4	H = 1/8 J = 11/64 R = 1/2	1A - LS RC - 1A
10, 9, 8, 7, 13/64, 6, 5, 4, 3, 7/32, 2, 1	.1935 to .2280	3/8 (.3750 / .3748)	1/4 3/8 1/2 3/4 1	SF-24-4 SF-24-6 SF-24-8 SF-24-12 SF-24-16	134 138 140 146 153	F = 5/8 G = 1/4	H = 1/8 J = 15/64 R = 29/64	#2 - LS

\*\* Price Code - See Separate Net Price Schedule





# ANSI and Acme Standard Bushings Slip-Fixed Renewable



I.D. Range (Drill Size)	Standard I.D. Tolerance (add to nominal I.D.)
#80 to 1/4	+ .0001 to + .0004
Over 1/4 to 3/4	+ .0001 to + .0005
Over 3/4 to 1-1/2	+ .0002 to + .0006
Over 1-1/2 to 2-3/4	+ .0003 to + .0007

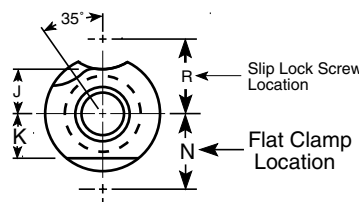
Type SF



A STANDARD I.D. SIZES		B BODY O.D. Nominal (Actual)	C LENGTH (Under Head)	ANSI SYMBOL Type SF	** PRICE CODE	HEAD SIZE		LOCK SCREWS AND CLAMPS
Number, Letter, or Fraction Size	Range of Dec. Equiv.					Head Dim.	Lockscrew Location	
15/64, 1/4, F, 17/64, 9/32	.2344 .2500 .2570 .2656 .2812	7/16 (.4375 / .4373)	3/8 1/2 3/4 1	SF-28-6 SF-28-8 SF-28-12 SF-28-16	138 140 146 153	F = 5/8 G = 1/4	H = 1/8 J = 15/64 R = 29/64	#2 - LS
9/64, 27, 26, 25, 24, 23, 5/32, 22, 21, 20, 19, 18, 11/64, 17, 16, 15, 14, 13, 3/16	.1406 to .1875	1/2 (.5000 / .4998)	5/16 3/8 1/2 3/4 1 1-3/8 1-3/4	SF-32-5 SF-32-6 SF-32-8 SF-32-12 SF-32-16 SF-32-22 SF-32-28	140 143 145 150 160 170 182	F = 51/64 G = 1/4	H = 1/8 J = 19/64 R = 5/8	1A - LS RC - 1A
12, 11, 10, 9, 8, 7, 13/64, 6, 5, 4, 3, 7/32, 2, 1, A, 15/64, B, C, D, 1/4, F, G, 17/64, H, I, J, K, 9/32, L, M, 19/64, N, 5/16, O, P, 21/64, Q, R, 11/32	.1890 to .3438	1/2 (.5000 / .4998)	5/16 3/8 1/2 3/4 1 1-3/8 1-3/4 2-1/8	SF-32-5 SF-32-6 SF-32-8 SF-32-12 SF-32-16 SF-32-22 SF-32-28 SF-32-34	137 138 140 146 153 165 177 245	F = 51/64 G = 1/4	H = 1/8 J = 19/64 R = 5/8	1A-LS RC - 1A
5/16, O, P, 21/64, Q, R, 11/32	.3125 to .3438	9/16 (.5625 / .5623)	1/2 5/8 3/4 1	SF-36-8 SF-36-10 SF-36-12 SF-36-16	140 143 146 153	F = 7/8 G = 1/4	H = 1/8 J = 23/64 R = 37/64	#2 - LS
23/64, U, 3/8, V, W, 25/64, X, Y, 13/32, Z, 27/64, 7/16	.3594 to .4375	5/8 (.6250 / .6248)	5/16 3/8 1/2 5/8 3/4 1 1-1/4	SF-40-5 SF-40-6 SF-40-8 SF-40-10 SF-40-12 SF-40-16 SF-40-20	137 138 140 142 144 150 165	F = 7/8 G = 1/4	H = 1/8 J = 23/64 R = 37/64	#2 - LS
9/32, L, M, 19/64, N, 5/16, O, P, 21/64, Q, R, 11/32, S, T, 23/64, U, 3/8, V, W, 25/64, X, Y, 13/32, Z, 27/64, 7/16, 29/64, 15/32, 31/64, 1/2, 33/64, 17/32, 35/64, 9/16	.2812 to .5625	3/4 (.7500 / .7498)	1/2 3/4 1 1-3/8 1-3/4 2-1/8 2-1/2 3	SF-48-8 SF-48-12 SF-48-16 SF-48-22 SF-48-28 SF-48-34 SF-48-40 SF-48-48	140 144 150 165 180 194 260 312	F = 1-3/64 G = 1/4	H = 1/8 J = 27/64 R = 3/4	1A - LS RC - 1A

\*\* Price Code - See Separate Net Price Schedule

“SF” bushings are available milled for flat clamps. To order please prefix the letters “FM”.



Body O.D.	“K”	“N”	Use Clamp
5/16	11/64	11/16	FC-1
1/2	17/64	25/32	FC-1
3/4	25/64	57/64	FC-1
1	1/2	1-9/64	FC-2
1-3/8	11/16	1-21/64	FC-2
1-3/4	7/8	1-33/64	FC-3
2-1/4	1-1/8	1-49/64	FC-3

# ANSI and Acme Standard Bushings

## Slip-Fixed Renewable

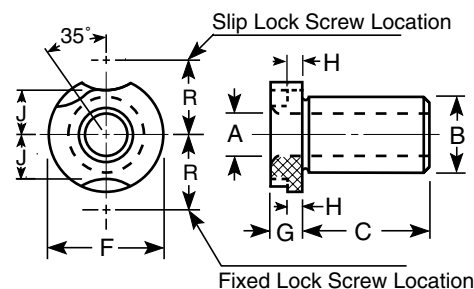


### Type SF



All type "SF" bushings are lapped, honed or ground in the I.D. Bushings with I.D.'s of 1/8" to 1" are concentric within .0003" T.I.R. to the O.D. Other I.D. sizes are held within .0005" T.I.R. A slip fit clearance is provided for proper alignment when inserted into a liner.

No-Counterbore bushings are standard with Acme.

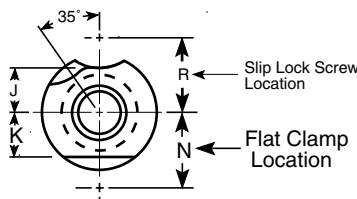


A STANDARD I.D. SIZES		B BODY O.D. Nominal (Actual)	C LENGTH (Under Head)	ANSI SYMBOL Type SF	** PRICE CODE	HEAD SIZE		LOCK SCREWS AND CLAMPS
Number, Letter, or Fraction Size	Range of Dec. Equiv.					Head Dim.	Lockscrew Location	
35/64, 9/16, 37/64, 19/32, 39/64, 5/8, 41/64, 21/32	.5469 to .6562	7/8 (.8750 / .8748)	1/2 3/4 1 1-1/4 1-1/2	SF-56-8 SF-56-12 SF-56-16 SF-56-20 SF-56-24	146 150 156 163 175	F = 1-1/4 G = 3/8	H = 3/16 J = 31/64 R = 53/64	2A - LS RC - 2A
15/32, 31/64, 1/2, 33/64, 17/32, 35/64, 9/16, 37/64, 19/32, 39/64, 5/8, 41/64, 21/32, 43/64, 11/16, 45/64, 23/32, 47/64, 3/4, 49/64, 25/32	.4688 to .7812	1" (1.0000 / .9998)	1/2 3/4 1 1-3/8 1-1/2 1-3/4 2-1/8 2-1/2 3	SF-64-8 SF-64-12 SF-64-16 SF-64-22 SF-64-24 SF-64-28 SF-64-34 SF-64-40 SF-64-48	146 151 156 164 175 187 205 272 316	F = 1-27/64 G = 3/8	H = 3/16 J = 19/32 R = 59/64	2A - LS RC - 2A
7/8 & 15/16	.8750 & .9375	1-1/4 (1.2500 / 1.2498)	3/4 1 1-1/4 2	SF-80-12 SF-80-16 SF-80-20 SF-80-32	188 200 210 254	F = 1-5/8 G = 3/8	H = 3/16 J = 43/64 R = 1-1/64	2A - LS RC - 2A
3/4, 49/64, 25/32, 51/64, 13/16, 53/64, 27/32, 55/64, 7/8, 57/64, 29/32, 59/64, 15/16, 61/64, 31/32, 63/64, 1", 1-1/64, 1-1/32, 1-3/64, 1-1/16	.7500 to 1.0625	1-3/8 (1.3750 / 1.3747)	3/4 1 1-3/8 1-1/2 1-3/4 2-1/8 2-1/2 3	SF-88-12 SF-88-16 SF-88-22 SF-88-24 SF-88-28 SF-88-34 SF-88-40 SF-88-48	182 193 204 213 223 245 288 325	F = 1-51/64 G = 3/8	H = 3/16 J = 25/32 R = 1-7/64	2A - LS RC - 2A
1", 1-1/64, 1-1/32, 1-3/64, 1-1/16, 1-5/64, 1-3/32, 1-7/64, 1-1/8, 1-9/64, 1-5/32, 1-11/64, 1-3/16, 1-13/64, 1-7/32, 1-15/64, 1-1/4, 1-17/64, 1-9/32, 1-19/64, 1-5/16, 1-21/64, 1-11/32, 1-23/64, 1-3/8	1.0000 to 1.3750	1-3/4 (1.7500 / 1.7497)	3/4 1 1-3/8 1-3/4 2-1/8 2-1/2 3	SF-112-12 SF-112-16 SF-112-22 SF-112-28 SF-112-34 SF-112-40 SF-112-48	238 220 235 251 273 306 331	F = 2-19/64 G = 3/8	H = 3/16 J = 1" R = 1-25/64	3A - LS RC - 3A
1-3/8, 1-25/64, 1-13/32, 1-27/64, 1-7/16, 1-29/64, 1-15/32, 1-31/64, 1-1/2, 1-33/64, 1-17/32, 1-35/64, 1-9/16, 1-37/64, 1-19/32, 1-39/64, 1-5/8, 1-41/64, 1-21/32, 1-43/64, 1-11/16, 1-45/64, 1-23/32, 1-47/64, 1-3/4	1.3750 to 1.7500	2-1/4 (2.2500 / 2.2496)	1 1-3/8 1-3/4 2-1/8 2-1/2 3	SF-144-16 SF-144-22 SF-144-28 SF-144-34 SF-144-40 SF-144-48	263 279 294 313 325 336	F = 2-51/64 G = 3/8	H = 3/16 J = 1-1/4 R = 1-41/64	3A - LS RC - 3A

\*\* Price Code - See Separate Net Price Schedule

Please use the prefix "FM" when ordering "SF" bushings milled for flat clamps.

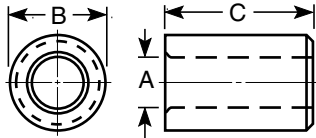
I.D. Range (Drill Size)	Standard I.D. Tolerance (add to nominal I.D.)
#80 to 1/4	+0.0001 to +0.0004
Over 1/4 to 3/4	+0.0001 to +0.0005
Over 3/4 to 1-1/2	+0.0002 to +0.0006
Over 1-1/2 to 2-3/4	+0.0003 to +0.0007



Body O.D.	"K"	"N"	Use Clamp
5/16	11/64	11/16	FC-1
1/2	17/64	25/32	FC-1
3/4	25/64	57/64	FC-1
1	1/2	1-9/64	FC-2
1-3/8	11/16	1-21/64	FC-2
1-3/4	7/8	1-33/64	FC-3
2-1/4	1-1/8	1-49/64	FC-3



# ANSI and Acme Standard Bushings Headless Liners



All liner bushings are honed or ground in the I.D. Liners with I.D.'s 3/16" to 1" are concentric within .0003" T.I.R. to the O.D. Other I.D. sizes are held within .0005" T.I.R. All unground bushings are left rough on the O.D. with concentricity of approximately .006" T.I.R.

**Type L**



A I.D. SIZE		B BODY O.D.			C LENGTH (Overall)	ANSI SYMBOL TYPE L		** Price Code
Nominal	Actual	Nominal	Actual			Ground	Unground	
			Ground	Unground				
3/16	.1876 .1879	5/16	.3141 .3138	.327 .322	1/4	L-20-4	L-20-4U	114
					5/16	L-20-5	L-20-5U	117
					3/8	L-20-6	L-20-6U	119
					1/2	L-20-8	L-20-8U	120
					5/8	L-20-10	L-20-10U	122
					3/4	L-20-12	L-20-12U	124
1/4	.2501 .2504	7/16	.4392 .4389	.453 .448	1/4	L-28-4	L-28-4U	110
					5/16	L-28-5	L-28-5U	112
					3/8	L-28-6	L-28-6U	113
					1/2	L-28-8	L-28-8U	114
					5/8	L-28-10	L-28-10U	116
					3/4	L-28-12	L-28-12U	118
5/16	.3126 .3129	1/2	.5017 .5014	.520 .515	1/4	L-32-4	L-32-4U	110
					5/16	L-32-5	L-32-5U	111
					3/8	L-32-6	L-32-6U	113
					1/2	L-32-8	L-32-8U	114
					3/4	L-32-12	L-32-12U	118
					1	L-32-16	L-32-16U	129
					1-3/8	L-32-22	L-32-22U	147
5/16	.3126 .3129	9/16	.5642 .5639	.582 .577	1/4	L-36-4	L-36-4U	117
					5/16	L-36-5	L-36-5U	112
					3/8	L-36-6	L-36-6U	112
					1/2	L-36-8	L-36-8U	111
					5/8	L-36-10	L-36-10U	113
					3/4	L-36-12	L-36-12U	114
1	L-36-16	L-36-16U	117					
3/8	.3751 .3754	5/8	.6267 .6264	.645 .640	1/4	L-40-4	L-40-4U	114
					5/16	L-40-5	L-40-5U	110
					3/8	L-40-6	L-40-6U	111
					1/2	L-40-8	L-40-8U	111
					5/8	L-40-10	L-40-10U	113
					3/4	L-40-12	L-40-12U	114
1	L-40-16	L-40-16U	117					
7/16	.4377 .4380	5/8	.6267 .6264	.645 .640	1/4	L-40-4	L-40-4U	114
					5/16	L-40-5	L-40-5U	110
					3/8	L-40-6	L-40-6U	111
					1/2	L-40-8	L-40-8U	111
					5/8	L-40-10	L-40-10U	113
					3/4	L-40-12	L-40-12U	114
1	L-40-16	L-40-16U	117					
1/2	.5002 .5005	3/4	.7518 .7515	.770 .765	5/16	L-48-5	L-48-5U	111
					3/8	L-48-6	L-48-6U	114
					1/2	L-48-8	L-48-8U	114
					3/4	L-48-12	L-48-12U	117
					1	L-48-16	L-48-16U	123
					1-3/8	L-48-22	L-48-22U	133
					1-3/4	L-48-28	L-48-28U	143
					2-1/8	L-48-34	L-48-34U	160

\*\* Price Code - See Separate Net Price Schedule

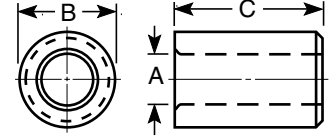
# ANSI and Acme Standard Bushings Headless Liners



## Type L



All liner bushings are honed or ground in the I.D. Liners with I.D.'s 3/16" to 1" are concentric within .0003" T.I.R. to the O.D. Other I.D. sizes are held within .0005" T.I.R. All unground bushings are left rough on the O.D. with concentricity of approximately .006" T.I.R.

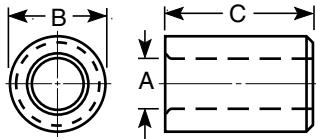


A I.D. SIZE		B BODY O.D.			C LENGTH (Overall)	ANSI SYMBOL TYPE L		** Price Code
Nominal	Actual	Nominal	Actual			Ground	Unground	
			Ground	Unground				
9/16	.5627 .5630	7/8	.8768 .8765	.895 .890	5/16	L-56-5	L-56-5U	127
					3/8	L-56-6	L-56-6U	129
					1/2	L-56-8	L-56-8U	123
					5/8	L-56-10	L-56-10U	124
					3/4	L-56-12	L-56-12U	125
					1	L-56-16	L-56-16U	128
					5/8	.6252 .6255	7/8	.8768 .8765
3/4	.7503 .7506	1	1.0018 1.0015	1.020 1.015	5/16 3/8 1/2 3/4 1 1-3/8 1-3/4 2-1/8 2-1/2 3	L-64-5 L-64-6 L-64-8 L-64-12 L-64-16 L-64-22 L-64-28 L-64-34 L-64-40 L-64-48	L-64-5U L-64-6U L-64-8U L-64-12U L-64-16U L-64-22U L-64-28U L-64-34U L-64-40U L-64-48U	124 120 124 125 128 132 146 156 174 232
7/8	.8754 .8757	1-1/4	1.2520 1.2517	1.270 1.265	3/8 1/2 5/8 3/4 1 1-1/4 1-1/2	L-80-6 L-80-8 L-80-10 L-80-12 L-80-16 L-80-20 L-80-24	L-80-6U L-80-8U L-80-10U L-80-12U L-80-16U L-80-20U L-80-24U	138 138 147 141 153 162 170
1	1.0004 1.0007	1-3/8	1.3772 1.3768	1.395 1.390	1/2 3/4 1 1-3/8 1-1/2 1-3/4 2-1/8 2-1/2 3	L-88-8 L-88-12 L-88-16 L-88-22 L-88-24 L-88-28 L-88-34 L-88-40 L-88-48	L-88-8U L-88-12U L-88-16U L-88-22U L-88-24U L-88-28U L-88-34U L-88-40U L-88-48U	153 141 153 162 170 178 194 210 262
1-1/4	1.2505 1.2509	1-5/8	1.6272 1.6268	1.645 1.640	5/8 3/4 1 1-1/4 1-1/2 1-3/4 2	L-104-10 L-104-12 L-104-16 L-104-20 L-104-24 L-104-28 L-104-32	L-104-10U L-104-12U L-104-16U L-104-20U L-104-24U L-104-28U L-104-32U	144 143 147 155 161 167 179

\*\* Price Code - See Separate Net Price Schedule



# ANSI and Acme Standard Bushings Headless Liners



All liner bushings are honed or ground in the I.D. Liners with I.D.'s 3/16" to 1" are concentric within .0003" T.I.R. to the O.D. Other I.D. sizes are held within .0005" T.I.R. All unground bushings are left rough on the O.D. with concentricity of approximately .006" T.I.R.

**Type L**



A I.D. SIZE		B BODY O.D.			C LENGTH (Overall)	ANSI SYMBOL TYPE L		** Price Code
Nominal	Actual	Nominal	Actual			Ground	Unground	
			Ground	Unground				
1-3/8	1.3756 1.3760	1-3/4	1.7523 1.7519	1.770 1.765	3/4	L-112-12	L-112-12U	173
					1	L-112-16	L-112-16U	162
					1-3/8	L-112-22	L-112-22U	173
					1-1/2	L-112-24	L-112-24U	172
					1-3/4	L-112-28	L-112-28U	186
					2-1/8	L-112-34	L-112-34U	205
					2-1/2	L-112-40	L-112-40U	256
					3	L-112-48	L-112-48U	288
1-1/2	1.5006 1.5010	1-7/8	1.8773 1.8769	1.895 1.890	3/4	L-120-12	L-120-12U	154
					1	L-120-16	L-120-16U	157
					1-1/4	L-120-20	L-120-20U	166
					1-1/2	L-120-24	L-120-24U	172
					1-3/4	L-120-28	L-120-28U	178
					2	L-120-32	L-120-32U	191
1-3/4	1.7508 1.7512	2-1/4	2.2525 2.2521	2.270 2.265	3/4	L-144-12	L-144-12U	185
					1	L-144-16	L-144-16U	196
					1-3/8	L-144-22	L-144-22U	210
					1-3/4	L-144-28	L-144-28U	223
					2-1/8	L-144-34	L-144-34U	246
					2-1/2	L-144-40	L-144-40U	264
2-1/4	2.2510 2.2515	2-3/4	2.7526 2.7522	2.770 2.765	3/4	L-176-12	L-176-12U	210
					1	L-176-16	L-176-16U	197
					1-3/8	L-176-22	L-176-22U	211
					1-3/4	L-176-28	L-176-28U	227
					2-1/8	L-176-34	L-176-34U	242
					2-1/2	L-176-40	L-176-40U	261
3	L-176-48	L-176-48U	316					

\*\* Price Code - See Separate Net Price Schedule

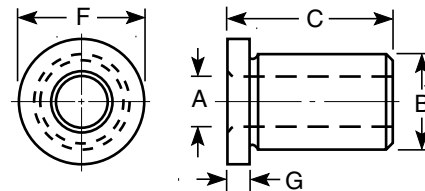
# ANSI and Acme Standard Bushings Head Liners



## Type HL



All liner bushings are honed or ground in the I.D. Liners with I.D.'s 3/16" to 1" are concentric within .0003" T.I.R. to the O.D. Other I.D. sizes are held within .0005" T.I.R. All unground bushings are left rough on the O.D. with concentricity of approximately .006" T.I.R.

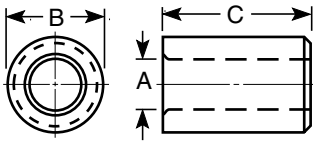


A I.D. SIZE		B BODY O.D.			C LENGTH (Overall)	ANSI SYMBOL TYPE HL		** Price Code	F & G HEAD SIZE						
Nominal	Actual	Nominal	Actual			Ground	Unground								
			Ground	Unground											
5/16	.3126 .3129	1/2	.5017 .5014	.520 .515	5/16	HL-32-5	HL-32-5U	120	F 5/8  G 3/32						
					3/8	HL-32-6	HL-32-6U	124							
					1/2	HL-32-8	HL-32-8U	125							
					3/4	HL-32-12	HL-32-12U	129							
					1	HL-32-16	HL-32-16U	146							
					1-3/8	HL-32-22	HL-32-22U	164							
1/2	.5002 .5005	3/4	.7518 .7515	.770 .765	5/16	HL-48-5	HL-48-5U	122	F 7/8  G 3/32						
					3/8	HL-48-6	HL-48-6U	125							
					1/2	HL-48-8	HL-48-8U	125							
					3/4	HL-48-12	HL-48-12U	129							
					1	HL-48-16	HL-48-16U	137							
					1-3/8	HL-48-22	HL-48-22U	149							
					1-3/4	HL-48-28	HL-48-28U	161							
					2-1/8	HL-48-34	HL-48-34U	175							
3/4	.7503 .7506	1	1.0018 1.0015	1.020 1.015	1/2	HL-64-8	HL-64-8U	136	F 1-1/8  G 1/8						
					3/4	HL-64-12	HL-64-12U	139							
					1	HL-64-16	HL-64-16U	144							
					1-3/8	HL-64-22	HL-64-22U	149							
					1-3/4	HL-64-28	HL-64-28U	168							
					2-1/8	HL-64-34	HL-64-34U	181							
					2-1/2	HL-64-40	HL-64-40U	203							
					3	HL-64-48	HL-64-48U	274							
					1	1.0004 1.0007	1-3/8	1.3772 1.3768		1.395 1.390	1/2	HL-88-8	HL-88-8U	156	F 1-1/2  G 1/8
											3/4	HL-88-12	HL-88-12U	156	
1	HL-88-16	HL-88-16U	156												
1-3/8	HL-88-22	HL-88-22U	163												
1-3/4	HL-88-28	HL-88-28U	179												
2-1/8	HL-88-34	HL-88-34U	192												
2-1/2	HL-88-40	HL-88-40U	210												
3	HL-88-48	HL-88-48U	305												
1-3/8	1.3756 1.3760	1-3/4	1.7523 1.7519	1.770 1.765					3/4		HL-112-12	HL-112-12U	175	F 1-7/8  G 3/16	
					1	HL-112-16	HL-112-16U	180							
					1-3/8	HL-112-22	HL-112-22U	191							
					1-3/4	HL-112-28	HL-112-28U	207							
					2-1/8	HL-112-34	HL-112-34U	225							
					2-1/2	HL-112-40	HL-112-40U	243							
					3	HL-112-48	HL-112-48U	324							
					1-3/4	1.7508 1.7512	2-1/4	2.2525 2.2521	2.270 2.265	3/4	HL-144-12	HL-144-12U	216		F 2-3/8  G 3/16
1	HL-144-16	HL-144-16U	204												
1-3/8	HL-144-22	HL-144-22U	217												
1-3/4	HL-144-28	HL-144-28U	232												
2-1/8	HL-144-34	HL-144-34U	249												
2-1/2	HL-144-40	HL-144-40U	269												
3	HL-144-48	HL-144-48U	331												
2-1/4	2.2510 2.2515	2-3/4	2.7526 2.7522	2.770 2.765	3/4	HL-176-12	HL-176-12U	247	F 2-7/8  G 3/16						
					1	HL-176-16	HL-176-16U	231							
					1-3/8	HL-176-22	HL-176-22U	249							
					1-3/4	HL-176-28	HL-176-28U	269							
					2-1/8	HL-176-34	HL-176-34U	284							
					2-1/2	HL-176-40	HL-176-40U	304							
					3	HL-176-48	HL-176-48U	336							

\*\* Price Code - See Separate Net Price Schedule



# Extended Range Bushings Headless Press Fit



Extended Range Bushings with a ground O.D. are concentric within .0005" T.I.R. Unground Extended Range Bushings have a concentricity of .006" T.I.R. To order an unground O.D., add the letter "U" to the end of the ANSI designation.

**Type P**



The price code is listed below the ANSI designation for each Extended Range Bushing and applies to standard drill sizes only. For prices see separate price schedule. Special Extended Range Bushings will be priced on request.

Extended Range Bushings are not returnable.

A I.D. RANGE	+ .0003 + .0007	1.5000 to 2.0000	1.5000 to 2.1250	1.5000 to 2.3750	1.7500 to 2.5000	2.2500 to 2.7500	2.2500 to 2.8750	2.5000 to 3.0000	2.5000 to 3.1250	2.7500 to 3.3750	3.0000 to 3.6250	3.0000 to 3.7500	3.3750 to 3.8750	3.3750 to 4.1250	3.6250 to 4.2500
B O.D. GROUND		2.3775 2.3771	2.5025 2.5021	2.7525 2.7521	3.0028 3.0023	3.2528 3.2523	3.3778 3.3773	3.5028 3.5023	3.7528 3.7523	4.0028 4.0023	4.2530 4.2525	4.3780 4.3775	4.5030 4.5025	4.7530 4.7525	5.0030 5.0025
B O.D. UNGROUND		2.395 2.390	2.520 2.515	2.770 2.765	3.020 3.015	3.270 3.265	3.395 3.390	3.520 3.515	3.770 3.765	4.020 4.015	4.270 4.265	4.395 4.390	4.520 4.515	4.770 4.765	5.020 5.015
LENGTH C	3/4	P152-12 279	P160-12 306	P176-12 318	P192-12 323	P208-12 349	P216-12 351	P224-12 354	P240-12 358	P256-12 363	P272-12 369	P280-12 372	P288-12 375	P304-12 382	P320-12 388
	1	P152-16 294	P160-16 311	P176-16 323	P192-16 331	P208-16 354	P216-16 357	P224-16 360	P240-16 365	P256-16 372	P272-16 378	P280-16 382	P288-16 385	P304-16 391	P320-16 398
	1-1/4	P152-20 294	P160-20 317	P176-20 330	P192-20 335	P208-20 361	P216-20 364	P224-20 367	P240-20 375	P256-20 383	P272-20 389	P280-20 392	P288-20 395	P304-20 402	P320-20 414
	1-1/2	P152-24 295	P160-24 322	P176-24 335	P192-24 336	P208-24 367	P216-24 371	P224-24 375	P240-24 384	P256-24 391	P272-24 399	P280-24 402	P288-24 406	P304-24 414	P320-24 422
	1-3/4	P152-28 307	P160-28 328	P176-28 336	P192-28 337	P208-28 375	P216-28 379	P224-28 384	P240-28 390	P256-28 399	P272-28 407	P280-28 411	P288-28 416	P304-28 426	P320-28 433
	2	P152-32 314	P160-32 333	P176-32 337	P192-32 341	P208-32 383	P216-32 387	P224-32 390	P240-32 399	P256-32 407	P272-32 417	P280-32 422	P288-32 428	P304-32 439	P320-32 448
	2-1/8	P152-34 316	P160-34 335	P176-34 338											
	2-1/4	P152-36 319	P160-36 336	P176-36 338	P192-36 348	P208-36 389	P216-36 394	P224-36 397	P240-36 406	P256-36 416	P272-36 428	P280-36 433	P288-36 439	P304-36 448	P320-36 459
	2-1/2	P152-40 323	P160-40 336	P176-40 343	P192-40 354	P208-40 394	P216-40 399	P224-40 403	P240-40 413	P256-40 424	P272-40 437	P280-40 442	P288-40 447	P304-40 456	P320-40 466
	2-3/4	P152-44 330	P160-44 337	P176-44 348	P192-44 359	P208-44 400	P216-44 405	P224-44 409	P240-44 419	P256-44 432	P272-44 445	P280-44 449	P288-44 455	P304-44 464	P320-44 473
	3	P152-48 334	P160-48 338	P176-48 353	P192-48 366	P208-48 401	P216-48 411	P224-48 416	P240-48 427	P256-48 440	P272-48 452	P280-48 457	P288-48 462	P304-48 471	P320-48 483
	3-1/4	P152-52 336	P160-52 345	P176-52 359	P192-52 372	P208-52 412	P216-52 419	P224-52 425	P240-52 437	P256-52 448	P272-52 460	P280-52 466	P288-52 471	P304-52 482	P320-52 494
	3-1/2	P152-56 338	P160-56 356	P176-56 371	P192-56 384	P208-56 423	P216-56 429	P224-56 436	P240-56 447	P256-56 460	P272-56 471	P280-56 477	P288-56 483	P304-56 495	P320-56 506
	3-3/4	P152-60 343	P160-60 361	P176-60 376	P192-60 389	P208-60 429	P216-60 434	P224-60 443	P240-60 454	P256-60 466	P272-60 478	P280-60 485	P288-60 490	P304-60 502	P320-60 514
	4	P152-64 348	P160-64 367	P176-64 385	P192-64 400	P208-64 440	P216-64 445	P224-64 450	P240-64 461	P256-64 472	P272-64 486	P280-64 492	P288-64 498	P304-64 510	P320-64 523
	4-1/4	P152-68 361	P160-68 381	P176-68 396	P192-68 409	P208-68 447	P216-68 453	P224-68 458	P240-68 469	P256-68 480	P272-68 493	P280-68 499	P288-68 505	P304-68 518	P320-68 533
	4-1/2	P152-72 371	P160-72 391	P176-72 406	P192-72 417	P208-72 454	P216-72 459	P224-72 464	P240-72 475	P256-72 488	P272-72 501	P280-72 506	P288-72 513	P304-72 528	P320-72 542
	4-3/4	P152-76 380	P160-76 398	P176-76 413	P192-76 427	P208-76 462	P216-76 466	P224-76 471	P240-76 485	P256-76 497	P272-76 510	P280-76 517	P288-76 524	P304-76 540	P320-76 551
	5	P152-80 389	P160-80 406	P176-80 423	P192-80 442	P208-80 471	P216-80 477	P224-80 482	P240-80 495	P256-80 507	P272-80 522	P280-80 530	P288-80 538	P304-80 551	P320-80 564
	5-1/2						P216-88 488	P224-88 492	P240-88 505	P256-88 520	P272-88 536	P280-88 543	P288-88 549	P304-88 562	P320-88 580
6								P240-96 515	P256-96 532	P272-96 547	P280-96 551	P288-96 558	P304-96 576	P320-96 594	

# Extended Range Bushings Head Press Fit

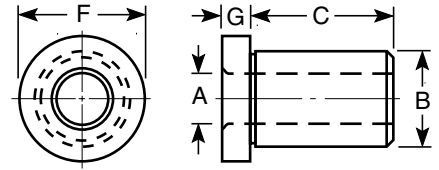


## Type H



Extended Range Bushings with a ground O.D. are concentric within .0005" T.I.R. Unground Extended Range Bushings have a concentricity of .006" T.I.R. To order an unground O.D., add the letter "U" to the end of the ANSI designation.

The price code is listed below the ANSI designation for each Extended Range Bushing and applies to standard drill sizes only. For prices see separate price schedule. Special Extended Range Bushings will be priced on request.



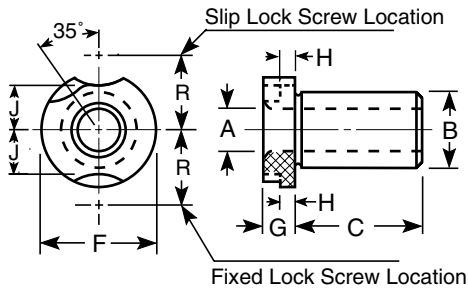
Extended Range Bushings are not returnable.

A I.D. RANGE		1.5000 to 2.0000	1.5000 to 2.1250	1.5000 to 2.3750	1.7500 to 2.5000	2.2500 to 2.7500	2.2500 to 2.8750	2.5000 to 3.0000	2.5000 to 3.1250	2.7500 to 3.3750	3.0000 to 3.6250	3.0000 to 3.7500	3.3750 to 3.8750	3.3750 to 4.1250	3.6250 to 4.2500
B O.D. GROUND		2.3775 2.3771	2.5025 2.5021	2.7525 2.7521	3.0028 3.0023	3.2528 3.2523	3.3778 3.3773	3.5028 3.5023	3.7528 3.7523	4.0028 4.0023	4.2530 4.2525	4.3780 4.3775	4.5030 4.5025	4.7530 4.7525	5.0030 5.0025
B O.D. UNGROUND		2.395 2.390	2.520 2.515	2.770 2.765	3.020 3.015	3.270 3.265	3.395 3.390	3.520 3.515	3.770 3.765	4.020 4.015	4.270 4.265	4.395 4.390	4.520 4.515	4.770 4.765	5.020 5.015
L E N G T H  C	3/4	H152-12 323	H160-12 325	H176-12 333	H192-12 335	H208-12 358	H216-12 365	H224-12 376	H240-12 383	H256-12 389	H272-12 397	H280-12 401	H288-12 405	H304-12 415	H320-12 430
	1	H152-16 330	H160-16 332	H176-16 335	H192-16 336	H208-16 365	H216-16 373	H224-16 385	H240-16 390	H256-16 397	H272-16 405	H280-16 410	H288-16 415	H304-16 425	H320-16 437
	1-1/4	H152-20 334	H160-20 335	H176-20 336	H192-20 338	H208-20 371	H216-20 380	H224-20 390	H240-20 397	H256-20 405	H272-20 414	H280-20 419	H288-20 424	H304-20 436	H320-20 446
	1-1/2	H152-24 335	H160-24 336	H176-24 337	H192-24 341	H208-24 379	H216-24 387	H224-24 398	H240-24 405	H256-24 415	H272-24 425	H280-24 430	H288-24 436	H304-24 446	H320-24 456
	1-3/4	H152-28 336	H160-28 337	H176-28 338	H192-28 347	H208-28 385	H216-28 394	H224-28 405	H240-28 413	H256-28 425	H272-28 435	H280-28 440	H288-28 445	H304-28 455	H320-28 466
	2	H152-32 337	H160-32 338	H176-32 344	H192-32 352	H208-32 391	H216-32 400	H224-32 412	H240-32 423	H256-32 434	H272-32 445	H280-32 450	H288-32 455	H304-32 466	H320-32 474
	2-1/8	H152-34 338	H160-34 340	H176-34 347											
	2-1/4	H152-36 339	H160-36 342	H176-36 348	H192-36 357	H208-36 396	H216-36 406	H224-36 419	H240-36 430	H256-36 441	H272-36 452	H280-36 457	H288-36 463	H304-36 472	H320-36 483
	2-1/2	H152-40 344	H160-40 349	H176-40 355	H192-40 364	H208-40 403	H216-40 414	H224-40 427	H240-40 439	H256-40 448	H272-40 459	H280-40 465	H288-40 470	H304-40 482	H320-40 492
	2-3/4	H152-44 349	H160-44 352	H176-44 360	H192-44 370	H208-44 409	H216-44 420	H224-44 434	H240-44 445	H256-44 455	H272-44 467	H280-44 472	H288-44 479	H304-44 490	H320-44 501
	3	H152-48 354	H160-48 357	H176-48 366	H192-48 377	H208-48 415	H216-48 427	H224-48 442	H240-48 452	H256-48 464	H272-48 473	H280-48 480	H288-48 488	H304-48 499	H320-48 510
	3-1/4	H152-52 362	H160-52 366	H176-52 375	H192-52 386	H208-52 425	H216-52 439	H224-52 452	H240-52 462	H256-52 473	H272-52 485	H280-52 491	H288-52 499	H304-52 511	H320-52 524
	3-1/2	H152-56 374	H160-56 380	H176-56 388	H192-56 398	H208-56 439	H216-56 452	H224-56 464	H240-56 474	H256-56 488	H272-56 500	H280-56 506	H288-56 514	H304-56 529	H320-56 542
	3-3/4	H152-60 381	H160-60 386	H176-60 394	H192-60 405	H208-60 445	H216-60 458	H224-60 470	H240-60 482	H256-60 495	H272-60 507	H280-60 514	H288-60 524	H304-60 539	H320-60 550
	4	H152-64 387	H160-64 392	H176-64 402	H192-64 413	H208-64 453	H216-64 466	H224-64 478	H240-64 490	H256-64 504	H272-64 517	H280-64 525	H288-64 536	H304-64 549	H320-64 560
	4-1/4	H152-68 397	H160-68 402	H176-68 412	H192-68 423	H208-68 460	H216-68 472	H224-68 486	H240-68 498	H256-68 511	H272-68 526	H280-68 535	H288-68 545	H304-68 555	H320-68 571
	4-1/2	H152-72 406	H160-72 412	H176-72 423	H192-72 435	H208-72 467	H216-72 480	H224-72 493	H240-72 504	H256-72 518	H272-72 535	H280-72 542	H288-72 551	H304-72 564	H320-72 581
	4-3/4	H152-76 419	H160-76 425	H176-76 435	H192-76 446	H208-76 473	H216-76 487	H224-76 499	H240-76 510	H256-76 526	H272-76 542	H280-76 549	H288-76 556	H304-76 574	H320-76 591
	5	H152-80 426	H160-80 431	H176-80 443	H192-80 454	H208-80 481	H216-80 493	H224-80 505	H240-80 518	H256-80 533	H272-80 549	H280-80 553	H288-80 566	H304-80 583	H320-80 598
	5-1/2						H216-88 502	H224-88 514	H240-88 529	H256-88 544	H272-88 557	H280-88 566	H288-88 580	H304-88 596	H320-88 609
6								H240-96 542	H256-96 552	H272-96 573	H280-96 583	H288-96 595	H304-96 608	H320-96 622	
HEAD SIZE	F	2-3/4	2-3/4	3	3-1/4	3-1/2	3-5/8	3-7/8	4-1/8	4-3/8	4-5/8	4-3/4	4-7/8	5-1/8	5-3/8
	G	3/8	3/8	3/8	3/8	3/8	3/8	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2





# Extended Range Bushings Slip-Fixed Renewable



Extended Range Slip-Fixed Renewable Bushings are ground to slip fit into Liners and are concentric within .0005" T.I.R.

The price code is listed below the ANSI designation for each Extended Range Bushing and applies to standard drill sizes only. For prices see separate price schedule. Special Extended Range Bushings will be priced on request.

Extended Range Bushings are not returnable.

## Type SF



A I.D. RANGE	+ .0003 + .0007	1.0937 to 1.5312	1.5000 to 2.0312	1.5000 to 2.2812	1.7500 to 2.5312	2.2500 to 2.6250	2.2500 to 2.8750	2.6250 to 2.8750	2.5000 to 3.1250	2.7500 to 3.2500	3.0000 to 3.5000	3.0000 to 3.6250	3.3750 to 3.7500	3.3750 to 4.0000	3.6250 to 4.2500
B O.D.		2.0000 to 1.9996	2.5000 to 2.4996	2.7500 to 2.7496	3.0000 to 2.9996	3.2500 to 3.2496	3.3750 to 3.3746	3.5000 to 3.4996	3.7500 to 3.7496	4.0000 to 3.9996	4.2500 to 4.2496	4.3750 to 4.3746	4.5000 to 4.4996	4.7500 to 4.7496	5.0000 to 4.9996
LENGTH	3/4	SF128-12 326	SF160-12 382	SF176-12 406	SF192-12 438	SF208-12 442	SF216-12 447	SF224-12 451	SF240-12 455	SF256-12 470	SF272-12 475	SF280-12 481	SF288-12 489	SF304-12 497	SF320-12 506
	1	SF128-16 330	SF160-16 387	SF176-16 415	SF192-16 443	SF208-16 448	SF216-16 453	SF224-16 458	SF240-16 462	SF256-16 473	SF272-16 481	SF280-16 487	SF288-16 495	SF304-16 502	SF320-16 514
	1-1/4	SF128-20 335	SF160-20 394	SF176-20 419	SF192-20 448	SF208-20 454	SF216-20 460	SF224-20 464	SF240-20 467	SF256-20 480	SF272-20 487	SF280-20 493	SF288-20 500	SF304-20 507	SF320-20 521
	1-1/2	SF128-24 337	SF160-24 400	SF176-24 431	SF192-24 454	SF208-24 460	SF216-24 466	SF224-24 471	SF240-24 474	SF256-24 486	SF272-24 492	SF280-24 498	SF288-24 505	SF304-24 512	SF320-24 529
	1-3/4	SF128-28 338	SF160-28 408	SF176-28 439	SF192-28 459	SF208-28 467	SF216-28 473	SF224-28 477	SF240-28 482	SF256-28 492	SF272-28 500	SF280-28 504	SF288-28 511	SF304-28 519	SF320-28 537
	2	SF128-32 350	SF160-32 417	SF176-32 445	SF192-32 465	SF208-32 472	SF216-32 481	SF224-32 485	SF240-32 489	SF256-32 498	SF272-32 506	SF280-32 509	SF288-32 517	SF304-32 525	SF320-32 545
	2-1/8	SF128-34 354	SF160-34 426	SF176-34 451											
	2-1/4	SF128-36 365	SF160-36 429	SF176-36 455	SF192-36 470	SF208-36 480	SF216-36 489	SF224-36 493	SF240-36 497	SF256-36 505	SF272-36 512	SF280-36 517	SF288-36 525	SF304-36 533	SF320-36 550
	2-1/2	SF128-40 370	SF160-40 438	SF176-40 460	SF192-40 476	SF208-40 486	SF216-40 497	SF224-40 500	SF240-40 504	SF256-40 511	SF272-40 520	SF280-40 525	SF288-40 533	SF304-40 541	SF320-40 555
	2-3/4	SF128-44 380	SF160-44 444	SF176-44 466	SF192-44 483	SF208-44 494	SF216-44 504	SF224-44 507	SF240-44 512	SF256-44 519	SF272-44 528	SF280-44 534	SF288-44 541	SF304-44 548	SF320-44 564
	3	SF128-48 387	SF160-48 448	SF176-48 470	SF192-48 489	SF208-48 500	SF216-48 512	SF224-48 516	SF240-48 521	SF256-48 527	SF272-48 536	SF280-48 542	SF288-48 548	SF304-48 552	SF320-48 573
	3-1/4	SF128-52 398	SF160-52 454	SF176-52 474	SF192-52 497	SF208-52 509	SF216-52 522	SF224-52 527	SF240-52 526	SF256-52 536	SF272-52 543	SF280-52 549	SF288-52 553	SF304-52 561	SF320-52 582
	3-1/2	SF128-56 406	SF160-56 459	SF176-56 479	SF192-56 503	SF208-56 517	SF216-56 532	SF224-56 536	SF240-56 541	SF256-56 543	SF272-56 550	SF280-56 555	SF288-56 562	SF304-56 570	SF320-56 593
	3-3/4	SF128-60 413	SF160-60 463	SF176-60 485	SF192-60 510	SF208-60 526	SF216-60 542	SF224-60 545	SF240-60 549	SF256-60 551	SF272-60 556	SF280-60 566	SF288-60 574	SF304-60 581	SF320-60 601
	4	SF128-64 419	SF160-64 466	SF176-64 489	SF192-64 519	SF208-64 534	SF216-64 548	SF224-64 551	SF240-64 553	SF256-64 557	SF272-64 564	SF280-64 577	SF288-64 585	SF304-64 592	SF320-64 609
	4-1/4	SF128-68 424	SF160-68 471	SF176-68 494	SF192-68 528	SF208-68 542	SF216-68 551	SF224-68 556	SF240-68 564	SF256-68 569	SF272-68 578	SF280-68 589	SF288-68 595	SF304-68 601	SF320-68 614
	4-1/2	SF128-72 430	SF160-72 477	SF176-72 498	SF192-72 538	SF208-72 549	SF216-72 556	SF224-72 565	SF240-72 574	SF256-72 581	SF272-72 590	SF280-72 597	SF288-72 603	SF304-72 610	SF320-72 628
	4-3/4	SF128-76 436	SF160-76 483	SF176-76 503	SF192-76 546	SF208-76 552	SF216-76 563	SF224-76 574	SF240-76 584	SF256-76 592	SF272-76 598	SF280-76 605	SF288-76 612	SF304-76 618	SF320-76 637
	5	SF128-80 441	SF160-80 490	SF176-80 511	SF192-80 552	SF208-80 560	SF216-80 570	SF224-80 583	SF240-80 593	SF256-80 599	SF272-80 606	SF280-80 613	SF288-80 620	SF304-80 628	SF320-80 643
	5-1/2						SF216-88 584	SF224-88 599	SF240-88 606	SF256-88 615	SF272-88 622	SF280-88 630	SF288-88 637	SF304-88 642	SF320-88 652
HEAD SIZE	F	2-9/16	3-1/16	3-7/16	3-11/16	3-15/16	4-1/16	4-3/16	4-9/16	4-13/16	5-1/16	5-3/16	5-5/16	5-9/16	5-13/16
	G	3/8	3/8	7/16	7/16	7/16	7/16	7/16	7/16	1/2	1/2	1/2	1/2	1/2	1/2
	H	3/16	3/16	7/32	7/32	7/32	7/32	7/32	7/32	1/4	1/4	1/4	1/4	1/4	1/4
	J	1-1/8	1-3/8	1-35/64	1-43/64	1-51/64	1-55/64	1-59/64	2-7/64	2-15/64	2-23/64	2-27/64	2-31/64	2-39/64	2-47/64
Lock Screw		3A-LS	3A-LS	4A-LS	4A-LS	4A-LS	4A-LS	4A-LS	4A-LS	5A-LS	5A-LS	5A-LS	5A-LS	5A-LS	

# Extended Range Bushings Headless Liners



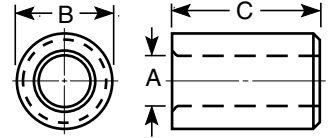
## Type L



Extended Range Bushings with a ground O.D. are concentric within .0005" T.I.R. Unground Extended Range Bushings have a concentricity of .006" T.I.R. To order an unground O.D., add the letter "U" to the end of the ANSI designation.

The price code is listed below the ANSI designation for each Extended Range Bushing. For prices see separate price schedule.

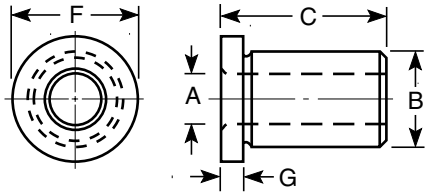
Extended Range Bushings are not returnable.



A I.D. SIZE	2.0010 2.0015	2.5010 2.5015	2.7510 2.7515	3.0010 3.0015	3.2510 3.2515	3.3760 3.3765	3.5010 3.5015	3.7510 3.7515	4.0010 4.0015	4.2510 4.2515	4.3760 4.3765	4.5010 4.5015	4.7510 4.7515	5.0010 5.0015	
B O.D. GROUND	2.5025 2.5021	3.0028 3.0023	3.3778 3.3773	3.6278 3.6273	3.8778 3.8773	4.0028 4.0023	4.1280 4.1275	4.5030 4.5025	4.7530 4.7525	5.0030 5.0025	5.1280 5.1275	5.2530 5.2525	5.5030 5.5025	5.7530 5.7525	
B O.D. UNGROUND	2.520 2.515	3.020 3.015	3.395 3.390	3.645 3.640	3.895 3.890	4.020 4.015	4.145 4.140	4.520 4.515	4.770 4.765	5.020 5.015	5.145 5.140	5.270 5.265	5.520 5.515	5.770 5.765	
↑ <b>L E N G T H C</b> ↓	3/4	L160-12 306	L192-12 323	L216-12 351	L232-12 356	L248-12 360	L256-12 363	L264-12 366	L288-12 375	L304-12 382	L320-12 388	L328-12 391	L336-12 395	L352-12 401	L368-12 408
	1	L160-16 311	L192-16 331	L216-16 357	L232-16 363	L248-16 369	L256-16 372	L264-16 375	L288-16 385	L304-16 391	L320-16 398	L328-16 401	L336-16 405	L352-16 412	L368-16 420
	1-1/4	L160-20 317	L192-20 335	L216-20 364	L232-20 370	L248-20 378	L256-20 383	L264-20 386	L288-20 395	L304-20 402	L320-20 410	L328-20 413	L336-20 417	L352-20 425	L368-20 433
	1-1/2	L160-24 322	L192-24 336	L216-24 371	L232-24 379	L248-24 386	L256-24 391	L264-24 394	L288-24 406	L304-24 414	L320-24 422	L328-24 426	L336-24 430	L352-24 439	L368-24 447
	1-3/4	L160-28 328	L192-28 337	L216-28 379	L232-28 387	L248-28 394	L256-28 399	L264-28 403	L288-28 416	L304-28 426	L320-28 433	L328-28 438	L336-28 443	L352-28 450	L368-28 459
	2	L160-32 333	L192-32 341	L216-32 387	L232-32 394	L248-32 402	L256-32 407	L264-32 412	L288-32 428	L304-32 439	L320-32 448	L328-32 452	L336-32 455	L352-32 462	L368-32 469
	2-1/8	L160-34 335	L192-34 345	L216-34 390											
	2-1/4	L160-36 336	L192-36 348	L216-36 394	L232-36 401	L248-36 410	L256-36 416	L264-36 421	L288-36 439	L304-36 448	L320-36 459	L328-36 463	L336-36 466	L352-36 473	L368-36 482
	2-1/2	L160-40 336	L192-40 354	L216-40 399	L232-40 408	L248-40 418	L256-40 424	L264-40 430	L288-40 447	L304-40 456	L320-40 466	L328-40 470	L336-40 475	L352-40 485	L368-40 496
	2-3/4	L160-44 337	L192-44 359	L216-44 405	L232-44 414	L248-44 425	L256-44 432	L264-44 438	L288-44 455	L304-44 464	L320-44 473	L328-44 479	L336-44 485	L352-44 497	L368-44 509
	3	L160-48 338	L192-48 366	L216-48 411	L232-48 422	L248-48 433	L256-48 440	L264-48 445	L288-48 462	L304-48 471	L320-48 483	L328-48 489	L336-48 496	L352-48 507	L368-48 521
	3-1/4	L160-52 345	L192-52 372	L216-52 419	L232-52 431	L248-52 443	L256-52 448	L264-52 454	L288-52 471	L304-52 482	L320-52 494	L328-52 500	L336-52 506	L352-52 520	L368-52 535
	3-1/2	L160-56 356	L192-56 384	L216-56 429	L232-56 442	L248-56 454	L256-56 460	L264-56 466	L288-56 483	L304-56 495	L320-56 506	L328-56 512	L336-56 520	L352-56 535	L368-56 549
	3-3/4	L160-60 361	L192-60 389	L216-60 434	L232-60 447	L248-60 460	L256-60 466	L264-60 471	L288-60 490	L304-60 502	L320-60 514	L328-60 522	L336-60 529	L352-60 544	L368-60 554
	4	L160-64 367	L192-64 400	L216-64 445	L232-64 455	L248-64 466	L256-64 472	L264-64 478	L288-64 498	L304-64 510	L320-64 523	L328-64 531	L336-64 539	L352-64 551	L368-64 565
	4-1/4	L160-68 381	L192-68 409	L216-68 453	L232-68 463	L248-68 473	L256-68 480	L264-68 486	L288-68 505	L304-68 518	L320-68 533	L328-68 541	L336-68 548	L352-68 559	L368-68 577
	4-1/2	L160-72 391	L192-72 417	L216-72 459	L232-72 469	L248-72 481	L256-72 488	L264-72 494	L288-72 513	L304-72 528	L320-72 542	L328-72 549	L336-72 553	L352-72 570	L368-72 590
	4-3/4	L160-76 398	L192-76 427	L216-76 466	L232-76 477	L248-76 490	L256-76 497	L264-76 502	L288-76 524	L304-76 540	L320-76 551	L328-76 558	L336-76 566	L352-76 585	L368-76 600
	5	L160-80 406	L192-80 442	L216-80 477	L232-80 488	L248-80 501	L256-80 507	L264-80 513	L288-80 538	L304-80 551	L320-80 564	L328-80 573	L336-80 583	L352-80 599	L368-80 613
	5-1/2						L256-88 520	L264-88 527	L288-88 549	L304-88 562	L320-88 580	L328-88 590	L336-88 597	L352-88 611	L368-88 627



# Extended Range Bushings Head Liners



Extended Range Bushings with a ground O.D. are concentric within .0005" T.I.R. Unground Extended Range Bushings have a concentricity of .006" T.I.R. To order an unground O.D., add the letter "U" to the end of the ANSI designation.

## Type HL



The price code is listed below the ANSI designation for each Extended Range Bushing. For prices see separate price schedule.

Extended Range Bushings are not returnable.

A I.D. SIZE	2.0010 2.0015	2.5010 2.5015	2.7510 2.7515	3.0010 3.0015	3.2510 3.2515	3.3760 3.3765	3.5010 3.5015	3.7510 3.7515	4.0010 4.0015	4.2510 4.2515	4.3760 4.3765	4.5010 4.5015	4.7510 4.7515	5.0010 5.0015	
B O.D. GROUND	2.5025 2.5021	3.0028 3.0023	3.3778 3.3773	3.6278 3.6273	3.8778 3.8773	4.0028 4.0023	4.1280 4.1275	4.5030 4.5025	4.7530 4.7525	5.0030 5.0025	5.1280 5.1275	5.2530 5.2525	5.5030 5.5025	5.7530 5.7525	
B O.D. UNGROUND	2.520 2.515	3.020 3.015	3.395 3.390	3.645 3.640	3.895 3.890	4.020 4.015	4.145 4.140	4.520 4.515	4.770 4.765	5.020 5.015	5.145 5.140	5.270 5.265	5.520 5.515	5.770 5.765	
↑ <b>L E N G T H  C</b> ↓	3/4	HL160-12 325	HL192-12 335	HL216-12 365	HL232-12 379	HL248-12 386	HL256-12 389	HL264-12 392	HL288-12 405	HL304-12 415	HL320-12 430	HL328-12 433	HL336-12 437	HL352-12 447	HL368-12 458
	1	HL160-16 332	HL192-16 336	HL216-16 373	HL232-16 387	HL248-16 394	HL256-16 397	HL264-16 401	HL288-16 415	HL304-16 425	HL320-16 437	HL328-16 443	HL336-16 447	HL352-16 458	HL368-16 467
	1-1/4	HL160-20 335	HL192-20 338	HL216-20 380	HL232-20 394	HL248-20 401	HL256-20 405	HL264-20 409	HL288-20 424	HL304-20 436	HL320-20 446	HL328-20 452	HL336-20 456	HL352-20 466	HL368-20 476
	1-1/2	HL160-24 336	HL192-24 341	HL216-24 387	HL232-24 401	HL248-24 410	HL256-24 415	HL264-24 419	HL288-24 436	HL304-24 446	HL320-24 456	HL328-24 462	HL336-24 466	HL352-24 476	HL368-24 488
	1-3/4	HL160-28 337	HL192-28 347	HL216-28 394	HL232-28 408	HL248-28 419	HL256-28 425	HL264-28 429	HL288-28 445	HL304-28 455	HL320-28 466	HL328-28 470	HL336-28 475	HL352-28 487	HL368-28 499
	2	HL160-32 338	HL192-32 352	HL216-32 400	HL232-32 417	HL248-32 428	HL256-32 434	HL264-32 440	HL288-32 455	HL304-32 466	HL320-32 474	HL328-32 480	HL336-32 486	HL352-32 497	HL368-32 509
	2-1/8	HL160-34 340	HL192-34 355	HL216-34 404											
	2-1/4	HL160-36 342	HL192-36 357	HL216-36 406	HL232-36 424	HL248-36 436	HL256-36 441	HL264-36 446	HL288-36 463	HL304-36 472	HL320-36 483	HL328-36 489	HL336-36 495	HL352-36 506	HL368-36 520
	2-1/2	HL160-40 349	HL192-40 364	HL216-40 414	HL232-40 432	HL248-40 444	HL256-40 448	HL264-40 454	HL288-40 470	HL304-40 482	HL320-40 492	HL328-40 498	HL336-40 503	HL352-40 516	HL368-40 531
	2-3/4	HL160-44 352	HL192-44 370	HL216-44 420	HL232-44 440	HL248-44 450	HL256-44 455	HL264-44 461	HL288-44 479	HL304-44 490	HL320-44 501	HL328-44 506	HL336-44 512	HL352-44 527	HL368-44 542
	3	HL160-48 357	HL192-48 377	HL216-48 427	HL232-48 447	HL248-48 457	HL256-48 464	HL264-48 468	HL288-48 488	HL304-48 499	HL320-48 510	HL328-48 517	HL336-48 524	HL352-48 539	HL368-48 551
	3-1/4	HL160-52 366	HL192-52 386	HL216-52 439	HL232-52 457	HL248-52 467	HL256-52 473	HL264-52 479	HL288-52 499	HL304-52 511	HL320-52 524	HL328-52 532	HL336-52 539	HL352-52 551	HL368-52 566
	3-1/2	HL160-56 380	HL192-56 398	HL216-56 452	HL232-56 469	HL248-56 480	HL256-56 488	HL264-56 494	HL288-56 514	HL304-56 529	HL320-56 542	HL328-56 549	HL336-56 553	HL352-56 571	HL368-56 590
	3-3/4	HL160-60 386	HL192-60 405	HL216-60 458	HL232-60 476	HL248-60 488	HL256-60 495	HL264-60 501	HL288-60 524	HL304-60 539	HL320-60 550	HL328-60 555	HL336-60 564	HL352-60 583	HL368-60 599
	4	HL160-64 392	HL192-64 413	HL216-64 466	HL232-64 485	HL248-64 496	HL256-64 504	HL264-64 510	HL288-64 536	HL304-64 549	HL320-64 560	HL328-64 568	HL336-64 579	HL352-64 595	HL368-64 610
	4-1/4	HL160-68 402	HL192-68 423	HL216-68 472	HL232-68 492	HL248-68 504	HL256-68 511	HL264-68 519	HL288-68 545	HL304-68 555	HL320-68 571	HL328-68 581	HL336-68 590	HL352-68 604	HL368-68 619
	4-1/2	HL160-72 412	HL192-72 435	HL216-72 480	HL232-72 499	HL248-72 510	HL256-72 518	HL264-72 526	HL288-72 551	HL304-72 564	HL320-72 581	HL328-72 591	HL336-72 597	HL352-72 612	HL368-72 627
	4-3/4	HL160-76 425	HL192-76 446	HL216-76 487	HL232-76 505	HL248-76 517	HL256-76 526	HL264-76 534	HL288-76 556	HL304-76 574	HL320-76 591	HL328-76 598	HL336-76 605	HL352-76 625	HL368-76 636
	5	HL160-80 431	HL192-80 454	HL216-80 493	HL232-80 511	HL248-80 525	HL256-80 533	HL264-80 542	HL288-80 566	HL304-80 583	HL320-80 598	HL328-80 605	HL336-80 612	HL352-80 628	HL368-80 642
	5-1/2						HL256-88 544	HL264-88 551	HL288-88 580	HL304-88 596	HL320-88 609	HL328-88 616	HL336-88 624	HL352-88 640	HL368-88 649
HEAD SIZE	F	2-5/8	3-1/8	3-1/2	3-7/8	4-1/8	4-1/4	4-3/8	4-3/4	5	5-1/4	5-3/8	5-1/2	5-3/4	6
	G	3/16	3/16	3/16	3/16	3/16	3/16	3/16	7/32	7/32	7/32	7/32	7/32	7/32	7/32

# Extra-Thinwall Bushings

## Type XTW



All "XTW" bushings are lapped, honed or ground in the I.D. Bushings with I.D.'s of 1/8" to 1" are ground to give a uniform wall thickness within .0003" T.I.R. Other I.D. sizes are held within .0005" T.I.R. Wall thickness (W) must fall within the range indicated in the chart below to be considered "XTW".

Because of the extremely thin wall, this type bushing tends to assume the shape of the hole into which it is inserted or the shape of the arbor onto which it is pressed. It will not necessarily be round in the free state.

Unless specified otherwise, "Xtra-Thinwall" Bushings will be manufactured to the following tolerances:

I.D. - Standard I.D. tolerances

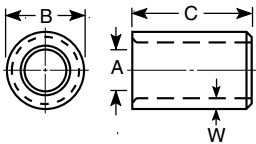
O.D. - Type XTWP and XTWH: Standard press fit tolerances

Type XTWSF: Standard slip-fit tolerances

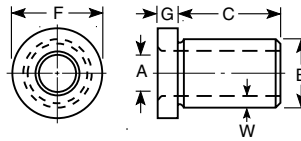
Xtra-Thinwall Bushings are not returnable.

Prices on request.

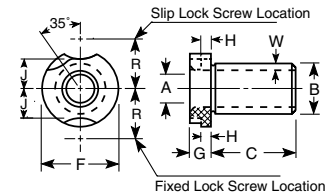
### Type XTWP



### Type XTWH



### Type XTWSF

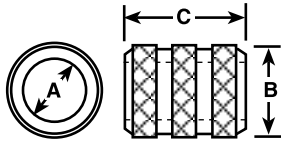


A I.D. Range	B O.D. Range	W Wall Thickness	C Length (Specify)	HEAD DIMENSIONS TYPE XTWH		HEAD DIMENSIONS TYPE XTWSF					
				F	G	F	G	H	J	R	Lock Screw
.0135 to .0485	.0785 to .1285	.0325 to .0400		1/4	3/32	5/16	3/16	3/32	3/32	17/64	#1-LS
.0486 to .0625	.0786 to .1425	.015 to .040		1/4	3/32	5/16	3/16	3/32	3/32	17/64	#1-LS
.0626 to .0995	.0926 to .1795	.015 to .040		5/16	3/32	5/16	3/16	3/32	3/32	17/64	#1-LS
.0996 to .1405	.1376 to .2305	.018 to .045		23/64	3/32	7/16	1/4	1/8	9/64	23/64	#2-LS
.1406 to .1910	.1786 to .2850	.019 to .047		27/64	1/8	35/64	1/4	1/8	11/64	1/2	1A-LS
.1911 to .2280	.2311 to .3140	.020 to .048		27/64	1/8	5/8	1/4	1/8	15/64	29/64	#2-LS
.2281 to .2900	.2671 to .3900	.021 to .050		1/2	5/32	5/8	1/4	1/8	15/64	29/64	#2-LS
.2901 to .3437	.3341 to .4577	.022 to .052		39/64	7/32	51/64	1/4	1/8	19/64	5/8	1A-LS
.3438 to .4375	.3918 to .5475	.024 to .055		11/16	3/32	7/8	1/4	1/8	23/64	37/64	#2-LS
.4376 to .5311	.4916 to .6512	.027 to .060		59/64	7/32	1-3/64	1/4	1/8	27/64	3/4	1A-LS
.5312 to .6561	.5913 to .7862	.030 to .065		1-7/64	1/4	1-1/4	3/8	3/16	31/64	53/64	2A-LS
.6562 to .7500	.7223 to .8900	.033 to .070		1-15/64	5/16	1-27/64	3/8	3/16	19/32	59/64	2A-LS
.7501 to .8437	.8201 to .9877	.035 to .072		1-15/64	5/16	1-27/64	3/8	3/16	19/32	59/64	2A-LS
.8438 to .9375	.9148 to 1.0875	.037 to .075		1-1/2	1/4	1-5/8	3/8	3/16	43/64	1-1/64	2A-LS
.9376 to 1.0000	1.0176 to 1.1600	.040 to .080		1-1/2	1/4	1-5/8	3/8	3/16	43/64	1-1/64	2A-LS



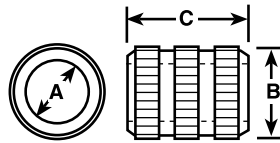
# Embedment Bushings For Use In Soft Materials

## Type DG



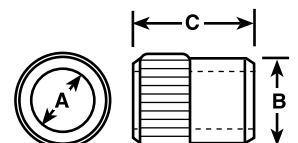
The Diamond-Groove type (DG) has a special knurl that provides superior holding strength in potting compounds and castable materials. The number of grooves is dependent on the length of the bushing.

## Type SG



The Ser-Groove (SG) bushing consists of a serration that permits the bushing to be pressed into a jig or fixture made of soft material or laminated fiberglass while maintaining its holding strength.

## Type SL



The Spline-Lock (SL) type bushing features a partially serrated and partially ground outside diameter. This configuration enables the bushing to be pressed into soft metals or wood.

A I.D. RANGE (Std. Drill Sizes)		B BODY O.D.			C LENGTH (Overall)	ORDERING SYMBOL		
Decimal	Numbers, Letters, and Fractions†	Nominal	Actual			Diamond - Groove (Type DG)	Ser - Groove (Type SG)	Spline - Lock (Type SL)
			DG & SG	SL				
.0980 to .1406	#40 to #28  7/64 to 9/64	1/4	.275	.2500	1/4	DG-16-4	SG-16-4	SL-16-4
			.260	.2498	5/16	DG-16-5	SG-16-5	SL-16-5
					3/8	DG-16-6	SG-16-6	SL-16-6
					1/2	DG-16-8	SG-16-8	SL-16-8
.1406 to .1935	#27 to #10  9/64 to 3/16	5/16	.337	.3125	1/4	DG-20-4	SG-20-4	SL-20-4
			.322	.3123	5/16	DG-20-5	SG-20-5	SL-20-5
					3/8	DG-20-6	SG-20-6	SL-20-6
					1/2	DG-20-8	SG-20-8	SL-20-8
		3/4	DG-20-12	SG-20-12	SL-20-12			
.1875 to .2570	#12 to #1  "A" to "F"  3/16 to 1/4	13/32	.431	.4062	1/4	DG-26-4	SG-26-4	SL-26-4
			.416	.4060	5/16	DG-26-5	SG-26-5	SL-26-5
					3/8	DG-26-6	SG-26-6	SL-26-6
					1/2	DG-26-8	SG-26-8	SL-26-8
		3/4	DG-26-12	SG-26-12	SL-26-12			
.2500 to .3160	"F" to "O"  1/4 to 5/16	1/2	.525	.5000	5/16	DG-32-5	SG-32-5	SL-32-5
			.510	.4998	3/8	DG-32-6	SG-32-6	SL-32-6
					1/2	DG-32-8	SG-32-8	SL-32-8
					3/4	DG-32-12	SG-32-12	SL-32-12
.3125 to .4375	"O" to "Z"  5/16 to 7/16	5/8	.650	.6250	3/8	DG-40-6	SG-40-6	SL-40-6
			.635	.6248	1/2	DG-40-8	SG-40-8	SL-40-8
					3/4	DG-40-12	SG-40-12	SL-40-12
					1	DG-40-16	SG-40-16	SL-40-16
					1-3/8	DG-40-22	SG-40-22	SL-40-16
.4375 to .5312	7/16 to 17/32	3/4	.775	.7500	3/8	DG-48-6	SG-48-6	SL-48-6
			.760	.7498	1/2	DG-48-8	SG-48-8	SL-48-8
					3/4	DG-48-12	SG-48-12	SL-48-12
					1	DG-48-16	SG-48-16	SL-48-16
					1-3/8	DG-48-22	SG-48-22	SL-48-16
.5000 to .6562	1/2 to 21/32	7/8	.900	.8750	3/8	DG-56-6	SG-56-6	SL-56-6
			.885	.8748	1/2	DG-56-8	SG-56-8	SL-56-8
					3/4	DG-56-12	SG-56-12	SL-56-12
					1	DG-56-16	SG-56-16	SL-56-16
					1-3/8	DG-56-22	SG-56-22	SL-56-16
.6250 to .7656	5/8 to 49/64	1"	1.025	1.0000	1/2	DG-64-8	SG-64-8	SL-64-8
			1.010	.9998	3/4	DG-64-12	SG-64-12	SL-64-12
					1	DG-64-16	SG-64-16	SL-64-16
					1-3/8	DG-64-22	SG-64-22	SL-64-22

† Fraction I.D. Range is in increments of 1/64" (except where indicated otherwise)  
Embedment Bushings are Priced on Request

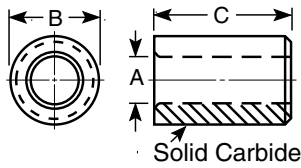
Types DG & SL are also available in Metric Sizes

I.D. Range (Drill Size)	Standard I.D. Tolerance (add to nominal I.D.)
7/64 to 1/4	+ .0001 to + .0004
Over 1/4 to 3/4	+ .0001 to + .0005
Over 3/4 to 49/64	+ .0002 to + .0006

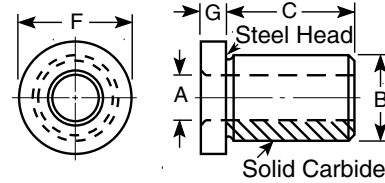
# Tungsten Carbide Bushings Headless and Head Press Fit



## Type CP



## Type CH



A I.D. RANGE (Std. Drill Sizes)		B BODY O.D.		C LENGTH (Under Head)	ANSI SYMBOL		HEAD SIZES (Type CH Only)	
Decimal	Numbers, Letters, and Fractions†	Nominal	Actual Ground		Headless Press Fit (Type CP)	Head Press Fit (Type CH)	F	G
.0135 to .0312	#80 to #68 1/64 and 1/32	5/32	.1578 .1575	1/4 5/16	CP-10-4 CP-10-5			
.0320 to .0469	#67 to #56 3/64	5/32	.1578 .1575	1/4 5/16 1/2	CP-10-4 CP-10-5 CP-10-8			
.0520 to .0995	#55 to #39 1/16 to 3/32	13/64	.2046 .2043	1/4 5/16 1/2	CP-13-4 CP-13-5 CP-13-8	CH-13-5 CH-13-8	19/64	3/32
.1015 to .1360	#38 to #29 7/64 and 1/8	1/4	.2516 .2513	1/4 5/16 1/2	CP-16-4 CP-16-5 CP-16-8	CH-16-5 CH-16-8	23/64	3/32
.1405 to .1875	#28 to #13 9/64 to 3/16	5/16	.3141 .3138	5/16 1/2 3/4 1	CP-20-5 CP-20-8 CP-20-12 CP-20-16	CH-20-5 CH-20-8 CH-20-12 CH-20-16	27/64	1/8
.1890 to .2500	#12 to #1 "A" to "D" 13/64 to 1/4	13/32	.4078 .4075	5/16 1/2 3/4 1	CP-26-5 CP-26-8 CP-26-12 CP-26-16	CH-26-5 CH-26-8 CH-26-12 CH-26-16	1/2	5/32
.2570 to .3125	"F" to "N" 17/64 to 5/16	1/2	.5017 .5014	5/16 1/2 3/4 1 1-3/8	CP-32-5 CP-32-8 CP-32-12 CP-32-16 CP-32-22	CH-32-5 CH-32-8 CH-32-12 CH-32-16 CH-32-22	39/64	7/32
.3160 to .4219	"O" to "Z" 21/64 to 27/64	5/8	.6267 .6264	1/2 3/4 1 1-3/8	CP-40-8 CP-40-12 CP-40-16 CP-40-22	CH-40-8 CH-40-12 CH-40-16 CH-40-22	51/64	7/32
.4375 to .5000	7/16 to 1/2	3/4	.7518 .7515	1/2 3/4 1 1-3/8	CP-48-8 CP-48-12 CP-48-16 CP-48-22	CH-48-8 CH-48-12 CH-48-16 CH-48-22	59/64	7/32
.5156 to .6250	33/64 to 5/8	7/8	.8768 .8765	3/4 1 1-3/8 1-3/4	CP-56-12 CP-56-16 CP-56-22 CP-56-28	CH-56-12 CH-56-16 CH-56-22 CH-56-28	1-7/64	1/4
.6406 to .7500	41/64 to 3/4	1	1.0018 1.0015	1/2 3/4 1 1-3/8 1-3/4	CP-64-8 CP-64-12 CP-64-16 CP-64-22 CP-64-28	CH-64-8 CH-64-12 CH-64-16 CH-64-22 CH-64-28	1-15/64	5/16
.7656 to 1.0000	49/64 to 1"	1-3/8	1.3772 1.3768	3/4 1 1-3/8 1-3/4 2-1/8 2-1/2	CP-88-12 CP-88-16 CP-88-22 CP-88-28 CP-88-34 CP-88-40	CH-88-12 CH-88-16 CH-88-22 CH-88-28 CH-88-34 CH-88-40	1-39/64	3/8
1.0156 to 1.3750	1-1/64 to 1-3/8	1-3/4	1.7523 1.7519	1 1-3/8 1-3/4 2-1/8 2-1/2 3	CP-112-16 CP-112-22 CP-112-28 CP-112-34 CP-112-40 CP-112-48	CH-112-16 CH-112-22 CH-112-28 CH-112-34 CH-112-40 CH-112-48	1-63/64	3/8
1.3906 to 1.7500	1-25/64 to 1-3/4	2-1/4	2.2525 2.2521	1 1-3/8 1-3/4 2-1/8 2-1/2 3	CP-144-16 CP-144-22 CP-144-28 CP-144-34 CP-144-40 CP-144-48	CH-144-16 CH-144-22 CH-144-28 CH-144-34 CH-144-40 CH-144-48	2-31/64	3/8

† Fraction I.D. Range is in increments of 1/64" (except where indicated otherwise)

Prices on Request

Carbide Bushings are not Returnable

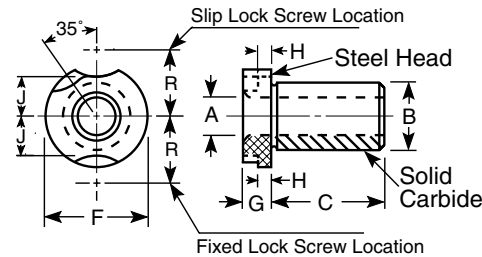


# Tungsten Carbide Bushings

## Slip-Fixed Renewable

### Type CSF

I.D. Range (Drill Size)	Standard I.D. Tolerance (add to nominal I.D.)
#80 to 1/4	+ .0001 to + .0004
Over 1/4 to 3/4	+ .0001 to + .0005
Over 3/4 to 1-1/2	+ .0002 to + .0006
Over 1-1/2 to 1-3/4	+ .0003 to + .0007



A I.D. RANGE (Std. Drill Sizes)		B Body O.D.		C Length (Under Head)	ANSI SYMBOL Slip-Fixed Renewable (Type CSF)	HEAD SIZE					Lock Screws and Clamps
Decimal	Numbers, Letters, and Fractions†	Nominal	Actual			F	G	H	J	R	
.0520 to .1562	#55 to #23 1/16 to 5/32	5/16	.3125 .3123	5/16 1/2 3/4 1	CSF-20-5 CSF-20-8 CSF-20-12 CSF-20-16	35/64	1/4	1/8	11/64	1/2	1A-LS RC-1A
.1570 to .3125	#22 to #1 "A" to "N" 11/64 to 5/16	1/2	.5000 .4998	5/16 1/2 3/4 1 1-3/8	CSF-32-5 CSF-32-8 CSF-32-12 CSF-32-16 CSF-32-22	51/64	1/4	1/8	19/64	5/8	1A-LS RC-1A
.3160 to .5000	"O" to "Z" 21/64 to 1/2	3/4	.7500 .7498	1/2 3/4 1 1-3/8	CSF-48-8 CSF-48-12 CSF-48-16 CSF-48-22	1-3/64	1/4	1/8	27/64	3/4	1A-LS RC-1A
.5156 to .7500	33/64 to 3/4	1	1.0000 .9998	1/2 3/4 1 1-3/8 1-3/4	CSF-64-8 CSF-64-12 CSF-64-16 CSF-64-22 CSF-64-28	1-27/64	3/8	3/16	19/32	59/64	2A-LS RC-2A
.7656 to 1.0000	49/64 to 1"	1-3/8	1.3750 1.3747	3/4 1 1-3/8 1-3/4 2-1/8 2-1/2	CSF-88-12 CSF-88-16 CSF-88-22 CSF-88-28 CSF-88-34 CSF-88-40	1-51/64	3/8	3/16	25/32	1-7/64	2A-LS RC-2A
1.0156 to 1.3750	1-1/64 to 1-3/8	1-3/4	1.7500 1.7497	1 1-3/8 1-3/4 2-1/8 2-1/2 3	CSF-112-16 CSF-112-22 CSF-112-28 CSF-112-34 CSF-112-40 CSF-112-48	2-19/64	3/8	3/16	1	1-25/64	3A-LS RC-3A
1.3906 to 1.7500	1-25/64 to 1-3/4	2-1/4	2.2500 2.2496	1 1-3/8 1-3/4 2-1/8 2-1/2 3	CSF-144-16 CSF-144-22 CSF-144-28 CSF-144-34 CSF-144-40 CSF-144-48	2-51/64	3/8	3/16	1-1/4	1-41/64	3A-LS RC-3A

† Fraction I.D. Range is in increments of 1/64" (except where indicated otherwise)

Prices on Request

Carbide Bushings are not Returnable

Carbide Bushings are also available in Metric sizes.

## ACME ULTIMATE™ BUSHINGS

- Is the brittle nature of Carbide Bushings unacceptable for your application?
  - Does the quantity of bushings you require for a job make Carbide Bushings cost prohibitive?
  - Is the abrasive action of Carbide Bushings causing premature tool wear?
- Acme Ultimate Bushings are the answer!

Acme Ultimate bushings are Titanium Nitride (TiN) coated for longer life. Titanium Nitride coated bushings have a hardness of 82-85 RC. This increase in surface hardness means the bushings can stand the abrasive wear of tools and chips for much longer periods of time and are less brittle than carbide bushings.

The TiN coating on Acme Ultimate Bushings has a very slippery surface. This slippery surface on the I.D. of the bushing will help increase tool life.

The greater the number of bushings needed for an application, the more Acme Ultimate Bushings can reduce your cost.

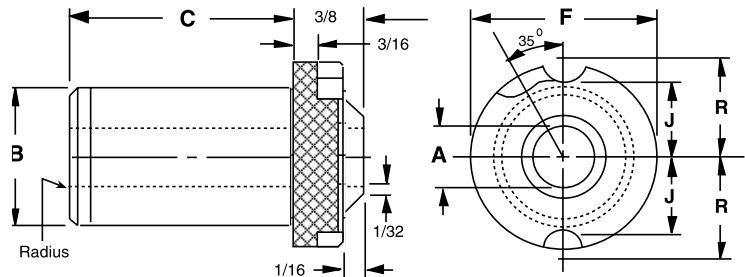
Contact us for more information.

# GUN DRILL BUSHINGS



## Type GDB

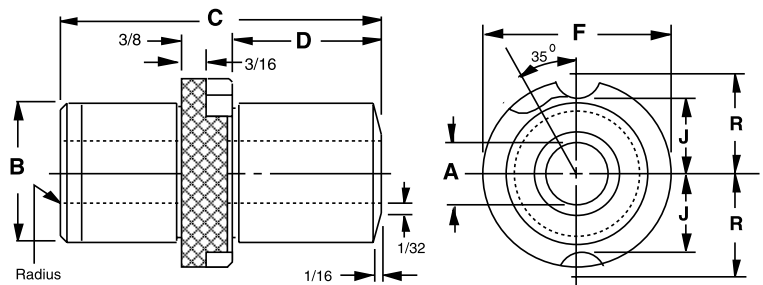
Acme Type GDB Bushings are thru-hardened to 61-65 RC and ground concentric within .0002" T.I.R. The head is undercut and ground square to the outside diameter. The face is square to the inside diameter within .0002" T.I.R. Type GDB Bushings are manufactured from semi-finished inventory for quick delivery.



Description	A I.D. Range +.0002 / -.0000	B O.D. Size		C Length (Under Head)	Head Dimensions			Lockscrew
		Nominal	Actual		F	J	R	
<b>GDB-64-16</b>	3/16 - 25/32 (.1875) (.7812)	1"	1.0000 .9998	1"	1-27/64	19/32	59/64	2A-LS
<b>GDB-64-22</b>	1/4 - 25/32 (.2500) (.7812)			1-3/8				
<b>GDB-88-16</b>	3/16 - 1-1/16 (.1875) (1.0625)	1-3/8	1.3750 1.3748	1"	1-51/64	25/32	1-7/64	2A-LS
<b>GDB-88-22</b>	1/4 - 1-1/16 (.2500) (1.0625)			1-3/8				

## Type GDX

Type GDX Bushings are made to the same high standards as Acme's other Gun Drill Bushings. The I.D. is ground concentric to the O.D. within .0002" T.I.R. and the face is also square to the I.D. within .0002" T.I.R. The head is undercut and ground square to the O.D. The O.D. of length "D" is left unground. GDX Bushings are made from tool steel and thru-hardened to 61-65 RC. Special sizes and materials are available on request.



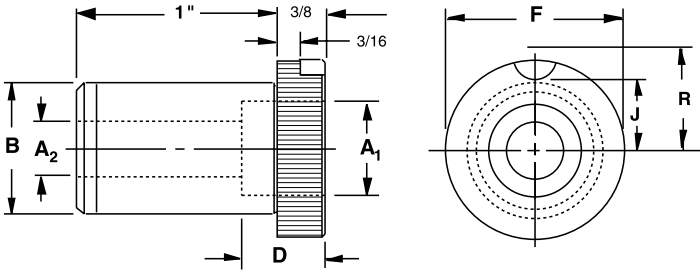
Description	A I.D. Range +.0002 / -.0000	B O.D. Size		C Overall Length	D	Head Dimensions			Lockscrew
		Nominal	Actual			F	J	R	
<b>GDX-88-30</b>	3/16 - 1-1/16 (.1875) (1.0625)	1-3/8	1.3750 1.3748	1-7/8	1/2	1-51/64	25/32	1-7/64	2A-LS
<b>GDX-88-38</b>	1/4 - 1-1/16 (.2500) (1.0625)			2-3/8	1"				
<b>GDX-88-46</b>	9/32 - 1-1/16 (.2812) (1.0625)			2-7/8	1-1/2				
<b>GDX-88-54</b>	5/16 - 1-1/16 (.3125) (1.0625)			3-3/8	2"				





# GUN DRILL BUSHINGS

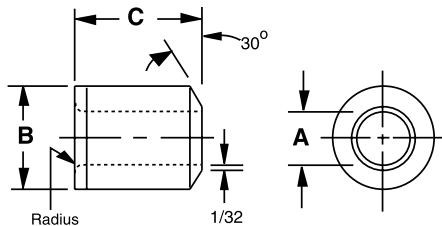
## Liners – Type GDL



Acme Gun Drill Liners are designed to be used with the replaceable inserts indicated in the table below. All type GDL Bushings are ground concentric within .0002" T.I.R. The heads are undercut and ground square with outside diameters so the liner will seat flat against the chip box.

Part Number	Description	A <sub>1</sub> +.0002 -.0000	A <sub>2</sub> ±.005	B O.D. Size		D	Head Dimensions			Lockscrew	Insert Used
				Nominal	Actual		F	J	R		
A51210	GDL-64-16	.2045	.125	1"	1.0000 .9998	7/16	1-27/64	19/32	59/64	2A-LS	GDI-13-8
A51212		.2515	.156								GDI-16-8
A51214		.3140	.218								GDI-20-8
A51216		.5016	.406								GDI-32-8
A51218		.7517	.625								GDI-48-8
A51240	GDL-88-16	.2045	.125	1-3/8	1.3750 1.3748	7/16	1-51/64	25/32	1-7/64	2A-LS	GDI-13-8
A51242		.2515	.156								GDI-16-8
A51244		.3140	.218								GDI-20-8
A51246		.5016	.406								GDI-32-8
A51248		.7517	.625								GDI-48-8
A51250		1.0017	.875			11/16	1-51/64	25/32	1-7/64	2A-LS	GDI-64-12

## Inserts – Type GDI



Acme Gun Drill Inserts are manufactured from thru-hardened tool steel and heat treated to 61–65 RC for longer life. The I.D., O.D., and face of GDI Bushings are ground concentric and square within .0002" T.I.R.

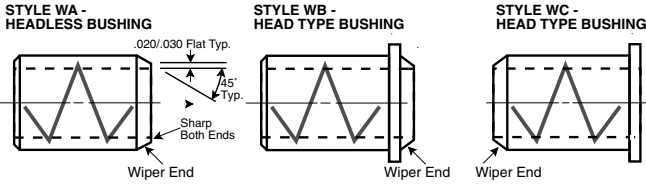
Inserts are stocked in standard drill sizes only. Special I.D. sizes and special materials (ie. Carbide or Titanium Nitride coating) are available to meet your requirements.

Description	A I.D. Range +.0002 / -.0000	B O.D. Size		C Length
		Nominal	Actual	
GDI-13-8	5/64 – #39 (.0781) (.0995)	13/64	.2047 .2044	1/2
GDI-16-8	#38 – 9/64 (.1015) (.1406)	1/4	.2517 .2514	1/2
GDI-20-8	#27 – #10 (.1440) (.1935)	5/16	.3142 .3139	1/2
GDI-32-8	9 – O (.1960) (.3160)	1/2	.5018 .5015	1/2
GDI-48-8	P – 17/32 (.3230) (.5312)	3/4	.7519 .7516	1/2
GDI-64-12	35/64 – 3/4 (.5469) (.7500)	1"	1.0019 1.0016	3/4

# Oil Groove Bushings Type OG



## Wiper Styles:



**Oil Grooves:** 1/16" wide x 1/32" deep

**Oil Holes:** 1/4" Diam. (If I.D., O.D., and/or Length are 1" or less, Oil hole will be 1/8" Diam. and O.D. groove will be 3/16" wide x 1/32" deep).  
**Order by:** Acme/ANSI Symbol or by I.D., O.D. and Length, indicating desired style of Oil Groove. Example: Style 18 Oil Groove, 1" X 1-3/8" x 3/4" Type P and WA Wiper.

**Prices Available on Request**  
**Oil Groove Bushings are not Returnable**

**Wiper Specifications:** Oil groove does not run out on wiper end.

**Material:** Tool Steel unless specified otherwise by customer.

**Range:** 1/2" to 8" I.D. and 1/2" to 6" long. Styles 1-9 must be 5/8" I.D. or larger.

<p><b>COIL</b></p> <p><b>STYLE 1. (F)</b></p> <p>ENCASED</p>	<p><b>OIL HOLE AND COIL</b></p> <p><b>STYLE 2. (C)</b></p> <p>ENCASED</p>	<p><b>OIL GROOVE, HOLE AND COIL</b></p> <p><b>STYLE 3. (J)</b></p> <p>ENCASED</p>	<p><b>FIGURE EIGHT</b></p> <p><b>STYLE 19. (Q)</b></p> <p>ENCASED</p>
<p><b>OUT ONE END</b></p> <p><b>STYLE 4. (D)</b></p> <p>OUT ONE END</p>	<p><b>OUT ONE END</b></p> <p><b>STYLE 5. (A)</b></p> <p>OUT ONE END</p>	<p><b>OUT ONE END</b></p> <p><b>STYLE 6. (G)</b></p> <p>OUT ONE END</p>	<p><b>OIL HOLE AND FIGURE EIGHT</b></p> <p><b>STYLE 20. (N)</b></p> <p>ENCASED</p>
<p><b>OUT TWO ENDS</b></p> <p><b>STYLE 7. (E)</b></p> <p>OUT TWO ENDS</p>	<p><b>OUT TWO ENDS</b></p> <p><b>STYLE 8. (B)</b></p> <p>OUT TWO ENDS</p>	<p><b>OUT TWO ENDS</b></p> <p><b>STYLE 9. (H)</b></p> <p>OUT TWO ENDS</p>	<p><b>OIL GROOVE, HOLE AND FIGURE EIGHT</b></p> <p><b>STYLE 21. (P)</b></p> <p>ENCASED</p>
<p><b>CROSS</b></p> <p><b>STYLE 10. (K)</b></p> <p>ENCASED</p>	<p><b>OIL HOLE AND CROSS</b></p> <p><b>STYLE 11. (L)</b></p> <p>ENCASED</p>	<p><b>OIL GROOVE, TWO HOLES OPPOSITE</b></p> <p><b>STYLE 12. (O)</b></p> <p>ENCASED</p>	<p><b>DOUBLE EIGHTS</b></p> <p><b>STYLE 22. (Z)</b></p> <p>ENCASED</p>
<p><b>ENCASED</b></p> <p><b>STYLE 13. (T)</b></p> <p>ENCASED</p>	<p><b>ENCASED</b></p> <p><b>STYLE 14. (R)</b></p> <p>ENCASED</p>	<p><b>ENCASED</b></p> <p><b>STYLE 15. (S)</b></p> <p>ENCASED</p>	<p><b>OIL HOLE AND DOUBLE EIGHTS</b></p> <p><b>STYLE 23. (X)</b></p> <p>ENCASED</p>
<p><b>ENCASED</b></p> <p><b>STYLE 16. (W)</b></p> <p>ENCASED</p>	<p><b>ENCASED</b></p> <p><b>STYLE 17. (U)</b></p> <p>ENCASED</p>	<p><b>ENCASED</b></p> <p><b>STYLE 18. (V)</b></p> <p>ENCASED</p>	<p><b>OIL GROOVE, HOLE AND DOUBLE EIGHTS</b></p> <p><b>STYLE 24. (Y)</b></p> <p>ENCASED</p>
			<p><b>ENCASED</b></p> <p><b>STYLE 25. (M)</b></p> <p>ENCASED</p>

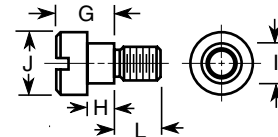


# Lockscrews & Clamps

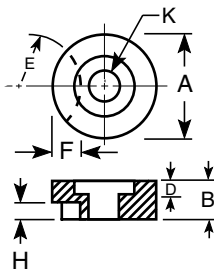
## Lock Screws



Part Number	Symbol	G	H	I	J	L	Thread
A00012	#1-LS	3/16	.100 .094	3/16	5/16	1/4	8-32
A00016	#2-LS	1/4	.132 .128	1/4	3/8	1/4	10-32
A00014	1A-LS	1/4	.138 .132	3/8	5/8		5/16-18
A00018	2A-LS	3/8	.200 .194	3/8	5/8	1/2	5/16-18
A00022	3A-LS	3/8	.200 .194	7/16	3/4		3/8-16
A00026	4A-LS	7/16	.231 .225	7/16	3/4	5/8	3/8-16
A00030	5A-LS	1/2	.263 .257	7/16	3/4		3/8-16



## Round Clamps

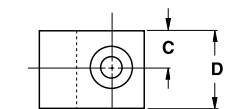
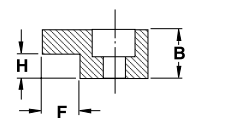
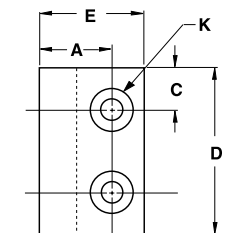


Part Number	Symbol	A	B	D	E	F	H	K
A00002	RC-1A	5/8	5/16	5/32	17/32	.109	1/8	5/16 SOC. HD. SCR.
A00004	RC-2A	5/8	7/16	7/32	29/32	.125	3/16	5/16 SOC. HD. SCR.
A00006	RC-3A	3/4	1/2	9/32	1-13/32	.156	3/16	3/8 SOC. HD. SCR.
A00008	RC-4A	3/4	17/32	1/4	2-1/2	.156	7/32	3/8 SOC. HD. SCR.
A00010	RC-5A	3/4	9/16	1/4	2-1/2	.156	1/4	3/8 SOC. HD. SCR.

## Flat Clamps



FOR FLUSH MOUNTING WITH HEADLESS LINERS (TYPE L)										
Part Number	Symbol	A	B	C	D	E	F	H	K	No. of Holes
A00050	FC-1	1/2	5/16	5/16	5/8	7/8	3/16	1/8	1/4 SOC. HD. SCR.	1
A00051	FC-2	5/8	3/8	1/2	1	1	1/4	3/16	5/16 SOC. HD. SCR.	1
A00052	FC-3	5/8	3/8	1/2	1	1-1/8	5/16	3/16	5/16 SOC. HD. SCR.	1
A00053	FC-4	51/64	3/8	5/8	1-1/4	1-11/64	27/64	7/32	3/8 SOC. HD. SCR.	1
A00054	FC-5	51/64	3/8	3/8	1-3/4	1-11/64	27/64	7/32	3/8 SOC. HD. SCR.	2
A00055	FC-6	51/64	1/2	5/8	1-1/4	1-11/64	27/64	1/4	3/8 SOC. HD. SCR.	1
A00056	FC-7	51/64	1/2	3/8	1-3/4	1-11/64	27/64	1/4	3/8 SOC. HD. SCR.	2
FOR PROJECTED MOUNTING WITH HEAD LINERS (TYPE HL)										
A00058	FC-11	1/2	3/8	5/16	5/8	7/8	3/16	1/4	1/4 SOC. HD. SCR.	1
A00059	FC-12	5/8	1/2	1/2	1	1	1/4	5/16	5/16 SOC. HD. SCR.	1
A00060	FC-13	5/8	1/2	1/2	1	1	1/4	3/8	5/16 SOC. HD. SCR.	1
A00061	FC-14	5/8	1/2	5/8	1-1/4	1-1/8	5/16	3/8	3/8 SOC. HD. SCR.	1
A00062	FC-15	5/8	1/2	3/8	1-3/4	1-1/8	5/16	3/8	3/8 SOC. HD. SCR.	2
A00064	FC-21	51/64	3/4	3/8	1-3/4	1-11/64	27/64	15/32	3/8 SOC. HD. SCR.	2



# Special / Custom Drill Bushings

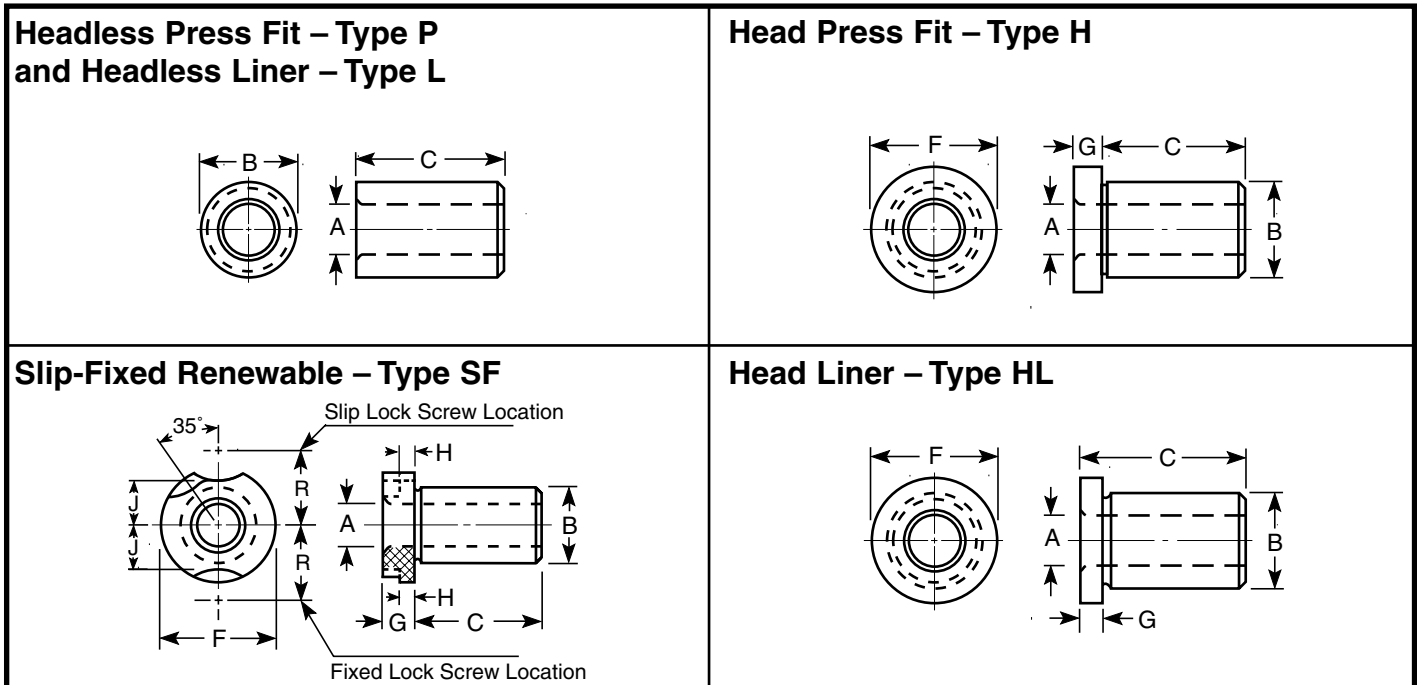


**To Standardize is to Economize**  
— Always try to order a standard bushing

Where possible, ACME will modify ANSI/ACME standard bushings to meet your requirements. This will save you money. However, we will gladly manufacture to your specifications and tolerances.

Just photocopy this page, fill in the necessary information and mail or FAX to:

ACME INDUSTRIAL COMPANY  
441 Maple Avenue  
Carpentersville, IL 60110  
Attn: Customer Service Department



Please Fill in the Required Dimensions:

A (I.D.)	B (O.D.)	C (Length)	F (Head Diam.)	G (Head Thick.)

- Our standard tolerances will be supplied unless otherwise specified.
- Please specify to four decimal places.
- No-Counterbore is standard unless specified otherwise.

Please check the type of bushing desired:

- P = Headless Press Fit
- H = Head Press Fit
- SF = Slip-Fixed Renewable
- L = Headless Liners
- HL = Head Liners

Material Required \_\_\_\_\_  
Hardness of \_\_\_\_\_RC  
Quantities Required \_\_\_\_\_  
and \_\_\_\_\_

Additional Information:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

If you need any further assistance in ordering special/custom drill bushings, please call our customer service department for help:

Phone: (847) 428-3911 or  
(800) 323-5582  
FAX: (847) 428-1820

Name: \_\_\_\_\_ Title: \_\_\_\_\_

Company: \_\_\_\_\_

Address: \_\_\_\_\_

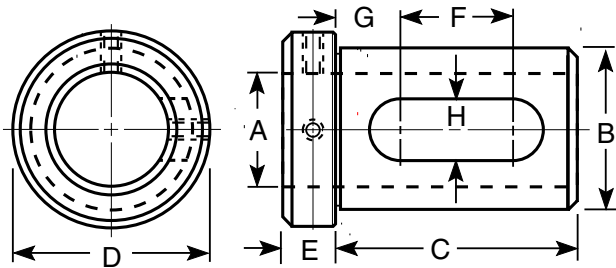
City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

Telephone: \_\_\_\_\_ FAX : \_\_\_\_\_ E-mail: \_\_\_\_\_



# TOOL HOLDER BUSHINGS

## CNC Style Type Z



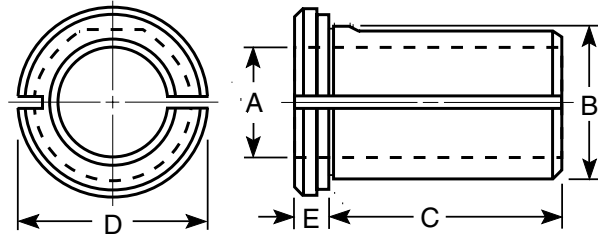
Acme Part Number	A I.D.	B O.D.	C Length (Under Head)	HEAD DIMENSIONS		F	G	H
				D O.D.	E Thickness			
A52321	1/2							
A52322	5/8							
A52323	3/4	1-1/2	3-1/4	2	3/4	2	11/16	7/8
A52325	7/8							
A52327	1							
A52328	1-1/4							
A52331	1/2							
A52332	5/8							
A52333	3/4	1-3/4	3-1/2	2-1/4	3/4	2	11/16	7/8
A52334	7/8							
A52335	1							
A52336	1-1/4							
A52337	1-1/2							
A52343	3/4							
A52344	7/8							
A52345	1	2	3-3/4	2-1/2	3/4	2-1/8	3/4	1
A52346	1-1/4							
A52347	1-1/2							
A52348	1-3/4							
A52352	3/4							
A52354	1							
A52355	1-1/4	2-1/2	4-1/4	3	3/4	2-1/8	7/8	1
A52356	1-1/2							
A52357	1-3/4							
A52358	2							
A52359	2-1/4							
A52361	1							
A52362	1-1/4							
A52363	1-1/2							
A52364	1-3/4	3	4-3/4	3-1/2	3/4	2-1/4	1	1-1/4
A52365	2							
A52366	2-1/4							
A52367	2-1/2							

Acme CNC Tool Holder Bushings are designed to adapt tools such as drills and boring bars to NC or CNC machine tools. The elongated slots on the body make adapting tools to all brands of equipment a snap. Set screws in the head of these bushings permit use with preset tooling. Type Z bushings are hardened and ground for long life and precision alignment.

# TOOL HOLDER BUSHINGS



## Split Style Type B



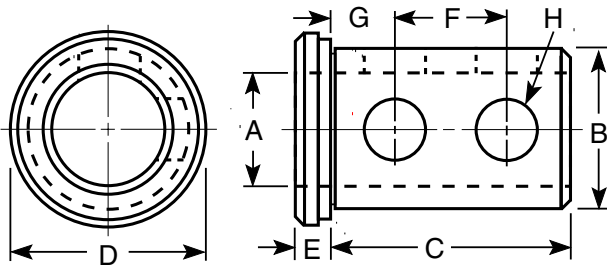
Type B Tool Holder Bushings are split through the entire length of the bushing on one side. This enables the bushing to clamp on the shank of cutting tools by tightening the screws in the turret bore or tool holder. Acme Type B bushings are hardened and precision ground to provide a longer lasting more accurate bushing. Solid, soft blanks with a machine finish are available upon request.

Acme Part Number	A I.D.	B O.D.	C Length (Under Head)	HEAD DIMENSIONS	
				D O.D.	E Thickness
A52001	5/16				
A52002	3/8	3/4	1-1/2	7/8	3/16
A52003	1/2				
A52010	3/8				
A52011	1/2	1	1-3/4	1-7/32	3/16
A52012	5/8				
A52013	3/4				
A52014	3/8				
A52015	1/2				
A52016	5/8	1-1/4	2-1/8	1-11/32	1/4
A52017	3/4				
A52018	7/8				
A52019	1				
A52020	3/8				
A52021	1/2				
A52022	5/8				
A52023	3/4	1-1/2	2-1/2	1-23/32	1/4
A52025	7/8				
A52027	1				
A52028	1-1/4				
A52031	1/2				
A52032	5/8				
A52033	3/4	1-3/4	3	1-31/32	5/16
A52035	1				
A52036	1-1/4				
A52037	1-1/2				
A52041	1/2				
A52042	5/8				
A52043	3/4				
A52045	1	2	3-1/2	2-7/32	5/16
A52046	1-1/4				
A52047	1-1/2				
A52048	1-3/4				
A52050	1/2				
A52051	5/8				
A52052	3/4				
A52054	1				
A52055	1-1/4	2-1/2	4	2-27/32	3/8
A52056	1-1/2				
A52057	1-3/4				
A52058	2				
A52059	2-1/4				
A52063	1-1/2				
A52064	1-3/4				
A52065	2	3	4-1/2	3-1/2	7/16
A52066	2-1/4				
A52067	2-1/2				



# TOOL HOLDER BUSHINGS

## Solid Style Type J



Acme Type J Tool Holder Bushings have clearance holes for set screws for proper clamping on the shank of tools. These bushings are hardened and ground for long life and accurate alignment. Solid, soft blanks for custom machining are available on request.



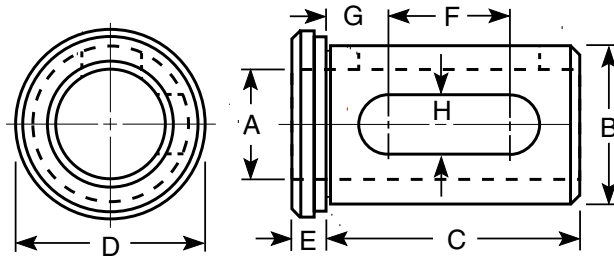
Acme Part Number	A I.D.	B O.D.	C Length (Under Head)	HEAD DIMENSIONS		F	G	H	Number of Holes
				D O.D.	E Thickness				
A52114	3/8								
A52115	1/2								
A52116	5/8	1-1/4	2-1/8	1-15/32	1/4	1	1/2	5/8	2
A52117	3/4								
A52118	7/8								
A52119	1								
A52121	1/2								
A52122	5/8								
A52123	3/4	1-1/2	2-1/2	1-23/32	1/4	1-1/8	11/16	7/8	2
A52125	7/8								
A52127	1								
A52128	1-1/4								
A52131	1/2								
A52132	5/8								
A52133	3/4	1-3/4	3	1-31/32	5/16	1-1/4	3/4	7/8	2
A52134	7/8								
A52135	1								
A52136	1-1/4								
A52137	1-1/2								
A52143	3/4								
A52144	7/8								
A52145	1	2	3-1/2	2-7/32	5/16	1-1/2	3/4	1	2
A52146	1-1/4								
A52147	1-1/2								
A52148	1-3/4								
A52152	3/4								2
A52154	1								2
A52155	1-1/4								4
A52156	1-1/2	2-1/2	4	2-27/32	3/8	1-3/4	7/8	1-1/4	4
A52157	1-3/4								4
A52158	2								4
A52159	2-1/4								4
A52161	1								2
A52162	1-1/4								4
A52163	1-1/2								4
A52164	1-3/4	3	4-1/2	3-1/2	7/16	2	1	1-1/4	4
A52165	2								4
A52166	2-1/4								4
A52167	2-1/2								4

# TOOL HOLDER BUSHINGS



## Slotted Style

### Type C



Acme Type C Tool Holder Bushings have an elongated slot to allow set screws to properly clamp on the shank of tools. Type C bushings are hardened and ground for a more accurate, longer lasting bushing.

Acme Part Number	A I.D.	B O.D.	C Length (Under Head)	HEAD DIMENSIONS		F	G	H
				D O.D.	E Thickness			
A52214	3/8							
A52215	1/2							
A52216	5/8	1-1/4	3-1/4	1-15/32	17/64	2	11/16	3/4
A52217	3/4							
A52218	7/8							
A52219	1							
A52221	1/2							
A52222	5/8							
A52223	3/4	1-1/2	3-3/8	1-23/32	17/64	2	11/16	7/8
A52225	7/8							
A52227	1							
A52228	1-1/4							
A52231	1/2							
A52232	5/8							
A52233	3/4	1-3/4	3-1/2	1-31/32	19/64	2-1/8	11/16	7/8
A52234	7/8							
A52235	1							
A52236	1-1/4							
A52237	1-1/2							
A52243	3/4							
A52244	7/8							
A52245	1	2	4	2-7/32	19/64	2-1/2	11/16	1
A52246	1-1/4							
A52247	1-1/2							
A52248	1-3/4							
A52252	3/4							
A52254	1							
A52255	1-1/4	2-1/2	4-1/2	2-27/32	21/64	2-3/4	11/16	1
A52256	1-1/2							
A52257	1-3/4							
A52258	2							
A52259	2-1/4							
A52261	1							
A52262	1-1/4							
A52263	1-1/2							
A52264	1-3/4	3	5	3-1/2	3/8	3-1/2	3/4	1
A52265	2							
A52266	2-1/4							
A52267	2-1/2							

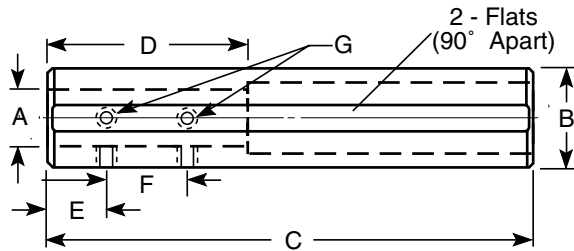
Bushings with O.D.'s greater than 2" and I.D.'s 1-1/4" and larger have two slots. All others have one slot.





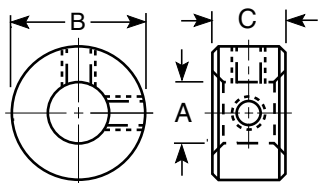
# TOOL HOLDER BUSHINGS

## Boring Bar Sleeves



Acme Part Number	A I.D.	B O.D.	C Length	D	E	F	G SCREW SIZE
A53401	3/8	1	6	1-3/4	7/16	7/8	1/4-28
A53402	1/2	1	6	2	7/16	7/8	1/4-28
A53411	3/8	1-1/2	6	1-1/2	7/16	7/8	#10-32
A53412	1/2	1-1/2	6	2	7/16	1	5/16-24
A53413	5/8	1-1/2	6	2	7/16	1	5/16-24
A53414	3/4	1-1/2	6	2	7/16	1	5/16-24
A53415	7/8	1-1/2	8	2	7/16	1	7/16-20
A53421	1/2	1-3/4	8	2-1/2	7/16	1	5/16-24
A53422	3/4	1-3/4	8	2-1/2	7/16	1	7/16-20
A53423	1	1-3/4	8	2-1/2	7/16	1	7/16-20
A53431	5/8	2	9	2	7/16	1	7/16-20
A53432	3/4	2	9	2	1/2	1	7/16-20
A53433	7/8	2	9	2	1/2	1	7/16-20
A53434	1	2	9	3	1/2	1	1/2-20
A53435	1-1/4	2	9	3	1/2	1	1/2-20
A53441	5/8	2-1/2	10	2-1/4	1/2	1	1/2-20
A53442	3/4	2-1/2	10	2-3/4	1/2	1	1/2-20
A53443	1	2-1/2	10	3-1/2	1/2	1	1/2-20
A53444	1-1/4	2-1/2	10	3-1/2	1/2	1	1/2-20
A53445	1-1/2	2-1/2	10	3-1/2	1/2	1	1/2-20
A53450	1	3	11-1/2	3-1/2	1/2	1	1/2-20
A53451	1-1/4	3	11-1/2	3-1/2	1/2	1	1/2-20
A53452	1-1/2	3	11-1/2	3-3/4	1/2	1	1/2-20
A53453	1-3/4	3	11-1/2	3-3/4	1/2	1	1/2-20
A53454	2	3	11-1/2	3-3/4	1/2	1	1/2-20
A53462	2	4	14	3-3/4	5/8	1-3/4	5/8-18
A53463	2-1/2	4	14	4	5/8	2	5/8-18

Acme Boring Bar Sleeves are ideal for adapting boring bars and other shank type tools to machine turret bores or tool holders. The long lengths and sturdy construction provide extra support to extend the range of the tool. These sleeves are hardened and ground. Special sizes can be manufactured to your specifications.



## Tool Collars



Acme Part Number	A I.D.	B O.D.	C Length
A53501	1	2	3/4
A53502	1-1/4	2-1/4	3/4
A53503	1-1/2	2-1/2	3/4
A53504	1-3/4	2-3/4	3/4
A53505	2	3	3/4
A53506	2-1/4	3-1/4	3/4
A53507	2-1/2	3-1/2	3/4
A53508	2-3/4	3-3/4	3/4
A53509	3	4	1

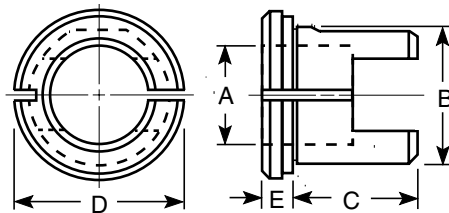
Acme hardened and ground Tool Collars are designed to be used with boring bar sleeves and boring bars. The two set screws lock the collar on the tool or sleeve at a predetermined location for preset tooling applications.

# TOOL HOLDER BUSHINGS



## Tap Holder Bushings

### Type K



Acme Tap Holder Bushings are split along the body with a square recess milled in the back to firmly grip and drive taps. Tap holder bushings are left soft to protect the tap. Type K bushings are precision ground for proper alignment.

Acme Part Number	TAP SIZES			BUSHING DIMENSIONS				
	Mach. Screw Size No.	Nom. Fract. Dia. (IN.)	Nom. Metric Dia. (MM)	A Dia. of Tap Shank	B Nom. O.D.	C Length (Under Head)	HEAD DIMENSIONS	
							D O.D.	E Thickness
A53002	8	5/32	M4	.168				
A53003	10	3/16	M4.5, M5	.194				
A53004	12	7/32		.220				
A53005	14	1/4	M6, M6.3	.255				
A53006		5/16	M7, M8	.318				
A53007		3/8		.381	1	15/16	1-3/16	3/16
A53008		7/16	M10	.323				
A53009		1/2	M12, M12.5	.367				
A53010		9/16	M14	.429				
A53011		5/8	M16	.480				
A53033		1/8*		.4375				
A53115	14	1/4	M6, M6.3	.255				
A53116		5/16	M7, M8	.318				
A53117		3/8		.381				
A53118		7/16	M10	.323				
A53119		1/2	M12, M12.5	.367				
A53120		9/16	M14	.429				
A53121		5/8	M16	.480				
A53122		11/16	M18	.542				
A53123		3/4		.590				
A53124		13/16	M20	.652				
A53125		7/8	M22	.697	1-1/2	1-3/16	1-11/16	1/4
A53126		15/16	M24	.760				
A53127		1	M25	.800				
A53128		1-1/16	M27	.896				
A53129		1-1/8		.896				
A53130		1-3/16	M30	1.021				
A53131		1-1/4		1.021				
A53135		1/4*		.5625				
A53136		3/8*		.7000				
A53137		1/2*		.6875				
A53138		3/4*		.9063				
A53139		1*		1.1250				
A53207		3/8		.381				
A53208		7/16	M10	.323				
A53209		1/2	M12, M12.5	.367				
A53210		9/16	M14	.429				
A53211		5/8	M16	.480				
A53212		11/16	M18	.542				
A53213		3/4		.590				
A53214		13/16	M20	.652				
A53215		7/8	M22	.697	1-3/4	1-5/16	2-1/8	5/16
A53216		15/16	M24	.760				
A53217		1	M25	.800				
A53218		1-1/16	M27	.896				
A53219		1-1/8		.896				
A53220		1-3/16	M30	1.021				
A53221		1-1/4		1.021				
A53236		1/2*		.6875				
A53237		3/4*		.9063				
A53238		1*		1.1250				

\* Pipe Tap



# Standard Metric Bushings

## Technical Information

### No-Counterbore Bushings are Standard with ACME

Acme is committed to the concept of manufacturing our bushings without a counterbore. No-Counterbore bushings are more difficult and costly to produce, because close tolerances are required the full length of the bushing. We believe this produces a better, longer lasting and more versatile bushing. Counterbored bushings will be supplied only upon special request.

### Plain Press Fit Bushings - Type PM

- Least expensive
- Typically for single stage drilling operations
- Permits close spacing
- Mounts flush with top of jig plate
- Length is measured overall

### Head Press Fit Bushings - Type HM

- Same as Plain Press Fit but with head (or shoulder) on the drill entry end
- Head prevents heavy axial loads from forcing bushing through jig hole
- Flush mount by counterboring jig plate to fit bushing head
- Length is measured overall

### Slip-Fixed Renewable Bushings - Type SFM

- Fixed and removable options on one knurled head for easier use
- Used with liner, permanently pressed into jig
- Held in place by lockscrew or clamp which fits a milled recess in the head
- Fixed mode for runs longer than life of bushing
- Slip mode for multiple operations on the same holes (such as drilling followed by reaming)
- O.D. has a slip fit tolerance for easy insertion or removal from the liner
- Length is measured under the head

### Plain Liners - Type PM

- Used with Slip-Fixed Renewable bushings to provide precise location point
- Permits interchange of Type SFM bushings with varied I.D.'s – without affecting center-line accuracy
- Permanently pressed into jig plate – for life of the jig
- Protects jig plate hole from wear caused by frequent bushing replacement
- Used where little impact or force will occur on the SF bushing's head
- Plain Liners are the same as Plain Press Fit Bushings

### Head Liners - Type HM

- Similar to Plain Liners but with a head or shoulder
- Use with Slip-Fixed Renewable bushings whenever excessive pounding or force will occur during operation
- Head prevents liner from being pushed through jig plate

- Flush mount by counterboring top of hole in jig plate
- Length is measured overall
- Head Liners are the same as Head Press Fit Bushings

### Bushing Installation

Production accuracy requires extra care when preparing mounting holes and installing bushings/liners. The following factors should be considered: interference fits, alignment, chip clearance, and how close the bushing is to the workpiece.

Because of the many variables, no definite rules can substitute for the skill and judgment of the experienced toolmaker.

### Interference Fits

Interference holds press fit bushings in the jig plate. Too much interference may cause a number of problems: (1) jig plate distortion; (2) bellmouthing (bushing/liner walls bow inward); (3) tool seizure, or (4) trouble with slip-fixed renewable fitting into the liner. Too little interference may allow slippage, thus causing inaccurately drilled holes.

### Mounting Hole Preparation

It is recommended that all mounting holes be jig bored or sized with a reamer to assure roundness. Bushings tend to assume the shape of the hole they are pressed into. See chart below for recommended size.

The recommended installation hole size should be in accordance with metric tolerance class H7.

Nominal O.D.	Recommended Hole Size
4 to 6	Nominal +0/+.012
7 to 10	Nominal +0/+.015
12 to 18	Nominal +0/+.018
22 to 30	Nominal +0/+.021
35 to 48	Nominal +0/+.025
55 to 78	Nominal +0/+.030
85 to 115	Nominal +0/+.035
125	Nominal +0/+.040

### Press Fit Bushing Installation

First, lubricate the inside diameter of the mounting hole and the outside diameter of the bushing/liner.

Second, use an arbor press to press the bushing/liner into place. If an arbor press is not available, draw the bushing/liner into place by tightening two steel plates connected by a nut and bolt. Maintain centerline perpendicularity.

### Bushing Features

- All bushings that are ground on the O.D. are held within .012 mm concentricity T.I.R. (Total Indicator Reading).
- Longer lengths than standard or excessively counterbored bushings will meet the above tolerances at the drill exit end only.

- All Acme bushings are manufactured with a blended radius at the drill entrance end unless specified otherwise.
- All Press Fit bushings have a chamfer and ground lead on the exit end.
- Standard and Special bushings will be manufactured from thru-hardened tool steel and heat treated to 61-65 Rockwell "C" unless instructed otherwise by the customer.
- No-Counterbore bushings will be supplied unless requested otherwise. No-Counterbore bushings allow for truer alignment, more accurate holes, less tool wear, and less problems with chips packing up in the I.D. of the bushing.

### Inside Diameter Tolerances

The minimum and maximum allowance for the Inside Diameter of standard bushings is in accordance with metric tolerance class G6. Special bushings will be supplied with the tolerances shown, unless specified otherwise.

Standard Drill Bushings:

I.D. Range (Drill Size)	Standard I.D. Tolerance (add to nominal I.D.)
0.35 to 3.00	+0.02 to +.008
3.01 to 6.00	+0.04 to +.012
6.01 to 10.00	+0.05 to +.014
10.01 to 18.00	+0.06 to +.017
18.01 to 30.00	+0.07 to +.020
30.01 to 50.00	+0.09 to +.025
50.01 to 80.00	+0.10 to +.029
80.01 to 105.00	+0.12 to +.034

Reamer Bushings:

I.D. Range (Reamer Size)	I.D. Tolerance (add to nominal I.D.)
1.00 to 3.00	+0.06 to +.012
3.01 to 6.00	+0.10 to +.018
6.01 to 10.00	+0.13 to +.022
10.01 to 18.00	+0.16 to +.027
18.01 to 30.00	+0.20 to +.033

Reamer Bushings are considered specials and are priced accordingly. When ordering specify the letters "RM" after the I.D.

### Outside Diameter Tolerances

The minimum and maximum metric tolerance for the Outside Diameter of standard press fit bushings is class s6 and class h5 for slip-fixed renewable bushings.

### Ordering Information

To order metric bushings please provide the quantity required, ANSI Symbol, and inside diameter. The order for 26 pieces of a 38 mm I.D., by 55 mm O.D., by 30 mm long, Type PM bushing should appear as follows:

Qty.	Type	O.D. (in mm)	Lgth. (in mm)	I.D. (in mm)
26 pcs.	PM	55	30	38.00

# Standard Metric Bushings

## Plain Press Fit



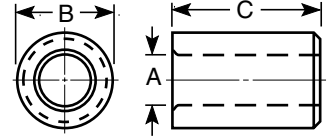
### Type PM



All press fit bushings are lapped, honed or ground in the I.D. and are concentric within .012 T.I.R. to the O.D.

Please order by providing the ANSI symbol and I.D. size. Example: 9mm I.D. X 15mm O.D. X 20mm Long Type PM, order as PM-15-20-9.00

No-Counterbore bushings are standard with Acme.



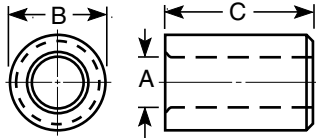
A Inside Diameter Range of Standard Drill Sizes	B Outside Diameter (Actual O.D.)	C Length Overall	ANSI Symbol Type "PM"
0.35 thru 1.00	4 (4.027 / 4.019)	6	PM-4-6
1.01 thru 1.80		9	PM-4-9
1.81 thru 2.60	5 (5.027 / 5.019)	6	PM-5-6
		9	PM-5-9
2.61 thru 3.30	6 (6.027 / 6.019)	8	PM-6-8
		12	PM-6-12
		16	PM-6-16
3.31 thru 4.00	7 (7.032 / 7.023)	8	PM-7-8
		12	PM-7-12
		16	PM-7-16
4.01 thru 5.00	8 (8.032 / 8.023)	8	PM-8-8
		12	PM-8-12
		16	PM-8-16
5.01 thru 6.00	10 (10.032 / 10.023)	10	PM-10-10
		16	PM-10-16
		20	PM-10-20
6.01 thru 8.00	12 (12.039 / 12.028)	10	PM-12-10
		16	PM-12-16
		20	PM-12-20
8.01 thru 10.00	15 (15.039 / 15.028)	12	PM-15-12
		20	PM-15-20
		25	PM-15-25
10.01 thru 12.00	18 (18.039 / 18.028)	12	PM-18-12
		20	PM-18-20
		25	PM-18-25
12.01 thru 15.00	22 (22.048 / 22.035)	16	PM-22-16
		28	PM-22-28
		36	PM-22-36
15.01 thru 18.00	26 (26.048 / 26.035)	16	PM-26-16
		28	PM-26-28
		36	PM-26-36
18.01 thru 22.00	30 (30.048 / 30.035)	20	PM-30-20
		36	PM-30-36
		45	PM-30-45
22.01 thru 26.00	35 (35.059 / 35.043)	20	PM-35-20
		36	PM-35-36
		45	PM-35-45

All dimensions are in millimeters.

Std. Metric Drill Sizes		
0.35	3.40	8.25
0.38	3.50	8.30
0.40	3.60	8.40
0.42	3.70	8.50
0.45	3.75	8.60
0.48	3.80	8.70
0.50	3.90	8.75
0.55	4.00	8.80
0.60	4.10	8.90
0.65	4.20	9.00
0.70	4.25	9.10
0.75	4.30	9.20
0.80	4.40	9.25
0.85	4.50	9.30
0.90	4.60	9.40
0.95	4.70	9.50
1.00	4.75	9.60
1.05	4.80	9.70
1.10	4.90	9.75
1.15	5.00	9.80
1.20	5.10	9.90
1.25	5.20	10.0
1.30	5.25	10.2
1.35	5.30	10.5
1.40	5.40	10.8
1.45	5.50	11.0
1.50	5.60	11.2
1.55	5.70	11.5
1.60	5.75	11.8
1.65	5.80	12.0
1.70	5.90	12.2
1.75	6.00	12.5
1.80	6.10	13.0
1.85	6.20	13.5
1.90	6.25	14.0
1.95	6.30	14.5
2.00	6.40	15.0
2.05	6.50	15.5
2.10	6.60	16.0
2.15	6.70	16.5
2.20	6.75	17.0
2.25	6.80	17.5
2.30	6.90	18.0
2.35	7.00	18.5
2.40	7.10	19.0
2.45	7.20	19.5
2.50	7.25	20.0
2.55	7.30	20.5
2.60	7.40	21.0
2.65	7.50	21.5
2.70	7.60	22.0
2.75	7.70	22.5
2.80	7.75	23.0
2.90	7.80	23.5
3.00	7.90	24.0
3.10	8.00	24.5
3.20	8.10	25.0
3.25	8.20	26.0
3.30		



# Standard Metric Bushings Plain Press Fit



I.D. Range (Drill Size)	Standard I.D. Tolerance (add to nominal I.D.)
0.35 to 3.00	+0.002 to +0.008
3.01 to 6.00	+0.004 to +0.012
6.01 to 10.00	+0.005 to +0.014
10.01 to 18.00	+0.006 to +0.017
18.01 to 30.00	+0.007 to +0.020
30.01 to 50.00	+0.009 to +0.025
50.01 to 80.00	+0.010 to +0.029
80.01 to 105.00	+0.012 to +0.034

Type PM



Std. Metric Drill Sizes
27.0
28.0
29.0
30.0
31.0
32.0
33.0
34.0
35.0
36.0
37.0
38.0
39.0
40.0
41.0
42.0
43.0
44.0
45.0
46.0
47.0
48.0
49.0
50.0
55.0
60.0
65.0
70.0
75.0
80.0
85.0
90.0
95.0
100.0
105.0

A Inside Diameter Range of Standard Drill Sizes	B Outside Diameter (Actual O.D.)	C Length Overall	ANSI Symbol Type "PM"
26.01 thru 30.00	42 (42.059 / 42.043)	25 45 56	PM-42-25 PM-42-45 PM-42-56
30.01 thru 35.00	48 (48.059 / 48.043)	25 45 56	PM-48-25 PM-48-45 PM-48-56
35.01 thru 42.00	55 (55.072 / 55.053)	30 56 67	PM-55-30 PM-55-56 PM-55-67
42.01 thru 48.00	62 (62.072 / 62.053)	30 56 67	PM-62-30 PM-62-56 PM-62-67
48.01 thru 55.00	70 (70.078 / 70.059)	30 56 67	PM-70-30 PM-70-56 PM-70-67
55.01 thru 63.00	78 (78.078 / 78.059)	35 67 78	PM-78-35 PM-78-67 PM-78-78
63.01 thru 70.00	85 (85.093 / 85.071)	35 67 78	PM-85-35 PM-85-67 PM-85-78
70.01 thru 78.00	95 (95.093 / 95.071)	40 78 105	PM-95-40 PM-95-78 PM-95-105
78.01 thru 85.00	105 (105.101 / 105.079)	40 78 105	PM-105-40 PM-105-78 PM-105-105
85.01 thru 95.00	115 (115.101 / 115.079)	45 89 112	PM-115-45 PM-115-89 PM-115-112
95.01 thru 105.00	125 (125.117 / 125.092)	45 89 112	PM-125-45 PM-125-89 PM-125-112

All dimensions are in millimeters.

**No-Counterbore (Full Bearing Surface) Bushings are Standard at ACME.**

# Standard Metric Bushings

## Head Press Fit



### Type HM

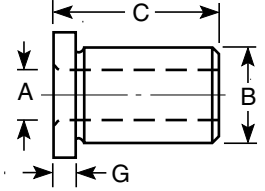
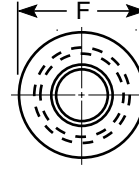


All press fit bushings are lapped, honed or ground in the I.D. and are concentric within .012 T.I.R. to the O.D.

Please order by providing the ANSI symbol and I.D. size. Example: 9mm I.D. X 15mm O.D. X 20mm Long Type HM, order as HM-15-20-9.00

No-Counterbore bushings are standard with Acme.

Please note that the length on type "HM" bushings is measured overall.



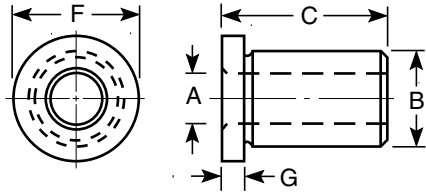
A Inside Diameter Range of Standard Drill Sizes	B Outside Diameter (Actual O.D.)	C Length Overall	ANSI Symbol Type "HM"	Head Dimensions	
				F	G
0.35 thru 1.00	4 (4.027 / 4.019)	6	HM-4-6	7	2.0
1.01 thru 1.80		9	HM-4-9		
1.81 thru 2.60	5 (5.027 / 5.019)	6	HM-5-6	8	2.0
		9	HM-5-9		
2.61 thru 3.30	6 (6.027 / 6.019)	8	HM-6-8	9	2.5
		12	HM-6-12		
		16	HM-6-16		
3.31 thru 4.00	7 (7.032 / 7.023)	8	HM-7-8	10	2.5
		12	HM-7-12		
		16	HM-7-16		
4.01 thru 5.00	8 (8.032 / 8.023)	8	HM-8-8	11	2.5
		12	HM-8-12		
		16	HM-8-16		
5.01 thru 6.00	10 (10.032 / 10.023)	10	HM-10-10	13	3.0
		16	HM-10-16		
		20	HM-10-20		
6.01 thru 8.00	12 (12.039 / 12.028)	10	HM-12-10	15	3.0
		16	HM-12-16		
		20	HM-12-20		
8.01 thru 10.00	15 (15.039 / 15.028)	12	HM-15-12	18	3.0
		20	HM-15-20		
		25	HM-15-25		
10.01 thru 12.00	18 (18.039 / 18.028)	12	HM-18-12	22	4.0
		20	HM-18-20		
		25	HM-18-25		
12.01 thru 15.00	22 (22.048 / 22.035)	16	HM-22-16	26	4.0
		28	HM-22-28		
		36	HM-22-36		
15.01 thru 18.00	26 (26.048 / 26.035)	16	HM-26-16	30	4.0
		28	HM-26-28		
		36	HM-26-36		
18.01 thru 22.00	30 (30.048 / 30.035)	20	HM-30-20	34	5.0
		36	HM-30-36		
		45	HM-30-45		
22.01 thru 26.00	35 (35.059 / 35.043)	20	HM-35-20	39	5.0
		36	HM-35-36		
		45	HM-35-45		

Std. Metric Drill Sizes		
0.35	3.40	8.25
0.38	3.50	8.30
0.40	3.60	8.40
0.42	3.70	8.50
0.45	3.75	8.60
0.48	3.80	8.70
0.50	3.90	8.75
0.55	4.00	8.80
0.60	4.10	8.90
0.65	4.20	9.00
0.70	4.25	9.10
0.75	4.30	9.20
0.80	4.40	9.25
0.85	4.50	9.30
0.90	4.60	9.40
0.95	4.70	9.50
1.00	4.75	9.60
1.05	4.80	9.70
1.10	4.90	9.75
1.15	5.00	9.80
1.20	5.10	9.90
1.25	5.20	10.0
1.30	5.25	10.2
1.35	5.30	10.5
1.40	5.40	10.8
1.45	5.50	11.0
1.50	5.60	11.2
1.55	5.70	11.5
1.60	5.75	11.8
1.65	5.80	12.0
1.70	5.90	12.2
1.75	6.00	12.5
1.80	6.10	13.0
1.85	6.20	13.5
1.90	6.25	14.0
1.95	6.30	14.5
2.00	6.40	15.0
2.05	6.50	15.5
2.10	6.60	16.0
2.15	6.70	16.5
2.20	6.75	17.0
2.25	6.80	17.5
2.30	6.90	18.0
2.35	7.00	18.5
2.40	7.10	19.0
2.45	7.20	19.5
2.50	7.25	20.0
2.55	7.30	20.5
2.60	7.40	21.0
2.65	7.50	21.5
2.70	7.60	22.0
2.75	7.70	22.5
2.80	7.75	23.0
2.90	7.80	23.5
3.00	7.90	24.0
3.10	8.00	24.5
3.20	8.10	25.0
3.25	8.20	26.0
3.30		

All dimensions are in millimeters.



# Standard Metric Bushings Head Press Fit



I.D. Range (Drill Size)	Standard I.D. Tolerance (add to nominal I.D.)
0.35 to 3.00	+0.002 to +0.008
3.01 to 6.00	+0.004 to +0.012
6.01 to 10.00	+0.005 to +0.014
10.01 to 18.00	+0.006 to +0.017
18.01 to 30.00	+0.007 to +0.020
30.01 to 50.00	+0.009 to +0.025
50.01 to 80.00	+0.010 to +0.029
80.01 to 105.00	+0.012 to +0.034

Type HM



Std. Metric Drill Sizes
27.0
28.0
29.0
30.0
31.0
32.0
33.0
34.0
35.0
36.0
37.0
38.0
39.0
40.0
41.0
42.0
43.0
44.0
45.0
46.0
47.0
48.0
49.0
50.0
55.0
60.0
65.0
70.0
75.0
80.0
85.0
90.0
95.0
100.0
105.0

A Inside Diameter Range of Standard Drill Sizes	B Outside Diameter (Actual O.D.)	C Length Overall	ANSI Symbol Type "HM"	Head Dimensions	
				F	G
26.01 thru 30.00	42 (42.059 / 42.043)	25 45 56	HM-42-25 HM-42-45 HM-42-56	46	5.0
30.01 thru 35.00	48 (48.059 / 48.043)	25 45 56	HM-48-25 HM-48-45 HM-48-56	52	5.0
35.01 thru 42.00	55 (55.072 / 55.053)	30 56 67	HM-55-30 HM-55-56 HM-55-67	59	5.0
42.01 thru 48.00	62 (62.072 / 62.053)	30 56 67	HM-62-30 HM-62-56 HM-62-67	66	6.0
48.01 thru 55.00	70 (70.078 / 70.059)	30 56 67	HM-70-30 HM-70-56 HM-70-67	74	6.0
55.01 thru 63.00	78 (78.078 / 78.059)	35 67 78	HM-78-35 HM-78-67 HM-78-78	82	6.0
63.01 thru 70.00	85 (85.093 / 85.071)	35 67 78	HM-85-35 HM-85-67 HM-85-78	90	6.0
70.01 thru 78.00	95 (95.093 / 95.071)	40 78 105	HM-95-40 HM-95-78 HM-95-105	100	6.0
78.01 thru 85.00	105 (105.101 / 105.079)	40 78 105	HM-105-40 HM-105-78 HM-105-105	110	6.0
85.01 thru 95.00	115 (115.101 / 115.079)	45 89 112	HM-115-45 HM-115-89 HM-115-112	120	6.0
95.01 thru 105.00	125 (125.117 / 125.092)	45 89 112	HM-125-45 HM-125-89 HM-125-112	130	6.0

All dimensions are in millimeters.

**No-Counterbore (Full Bearing Surface) Bushings are Standard at ACME.**

# Standard Metric Bushings

## Slip-Fixed Renewable



### Type SFM

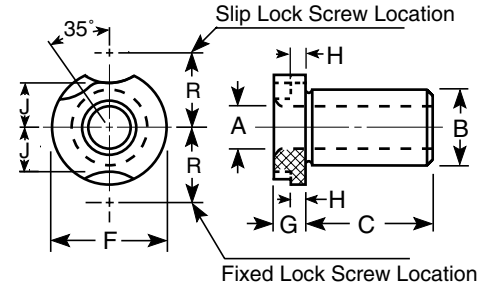


All type "SFM" bushings are lapped, honed or ground in the I.D. and are concentric within .012 T.I.R. to the O.D. A slip fit clearance is provided for proper alignment when inserted into a liner.

Please order by providing the ANSI symbol and I.D. size. Example: 8.5 mm I.D. X 15 mm O.D. X 28 mm Long Type SFM, order as SFM-15-28-8.50

No-Counterbore bushings are standard with Acme.

Please note that the length on type "SFM" bushings is measured under the head.



A Inside Diameter Range of Standard Drill Sizes	B Outside Diameter (Actual O.D.)	C Length Under Head	ANSI Symbol Type "SFM"	Head Dimensions					Lock Screws and Clamps
				F	G	H	J	R	
0.35 thru 1.00	8 (8.000 / 7.994)	10 16	SFM-8-10 SFM-8-16	15	6	3.0	4.5	11.5	LSM-1 or 2 RCM-1 or 2
1.01 thru 1.80									
1.81 thru 4.00									
4.01 thru 6.00	10 (10.000 / 9.994)	12 20 25	SFM-10-12 SFM-10-20 SFM-10-25	18	6	3.0	6.0	13.0	LSM-1 or 2 RCM-1 or 2
6.01 thru 8.00									
8.01 thru 10.00	15 (15.000 / 14.992)	16 28 36	SFM-15-16 SFM-15-28 SFM-15-36	26	8	4.0	9.5	18.0	LSM-3 or 4 RCM-3 or 4
10.01 thru 12.00									
12.01 thru 15.00									
15.01 thru 18.00	26 (26.000 / 25.991)	20 36 45	SFM-26-20 SFM-26-36 SFM-26-45	39	10	5.5	15.5	26.0	LSM-5 or 6 RCM-5 or 6
18.01 thru 22.00									
22.01 thru 26.00									
26.01 thru 30.00	42 (42.000 / 41.989)	30 56 67	SFM-42-30 SFM-42-56 SFM-42-67	59	10	5.5	25.5	36.0	LSM-5 or 6 RCM-5 or 6
30.01 thru 35.00									

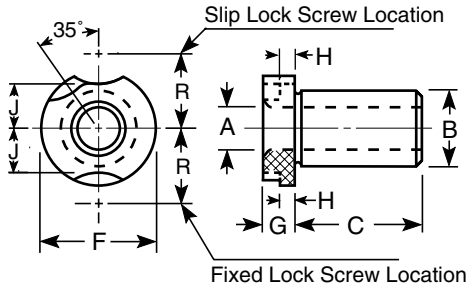
Std. Metric Drill Sizes		
0.35	3.70	8.75
0.38	3.75	8.80
0.40	3.80	8.90
0.42	3.90	9.00
0.45	4.00	9.10
0.48	4.10	9.20
0.50	4.20	9.25
0.55	4.25	9.30
0.60	4.30	9.40
0.65	4.40	9.50
0.70	4.50	9.60
0.75	4.60	9.70
0.80	4.70	9.75
0.85	4.75	9.80
0.90	4.80	9.90
0.95	4.90	10.0
1.00	5.00	10.2
1.05	5.10	10.5
1.10	5.20	10.8
1.15	5.25	11.0
1.20	5.30	11.2
1.25	5.40	11.5
1.30	5.50	11.8
1.35	5.60	12.0
1.40	5.70	12.2
1.45	5.75	12.5
1.50	5.80	13.0
1.55	5.90	13.5
1.60	6.00	14.0
1.65	6.10	14.5
1.70	6.20	15.0
1.75	6.25	15.5
1.80	6.30	16.0
1.85	6.40	16.5
1.90	6.50	17.0
1.95	6.60	17.5
2.00	6.70	18.0
2.05	6.75	18.5
2.10	6.80	19.0
2.15	6.90	19.5
2.20	7.00	20.0
2.25	7.10	20.5
2.30	7.20	21.0
2.35	7.25	21.5
2.40	7.30	22.0
2.45	7.40	22.5
2.50	7.50	23.0
2.55	7.60	23.5
2.60	7.70	24.0
2.65	7.75	24.5
2.70	7.80	25.0
2.75	7.90	26.0
2.80	8.00	27.0
2.90	8.10	28.0
3.00	8.20	29.0
3.10	8.25	30.0
3.20	8.30	31.0
3.25	8.40	32.0
3.30	8.50	33.0
3.40	8.60	34.0
3.50	8.70	35.0
3.60		

All dimensions are in millimeters.





# Standard Metric Bushings Slip-Fixed Renewable



I.D. Range (Drill Size)	Standard I.D. Tolerance (add to nominal I.D.)
0.35 to 3.00	+0.002 to +0.008
3.01 to 6.00	+0.004 to +0.012
6.01 to 10.00	+0.005 to +0.014
10.01 to 18.00	+0.006 to +0.017
18.01 to 30.00	+0.007 to +0.020
30.01 to 50.00	+0.009 to +0.025
50.01 to 80.00	+0.010 to +0.029
80.01 to 105.00	+0.012 to +0.034

## Type SFM



Std. Metric Drill Sizes
36.0
37.0
38.0
39.0
40.0
41.0
42.0
43.0
44.0
45.0
46.0
47.0
48.0
49.0
50.0
55.0
60.0
65.0
70.0
75.0
80.0
85.0
90.0
95.0
100.0
105.0

A Inside Diameter Range of Standard Drill Sizes	B Outside Diameter (Actual O.D.)	C Length Under Head	ANSI Symbol Type "SFM"	Head Dimensions					Lock Screws and Clamps
				F	G	H	J	R	
35.01 thru 42.00	55 (55.000 / 54.987)	30 56 67	SFM-55-30 SFM-55-56 SFM-55-67	74	12	7.0	32.5	45.0	LSM-7 or 8 RCM-7 or 8
42.01 thru 48.00	62 (62.000 / 61.987)	35 67 78	SFM-62-35 SFM-62-67 SFM-62-78	82	12	7.0	36.5	49.0	LSM-7 or 8 RCM-7 or 8
48.01 thru 55.00	70 (70.000 / 69.987)	35 67 78	SFM-70-35 SFM-70-67 SFM-70-78	90	12	7.0	40.5	53.0	LSM-7 or 8 RCM-7 or 8
55.01 thru 62.00	78 (78.000 / 77.987)	40 78 105	SFM-78-40 SFM-78-78 SFM-78-105	100	12	7.0	45.5	58.0	LSM-7 or 8 RCM-7 or 8
62.01 thru 70.00	85 (85.000 / 84.985)	40 78 105	SFM-85-40 SFM-85-78 SFM-85-105	110	12	7.0	50.5	63.0	LSM-7 or 8 RCM-7 or 8
70.01 thru 78.00	95 (95.000 / 94.985)	45 89 112	SFM-95-45 SFM-95-89 SFM-95-112	120	12	7.0	55.5	68.0	LSM-7 or 8 RCM-7 or 8
78.01 thru 85.00	105 (105.000 / 104.985)	45 89 112	SFM-105-45 SFM-105-89 SFM-105-112	130	12	7.0	60.5	73.0	LSM-7 or 8 RCM-7 or 8

All dimensions are in millimeters.

**No-Counterbore (Full Bearing Surface) Bushings are Standard at ACME.**

# Standard Metric Bushings

## Plain Liners



### Type PM

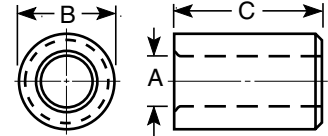


All liners are honed or ground in the I.D. and are concentric within .012 T.I.R. to the O.D.

Please order by providing the ANSI symbol and I.D. size. Example: 15mm I.D. X 22mm O.D. X 28mm Long Type PM, order as PM-22-28-15.00

No-Counterbore bushings are standard with Acme.

Plain Liners are dimensionally the same as Plain Press Fit Bushings so they both have the same type "PM" designation. Some catalogs may refer to Plain Liners as type "LM".

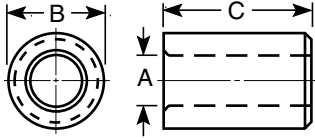


A Inside Diameter (Actual I.D.)	B Outside Diameter (Actual O.D.)	C Length Overall	ANSI Symbol Type "PM"
8.00 (8.005 / 8.014)	12 (12.039 / 12.028)	10 16	PM-12-10-8.00 PM-12-16-8.00
10.00 (10.005 / 10.014)	15 (15.039 / 15.028)	12 20 25	PM-15-12-10.00 PM-15-20-10.00 PM-15-25-10.00
12.00 (12.006 / 12.017)	18 (18.039 / 18.028)	12 20 25	PM-18-12-12.00 PM-18-20-12.00 PM-18-25-12.00
15.00 (15.006 / 15.017)	22 (22.048 / 22.035)	16 28 36	PM-22-16-15.00 PM-22-28-15.00 PM-22-36-15.00
18.00 (18.006 / 18.017)	26 (26.048 / 26.035)	16 28 36	PM-26-16-18.00 PM-26-28-18.00 PM-26-36-18.00
22.00 (22.007 / 22.020)	30 (30.048 / 30.035)	20 36 45	PM-30-20-22.00 PM-30-36-22.00 PM-30-45-22.00
26.00 (26.007 / 26.020)	35 (35.059 / 35.043)	20 36 45	PM-35-20-26.00 PM-35-36-26.00 PM-35-45-26.00
30.00 (30.007 / 30.020)	42 (42.059 / 42.043)	25 45 56	PM-42-25-30.00 PM-42-45-30.00 PM-42-56-30.00
35.00 (35.009 / 35.025)	48 (48.059 / 48.043)	25 45 56	PM-48-25-35.00 PM-48-45-35.00 PM-48-56-35.00
42.00 (42.009 / 42.025)	55 (55.072 / 55.053)	30 56 67	PM-55-30-42.00 PM-55-56-42.00 PM-55-67-42.00
48.00 (48.009 / 48.025)	62 (62.072 / 62.053)	30 56 67	PM-62-30-48.00 PM-62-56-48.00 PM-62-67-48.00

All dimensions are in millimeters.



# Standard Metric Bushings Plain Liners



Plain Liners are dimensionally the same as Plain Press Fit Bushings so they both have the same type “PM” designation. Some catalogs may refer to Plain Liners as type “LM”.

## Type PM



A Inside Diameter (Actual I.D.)	B Outside Diameter (Actual O.D.)	C Length Overall	ANSI Symbol Type “PM”
55.00 (55.010 / 55.029)	70 (70.078 / 70.059)	30 56 67	PM-70-30-55.00 PM-70-56-55.00 PM-70-67-55.00
62.00 (62.010 / 62.029)	78 (78.078 / 78.059)	35 67 78	PM-78-35-62.00 PM-78-67-62.00 PM-78-78-62.00
70.00 (70.010 / 70.029)	85 (85.093 / 85.071)	35 67 78	PM-85-35-70.00 PM-85-67-70.00 PM-85-78-70.00
78.00 (78.010 / 78.029)	95 (95.093 / 95.071)	40 78 105	PM-95-40-78.00 PM-95-78-78.00 PM-95-105-78.00
85.00 (85.012 / 85.034)	105 (105.101 / 105.079)	40 78 105	PM-105-40-85.00 PM-105-78-85.00 PM-105-105-85.00
95.00 (95.012 / 95.034)	115 (115.101 / 115.079)	45 89 112	PM-115-45-95.00 PM-115-89-95.00 PM-115-112-95.00
105.00 (105.012 / 105.034)	125 (125.117 / 125.092)	45 89 112	PM-125-45-105.00 PM-125-89-105.00 PM-125-112-105.00

All dimensions are in millimeters.

**No-Counterbore (Full Bearing Surface) Bushings are Standard at ACME.**

# Standard Metric Bushings Head Liners



## Type HM

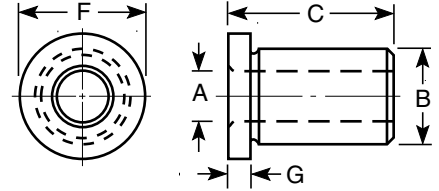


All Head Liners are honed or ground in the I.D. and are concentric within .012 T.I.R. to the O.D.

Please order by providing the ANSI symbol and I.D. size. Example: 18mm I.D. X 26mm O.D. X 16mm Long Type HM, order as HM-26-16-18.00

No-Counterbore bushings are standard with Acme.

Head Liners are dimensionally the same as Head Press Fit Bushings so they both have the same type "HM" designation. Some catalogs may refer to Head Liners as type "HLM".

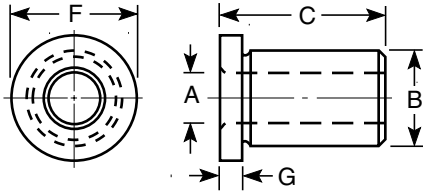


A Inside Diameter (Actual I.D.)	B Outside Diameter (Actual O.D.)	C Length Overall	ANSI Symbol Type "HM"	Head Dimensions	
				F	G
8 (8.005 / 8.014)	12 (12.039 / 12.028)	10 16	HM-12-10-8.00 HM-12-16-8.00	15	3.0
10 (10.005 / 10.014)	15 (15.039 / 15.028)	12 20 25	HM-15-12-10.00 HM-15-20-10.00 HM-15-25-10.00	18	3.0
12 (12.006 / 12.017)	18 (18.039 / 18.028)	12 20 25	HM-18-12-12.00 HM-18-20-12.00 HM-18-25-12.00	22	4.0
15 (15.006 / 15.017)	22 (22.048 / 22.035)	16 28 36	HM-22-16-15.00 HM-22-28-15.00 HM-22-36-15.00	26	4.0
18 (18.006 / 18.017)	26 (26.048 / 26.035)	16 28 36	HM-26-16-18.00 HM-26-28-18.00 HM-26-36-18.00	30	4.0
22 (22.007 / 22.020)	30 (30.048 / 30.035)	20 36 45	HM-30-20-22.00 HM-30-36-22.00 HM-30-45-22.00	34	5.0
26 (26.007 / 26.020)	35 (35.059 / 35.043)	20 36 45	HM-35-20-26.00 HM-35-36-26.00 HM-35-45-26.00	39	5.0
30 (30.007 / 30.020)	42 (42.059 / 42.043)	25 45 56	HM-42-25-30.00 HM-42-45-30.00 HM-42-56-30.00	46	5.0
35 (35.009 / 35.025)	48 (48.059 / 48.043)	25 45 56	HM-48-25-35.00 HM-48-45-35.00 HM-48-56-35.00	52	5.0
42 (42.009 / 42.025)	55 (55.072 / 55.053)	30 56 67	HM-55-30-42.00 HM-55-56-42.00 HM-55-67-42.00	59	5.0
48 (48.009 / 48.025)	62 (62.072 / 62.053)	30 56 67	HM-62-30-48.00 HM-62-56-48.00 HM-62-67-48.00	66	6.0

All dimensions are in millimeters.



# Standard Metric Bushings Head Liners



Head Liners are dimensionally the same as Head Press Fit Bushings so they both have the same type designation "HM". Some catalogs may refer to Head Liners as type "HLM". Please note that the length on type "HM" bushings and liners is measured overall.

## Type HM



A Inside Diameter Range of Standard Drill Sizes	B Outside Diameter (Actual O.D.)	C Length Overall	ANSI Symbol Type "HM"	Head Dimensions	
				F	G
55 (55.010 / 55.029)	70 (70.078 / 70.059)	30 56 67	HM-70-30-55.00 HM-70-56-55.00 HM-70-67-55.00	74	6.0
62 (62.010 / 62.029)	78 (78.078 / 78.059)	35 67 78	HM-78-35-62.00 HM-78-67-62.00 HM-78-78-62.00	82	6.0
70 (70.010 / 70.029)	85 (85.093 / 85.071)	35 67 78	HM-85-35-70.00 HM-85-67-70.00 HM-85-78-70.00	90	6.0
78 (78.010 / 78.029)	95 (95.093 / 95.071)	40 78 105	HM-95-40-78.00 HM-95-78-78.00 HM-95-105-78.00	100	6.0
85 (85.012 / 85.034)	105 (105.101 / 105.079)	40 78 105	HM-105-40-85.00 HM-105-78-85.00 HM-105-105-85.00	110	6.0
95 (95.012 / 95.034)	115 (115.101 / 115.079)	45 89 112	HM-115-45-95.00 HM-115-89-95.00 HM-115-112-95.00	120	6.0
105 (105.012 / 105.034)	125 (125.117 / 125.092)	45 89 112	HM-125-45-105.00 HM-125-89-105.00 HM-125-112-105.00	130	6.0

All dimensions are in millimeters.

**No-Counterbore (Full Bearing Surface) Bushings are Standard at ACME.**

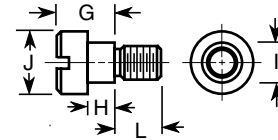
# Standard Metric Lockscrews & Clamps



## Lock Screws

### Standard Mounting

Symbol	G	H	I	J	L	Thread
LSM-1	6	3.0	7.5	13	9	M5x0.8
LSM-3	8	4.0	9.5	16	10	M6x1.0
LSM-5	10	5.5	12.0	20	12	M8x1.25
LSM-7	12	7.0	15.0	24	20	M10x1.5



### Projected Mounting

Symbol	G	H	I	J	L	Thread
LSM-2	9	6.0	7.5	13	9	M5x0.8
LSM-4	12	8.0	9.5	16	10	M6x1.0
LSM-6	15	10.5	12.0	20	12	M8x1.25
LSM-8	18	13.0	15.0	24	20	M10x1.5

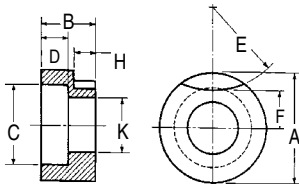
All dimensions are in millimeters.



## Round Clamps

### Standard Mounting

Symbol	A	B	C	D	E	F	H	K	Used With Thread
RCM-1	13	8	10	4	9.5	3.7	3.0	5.4	M5x0.8
RCM-3	16	10	12	5	15.0	4.7	4.0	6.4	M6x1.0
RCM-5	20	12	15	5	30.0	6.2	5.5	8.4	M8x1.25
RCM-7	24	16	18	7	80.0	7.5	7.0	10.5	M10x1.5



### Projected Mounting

Symbol	A	B	C	D	E	F	H	K	Used With Thread
RCM-2	13	11	10	4	9.5	3.7	6.0	5.4	M5x0.8
RCM-4	16	14	12	5	15.0	4.7	8.0	6.4	M6x1.0
RCM-6	20	17	15	5	30.0	6.2	10.5	8.4	M8x1.25
RCM-8	24	22	18	7	80.0	7.5	13.0	10.5	M10x1.5

All dimensions are in millimeters.

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# DECIMAL CONVERSION CHART

## Decimal Equivalents of Fraction, Wire, and Letter Sizes

Size	Decimal	Size	Decimal	Size	Decimal	Size	Decimal	Size	Decimal	Size	Decimal
80.....	.0135	5/64.....	.0781	17.....	.1730	N.....	.3020	11/16.....	.6875	1-17/64.....	1.2656
79.....	.0145	47.....	.0785	16.....	.1770	5/16.....	.3125	45/64.....	.7031	1-9/32.....	1.2812
1/64.....	.0156	46.....	.0810	15.....	.1800	O.....	.3160	23/32.....	.7188	1-19/64.....	1.2969
78.....	.0160	45.....	.0820	14.....	.1820	P.....	.3230	47/64.....	.7344	1-5/16.....	1.3125
77.....	.0180	44.....	.0860	13.....	.1850	21/64.....	.3281	3/4.....	.7500	1-21/64.....	1.3281
76.....	.0200	43.....	.0890	3/16.....	.1875	Q.....	.3320	49/64.....	.7656	1-11/32.....	1.3438
75.....	.0210	42.....	.0935	12.....	.1890	R.....	.3390	25/32.....	.7812	1-23/64.....	1.3594
74.....	.0225	3/32.....	.0938	11.....	.1910	11/32.....	.3438	51/64.....	.7969	1-3/8.....	1.3750
73.....	.0240	41.....	.0960	10.....	.1935	S.....	.3480	13/16.....	.8125	1-25/64.....	1.3906
72.....	.0250	40.....	.0980	9.....	.1960	T.....	.3580	53/64.....	.8281	1-13/32.....	1.4062
71.....	.0260	39.....	.0995	8.....	.1990	23/64.....	.3594	27/32.....	.8438	1-27/64.....	1.4219
70.....	.0280	38.....	.1015	7.....	.2010	U.....	.3680	55/64.....	.8594	1-7/16.....	1.4375
69.....	.0292	37.....	.1040	13/64.....	.2031	3/8.....	.3750	7/8.....	.8750	1-29/64.....	1.4531
68.....	.0310	36.....	.1065	6.....	.2040	V.....	.3770	57/64.....	.8906	1-15/32.....	1.4688
1/32.....	.0312	7/64.....	.1094	5.....	.2055	W.....	.3860	29/32.....	.9062	1-31/64.....	1.4844
67.....	.0320	35.....	.1100	4.....	.2090	25/64.....	.3906	59/64.....	.9219	1-1/2.....	1.5000
66.....	.0330	34.....	.1110	3.....	.2130	X.....	.3970	15/16.....	.9375	1-33/64.....	1.5156
65.....	.0350	33.....	.1130	7/32.....	.2188	Y.....	.4040	61/64.....	.9531	1-17/32.....	1.5312
64.....	.0360	32.....	.1160	2.....	.2210	13/32.....	.4062	31/32.....	.9688	1-35/64.....	1.5469
63.....	.0370	31.....	.1200	1.....	.2280	Z.....	.4130	63/64.....	.9844	1-9/16.....	1.5625
62.....	.0380	1/8.....	.1250	A.....	.2340	27/64.....	.4219	1".....	1.0000	1-37/64.....	1.5781
61.....	.0390	30.....	.1285	15/64.....	.2344	7/16.....	.4375	1-1/64.....	1.0156	1-19/32.....	1.5938
60.....	.0400	29.....	.1360	B.....	.2380	29/64.....	.4531	1-1/32.....	1.0312	1-39/64.....	1.6094
59.....	.0410	28.....	.1405	C.....	.2420	15/32.....	.4688	1-3/64.....	1.0469	1-5/8.....	1.6250
58.....	.0420	9/64.....	.1406	D.....	.2460	31/64.....	.4844	1-1/16.....	1.0625	1-41/64.....	1.6406
57.....	.0430	27.....	.1440	1/4.....	.2500	1/2.....	.5000	1-5/64.....	1.0781	1-21/32.....	1.6562
56.....	.0465	26.....	.1470	F.....	.2570	33/64.....	.5156	1-3/32.....	1.0938	1-43/64.....	1.6719
3/64.....	.0469	25.....	.1495	G.....	.2610	17/32.....	.5312	1-7/64.....	1.1094	1-11/16.....	1.6875
55.....	.0520	24.....	.1520	17/64.....	.2656	35/64.....	.5469	1-1/8.....	1.1250	1-45/64.....	1.7031
54.....	.0550	23.....	.1540	H.....	.2660	9/16.....	.5625	1-9/64.....	1.1406	1-23/32.....	1.7188
53.....	.0595	5/32.....	.1562	I.....	.2720	37/64.....	.5781	1-5/32.....	1.1562	1-47/64.....	1.7344
1/16.....	.0625	22.....	.1570	J.....	.2770	19/32.....	.5938	1-11/64.....	1.1719	1-3/4.....	1.7500
52.....	.0635	21.....	.1590	K.....	.2810	39/64.....	.6094	1-3/16.....	1.1875	2-1/4.....	2.2500
51.....	.0670	20.....	.1610	9/32.....	.2812	5/8.....	.6250	1-13/64.....	1.2031		
50.....	.0700	19.....	.1660	L.....	.2900	41/64.....	.6406	1-7/32.....	1.2188		
49.....	.0730	18.....	.1695	M.....	.2950	21/32.....	.6562	1-15/64.....	1.2344		
48.....	.0760	11/64.....	.1719	19/64.....	.2969	43/64.....	.6719	1-1/4.....	1.2500		

## Decimal Equivalents of Millimeter Sizes

mm	Decimal	mm	Decimal	mm	Decimal	mm	Decimal	mm	Decimal	mm	Decimal
.35.....	.0138	1.95.....	.0768	4.30.....	.1693	7.25.....	.2854	10.50.....	.4134	27.00.....	1.0630
.38.....	.0150	2.00.....	.0787	4.40.....	.1732	7.30.....	.2874	10.80.....	.4252	28.00.....	1.1024
.40.....	.0157	2.05.....	.0807	4.50.....	.1772	7.40.....	.2913	11.00.....	.4331	29.00.....	1.1417
.42.....	.0165	2.10.....	.0827	4.60.....	.1811	7.50.....	.2953	11.20.....	.4409	30.00.....	1.1811
.45.....	.0177	2.15.....	.0846	4.70.....	.1850	7.60.....	.2992	11.50.....	.4528	31.00.....	1.2205
.48.....	.0189	2.20.....	.0866	4.75.....	.1870	7.70.....	.3031	11.80.....	.4646	32.00.....	1.2598
.50.....	.0197	2.25.....	.0886	4.80.....	.1890	7.75.....	.3051	12.00.....	.4724	33.00.....	1.2992
.55.....	.0217	2.30.....	.0906	4.90.....	.1929	7.80.....	.3071	12.20.....	.4803	34.00.....	1.3386
.60.....	.0236	2.35.....	.0925	5.00.....	.1969	7.90.....	.3110	12.50.....	.4921	35.00.....	1.3780
.65.....	.0256	2.40.....	.0945	5.10.....	.2008	8.00.....	.3150	13.00.....	.5118	36.00.....	1.4173
.70.....	.0276	2.45.....	.0965	5.20.....	.2047	8.10.....	.3189	13.50.....	.5315	37.00.....	1.4567
.75.....	.0295	2.50.....	.0984	5.25.....	.2067	8.20.....	.3228	14.00.....	.5512	38.00.....	1.4961
.80.....	.0315	2.55.....	.1004	5.30.....	.2087	8.25.....	.3248	14.50.....	.5709	39.00.....	1.5354
.85.....	.0335	2.60.....	.1024	5.40.....	.2126	8.30.....	.3268	15.00.....	.5906	40.00.....	1.5748
.90.....	.0354	2.65.....	.1043	5.50.....	.2165	8.40.....	.3307	15.50.....	.6102	41.00.....	1.6142
.95.....	.0374	2.70.....	.1063	5.60.....	.2205	8.50.....	.3346	16.00.....	.6299	42.00.....	1.6535
1.00.....	.0394	2.75.....	.1083	5.70.....	.2244	8.60.....	.3386	16.50.....	.6496	43.00.....	1.6929
1.05.....	.0413	2.80.....	.1102	5.75.....	.2264	8.70.....	.3425	17.00.....	.6693	44.00.....	1.7323
1.10.....	.0433	2.90.....	.1142	5.80.....	.2283	8.75.....	.3445	17.50.....	.6890	45.00.....	1.7717
1.15.....	.0453	3.00.....	.1181	5.90.....	.2323	8.80.....	.3465	18.00.....	.7087	46.00.....	1.8110
1.20.....	.0472	3.10.....	.1220	6.00.....	.2362	8.90.....	.3504	18.50.....	.7283	47.00.....	1.8504
1.25.....	.0492	3.20.....	.1260	6.10.....	.2402	9.00.....	.3543	19.00.....	.7480	48.00.....	1.8898
1.30.....	.0512	3.25.....	.1280	6.20.....	.2441	9.10.....	.3583	19.50.....	.7677	49.00.....	1.9291
1.35.....	.0531	3.30.....	.1299	6.25.....	.2461	9.20.....	.3622	20.00.....	.7874	50.00.....	1.9685
1.40.....	.0551	3.40.....	.1339	6.30.....	.2480	9.25.....	.3642	20.50.....	.8071	55.00.....	2.1654
1.45.....	.0571	3.50.....	.1378	6.40.....	.2520	9.30.....	.3661	21.00.....	.8268	60.00.....	2.3622
1.50.....	.0591	3.60.....	.1417	6.50.....	.2559	9.40.....	.3701	21.50.....	.8465	65.00.....	2.5591
1.55.....	.0610	3.70.....	.1457	6.60.....	.2598	9.50.....	.3740	22.00.....	.8661	70.00.....	2.7559
1.60.....	.0630	3.75.....	.1476	6.70.....	.2638	9.60.....	.3780	22.50.....	.8858	75.00.....	2.9528
1.65.....	.0650	3.80.....	.1496	6.75.....	.2657	9.70.....	.3819	23.00.....	.9055	80.00.....	3.1496
1.70.....	.0669	3.90.....	.1535	6.80.....	.2677	9.75.....	.3839	23.50.....	.9252	85.00.....	3.3465
1.75.....	.0689	4.00.....	.1575	6.90.....	.2717	9.80.....	.3858	24.00.....	.9449	90.00.....	3.5433
1.80.....	.0709	4.10.....	.1614	7.00.....	.2756	9.90.....	.3898	24.50.....	.9646	95.00.....	3.7402
1.85.....	.0728	4.20.....	.1654	7.10.....	.2795	10.00.....	.3937	25.00.....	.9843	100.00.....	3.9370
1.90.....	.0748	4.25.....	.1673	7.20.....	.2835	10.20.....	.4016	26.00.....	1.0236	105.00.....	4.1339



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